



Building
Management

RICCIUS + SOHN
PRICELIST 2008



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Alphabetical Directory

**Electronic Controllers and
Control Systems**

Sensors

**Remote Setpoint potentiometer
and Remote Operating Units**

**Actuators, Valves, Flipper Valves,
Butterfly Valves, Consoles, Zone Valves
and Accessories**

Time Switches, Operating Hour Meters

Thermostates, Hygrostats, Pressure-stats

Pumps

**Heat Meters, Volume Metric Flow
Meters, Water Meters, Electric Meters,
Gas Meters, M-Bus Components**

**Tools to select the right Components
(Valves, Pumps, Meters etc.)**

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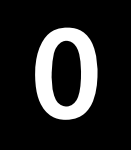
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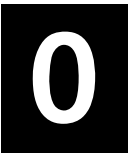
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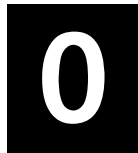
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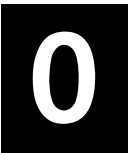
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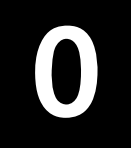
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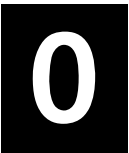
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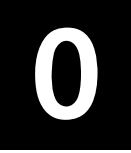
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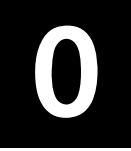
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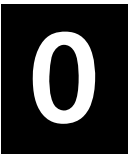


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| 2MVP-B 25-208 | P1014 2230 | C | 2.781,- | 131 | 2NBPD 32/210BE | P1014 2614 | C | 5.368,- | 132 |
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| 2MVP-B 40-806-VMT | P1014 1430 | C | 4.340,- | 130 | 3MVP 65-3205 | P1014 2546 | C | 18.970,- | 132 |
| 2MVP-B 40-806-VTT | P1014 1460 | C | 5.470,- | 130 | 3MVP 80-4802 | P1014 2548 | C | 18.053,- | 132 |
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| 2MVP-BM 25-205 | P1014 2204 | C | 2.385,- | 131 | 3MVP 80-4804 | P1014 2552 | C | 22.255,- | 132 |
| 2MVP-BM 25-206 | P1014 2206 | C | 2.486,- | 131 | 3MVP 80-4805 | P1014 2554 | C | 24.185,- | 132 |
| 2MVP-BM 25-207 | P1014 2208 | C | 2.536,- | 131 | 3MVP-B 25-204 | P1014 2302 | C | 4.298,- | 131 |
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| 2MVP-BM 32-405 | P1014 2214 | C | 2.530,- | 131 | 3MVP-B 25-207 | P1014 2308 | C | 4.611,- | 131 |
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| 2NBP 50/16AE | P1014 2640 | C | 6.950,- | 132 | 3NBP 50M/DE | P1014 2730 | C | 16.733,- | 133 |
| 2NBP 50/16BE | P1014 2638 | C | 5.951,- | 132 | 3NBP 50M/EE | P1014 2728 | C | 15.738,- | 133 |
| 2NBP 50/20AE | P1014 2644 | C | 8.205,- | 132 | 3NBP 65/16AE | P1014 2736 | C | 14.918,- | 133 |
| 2NBP 50/20BE | P1014 2642 | C | 7.846,- | 132 | 3NBP 65/16BE | P1014 2734 | C | 13.921,- | 133 |
| 2NBP 50/25AE | P1014 2650 | C | 10.411,- | 132 | 3NBP 65/200AE | P1014 2742 | C | 21.103,- | 133 |
| 2NBP 50/25BE | P1014 2648 | C | 9.168,- | 132 | 3NBP 65/20BE | P1014 2740 | C | 16.825,- | 133 |
| 2NBP 50/25CE | P1014 2646 | C | 8.551,- | 132 | 3NBP 65/20CE | P1014 2738 | C | 15.149,- | 133 |
| 2NBP 50M/CE | P1014 2656 | C | 11.823,- | 132 | 3NBP 65/250AE | P1014 2748 | C | 34.469,- | 133 |
| 2NBP 50M/DE | P1014 2654 | C | 10.519,- | 132 | 3NBP 65/250BE | P1014 2746 | C | 27.276,- | 133 |
| 2NBP 50M/EE | P1014 2652 | C | 9.899,- | 132 | 3NBP 65/250CE | P1014 2744 | C | 21.918,- | 133 |
| 2NBP 65/16AE | P1014 2660 | C | 9.765,- | 132 | 3NBP 80/16AE | P1014 2752 | C | 18.626,- | 133 |
| 2NBP 65/16BE | P1014 2658 | C | 9.146,- | 132 | 3NBP 80/16BE | P1014 2750 | C | 17.308,- | 133 |
| 2NBP 65/200AE | P1014 2666 | C | 13.840,- | 133 | 3NBP 80/200AE | P1014 2756 | C | 28.475,- | 133 |
| 2NBP 65/20BE | P1014 2664 | C | 11.174,- | 132 | 3NBP 80/200BE | P1014 2754 | C | 22.984,- | 133 |
| 2NBP 65/20CE | P1014 2662 | C | 9.920,- | 132 | 3NBP 80/250AE | P1014 2766 | C | 46.606,- | 133 |
| 2NBP 65/250AE | P1014 2672 | C | 22.494,- | 133 | 3NBP 80/250BE | P1014 2764 | C | 38.623,- | 133 |
| 2NBP 65/250BE | P1014 2670 | C | 17.908,- | 133 | 3NBP 80/250CE | P1014 2762 | C | 36.225,- | 133 |
| 2NBP 65/250CE | P1014 2668 | C | 14.340,- | 133 | 3NBP 80/250DE | P1014 2760 | C | 29.073,- | 133 |

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| AF 24 | 4103 3200 | C | 226,- | 71 |
| AF 24 SR | 4103 3300 | C | 294,- | 71 |
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| ATR 83100 | 6108 2030 | C | 30,- | 109 |
| ATR 83101 | 6108 2010 | C | 24,- | 109 |
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| ATW 80/120-150 | 6110 1010 | C | 129,- | 109 |
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| BA-RGV20 | 4220 3100 | C | 258,- | 92 |
| BA-RGV25 | 4220 3200 | C | 278,- | 92 |
| BA-RGV32 | 4220 3300 | C | 344,- | 92 |
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| BEGLlwas 150 | 8002 2040 | - | 188,60 | 150 |
| BEGLlwas 250 | 8002 2050 | - | 252,81 | 150 |
| BEGLlwas 50 | 8002 2020 | - | 115,60 | 150 |
| BEGLwhvK 10 | 8002 3010 | - | 33147,00 | 150 |
| BEGLwhvK 100 | 8002 3030 | - | 120,50 | 150 |
| BEGLwhvK 150 | 8002 3040 | - | 163,40 | 150 |
| BEGLwhvK 250 | 8002 3050 | - | 209,90 | 150 |
| BEGLwhvK 50 | 8002 3020 | - | 52,40 | 150 |
| BEGLwhvK 6 | 8002 3000 | - | 7,50 | 150 |
| BEGLwhvK 600 | 8002 3060 | - | 341,90 | 150 |
| BEGLwhvW 10 | 8002 4010 | - | 45,50 | 150 |
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| BEGLwhvW 50 | 8002 4020 | - | 103,00 | 150 |
| BEGLwhvW 6 | 8002 4000 | - | 30,30 | 150 |
| BEGLwolt 10 | 8002 1010 | - | 9,30 | 150 |
| BEGLwolt 100 | 8002 1030 | - | 103,00 | 150 |
| BEGLwolt 150 | 8002 1040 | - | 117,80 | 150 |
| BEGLwolt 250 | 8002 1050 | - | 163,40 | 150 |
| BEGLwolt 50 | 8002 1020 | - | 44,80 | 150 |
| BEGLwolt 6 | 8002 1000 | - | 6,40 | 150 |
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| CAN-IO-16EK | 1801 2200 | C | 235,- | 44 |
| CAN-IO-16G20 | 1804 1200 | C | 241,- | 42 |
| CAN-IO-16G20 | 1804 1200 | C | 241,- | 44 |
| CAN-IO-16R | 1802 5200 | C | 274,- | 44 |
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| CB 403-2 | P1005 2030 | C | 1.486,- | 122 |
| CB 403-4 | P1005 1030 | C | 855,- | 122 |
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| CB 501-4 | P1005 1040 | C | 1.184,- | 122 |
| CB 502-2 | P1005 2050 | C | 2.177,- | 122 |
| CB 502-4 | P1005 1050 | C | 948,- | 122 |
| CB 503-2 | P1005 2060 | C | 2.039,- | 122 |
| CB 503-4 | P1005 1060 | C | 880,- | 122 |
| CB 651-2 | P1005 2070 | C | 3.939,- | 122 |
| CB 651-4 | P1005 1070 | C | 1.334,- | 122 |
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| CB 652-4 | P1005 1080 | C | 1.207,- | 122 |
| CB 653-2 | P1005 2090 | C | 2.327,- | 122 |
| CB 653-4 | P1005 1090 | C | 963,- | 122 |
| CB 801-4 | P1005 1100 | C | 1.610,- | 122 |
| CB 802-4 | P1005 1110 | C | 1.394,- | 122 |
| CL 1001-4 | P1004 2165 | C | 1.611,- | 121 |
| CL 1002-4 | P1004 2170 | C | 1.394,- | 121 |
| CL 401-2 | P1004 2205 | C | 1.962,- | 121 |
| CL 401-4 | P1004 2105 | C | 945,- | 121 |
| CL 402-2 | P1004 2210 | C | 1.723,- | 121 |
| CL 402-4 | P1004 2110 | C | 852,- | 121 |
| CL 403-2 | P1004 2215 | C | 1.409,- | 121 |
| CL 403-4 | P1004 2115 | C | 729,- | 121 |
| CL 501-2 | P1004 2220 | C | 2.741,- | 121 |
| CL 501-4 | P1004 2120 | C | 1.019,- | 121 |
| CL 502-2 | P1004 2225 | C | 2.087,- | 121 |
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| CL 651-4 | P1004 2135 | C | 1.183,- | 121 |
| CL 652-2 | P1004 2240 | C | 2.239,- | 121 |
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| CL 653-4 | P1004 2145 | C | 845,- | 121 |
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| CL 801-4 | P1004 2150 | C | 1.334,- | 121 |
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| CLP 402-4 | P1004 4110 | C | 1.581,- | 122 |
| CLP 403-2 | P1004 4215 | C | 2.501,- | 122 |
| CLP 403-4 | P1004 4115 | C | 1.399,- | 122 |
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| CLP 501-4 | P1004 4120 | C | 1.892,- | 122 |
| CLP 502-2 | P1004 4225 | C | 3.544,- | 122 |
| CLP 502-4 | P1004 4125 | C | 1.736,- | 122 |
| CLP 503-2 | P1004 4230 | C | 2.689,- | 122 |
| CLP 503-4 | P1004 4130 | C | 1.601,- | 122 |
| CLP 651-2 | P1004 4235 | C | 5.805,- | 122 |
| CLP 651-4 | P1004 4135 | C | 2.125,- | 122 |
| CLP 652-2 | P1004 4240 | C | 3.965,- | 122 |
| CLP 652-4 | P1004 4140 | C | 1.808,- | 122 |
| CLP 653-2 | P1004 4245 | C | 3.680,- | 122 |
| CLP 653-4 | P1004 4145 | C | 1.672,- | 122 |
| CLP 801-2 | P1004 4250 | C | 6.933,- | 122 |
| CLP 801-4 | P1004 4150 | C | 2.397,- | 122 |
| CLP 802-4 | P1004 4155 | C | 2.164,- | 122 |
| CLP 803-2 | P1004 4260 | C | 4.186,- | 122 |
| CLP 803-2 | P1004 4255 | C | 6.013,- | 122 |
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| COF | 2801 3000 | C | 184,- | 42 |
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| COOLultra | 8219 1040 | C | 45,- add. | 141 |
| COOLultraW | 8609 1000 | C | 88,- add. | 148 |
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| CV-32-2/70 | P1004 1050 | C | 487,- | 121 |
| CV-32-2/80 | P1004 1040 | C | 487,- | 121 |
| CV-32-4/60 | P1004 1030 | C | 487,- | 121 |
| CV-32-4/70 | P1004 1020 | C | 487,- | 121 |
| CV-32-4/80 | P1004 1010 | C | 487,- | 121 |
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| DDS-10 | 2402 0400 | C | 183,- | 54 |
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| DDT692/1 | 2406 0200 | C | 512,- | 54 |
| DDT692/2,5 | 2406 0500 | C | 512,- | 54 |
| DDT692/4 | 2406 0600 | C | 512,- | 54 |
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| DDW-30 | 6301 1050 | C | 60,- | 110 |
| DDW-6 | 6301 1030 | C | 60,- | 110 |
| DF/FST | 6103 1200 | C | 3,- | 106 |
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| DN 125 - DN 150 | P1015 0180 | C | 103,- | 136 |
| DN 150 - DN 200 | P1015 0190 | C | 153,- | 136 |
| DN 65 - DN 80 | P1015 0140 | C | 43,- | 136 |
| DN 80 - DN 100 | P1015 0150 | C | 54,- | 136 |
| DN 80 - DN 125 | P1015 0160 | C | 61,- | 136 |
| DN100 | P1006 0150 | C | 1.133,- | 123 |
| DN25 | P1013 0110 | C | 55,- | 128 |
| DN32 | P1013 0120 | C | 60,- | 128 |
| DN40 | P1002 0310 | C | 21,- | 120 |
| DN40 | P1013 0130 | C | 68,- | 128 |
| DN40 | P1006 0110 | C | 554,- | 123 |
| DN50 | P1012 0110 | C | 38,- | 126 |
| DN50 | P1006 0120 | C | 682,- | 123 |
| DN65 | P1002 0820 | C | 32,- | 120 |
| DN65 | P1012 0120 | C | 54,- | 126 |
| DN65 | P1013 0250 | C | 54,- | 128 |
| DN65 | P1006 0130 | C | 1.069,- | 123 |
| DN80 | P1002 0830 | C | 35,- | 120 |
| DN80 | P1012 0130 | C | 73,- | 126 |
| DN80 | P1013 0260 | C | 73,- | 128 |
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| E master 200 /100 | 1706 1040 | C | on req. | 40 |
| E master 200 /1000 | 1706 1070 | C | on req. | 40 |
| E master 200 /20 | 1706 1020 | C | on req. | 40 |
| E master 200 /200 | 1706 1050 | C | on req. | 40 |
| E master 200 /50 | 1706 1030 | C | on req. | 40 |
| E master 200 /500 | 1706 1060 | C | on req. | 40 |
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| E- METER 300 | 8801 1010 | C | on req. | 149 |
| E- METER 400 | 8800 1020 | C | on req. | 149 |
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| ECL 1002-4 | P1006 1100 | C | 3.937,- | 123 |
| ECL 401-4 | P1006 1010 | C | 3.029,- | 123 |
| ECL 402-2 | P1006 2010 | C | 4.082,- | 123 |
| ECL 402-4 | P1006 1020 | C | 2.594,- | 123 |
| ECL 403-2 | P1006 2020 | C | 3.585,- | 123 |
| ECL 501-4 | P1006 1030 | C | 3.184,- | 123 |
| ECL 502-2 | P1006 2030 | C | 3.914,- | 123 |
| ECL 502-4 | P1006 1040 | C | 2.893,- | 123 |
| ECL 503-2 | P1006 2040 | C | 3.724,- | 123 |
| ECL 651-4 | P1006 1050 | C | 3.471,- | 123 |
| ECL 652-2 | P1006 2050 | C | 5.256,- | 123 |
| ECL 652-4 | P1006 1060 | C | 3.233,- | 123 |
| ECL 653-2 | P1006 2060 | C | 4.919,- | 123 |
| ECL 801-4 | P1006 1070 | C | 3.799,- | 123 |
| ECL 802-4 | P1006 1080 | C | 3.523,- | 123 |
| ECL 803-2 | P1006 2070 | C | 5.560,- | 123 |
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| EFV 48-300/250 | 3101 1110 | C | 61,- | 57 |
| EGHN 40-100 F | P1002 3110 | C | 1.562,- | 119 |
| EGHN 40-60 F | P1002 3120 | C | 1.472,- | 119 |
| EGHN 50-100 F | P1002 3130 | C | 1.993,- | 119 |
| EGHN 50-60 F | P1002 3140 | C | 1.901,- | 119 |
| EGHN 65-120 F | P1002 3150 | C | 2.117,- | 119 |
| EGHN 65-60 F | P1002 3160 | C | 2.044,- | 119 |
| EGHN 80-60 F | P1002 3170 | C | 2.399,- | 119 |
| EGHN SMART 15/60-130 | P1002 1010 | C | 124,- | 118 |
| EGHN SMART 20/60-130 | P1002 1020 | C | 124,- | 118 |
| EGHN SMART 20/60-180 | P1002 1040 | C | 124,- | 118 |
| EGHN SMART 25/60-130 | P1002 1030 | C | 124,- | 118 |
| EGHN SMART 25/60-180 | P1002 1050 | C | 124,- | 118 |
| EGHN SMART 32/60-180 | P1002 1060 | C | 124,- | 118 |
| EGHND 40-100 F | P1002 3210 | C | 3.050,- | 119 |
| EGHND 40-60 F | P1002 3220 | C | 2.865,- | 119 |
| EGHND 50-100 F | P1002 3230 | C | 3.888,- | 119 |
| EGHND 50-60 F | P1002 3240 | C | 3.729,- | 119 |

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| EGHND 65-60 F | P1002 3260 | C | 3.988,- | 119 |
| EGHND 80-60 F | P1002 3270 | C | 4.593,- | 119 |
| EGHND-L40-100 F | P1002 4210 | C | 2.512,- | 120 |
| EGHND-L50-100 F | P1002 4220 | C | 3.199,- | 120 |
| EGHND-L65-120 F | P1002 4230 | C | 4.001,- | 120 |
| EGHND-L80-120 F/6 | P1002 4240 | C | 4.578,- | 120 |
| EGHN-L40-100 F | P1002 4110 | C | 1.562,- | 119 |
| EGHN-L50-100 F | P1002 4120 | C | 1.996,- | 119 |
| EGHN-L65-120 F | P1002 4130 | C | 2.116,- | 119 |
| EGHN-L80-120 F/10 | P1002 4150 | C | 2.592,- | 119 |
| EGHN-L80-120 F/6 | P1002 4140 | C | 2.592,- | 119 |
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| EM P-Station SCPU | 1706 0300 | C | on req. | 40 |
| ENERGY master 200 | 1706 1000 | C | on req. | 40 |
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| ETHI 0,6/20/120 | 8301 1200 | C | on req. | 142 |
| ETHI 0,6/20/120/M | 8301 2200 | C | on req. | 143 |
| ETHI 0,6/20/130 | 8301 1300 | C | on req. | 142 |
| ETHI 0,6/20/130/M | 8301 2300 | C | on req. | 143 |
| ETHI 1,5/15/110 | 8301 1400 | C | on req. | 142 |
| ETHI 1,5/15/110/M | 8301 2400 | C | on req. | 143 |
| ETHI 1,5/20/110 | 8301 1500 | C | on req. | 142 |
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| ETHI 1,5/20/130 | 8301 1600 | C | on req. | 142 |
| ETHI 1,5/20/130/M | 8301 2600 | C | on req. | 143 |
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| FE FP L 100-022 NFE | P1002 0140 | C | 1.078,- | 120 |
| FEUERS | 1005 0400 | C | 109,- | 43 |
| FL/HyK | 6202 1300 | C | 23,- | 110 |
| FLCD-CS | 3401 7420 | C | 233,- | 58 |
| FM 3100 | 4361 1600 | C | 281,- | 93 |
| FM 3125 | 4361 1700 | C | 415,- | 93 |
| FM 332 | 4361 1100 | C | 115,- | 93 |
| FM 340 | 4361 1200 | C | 117,- | 93 |
| FM 350 | 4361 1300 | C | 147,- | 93 |
| FM 365 | 4361 1400 | C | 171,- | 93 |
| FM 380 | 4361 1500 | C | 232,- | 93 |
| FM 4100 | 4261 2600 | C | 293,- | 93 |
| FM 4125 | 4261 2700 | C | 670,- | 93 |
| FM 432 | 4261 2100 | C | 119,- | 93 |
| FM 440 | 4261 2200 | C | 121,- | 93 |
| FM 450 | 4261 2300 | C | 147,- | 93 |
| FM 465 | 4261 2400 | C | 183,- | 93 |
| FM 480 | 4261 2500 | C | 256,- | 93 |
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| FP L 100-015 N | P1002 0130 | C | 806,- | 120 |
| FR1-CS | 3401 1220 | C | 113,- | 58 |
| FR2-CS | 3401 1240 | C | 106,- | 58 |
| FR2-CS/U | 3402 124x | C | on req. | 59 |
| FR3-CS | 3401 1260 | C | 113,- | 58 |
| FR3-CS/U | 3402 126x | C | on req. | 59 |
| FST 600 | 6103 1000 | C | 82,- | 106 |
| FTR1-CS | 3401 3220 | C | 109,- | 58 |
| FTR2-CS | 3401 3240 | C | 113,- | 58 |
| FTR2-CS/U | 3402 324x | C | on req. | 59 |
| FV | 3102 1100 | C | 63,- | 58 |
| FV10 | 3102 4100 | C | 65,- | 58 |
| FVm | 3102 3500 | C | 66,- | 58 |
| FVR1-CS | 3401 5420 | C | 120,- | 58 |
| FVR2-CS | 3401 5440 | C | 113,- | 58 |
| FVR2-CS/U | 3402 544x | C | on req. | 59 |
| FVR2S-CS | 3401 6440 | C | 113,- | 58 |
| FVR2S-CS/U | 3402 644x | C | on req. | 59 |
| FVS | 3201 0000 | C | 70,- | 58 |

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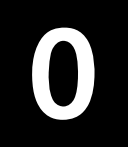
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|-------------|-----------|---|-------|----|
| G 320/4 MS | 4341 0100 | C | 54,- | 94 |
| G 320/6 MS | 4341 0110 | C | 54,- | 94 |
| G 325/12 MS | 4341 0200 | C | 59,- | 94 |
| G 332/18 MS | 4341 0300 | C | 65,- | 94 |
| G 340/28 MS | 4341 0400 | C | 125,- | 94 |
| G 350/44 MS | 4341 0500 | C | 130,- | 94 |
| G 420/4 MS | 4342 0100 | C | 58,- | 95 |
| G 420/6 MS | 4342 0110 | C | 58,- | 95 |
| G 425/12 MS | 4342 0200 | C | 65,- | 95 |
| G 432/18 MS | 4342 0300 | C | 70,- | 95 |

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| G 440/28 MS | 4342 0400 | C | 130,- | 95 |
| G 450/44 MS | 4342 0500 | C | 138,- | 95 |
| G- METER Z25 | 8900 1010 | C | on req. | 149 |
| G- METER Z4 | 8900 1000 | C | on req. | 149 |
| G- METER Z40 | 8900 1020 | C | on req. | 149 |
| G11/4-G2 | P1015 0110 | C | 30,- | 136 |
| G2 - G2 1/2 | P1015 0130 | C | 36,- | 136 |
| GA/HyK | 6202 1200 | C | 17,- | 110 |
| GF | 2108 2000 | A | 136,- | 53 |
| GHN 15/40-130 | P1001 1010 | C | 75,- | 117 |
| GHN 15/60-130 | P1001 1040 | C | 75,- | 117 |
| GHN 15/65-130 | P1001 1070 | C | 76,- | 117 |
| GHN 20/40-130 | P1001 1020 | C | 75,- | 117 |
| GHN 20/40-180 | P1001 2010 | C | 75,- | 117 |
| GHN 20/60-130 | P1001 1050 | C | 75,- | 117 |
| GHN 20/60-180 | P1001 2040 | C | 74,- | 117 |
| GHN 20/65-130 | P1001 1080 | C | 76,- | 117 |
| GHN 25/40-130 | P1001 1030 | C | 75,- | 117 |
| GHN 25/40-180 | P1001 2020 | C | 75,- | 117 |
| GHN 25/60-130 | P1001 1060 | C | 75,- | 117 |
| GHN 25/60-180 | P1001 2050 | C | 75,- | 117 |
| GHN 25/65-130 | P1001 1090 | C | 76,- | 117 |
| GHN 25/65-180 | P1001 2070 | C | 76,- | 117 |
| GHN 25/70-180 | P1001 2090 | C | 124,- | 117 |
| GHN 32/120-180 | P1001 2120 | C | 364,- | 117 |
| GHN 32/40-180 | P1001 2030 | C | 75,- | 117 |
| GHN 32/60-180 | P1001 2060 | C | 75,- | 117 |
| GHN 32/65-180 | P1001 2080 | C | 76,- | 117 |
| GHN 32/70-180 | P1001 2100 | C | 124,- | 117 |
| GHN 32/80-180 | P1001 2110 | C | 229,- | 117 |
| GHN 40-120 F | P1001 3105 | C | 555,- | 117 |
| GHN 40-40 F | P1001 3115 | C | 503,- | 117 |
| GHN 40-70 F | P1001 3110 | C | 517,- | 117 |
| GHN 50-120 F | P1001 3120 | C | 696,- | 117 |
| GHN 50-40 F | P1001 3130 | C | 646,- | 117 |
| GHN 50-70 F | P1001 3125 | C | 669,- | 117 |
| GHN 65-120 F | P1001 3135 | C | 813,- | 117 |
| GHN 65-40 F | P1001 3145 | C | 796,- | 117 |
| GHN 65-70 F | P1001 3140 | C | 796,- | 117 |
| GHN 80-120 F/6 | P1001 3150 | C | 1.067,- | 117 |
| GHN 80-120 F/10 | P1001 3160 | C | 1.013,- | 117 |
| GHN 80-70 F/6 | P1001 3155 | C | 1.013,- | 117 |
| GHN 80-70 F/10 | P1001 3165 | C | 1.013,- | 117 |
| GHND 40 | P1002 0210 | C | 56,- | 120 |
| GHND 40-120 F | P1001 3205 | C | 1.080,- | 117 |
| GHND 40-40 F | P1001 3215 | C | 981,- | 117 |
| GHND 40-70 F | P1001 3210 | C | 1.080,- | 117 |
| GHND 50, 65, 80 | P1002 0220 | C | 89,- | 120 |
| GHND 50-120 F | P1001 3220 | C | 1.357,- | 117 |
| GHND 50-40 F | P1001 3230 | C | 1.261,- | 117 |
| GHND 50-70 F | P1001 3225 | C | 1.357,- | 117 |
| GHND 65-120 F | P1001 3235 | C | 1.585,- | 117 |
| GHND 65-40 F | P1001 3245 | C | 1.545,- | 117 |
| GHND 65-70 F | P1001 3240 | C | 1.585,- | 117 |
| GHND 80-120 F/6 | P1001 3250 | C | 2.079,- | 117 |
| GHND 80-120 F/10 | P1001 3260 | C | 2.079,- | 117 |
| GHND 80-70 F/6 | P1001 3255 | C | 2.079,- | 117 |
| GHND 80-70 F/10 | P1001 3265 | C | 1.976,- | 117 |
| GHNMD 40-120 F | P1001 4110 | C | 615,- | 118 |
| GHNMD 40-70 F | P1001 4120 | C | 589,- | 118 |
| GHNMD 50-120 F | P1001 4130 | C | 816,- | 118 |
| GHNMD 50-70 F | P1001 4140 | C | 792,- | 118 |
| GHNMD 40-120 F | P1001 4210 | C | 1.199,- | 118 |
| GHNMD 40-70 F | P1001 4220 | C | 1.150,- | 118 |
| GHNMD 50-120 F | P1001 4230 | C | 1.594,- | 118 |
| GHNMD 50-70 F | P1001 4240 | C | 1.545,- | 118 |
| GI | P1013 0210 | C | 55,- | 128 |
| GI 1/2-G2 1/2 | P1015 0120 | C | 34,- | 136 |
| GI 1/4 | P1013 0220 | C | 60,- | 128 |
| GI/2 | P1013 0230 | C | 68,- | 128 |
| GM 230A | 4103 4100 | C | 228,- | 71 |
| GM 24A | 4103 4200 | C | 225,- | 71 |
| GM 24ASR | 4103 4300 | C | 286,- | 71 |
| GM 320 | 4362 1100 | C | 87,- | 94 |
| GM 320/K | 4363 1100 | C | 66,- | 95 |
| GM 325 | 4362 1200 | C | 88,- | 94 |
| GM 325/K | 4363 1200 | C | 67,- | 95 |
| GM 332 | 4362 1300 | C | 91,- | 94 |
| GM 332/K | 4363 1300 | C | 70,- | 95 |
| GM 340 | 4362 1400 | C | 99,- | 94 |
| GM 340/K | 4363 1400 | C | 76,- | 95 |
| GM 350 | 4362 1500 | C | 120,- | 94 |
| GM 365 | 4362 1600 | C | 174,- | 94 |
| GM 420 | 4362 2100 | C | 86,- | 94 |
| GM 420/K | 4363 2100 | C | 65,- | 95 |
| GM 425 | 4362 2200 | C | 87,- | 94 |
| GM 425/K | 4363 2200 | C | 66,- | 95 |
| GM 432 | 4362 2300 | C | 91,- | 94 |
| GM 432/K | 4363 2300 | C | 70,- | 95 |

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| GM 440 | 4362 2400 | C | 98,- | 94 |
| GM 440/K | 4363 2400 | C | 75,- | 95 |
| GM 450 | 4362 2500 | C | 109,- | 94 |
| GM 465 | 4362 2600 | C | 185,- | 94 |
| GRAUGUSS R 1 1/4" | P1001 0130 | C | 10,- | 118 |
| GRAUGUSS R 1" | P1001 0120 | C | 6,- | 118 |
| GRAUGUSS R 3/4" | P1001 0110 | C | 6,- | 118 |
| GRAUGUSS R 5/4" | P1001 0210 | C | 30,- | 118 |
| GSE-DG100 | 4220 1480 | C | 365,- | 91 |
| GSE-DG125 | 4220 1490 | C | 481,- | 92 |
| GSE-DG150 | 4220 1500 | C | 739,- | 92 |
| GSE-DG15-25 | 4220 1400 | C | 162,- | 91 |
| GSE-DG32 | 4220 1430 | C | 183,- | 91 |
| GSE-DG40 | 4220 1440 | C | 203,- | 91 |
| GSE-DG50 | 4220 1450 | C | 229,- | 91 |
| GSE-DG65 | 4220 1460 | C | 287,- | 91 |
| GSE-DG80 | 4220 1470 | C | 321,- | 91 |
| GSE-DW100 | 4220 1680 | C | 585,- | 92 |
| GSE-DW125 | 4220 1690 | C | 786,- | 92 |
| GSE-DW150 | 4220 1700 | C | 1.151,- | 92 |
| GSE-DW15-25 | 4220 1600 | C | 272,- | 92 |
| GSE-DW32 | 4220 1630 | C | 293,- | 92 |
| GSE-DW40 | 4220 1640 | C | 313,- | 92 |
| GSE-DW50 | 4220 1650 | C | 356,- | 92 |
| GSE-DW65 | 4220 1660 | C | 438,- | 92 |
| GSE-DW80 | 4220 1670 | C | 501,- | 92 |
| GS-I | 1604 1320 | C | 105,- | 39 |
| GS-U | 1604 1310 | C | 105,- | 39 |

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|------------------------|-----------|---|---------|-----|
| heat STAR 1 /1 | 8402 0000 | C | 276,- | 145 |
| heat STAR 1 /10 | 8402 0100 | C | 276,- | 145 |
| heat STAR 1 /100 | 8402 0200 | C | 276,- | 145 |
| heat STAR 1 /1000 | 8402 0300 | C | 276,- | 145 |
| heat STAR 1 flow | 8409 1030 | C | 34,- | 147 |
| heat STAR 1 FV 1,5G | 8403 2000 | C | 533,- | 146 |
| heat STAR 1 FV 10G | 8403 2050 | C | 753,- | 146 |
| heat STAR 1 FV 10GX | 8403 2060 | C | 753,- | 146 |
| heat STAR 1 FV 2,5G | 8403 2010 | C | 533,- | 146 |
| heat STAR 1 FV 3,5G | 8403 2020 | C | 554,- | 146 |
| heat STAR 1 FV 6,0-25G | 8403 2030 | C | 554,- | 146 |
| heat STAR 1 FV 6,0-32G | 8403 2040 | C | 504,- | 146 |
| heat STAR 1 hybrid | 8409 1090 | C | 45,- | 147 |
| heat STAR 1 mbus | 8409 1000 | C | 37,- | 147 |
| heat STAR 1 pulseE | 8409 1010 | C | 77,- | 147 |
| heat STAR 1 pulseEV | 8409 1020 | C | 111,- | 147 |
| heat STAR 1 R4 | 8409 1040 | C | 56,- | 147 |
| heat STAR 1 SV 1,5G | 8403 1000 | C | 533,- | 146 |
| heat STAR 1 SV 10G | 8403 1050 | C | 753,- | 146 |
| heat STAR 1 SV 10GX | 8403 1050 | C | 753,- | 146 |
| heat STAR 1 SV 2,5G | 8403 1010 | C | 533,- | 146 |
| heat STAR 1 SV 3,5G | 8403 1020 | C | 554,- | 146 |
| heat STAR 1 SV 6,0-25G | 8403 1030 | C | 554,- | 146 |
| heat STAR 1 SV 6,0-32G | 8403 1040 | C | 594,- | 146 |
| heat STAR 1 T10 | 8409 1050 | C | 34,- | 147 |
| heat STAR 1 WP 100F8 | 8405 2030 | C | 1.895,- | 147 |
| heat STAR 1 WP 150F8 | 8405 2040 | C | 2.602,- | 147 |
| heat STAR 1 WP 15F4 | 8405 1000 | C | 1.251,- | 147 |
| heat STAR 1 WP 250F8 | 8405 2050 | C | 3.050,- | 147 |
| heat STAR 1 WP 25F4 | 8405 1010 | C | 1.314,- | 147 |
| heat STAR 1 WP 400F8 | 8405 2060 | C | on req. | 147 |
| heat STAR 1 WP 40F4 | 8405 1020 | C | 1.357,- | 147 |
| heat STAR 1 WP 40F8 | 8405 2000 | C | 1.092,- | 147 |
| heat STAR 1 WP 40Fx4 | 8405 1030 | C | 1.357,- | 147 |
| heat STAR 1 WP 40Fx8 | 8405 2010 | C | 1.357,- | 147 |
| heat STAR 1 WP 600F8 | 8405 2070 | C | on req. | 147 |
| heat STAR 1 WP 60F8 | 8405 2020 | C | 1.585,- | 147 |
| heat STAR 1 WV 1,5F | 8402 2000 | C | 633,- | 145 |
| heat STAR 1 WV 1,5G | 84021 000 | C | 488,- | 145 |
| heat STAR 1 WV 10F | 8402 2050 | C | 827,- | 145 |
| heat STAR 1 WV 10G | 8402 1050 | C | 657,- | 145 |
| heat STAR 1 WV 150F8 | 8404 1050 | C | 2.602,- | 146 |
| heat STAR 1 WV 15F4 | 8404 1000 | C | 1.251,- | 146 |
| heat STAR 1 WV 2,5F | 8402 2010 | C | 633,- | 145 |
| heat STAR 1 WV 2,5G | 8402 1010 | C | 488,- | 145 |
| heat STAR 1 WV 25F4 | 8404 1010 | C | 1.314,- | 146 |
| heat STAR 1 WV 3,5F | 8402 2020 | C | 655,- | 145 |
| heat STAR 1 WV 3,5G | 8402 1020 | C | 525,- | 145 |
| heat STAR 1 WV 40F4 | 8404 1020 | C | 1.357,- | 146 |
| heat STAR 1 WV 40F8 | 8404 1030 | C | 1.357,- | 146 |
| heat STAR 1 WV 60-25F | 8402 2030 | C | 655,- | 145 |
| heat STAR 1 WV 60-25G | 8402 1030 | C | 525,- | 145 |
| heat STAR 1 WV 60-32F | 8402 2040 | C | 668,- | 145 |
| heat STAR 1 WV 60-32G | 8402 1040 | C | 535,- | 145 |
| heat STAR 1 WV 60F8 | 8404 1040 | C | 1.585,- | 146 |
| heat STAR 2 cold | 8401 9090 | C | 39,- | 144 |
| heat STAR 2 flow | 8401 9010 | C | 34,- | 144 |
| heat STAR 2 hybrid | 8401 9100 | C | 45,- | 144 |
| heat STAR 2 mbusc | 8401 9080 | C | on req. | 144 |



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| heat STAR 2 power | 8401 9030 | C | on req. | 144 | HM 2250 XSR/24 | 4101 7300 | C | 622,- | 64 |
| heat STAR 2 pulse | 8401 9000 | C | 27,- | 144 | HM 2250 XSR/W/24 | 4101 7310 | C | 680,- | 64 |
| heat STAR 2 solar | 8401 9020 | C | 40,- | 144 | HM 2250 XW | 4101 7120 | C | 458,- | 64 |
| heat STAR 2 t5.2 | 8401 9040 | C | o. AufPrice | 144 | HM 2250 XW/24 | 4101 7220 | C | 520,- | 64 |
| heat STAR 2 ta1 | 8401 9050 | C | 9,- | 144 | HM 2500 | 4101 9200 | C | 1.200,- | 64 |
| heat STAR 2 ta2 | 8401 9060 | C | 12,- | 144 | HM 2500/24 | 4101 9220 | C | 1.143,- | 64 |
| heat STAR 2 ta3 | 8401 9070 | C | 24,- | 144 | HMVF 2100/160 | 4211 2800 | C | 960,- | 76 |
| heat STAR 2/06M | 8401 2000 | C | 186,- | 144 | HMVF 2100/160-6 | 4211 0800 | C | 855,- | 75 |
| heat STAR 2/15M | 8401 2010 | C | 186,- | 144 | HMVF 2100NR 125 | 4211 2810 | C | 960,- | 76 |
| heat STAR 2/256M | 8401 2020 | C | 193,- | 144 | HMVF 2100NR125-6 | 4211 0810 | C | 855,- | 75 |
| heat STAR 2+/06M | 8401 1000 | C | 201,- | 144 | HMVF 2125/125 | 4211 2910 | C | 2.323,- | 76 |
| heat STAR 2+/15M | 8401 1010 | C | 201,- | 144 | HMVF 215/4 | 4211 2000 | C | 213,- | 76 |
| heat STAR 2+/25M | 8401 1020 | C | 209,- | 144 | HMVF 215/4-6 | 4211 0000 | C | 185,- | 75 |
| HM 1090 X | 4101 4400 | C | 365,- | 63 | HMVF 2150/315 | 4211 3010 | C | 2.775,- | 76 |
| HM 1090 X/24 | 4101 4500 | C | 388,- | 63 | HMVF 215NR 0,63 | 4211 2040 | C | 213,- | 76 |
| HM 1090 XRP | 4101 4410 | C | 468,- | 63 | HMVF 215NR 0,63-6 | 4211 0040 | C | 185,- | 75 |
| HM 1090 XRP/24 | 4101 4510 | C | 484,- | 63 | HMVF 215NR 1,25 | 4211 2060 | C | 213,- | 76 |
| HM 1090 XRP/W | 4101 4430 | C | 496,- | 63 | HMVF 215NR 1,25-6 | 4211 0060 | C | 185,- | 75 |
| HM 1090 XRP/W/24 | 4101 4530 | C | 537,- | 63 | HMVF 215NR 1,6 | 4211 2070 | C | 213,- | 76 |
| HM 1090 XSR/24 | 4101 4600 | C | 550,- | 63 | HMVF 215NR 1,6-6 | 4211 0070 | C | 185,- | 75 |
| HM 1090 XSR/W/24 | 4101 4610 | C | 609,- | 63 | HMVF 215NR 2,5 | 4211 2090 | C | 213,- | 76 |
| HM 1090 XW | 4101 4420 | C | 424,- | 63 | HMVF 215NR 2,5-6 | 4211 0090 | C | 185,- | 75 |
| HM 1090 XW/24 | 4101 4520 | C | 446,- | 63 | HMVF 220/6,3 | 4211 2100 | C | 220,- | 76 |
| HM 1150 X | 4101 5300 | C | 383,- | 63 | HMVF 220/6,3-6 | 4211 0100 | C | 198,- | 75 |
| HM 1150 X/24 | 4101 5400 | C | 405,- | 63 | HMVF 220NR 5 | 4211 2110 | C | 220,- | 76 |
| HM 1150 XRP | 4101 5310 | C | 472,- | 63 | HMVF 220NR 5-6 | 4211 0110 | C | 198,- | 75 |
| HM 1150 XRP/24 | 4101 5410 | C | 486,- | 63 | HMVF 225/10 | 4211 2200 | C | 233,- | 76 |
| HM 1150 XRP/W | 4101 5330 | C | 524,- | 63 | HMVF 225/10-6 | 4211 0200 | C | 208,- | 75 |
| HM 1150 XRP/W/24 | 4101 5430 | C | 537,- | 64 | HMVF 225NR 8 | 4211 2210 | C | 233,- | 76 |
| HM 1150 XSR/24 | 4101 5500 | C | 587,- | 64 | HMVF 225NR 8-6 | 4211 0210 | C | 208,- | 75 |
| HM 1150 XSR/W/24 | 4101 5510 | C | 647,- | 64 | HMVF 232/16 | 4211 2300 | C | 273,- | 76 |
| HM 1150 XW | 4101 5320 | C | 471,- | 63 | HMVF 232/16-6 | 4211 0300 | C | 253,- | 75 |
| HM 1150 XW/24 | 4101 5420 | C | 486,- | 63 | HMVF 232NR 12,5 | 4211 2310 | C | 273,- | 76 |
| HM 2025 | 4101 1100 | C | 242,- | 61 | HMVF 232NR 12,5-6 | 4211 0310 | C | 253,- | 75 |
| HM 2025 RP | 4101 1110 | C | 291,- | 61 | HMVF 240/25 | 4211 2400 | C | 295,- | 76 |
| HM 2025 RP/24 | 4101 1210 | C | 315,- | 61 | HMVF 240/25-6 | 4211 0400 | C | 270,- | 75 |
| HM 2025 RP/E/W | 4101 1130 | C | 355,- | 61 | HMVF 240NR 20 | 4211 2410 | C | 295,- | 76 |
| HM 2025 RP/E/W/24 | 4101 1230 | C | 379,- | 61 | HMVF 240NR 20-6 | 4211 0410 | C | 270,- | 75 |
| HM 2025 SR/24 | 4101 1300 | C | 280,- | 61 | HMVF 250/40 | 4211 2500 | C | 335,- | 76 |
| HM 2025 SR/E/W/24 | 4101 1320 | C | 365,- | 61 | HMVF 250/40-6 | 4211 0500 | C | 288,- | 75 |
| HM 2025 SR/W/24 | 4101 1310 | C | 327,- | 61 | HMVF 250NR 31,5 | 4211 2510 | C | 335,- | 76 |
| HM 2025 W | 4101 1120 | C | 282,- | 61 | HMVF 250NR 31,5-6 | 4211 0510 | C | 288,- | 75 |
| HM 2025 W/24 | 4101 1220 | C | 302,- | 61 | HMVF 265/63 | 4211 2600 | C | 553,- | 76 |
| HM 2025/24 | 4101 1200 | C | 253,- | 61 | HMVF 265/63-6 | 4211 0600 | C | 505,- | 75 |
| HM 2030 | 4101 1500 | C | 131,- | 62 | HMVF 265NR 50 | 4211 2610 | C | 553,- | 76 |
| HM 2030 SR/24 | 4101 1520 | C | 190,- | 62 | HMVF 265NR 50-6 | 4211 0610 | C | 505,- | 75 |
| HM 2030/24 | 4101 1510 | C | 131,- | 62 | HMVF 280/100 | 4211 2700 | C | 775,- | 76 |
| HM 2030/24/W | 4101 1540 | C | 161,- | 62 | HMVF 280/100-6 | 4211 0700 | C | 668,- | 75 |
| HM 2030/W | 4101 1530 | C | 161,- | 62 | HMVF 280NR 80 | 4211 2710 | C | 775,- | 76 |
| HM 2040 | 4101 2100 | C | 245,- | 61 | HMVF 280NR 80-6 | 4211 0710 | C | 668,- | 75 |
| HM 2040 RP | 4101 2110 | C | 327,- | 61 | HMVF 3100/160 | 4212 2800 | C | 855,- | 79 |
| HM 2040 RP/24 | 4101 2210 | C | 344,- | 61 | HMVF 3100/160-6 | 4212 0800 | C | 763,- | 78 |
| HM 2040 RP/E/W | 4101 2130 | C | 391,- | 61 | HMVF 3100NR 125 | 4212 2810 | C | 855,- | 79 |
| HM 2040 RP/E/W/24 | 4101 2230 | C | 410,- | 62 | HMVF 3100NR125-6 | 4212 0810 | C | 763,- | 78 |
| HM 2040 SR/24 | 4101 2300 | C | 294,- | 62 | HMVF 3125/250 | 4212 2910 | C | 2.158,- | 79 |
| HM 2040 SR/E/W/24 | 4101 2320 | C | 387,- | 62 | HMVF 3150/315 | 4212 3010 | C | 2.523,- | 79 |
| HM 2040 SR/W/24 | 4101 2310 | C | 352,- | 62 | HMVF 315/4 | 4212 2000 | C | 178,- | 79 |
| HM 2040 W | 4101 2120 | C | 311,- | 61 | HMVF 315/4-6 | 4212 0000 | C | 155,- | 78 |
| HM 2040 W/24 | 4101 2220 | C | 330,- | 62 | HMVF 315NR 0,63 | 4212 2040 | C | 178,- | 79 |
| HM 2040/24 | 4101 2200 | C | 265,- | 61 | HMVF 315NR 0,63-6 | 4212 0040 | C | 155,- | 78 |
| HM 2060 X | 4101 3100 | C | 283,- | 62 | HMVF 315NR 1,25 | 4212 2060 | C | 178,- | 79 |
| HM 2060 X/24 | 4101 3200 | C | 294,- | 62 | HMVF 315NR 1,25-6 | 4212 0060 | C | 155,- | 78 |
| HM 2060 XRP | 4101 3110 | C | 355,- | 62 | HMVF 315NR 1,6 | 4212 2070 | C | 178,- | 79 |
| HM 2060 XRP/24 | 4101 3210 | C | 368,- | 62 | HMVF 315NR 1,6-6 | 4212 0070 | C | 155,- | 78 |
| HM 2060 XRP/E/W | 4101 3130 | C | 418,- | 62 | HMVF 315NR 2,5 | 4212 2090 | C | 178,- | 79 |
| HM 2060 XRP/E/W/24 | 4101 3230 | C | 429,- | 62 | HMVF 315NR 2,5-6 | 4212 0090 | C | 155,- | 78 |
| HM 2060 XSR/24 | 4101 3300 | C | 358,- | 62 | HMVF 320/6,3 | 4212 2100 | C | 185,- | 79 |
| HM 2060 XSR/E/W/24 | 4101 3320 | C | 448,- | 62 | HMVF 320/6,3-6 | 4212 0100 | C | 165,- | 78 |
| HM 2060 XSR/W/24 | 4101 3310 | C | 415,- | 62 | HMVF 320NR 5 | 4212 2110 | C | 185,- | 79 |
| HM 2060 XW | 4101 3120 | C | 360,- | 62 | HMVF 320NR 5-6 | 4212 0110 | C | 165,- | 78 |
| HM 2060 XW/24 | 4101 3220 | C | 366,- | 62 | HMVF 325/10 | 4212 2200 | C | 195,- | 79 |
| HM 2090 X | 4101 4700 | C | 335,- | 63 | HMVF 325/10-6 | 4212 0200 | C | 175,- | 78 |
| HM 2090 X/24 | 4101 4800 | C | 352,- | 63 | HMVF 325NR 8 | 4212 2210 | C | 195,- | 79 |
| HM 2090 XRP | 4101 4710 | C | 408,- | 63 | HMVF 325NR 8-6 | 4212 0210 | C | 175,- | 78 |
| HM 2090 XRP/24 | 4101 4810 | C | 438,- | 63 | HMVF 332/16 | 4212 2300 | C | 235,- | 79 |
| HM 2090 XRP/W | 4101 4730 | C | 466,- | 63 | HMVF 332/16-6 | 4212 0300 | C | 205,- | 78 |
| HM 2090 XRP/W/24 | 4101 4830 | C | 492,- | 63 | HMVF 332NR 12,5 | 4212 2310 | C | 235,- | 79 |
| HM 2090 XSR/24 | 4101 4900 | C | 456,- | 63 | HMVF 332NR 12,5-6 | 4212 0310 | C | 205,- | 78 |
| HM 2090 XSR/W/24 | 4101 4910 | C | 517,- | 63 | HMVF 340/25 | 4212 2400 | C | 255,- | 79 |
| HM 2090 XW | 4101 4720 | C | 393,- | 63 | HMVF 340/25-6 | 4212 0400 | C | 220,- | 78 |
| HM 2090 XW/24 | 4101 4820 | C | 437,- | 63 | HMVF 340NR 20 | 4212 2410 | C | 255,- | 79 |
| HM 2100 | 4101 9300 | C | 1.929,- | 64 | HMVF 340NR 20-6 | 4212 0410 | C | 220,- | 78 |
| HM 2100/24 | 4101 9320 | C | 1.828,- | 64 | HMVF 350/40 | 4212 2500 | C | 285,- | 79 |
| HM 2250 X | 4101 7100 | C | 399,- | 64 | HMVF 350/40-6 | 4212 0500 | C | 240,- | 78 |
| HM 2250 X/24 | 4101 7200 | C | 429,- | 64 | HMVF 350NR 31,5 | 4212 2510 | C | 285,- | 79 |
| HM 2250 XRP | 4101 7110 | C | 472,- | 64 | HMVF 350NR 31,5-6 | 4212 0510 | C | 240,- | 78 |
| HM 2250 XRP/24 | 4101 7210 | C | 521,- | 64 | HMVF 365/63 | 4212 2600 | C | 495,- | 79 |
| HM 2250 XRP/W | 4101 7130 | C | 560,- | 64 | HMVF 365/63-6 | 4212 0600 | C | 450,- | 78 |
| HM 2250 XRP/W/24 | 4101 7230 | C | 574,- | 64 | HMVF 365NR 50 | 4212 2610 | C | 495,- | 79 |

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| HMVF 365NR 50-6 | 4212 0610 | C | 450,- | 78 |
| HMVF 380/100 | 4212 2700 | C | 690,- | 79 |
| HMVF 380/100-6 | 4212 0700 | C | 588,- | 78 |
| HMVF 380NR 80 | 4212 2710 | C | 690,- | 79 |
| HMVF 380NR 80-6 | 4212 0710 | C | 588,- | 78 |
| HPG 35/25 | P1008 1010 | C | 263,- | 123 |
| HPN 35/25 | P1008 1020 | C | 313,- | 123 |
| HPN 60/25 | P1008 1030 | C | 352,- | 123 |
| HWyK | 6202 2000 | C | 213,- | 110 |
| HyK | 6202 1000 | C | 207,- | 110 |
| HyRRx | 6201 2000 | C | 72,- | 110 |
| HyRWx | 6201 2100 | C | 74,- | 110 |

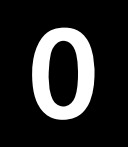
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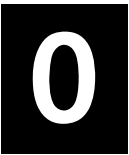
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| INT 510 | 2702 1100 | C | 313,- | 55 |
| INT 510/24 | 2702 1200 | C | 313,- | 55 |
| INT 511 | 2701 1100 | C | 233,- | 55 |
| INT 511/24 | 2701 1200 | C | 233,- | 55 |
| IPultra 10 | 8219 1010 | C | on req. | 141 |
| IPultra 2,5 | 8219 1000 | C | on req. | 141 |
| IRMA control | 1902 5000 00 | C | 500,- | 47 |
| IRMA editor | 1902 5220 00 | C | on req. | 47 |
| IRMA grafic | 1902 5200 00 | C | on req. | 47 |
| IRMA grafic plus | 1902 5210 00 | C | on req. | 47 |
| IRMA invoice | 1902 5250 00 | C | on req. | 47 |
| IRMA message | 1902 5100 00 | C | on req. | 47 |
| IRMA server | 1902 5240 00 | C | on req. | 47 |
| IRMA server dongle | 1902 5240 10 | C | on req. | 47 |

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| K DR P | 1903 5510 | C | 38,- | 49 |
| K1 RPTR | 1903 5960 | C | 47,- | 49 |
| K10 DR S | 1903 5410 | C | 67,- | 49 |
| K10 MOD | 1903 5310 | C | 71,- | 48 |
| K10 MOD 25 ST1 | 1903 5370 | C | 63,- | 49 |
| K10 MOD 9 | 1903 5330 | C | 66,- | 48 |
| K10 MOD 9 ST1 | 1903 5350 | C | 63,- | 48 |
| K10 PC 25 | 1903 5210 | C | 81,- | 48 |
| K10 PC 9 | 1903 5110 | C | 72,- | 48 |
| K10 PC 9 ST1 | 1903 5140 | C | 77,- | 48 |
| K2 DR S | 1903 5420 | C | 43,- | 49 |
| K2 MOD | 1903 5320 | C | 55,- | 48 |
| K2 MOD 25 ST1 | 1903 5380 | C | 44,- | 49 |
| K2 MOD 9 | 1903 5340 | C | 43,- | 48 |
| K2 MOD 9 ST1 | 1903 5360 | C | 44,- | 48 |
| K2 PC 25 | 1903 5220 | C | 53,- | 48 |
| K2 PC 9 | 1903 5120 | C | 31,- | 48 |
| K2 PC 9 ST1 | 1903 5130 | C | 44,- | 48 |
| K2 SCH 1 | 1903 5920 | C | 82,- | 49 |
| K2 SCH 2 | 1903 5930 | C | 71,- | 49 |
| K2ST1BUS | 1903 5910 | C | 53,- | 49 |
| KBUS-E | 1903 5720 | C | on req. | 49 |
| KBUS-F | 1903 5730 | C | on req. | 49 |
| KD100 | 4220 1080 | C | 2.108,- | 91 |
| KD125 | 4220 1090 | C | 2.644,- | 91 |
| KD150 | 4220 1100 | C | 3.452,- | 91 |
| KD32 | 4220 1030 | C | 533,- | 91 |
| KD40 | 4220 1040 | C | 704,- | 91 |
| KD50 | 4220 1050 | C | 866,- | 91 |
| KD65 | 4220 1060 | C | 1.191,- | 91 |
| KD80 | 4220 1070 | C | 1.727,- | 91 |
| KF 310 | 2107 2000 | A | 72,- | 53 |
| K-GRAV-MP | 1220 4000 | C | on req. | 15 |
| KHSF I215 | 4506 1000 | C | 251,- | 99 |
| KHSF I220 | 4506 0200 | C | 256,- | 99 |
| KHSF I225 | 4506 0300 | C | 272,- | 99 |
| KHSF I232 | 4506 0400 | C | 287,- | 99 |
| KK100 | 4220 2800 | C | 139,- | 92 |
| KK15-25 | 4220 2000 | C | 78,- | 92 |
| KK32-50 | 4220 2200 | C | 87,- | 92 |
| KK65 | 4220 2600 | C | 101,- | 92 |
| KK80 | 4220 2700 | C | 116,- | 92 |
| Kla | 4704 0010 | C | 49,- | 103 |
| Klb | 4704 0020 | C | 18,- | 103 |
| KM 10K/230SX | 4104 1580 | C | 167,- | 68 |
| KM 10K/230X | 4104 1560 | C | 110,- | 68 |
| KM 10K/24 | 4104 1510 | C | 94,- | 68 |
| KM 10K/24S | 4104 1530 | C | 136,- | 68 |
| KM 10K/24SX | 4104 1570 | C | 148,- | 68 |
| KM 10K/24X | 4104 1550 | C | 105,- | 68 |
| KM 10K230 | 4104 1520 | C | 99,- | 68 |
| KM 10K230S | 4104 1540 | C | 155,- | 68 |
| KM 10KE/230 | 4104 3160 | C | 239,- | 70 |
| KM 10KE/230-2 | 4104 3120 | C | 226,- | 70 |
| KM 10KE/230-2X | 4104 3220 | C | 238,- | 70 |
| KM 10KE/230-3 | 4104 3140 | C | 231,- | 70 |
| KM 10KE/230-3X | 4104 3240 | C | 243,- | 70 |
| KM 10KE/230S | 4104 3180 | C | 302,- | 70 |
| KM 10KE/230SX | 4104 3280 | C | 313,- | 70 |

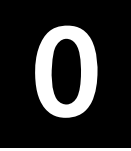
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| KM 10KE/230X | 4104 3260 | C | 251,- | 70 |
| KM 10KE/24 | 4104 3150 | C | 229,- | 70 |
| KM 10KE/24-2 | 4104 3110 | C | 216,- | 70 |
| KM 10KE/24-2X | 4104 3210 | C | 228,- | 70 |
| KM 10KE/24-3 | 4104 3130 | C | 221,- | 70 |
| KM 10KE/24-3X | 4104 3230 | C | 233,- | 70 |
| KM 10KE/24S | 4104 3170 | C | 278,- | 70 |
| KM 10KE/24SX | 4104 3270 | C | 290,- | 70 |
| KM 10KE/24X | 4104 3250 | C | 241,- | 70 |
| KM 15K/230 | 4104 1620 | C | 111,- | 69 |
| KM 15K/230S | 4104 1640 | C | 185,- | 69 |
| KM 15K/230SX | 4104 1680 | C | 197,- | 69 |
| KM 15K/230X | 4104 1660 | C | 123,- | 69 |
| KM 15K/24 | 4104 1610 | C | 106,- | 69 |
| KM 15K/24S | 4104 1630 | C | 162,- | 69 |
| KM 15K/24SX | 4104 1670 | C | 173,- | 69 |
| KM 15K/24X | 4104 1650 | C | 118,- | 69 |
| KM 20K/230 | 4104 1720 | C | 119,- | 69 |
| KM 20K/230S | 4104 1740 | C | 193,- | 69 |
| KM 20K/230SX | 4104 1780 | C | 205,- | 69 |
| KM 20K/230X | 4104 1760 | C | 131,- | 69 |
| KM 20K/24 | 4104 1710 | C | 114,- | 69 |
| KM 20K/24S | 4104 1730 | C | 170,- | 69 |
| KM 20K/24SX | 4104 1770 | C | 182,- | 69 |
| KM 20K/24X | 4104 1750 | C | 126,- | 69 |
| KM 4/230 | 4104 1150 | C | 79,- | 67 |
| KM 4/24 | 4104 1140 | C | 76,- | 67 |
| KM 4/24P | 4104 1160 | C | 104,- | 67 |
| KM 4/24S | 4104 1170 | C | 114,- | 67 |
| KM 4A/230 | 4104 1120 | C | 75,- | 67 |
| KM 4A/24 | 4104 1110 | C | 72,- | 67 |
| KM 4A/24S | 4104 1130 | C | 109,- | 67 |
| KM 4KF/230 | 4104 2120 | C | 132,- | 69 |
| KM 4KF/230-3 | 4104 2140 | C | 143,- | 69 |
| KM 4KF/230-3X | 4104 2240 | C | 156,- | 69 |
| KM 4KF/230S | 4104 2160 | C | 196,- | 69 |
| KM 4KF/230SX | 4104 2260 | C | 207,- | 69 |
| KM 4KF/230X | 4104 2220 | C | 145,- | 69 |
| KM 4KF/24 | 4104 2110 | C | 121,- | 69 |
| KM 4KF/24-3 | 4104 2130 | C | 132,- | 69 |
| KM 4KF/24-3X | 4104 2230 | C | 145,- | 69 |
| KM 4KF/24S | 4104 2150 | C | 168,- | 69 |
| KM 4KF/24SX | 4104 2250 | C | 180,- | 69 |
| KM 4KF/24X | 4104 2210 | C | 134,- | 69 |
| KM 4KFS/230 | 4104 2320 | C | 132,- | 70 |
| KM 4KFS/230-3 | 4104 2340 | C | 143,- | 70 |
| KM 4KFS/230-3X | 4104 2440 | C | 156,- | 70 |
| KM 4KFS/230S | 4104 2360 | C | 196,- | 70 |
| KM 4KFS/230SX | 4104 2460 | C | 207,- | 70 |
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| KM 4KFS/24-3X | 4104 2430 | C | 145,- | 70 |
| KM 4KFS/24S | 4104 2350 | C | 168,- | 70 |
| KM 4KFS/24SX | 4104 2450 | C | 180,- | 70 |
| KM 4KFS/24X | 4104 2410 | C | 134,- | 70 |
| KM 5K/230 | 4104 1320 | C | 94,- | 68 |
| KM 5K/230S | 4104 1340 | C | 148,- | 68 |
| KM 5K/230SX | 4104 1380 | C | 160,- | 68 |
| KM 5K/230X | 4104 1360 | C | 105,- | 68 |
| KM 5K/24 | 4104 1310 | C | 89,- | 68 |
| KM 5K/24S | 4104 1330 | C | 131,- | 68 |
| KM 5K/24SX | 4104 1370 | C | 143,- | 68 |
| KM 5K/24X | 4104 1350 | C | 100,- | 68 |
| KM 5KS/230 | 4104 1420 | C | 123,- | 68 |
| KM 5KS/230S | 4104 1440 | C | 185,- | 68 |
| KM 5KS/230SX | 4104 1480 | C | 197,- | 68 |
| KM 5KS/230X | 4104 1460 | C | 135,- | 68 |
| KM 5KS/24 | 4104 1410 | C | 113,- | 68 |
| KM 5KS/24S | 4104 1430 | C | 162,- | 68 |
| KM 5KS/24SX | 4104 1470 | C | 173,- | 68 |
| KM 5KS/24X | 4104 1450 | C | 125,- | 68 |
| KM ABJ | 4104 0150 | C | 10,- | 72 |
| KM ACR | 4104 0160 | C | 17,- | 72 |
| KM ACR2 | 4104 0170 | C | 15,- | 72 |
| KM ACRL | 4104 0180 | C | 19,- | 72 |
| KM ACRS | 4104 0190 | C | 66,- | 72 |
| KM ACRS2 | 4104 0200 | C | 66,- | 72 |
| KM AF08 | 4104 0210 | C | 3,- | 72 |
| KM AF08F | 4104 0260 | C | 6,- | 72 |
| KM AF10 | 4104 0220 | C | 3,- | 72 |
| KM AF10F | 4104 0270 | C | 6,- | 72 |
| KM AF12 | 4104 0230 | C | 3,- | 72 |
| KM AF12F | 4104 0280 | C | 6,- | 72 |
| KM AF14 | 4104 0240 | C | 3,- | 72 |
| KM AF14F | 4104 0290 | C | 6,- | 72 |
| KM AFL | 4104 0250 | C | 3,- | 72 |
| KM AFLF | 4104 0300 | C | 6,- | 72 |
| KM AHW25 | 4104 0310 | C | 7,- | 72 |

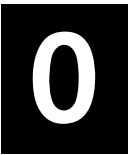




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| KM AHW30 | 4104 0320 | C | 7,- | 72 | MAK 2125/6 | 4421 2080 | C | 480,- | 96 |
| KM ALS | 4104 0330 | C | 3,- | 72 | MAK 2150/10 | 4421 3000 | C | 520,- | 96 |
| KM AMB | 4104 0340 | C | 28,- | 72 | MAK 2150/3 | 4421 2090 | C | 499,- | 96 |
| KM AMB2 | 4104 0350 | C | 23,- | 72 | MAK 220/10 | 4421 2100 | C | 206,- | 96 |
| KM AMFB | 4104 0360 | C | 25,- | 72 | MAK 225/10 | 4421 2200 | C | 206,- | 96 |
| KM AMR | 4104 0370 | C | 2,- | 72 | MAK 232/10 | 4421 2300 | C | 213,- | 96 |
| KM AMV1 | 4104 0380 | C | on req. | 72 | MAK 240/10 | 4421 2400 | C | 238,- | 96 |
| KM AMV2 | 4104 0390 | C | on req. | 72 | MAK 250/10 | 4421 2500 | C | 254,- | 96 |
| KM AP1000 | 4104 0410 | C | 56,- | 72 | MAK 265/10 | 4421 2600 | C | 266,- | 96 |
| KM AP10000 | 4104 0400 | C | 56,- | 72 | MAK 280/10 | 4421 2700 | C | 313,- | 96 |
| KM ARS | 4104 0420 | C | 2,- | 72 | MALF | 2102 1000 | C | 46,- | 51 |
| KM ARS2 | 4104 0430 | C | 5,- | 72 | MAS Centra 15-65 | 4702 0110 | C | 49,- | 103 |
| KM ARSL | 4104 0440 | C | 16,- | 72 | MAS Centra 80-100 | 4702 0120 | C | 65,- | 103 |
| KM AS1 | 4104 0450 | C | 40,- | 72 | MAS Centra Komp. | 4702 0130 | C | 65,- | 103 |
| KM AS2 | 4104 0460 | C | 50,- | 72 | MAS Centra/A | 4702 0140 | C | 53,- | 103 |
| KM AVC12 | 4104 0470 | C | 15,- | 72 | MAS ESBE/Elesta | 4702 0180 | C | 63,- | 103 |
| KM AZ | 4104 0480 | C | 2,- | 72 | MAS MAK 20-65 | 4703 0030 | C | 40,- | 103 |
| KM SAB | 4104 0110 | C | 4,- | 72 | MAS MAK 80-100 | 4703 0040 | C | 40,- | 103 |
| KM SAB15 | 4104 0120 | C | 3,- | 72 | MAS R+S N | 4702 0270 | C | 47,- | 103 |
| KM SCA | 4104 0130 | C | 10,- | 72 | MAS SM2010 C-DRU | 4702 0430 | C | 37,- | 66 |
| KM SCA2 | 4104 0140 | C | 17,- | 72 | MAS SM2010 C-DRU | 4702 0430 | C | 37,- | 103 |
| KM15KE/230 | 4104 3360 | C | 269,- | 70 | MAS SM2010 C-DRZR | 4702 0450 | C | 8,50 | 66 |
| KM15KE/230-2 | 4104 3320 | C | 255,- | 70 | MAS SM2010 C-DRZR | 4702 0450 | C | 8,50 | 103 |
| KM15KE/230-2X | 4104 3420 | C | 267,- | 70 | MAS SM2010 Cent | 4702 0480 | C | 4,20 | 66 |
| KM15KE/230-3 | 4104 3340 | C | 260,- | 70 | MAS SM2010 Cent | 4702 0480 | C | 4,20 | 103 |
| KM15KE/230-3X | 4104 3440 | C | 272,- | 70 | MAS SM2010 ESBE | 4702 0460 | C | 7,30 | 66 |
| KM15KE/230S | 4104 3380 | C | 331,- | 70 | MAS SM2010 ESBE | 4702 0460 | C | 7,30 | 103 |
| KM15KE/230SX | 4104 3480 | C | 343,- | 70 | MAS SM2010 Siem | 4702 0470 | C | 4,20 | 66 |
| KM15KE/230X | 4104 3440 | C | 281,- | 70 | MAS SM2010 Siem | 4702 0470 | C | 4,20 | 103 |
| KM15KE/24 | 4104 3350 | C | 259,- | 70 | MAS SM2010 xxx-C | 4702 04xx | C | on req. | 66 |
| KM15KE/24-2 | 4104 3310 | C | 245,- | 70 | MAS SM2010 xxx-C | 4702 04xx | C | on req. | 103 |
| KM15KE/24-2X | 4104 3410 | C | 257,- | 70 | MAS SM2010/3 | 4702 0420 | C | 4,20 | 66 |
| KM15KE/24-3 | 4104 3330 | C | 250,- | 70 | MAS SM2010/3 | 4702 0420 | C | 4,20 | 103 |
| KM15KE/24-3X | 4104 3430 | C | 267,- | 70 | MAS SM2010/4 | 4702 0440 | C | 4,20 | 66 |
| KM15KE/24S | 4104 3370 | C | 307,- | 70 | MAS SM2010/4 | 4702 0440 | C | 4,20 | 103 |
| KM15KE/24SX | 4104 3470 | C | 319,- | 70 | MAS SM4007/GG | 4702 0500 | C | 12,- | 65 |
| KM15KE/24X | 4104 3430 | C | 271,- | 70 | MAS SM4007/MS | 4702 0510 | C | 12,- | 65 |
| KR 24-1W-S | 1001 1100 | C | 25,- | 50 | MB/FST | 6103 1300 | C | 5,- | 106 |
| KR 80000 | 6106 1070 | C | 72,- | 107 | M-Bus Repeater-10 | 8010 1100 | C | 782,- | 149 |
| KR 80001 | 6106 1080 | C | 91,- | 107 | M-Bus Repeater-120 | 8010 1200 | C | 1257,- | 149 |
| KR 80003 | 6106 1010 | C | 88,- | 106 | M-Bus Repeater-250 | 8010 1300 | C | 1988,- | 149 |
| KR 80011 | 6106 1020 | C | 118,- | 106 | MBUUltraW | 8609 1000 | C | 48,- add. | 148 |
| KR 80028 | 6106 1050 | C | 91,- | 106 | MFR 50-12 | 4105 4100 | C | 367,- | 73 |
| KR 80029 | 6106 1060 | C | 92,- | 106 | MFR 50-12 | 4105 4100 | C | 367,- | 98 |
| KR 80100 | 6106 2050 | C | 76,- | 107 | MFR 50-12 SR 24 | 4105 4110 | C | 544,- | 73 |
| KR 80101 | 6106 2060 | C | 91,- | 107 | MFR 50-12 SR 24 | 4105 4110 | C | 544,- | 98 |
| KR 80108 | 6106 2010 | C | 88,- | 107 | MFR 50-7,5 | 4105 4000 | C | 323,- | 73 |
| KR 80116 | 6106 2030 | C | 69,- | 107 | MFR 50-7,5 | 4105 4000 | C | 323,- | 98 |
| KR 80124 | 6106 2070 | C | 92,- | 107 | MFR 50-7,5 SR 24 | 4105 4010 | C | 500,- | 73 |
| KRAC 230-2W | 1001 2600 | C | 15,- | 50 | MFR 50-7,5 SR 24 | 4105 4010 | C | 500,- | 98 |
| KRAC 24-2Wau | 1001 1600 | C | 15,- | 50 | MGF | 2108 1000 | C | 120,- | 53 |
| KRDC 24-2Wau | 1001 1500 | C | 14,- | 50 | MHyK | 2202 2000 | C | 236,- | 54 |
| KST1BUS.1 | 1903 5810 | C | 108,- | 49 | MHyR | 2201 2000 | C | 167,- | 54 |
| KSTBUS | 1903 5610 | C | 113,- | 49 | MKF 310 | 2107 1000 | C | 56,- | 53 |
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| KWZmess 2,5 | 8110 1010 | C | 30,- | 139 | MOD 3-R | 1903 1320 | C | on req. | 47 |
| KZHMTU | 4106 2210 | C | 26,- | 73 | MOD 3-RS | 1903 1330 | C | on req. | 47 |
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| | | | | | MP 19.688YYS-MS | 1212 8200 | C | 1.251,- | 15 |
| | | | | | MP19.1000-DS | 1203 1110 | C | 753,- | 13 |
| | | | | | MP19.1111S-MS | 1212 0110 | C | 1.128,- | 14 |
| | | | | | MP19.111K-LS | 1201 1290 | C | 1.099,- | 12 |
| | | | | | MP19.111XXS-MS | 1212 0410 | C | 1.251,- | 15 |
| | | | | | MP19.122K-LS | 1201 1310 | C | 1.099,- | 12 |
| | | | | | MP19.124K-LS | 1201 1410 | C | 1.099,- | 12 |
| | | | | | MP19.1333S-MS | 1212 0210 | C | 1.251,- | 14 |
| | | | | | MP19.133YYS-MS | 1212 0310 | C | 1.251,- | 14 |
| | | | | | MP19.1D10B-FS | 1202 1210 | C | 968,- | 13 |
| | | | | | MP19.224K-LS | 1201 2610 | C | 1.099,- | 12 |
| | | | | | MP19.2B00-T | 1205 2100 | C | 710,- | 13 |
| | | | | | MP19.4B00-TS | 1205 4510 | C | 837,- | 13 |
| | | | | | MP19.W121K-LS | 1201 6730 | C | 1.099,- | 12 |
| | | | | | MP19.W122K-LS | 1201 6010 | C | 1.099,- | 12 |
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| | | | | | MR/U | 2104 220x | C | 66,- | 52 |
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| | | | | | MR-CS/U | 2104 222x | C | on req. | 52 |
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| | | | | | MR-FVS 4 | 3205 0000 | C | 93,- | 58 |
| | | | | | MR-FVS2 | 3206 0000 | C | 93,- | 58 |
| | | | | | MR-FVS3 | 3207 0000 | C | 93,- | 58 |
| | | | | | MR-FVS5 | 3209 0000 | C | 93,- | 58 |
| | | | | | MS/FST | 6103 1100 | C | 6,- | 106 |
| | | | | | MTF 120 MS | 2103 1100 | C | 58,- | 51 |
| MAF | 2101 1000 | C | 46,- | 51 | | | | | |
| MAK 2100/10 | 4421 2800 | C | 345,- | 96 | | | | | |
| MAK 2125/10 | 4421 2900 | C | 405,- | 96 | | | | | |

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| MTF 120 V2A | 2103 1200 | C | 96,- | 51 | MVFL compact 215/7F | 4211 6510 | C | 87,- | 78 |
| MTF 170 MS | 2103 2100 | C | 96,- | 51 | MVFL compact 215/7T | 4211 6110 | C | 67,- | 77 |
| MTF 170 V2A | 2103 2200 | C | 148,- | 51 | MVFL compact 215/7W | 4211 6310 | C | 70,- | 78 |
| MTF 220 MS | 2103 3100 | C | 98,- | 51 | MVFL compact 215/8F | 4211 6500 | C | 87,- | 78 |
| MTF 220 V2A | 2103 3200 | C | 148,- | 51 | MVFL compact 215/8T | 4211 6100 | C | 67,- | 77 |
| MTF 310 MS | 2103 4100 | C | 101,- | 52 | MVFL compact 215/8W | 4211 6300 | C | 70,- | 78 |
| MTF 310 V2A | 2103 4200 | C | 148,- | 52 | MVFL compact 220/F | 4211 6580 | C | 101,- | 78 |
| MTR/STW 30/110-150 | 6107 5200 | C | 191,- | 108 | MVFL compact 220/T | 4211 6180 | C | 73,- | 77 |
| MUF | 2105 1110 | C | 39,- | 52 | MVFL compact 220/W | 4211 6380 | C | 76,- | 78 |
| MUF 2,5 | 2105 1120 | C | 40,- | 52 | MVFL compact 225/F | 4211 6590 | C | 117,- | 78 |
| MUF 3 | 2105 1130 | C | 42,- | 52 | MVFL compact 225/T | 4211 6190 | C | 81,- | 77 |
| MUF 3,5 | 2105 1140 | C | 43,- | 52 | MVFL compact 225/W | 4211 6390 | C | 85,- | 78 |
| MUF 4,5 | 2105 1150 | C | 48,- | 52 | MVFL compact 232/F | 4211 6600 | C | 158,- | 78 |
| MUF 5 | 2105 1210 | C | 55,- | 52 | MVFL compact 232/T | 4211 6200 | C | 101,- | 77 |
| MUF-HS 35 | 2105 4000 | C | 57,- | 53 | MVFL compact 232/W | 4211 6400 | C | 107,- | 78 |
| MUF-HS 55 | 2105 4100 | C | 57,- | 53 | MVFL compact 240/F | 4211 6610 | C | 175,- | 78 |
| MUF-HS 80 | 2105 4200 | C | 58,- | 53 | MVFL compact 240/T | 4211 6210 | C | 112,- | 77 |
| MUFTH MS | 2106 2100 | C | 68,- | 53 | MVFL compact 240/W | 4211 6410 | C | 118,- | 78 |
| MUFTH MS S | 2106 2200 | C | 109,- | 53 | MVFL compact 315/1F | 4212 6570 | C | 100,- | 82 |
| MUFTH V4A | 2106 1100 | C | 117,- | 53 | MVFL compact 315/1T | 4212 6170 | C | 68,- | 82 |
| MUFTH V4A S | 2106 1200 | C | 174,- | 53 | MVFL compact 315/1W | 4212 6370 | C | 71,- | 82 |
| MVF 2125/250 | 4211 4900 | C | 2.513,- | 75 | MVFL compact 315/2F | 4212 6560 | C | 100,- | 82 |
| MVF 2125NR 125 | 4211 4910 | C | 2.686,- | 75 | MVFL compact 315/2T | 4212 6160 | C | 68,- | 82 |
| MVF 2125NR 160 | 4211 4920 | C | 2.513,- | 75 | MVFL compact 315/2W | 4212 6360 | C | 71,- | 82 |
| MVF 2125NR 200 | 4211 4930 | C | 2.686,- | 75 | MVFL compact 315/3F | 4212 6550 | C | 100,- | 82 |
| MVF 2150/400 | 4211 5000 | C | 3.407,- | 75 | MVFL compact 315/3T | 4212 6150 | C | 68,- | 82 |
| MVF 2150NR 200 | 4211 5010 | C | 3.580,- | 75 | MVFL compact 315/3W | 4212 6350 | C | 71,- | 82 |
| MVF 2150NR 250 | 4211 5020 | C | 3.407,- | 75 | MVFL compact 315/4F | 4212 6540 | C | 100,- | 82 |
| MVF 2150NR 315 | 4211 5030 | C | 3.580,- | 75 | MVFL compact 315/4T | 4212 6140 | C | 68,- | 82 |
| MVF 3100/160 | 4212 4800 | C | 2.291,- | 80 | MVFL compact 315/4W | 4212 6340 | C | 71,- | 82 |
| MVF 3100NR 100 | 4212 4820 | C | 2.447,- | 81 | MVFL compact 315/5F | 4212 6530 | C | 100,- | 82 |
| MVF 3100NR 125 | 4212 4830 | C | 2.291,- | 81 | MVFL compact 315/5T | 4212 6130 | C | 68,- | 82 |
| MVF 3100NR 80 | 4212 4810 | C | 2.447,- | 81 | MVFL compact 315/5W | 4212 6330 | C | 71,- | 82 |
| MVF 3125/250 | 4212 4900 | C | 3.144,- | 80 | MVFL compact 315/6F | 4212 6520 | C | 100,- | 82 |
| MVF 3125NR 125 | 4212 4910 | C | 3.317,- | 81 | MVFL compact 315/6T | 4212 6120 | C | 68,- | 82 |
| MVF 3125NR 160 | 4212 4920 | C | 3.317,- | 81 | MVFL compact 315/6W | 4212 6320 | C | 71,- | 82 |
| MVF 3125NR 200 | 4212 4930 | C | 3.144,- | 81 | MVFL compact 315/7F | 4212 6510 | C | 100,- | 82 |
| MVF 315/4 | 4212 4000 | C | 699,- | 80 | MVFL compact 315/7T | 4212 6110 | C | 68,- | 82 |
| MVF 3150/400 | 4212 5000 | C | 4.261,- | 80 | MVFL compact 315/7W | 4212 6310 | C | 71,- | 82 |
| MVF 3150NR 200 | 4212 5010 | C | 4.434,- | 81 | MVFL compact 320/F | 4212 6580 | C | 118,- | 82 |
| MVF 3150NR 250 | 4212 5020 | C | 4.434,- | 81 | MVFL compact 320/T | 4212 6180 | C | 76,- | 82 |
| MVF 3150NR 315 | 4212 5030 | C | 4.261,- | 81 | MVFL compact 320/W | 4212 6380 | C | 81,- | 82 |
| MVF 315NR 2,5 | 4212 4090 | C | 699,- | 80 | MVFL compact 325/F | 4212 6590 | C | 138,- | 82 |
| MVF 320/6,3 | 4212 4100 | C | 771,- | 80 | MVFL compact 325/T | 4212 6190 | C | 84,- | 82 |
| MVF 320NR 2,5 | 4212 4110 | C | 771,- | 80 | MVFL compact 325/W | 4212 6390 | C | 90,- | 82 |
| MVF 320NR 4,0 | 4212 4120 | C | 873,- | 80 | MVFL compact 332/F | 4212 6600 | C | 191,- | 82 |
| MVF 320NR 5,0 | 4212 4130 | C | 873,- | 80 | MVFL compact 332/T | 4212 6200 | C | 104,- | 82 |
| MVF 325/10 | 4212 4200 | C | 816,- | 80 | MVFL compact 332/W | 4212 6400 | C | 114,- | 82 |
| MVF 325NR 5,0 | 4212 4210 | C | 918,- | 80 | MVFL compact 340/F | 4212 6610 | C | 215,- | 82 |
| MVF 325NR 6,3 | 4212 4220 | C | 918,- | 80 | MVFL compact 340/T | 4212 6210 | C | 117,- | 82 |
| MVF 325NR 8,0 | 4212 4230 | C | 816,- | 80 | MVFL compact 340/W | 4212 6410 | C | 128,- | 82 |
| MVF 332/16 | 4212 4300 | C | 855,- | 80 | MVFS 2100/160 | 4221 2800 | C | 2.810,- | 83 |
| MVF 332NR 10 | 4212 4320 | C | 966,- | 80 | MVFS 2100NR 100 | 4221 2820 | C | 2.819,- | 83 |
| MVF 332NR 12,5 | 4212 4330 | C | 855,- | 80 | MVFS 2100NR 125 | 4221 2830 | C | 2.966,- | 83 |
| MVF 332NR 8,0 | 4212 4310 | C | 966,- | 80 | MVFS 2100NR 80 | 4221 2810 | C | 2.966,- | 83 |
| MVF 340/25 | 4212 4400 | C | 889,- | 80 | MVFS 2125/250 | 4221 2900 | C | 3.886,- | 83 |
| MVF 340NR 12,5 | 4212 4410 | C | 1.006,- | 80 | MVFS 2125NR 125 | 4221 2910 | C | 4.059,- | 83 |
| MVF 340NR 16 | 4212 4420 | C | 1.006,- | 80 | MVFS 2125NR 160 | 4221 2920 | C | 3.886,- | 83 |
| MVF 340NR 20 | 4212 4430 | C | 889,- | 80 | MVFS 2125NR 200 | 4221 2930 | C | 4.059,- | 83 |
| MVF 350/40 | 4212 4500 | C | 917,- | 80 | MVFS 215/4 | 4221 2000 | C | 599,- | 83 |
| MVF 350NR 20 | 4212 4510 | C | 1.043,- | 80 | MVFS 2150/400 | 4221 3000 | C | 5.399,- | 83 |
| MVF 350NR 25 | 4212 4520 | C | 1.043,- | 80 | MVFS 2150NR 200 | 4221 3010 | C | 5.573,- | 84 |
| MVF 350NR 31,5 | 4212 4530 | C | 917,- | 80 | MVFS 2150NR 250 | 4221 3020 | C | 5.399,- | 84 |
| MVF 365/63 | 4212 4600 | C | 1.302,- | 80 | MVFS 2150NR 315 | 4221 3030 | C | 5.573,- | 84 |
| MVF 365NR 31,5 | 4212 4610 | C | 1.445,- | 81 | MVFS 215NR 0,16 | 4221 2010 | C | 679,- | 83 |
| MVF 365NR 40 | 4212 4620 | C | 1.445,- | 81 | MVFS 215NR 0,25 | 4221 2020 | C | 679,- | 83 |
| MVF 365NR 50 | 4212 4630 | C | 1.302,- | 81 | MVFS 215NR 0,4 | 4221 2030 | C | 679,- | 83 |
| MVF 380/100 | 4212 4700 | C | 1.636,- | 80 | MVFS 215NR 0,63 | 4221 2040 | C | 679,- | 83 |
| MVF 380NR 50 | 4212 4710 | C | 1.793,- | 81 | MVFS 215NR 1,0 | 4221 2050 | C | 679,- | 83 |
| MVF 380NR 63 | 4212 4720 | C | 1.793,- | 81 | MVFS 215NR 1,25 | 4221 2060 | C | 679,- | 83 |
| MVF 380NR 80 | 4212 4730 | C | 1.636,- | 81 | MVFS 215NR 1,6 | 4221 2070 | C | 679,- | 83 |
| MVFL compact 215/1F | 4211 6570 | C | 87,- | 78 | MVFS 215NR 2,5 | 4221 2090 | C | 679,- | 83 |
| MVFL compact 215/1T | 4211 6170 | C | 67,- | 77 | MVFS 220 NR 5,0 | 4221 2130 | C | 768,- | 83 |
| MVFL compact 215/1W | 4211 6370 | C | 70,- | 78 | MVFS 220/6,3 | 4221 2100 | C | 665,- | 83 |
| MVFL compact 215/2F | 4211 6560 | C | 87,- | 78 | MVFS 220NR 2,5 | 4221 2110 | C | 768,- | 83 |
| MVFL compact 215/2T | 4211 6160 | C | 67,- | 77 | MVFS 220NR 4,0 | 4221 2120 | C | 665,- | 83 |
| MVFL compact 215/2W | 4211 6360 | C | 70,- | 78 | MVFS 225/10 | 4221 2200 | C | 726,- | 83 |
| MVFL compact 215/3F | 4211 6550 | C | 87,- | 78 | MVFS 225NR 5,0 | 4221 2210 | C | 828,- | 83 |
| MVFL compact 215/3T | 4211 6150 | C | 67,- | 77 | MVFS 225NR 6,3 | 4221 2220 | C | 726,- | 83 |
| MVFL compact 215/3W | 4211 6350 | C | 70,- | 78 | MVFS 225NR 8,0 | 4221 2230 | C | 828,- | 83 |
| MVFL compact 215/4F | 4211 6540 | C | 87,- | 78 | MVFS 232/16 | 4221 2300 | C | 905,- | 83 |
| MVFL compact 215/4T | 4211 6140 | C | 67,- | 77 | MVFS 232NR 10 | 4221 2320 | C | 905,- | 83 |
| MVFL compact 215/4W | 4211 6340 | C | 70,- | 78 | MVFS 232NR 12,5 | 4221 2330 | C | 1.015,- | 83 |
| MVFL compact 215/5F | 4211 6530 | C | 87,- | 78 | MVFS 232NR 8,0 | 4221 2310 | C | 1.015,- | 83 |
| MVFL compact 215/5T | 4211 6130 | C | 67,- | 77 | MVFS 240/25 | 4221 2400 | C | 984,- | 83 |
| MVFL compact 215/5W | 4211 6330 | C | 70,- | 78 | MVFS 240NR 12,5 | 4221 2410 | C | 1.101,- | 83 |
| MVFL compact 215/6F | 4211 6520 | C | 87,- | 78 | MVFS 240NR 16 | 4221 2420 | C | 984,- | 83 |
| MVFL compact 215/6T | 4211 6120 | C | 67,- | 77 | MVFS 240NR 20 | 4221 2430 | C | 1.101,- | 83 |
| MVFL compact 215/6W | 4211 6320 | C | 70,- | 78 | MVFS 250/40 | 4221 2500 | C | 1.062,- | 83 |

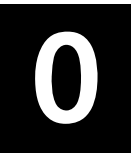




| Type | Art-Nr. | PG | Price EUR | Page | Type | Art-Nr. | PG | Price EUR | Page |
|------------------|-----------|----|-----------|------|------------------|------------|----|-----------|------|
| MVFS 250NR 20 | 4221 2510 | C | 1.188,- | 83 | MVFSP 240NR 20 | 4251 2430 | C | 826,- | 89 |
| MVFS 250NR 25 | 4221 2520 | C | 1.062,- | 83 | MVFSP 250/40 | 4251 2500 | C | 733,- | 88 |
| MVFS 250NR 31,5 | 4221 2530 | C | 1.188,- | 83 | MVFSP 250NR 20 | 4251 2510 | C | 859,- | 89 |
| MVFS 265/63 | 4221 2600 | C | 1.564,- | 83 | MVFSP 250NR 25 | 4251 2520 | C | 733,- | 89 |
| MVFS 265NR 31,5 | 4221 2610 | C | 1.707,- | 83 | MVFSP 250NR 31,5 | 4251 2530 | C | 859,- | 89 |
| MVFS 265NR 40 | 4221 2620 | C | 1.564,- | 83 | MVFSP 265/63 | 4251 2600 | C | 1.228,- | 88 |
| MVFS 265NR 50 | 4221 2630 | C | 1.707,- | 83 | MVFSP 265NR 31,5 | 4251 2610 | C | 1.371,- | 89 |
| MVFS 280/100 | 4221 2700 | C | 2.073,- | 83 | MVFSP 265NR 40 | 4251 2620 | C | 1.228,- | 89 |
| MVFS 280NR 50 | 4221 2710 | C | 2.229,- | 83 | MVFSP 265NR 50 | 4251 2630 | C | 1.371,- | 89 |
| MVFS 280NR 63 | 4221 2720 | C | 2.073,- | 83 | MVFSP 280/100 | 4251 2700 | C | 1.537,- | 88 |
| MVFS 280NR 80 | 4221 2730 | C | 2.229,- | 83 | MVFSP 280NR 50 | 4251 2710 | C | 1.694,- | 89 |
| MVFS 3100/160 | 4222 2800 | C | 3.651,- | 84 | MVFSP 280NR 63 | 4251 2720 | C | 1.537,- | 89 |
| MVFS 3100NR 100 | 4222 2820 | C | 3.807,- | 85 | MVFSP 280NR 80 | 4251 2730 | C | 1.694,- | 89 |
| MVFS 3100NR 125 | 4222 2830 | C | 3.651,- | 85 | MVFSP 3100/160 | 4252 2800 | C | 2.291,- | 90 |
| MVFS 3100NR 80 | 4222 2810 | C | 3.807,- | 85 | MVFSP 3100NR 100 | 4252 2820 | C | 2.447,- | 90 |
| MVFS 3125/250 | 4222 2900 | C | 5.053,- | 84 | MVFSP 3100NR 125 | 4252 2830 | C | 2.291,- | 90 |
| MVFS 3125NR 125 | 4222 2910 | C | 5.226,- | 85 | MVFSP 3100NR 80 | 4252 2810 | C | 2.447,- | 90 |
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| MVFS 3125NR 200 | 4222 2930 | C | 5.053,- | 85 | MVFSP 3125NR 125 | 4252 2910 | C | 3.614,- | 90 |
| MVFS 315/4 | 4222 2000 | C | 777,- | 84 | MVFSP 3125NR 160 | 4252 2920 | C | 3.614,- | 90 |
| MVFS 3150/400 | 4222 3000 | C | 7.018,- | 84 | MVFSP 3125NR 200 | 4252 2930 | C | 3.441,- | 90 |
| MVFS 3150NR 200 | 4222 3010 | C | 7.191,- | 85 | MVFSP 315/4 | 4252 2000 | C | 699,- | 90 |
| MVFS 3150NR 250 | 4222 3020 | C | 7.191,- | 85 | MVFSP 3150/400 | 4252 3000 | C | 4.650,- | 90 |
| MVFS 3150NR 315 | 4222 3030 | C | 7.018,- | 85 | MVFSP 3150NR 200 | 4252 3010 | C | 4.823,- | 90 |
| MVFS 315NR 2,5 | 4222 2090 | C | 777,- | 84 | MVFSP 3150NR 250 | 4252 3020 | C | 4.823,- | 90 |
| MVFS 320/6,3 | 4222 2100 | C | 866,- | 84 | MVFSP 3150NR 315 | 4252 3030 | C | 4.650,- | 90 |
| MVFS 320NR 2,5 | 4222 2110 | C | 968,- | 84 | MVFSP 315NR 2,5 | 4252 2090 | C | 699,- | 90 |
| MVFS 320NR 4,0 | 4222 2120 | C | 968,- | 84 | MVFSP 320/6,3 | 4252 2100 | C | 771,- | 90 |
| MVFS 320NR 5,0 | 4222 2130 | C | 866,- | 84 | MVFSP 320NR 2,5 | 4252 2110 | C | 873,- | 90 |
| MVFS 325/10 | 4222 2200 | C | 944,- | 84 | MVFSP 320NR 4,0 | 4252 2120 | C | 873,- | 90 |
| MVFS 325NR 5,0 | 4222 2210 | C | 1.047,- | 84 | MVFSP 320NR 5,0 | 4252 2130 | C | 771,- | 90 |
| MVFS 325NR 6,3 | 4222 2220 | C | 1.047,- | 84 | MVFSP 325/10 | 4252 2200 | C | 816,- | 90 |
| MVFS 325NR 8,0 | 4222 2230 | C | 944,- | 84 | MVFSP 325NR 5,0 | 4252 2210 | C | 918,- | 90 |
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| MVFS 332NR 12,5 | 4222 2330 | C | 1.179,- | 84 | MVFSP 332/16 | 4252 2300 | C | 855,- | 90 |
| MVFS 332NR 8,0 | 4222 2310 | C | 1.290,- | 84 | MVFSP 332NR 10 | 4252 2320 | C | 966,- | 90 |
| MVFS 340 NR 20 | 4222 2430 | C | 1.280,- | 85 | MVFSP 332NR 12,5 | 4252 2330 | C | 855,- | 90 |
| MVFS 340/25 | 4222 2400 | C | 1.280,- | 84 | MVFSP 332NR 8 | 4252 2310 | C | 966,- | 90 |
| MVFS 340NR 12,5 | 4222 2410 | C | 1.397,- | 84 | MVFSP 340/25 | 4252 2400 | C | 889,- | 90 |
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| MVFS 350/40 | 4222 2500 | C | 1.380,- | 84 | MVFSP 340NR 16 | 4252 2420 | C | 1.006,- | 90 |
| MVFS 350NR 20 | 4222 2510 | C | 1.506,- | 85 | MVFSP 340NR 20 | 4252 2430 | C | 889,- | 90 |
| MVFS 350NR 25 | 4222 2520 | C | 1.506,- | 85 | MVFSP 350/40 | 4252 2500 | C | 917,- | 90 |
| MVFS 350NR 31,5 | 4222 2530 | C | 1.380,- | 85 | MVFSP 350NR 20 | 4252 2510 | C | 1.043,- | 90 |
| MVFS 365/63 | 4222 2600 | C | 2.033,- | 84 | MVFSP 350NR 25 | 4252 2520 | C | 1.043,- | 90 |
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| MVFS 365NR 40 | 4222 2620 | C | 2.176,- | 85 | MVFSP 365/63 | 4252 2600 | C | 1.302,- | 90 |
| MVFS 365NR 50 | 4222 2630 | C | 2.033,- | 85 | MVFSP 365NR 31,5 | 4252 2610 | C | 1.445,- | 90 |
| MVFS 380/100 | 4222 2700 | C | 2.691,- | 84 | MVFSP 365NR 40 | 4252 2620 | C | 1.445,- | 90 |
| MVFS 380NR 50 | 4222 2710 | C | 2.848,- | 85 | MVFSP 365NR 50 | 4252 2630 | C | 1.302,- | 90 |
| MVFS 380NR 63 | 4222 2720 | C | 2.848,- | 85 | MVFSP 380/100 | 4252 2700 | C | 1.636,- | 90 |
| MVFS 380NR 80 | 4222 2730 | C | 2.691,- | 85 | MVFSP 380NR 50 | 4252 2710 | C | 1.793,- | 90 |
| MVFSP 2100/160 | 4251 2800 | C | 2.000,- | 88 | MVFSP 380NR 63 | 4252 2720 | C | 1.793,- | 90 |
| MVFSP 2100NR 100 | 4251 2820 | C | 2.000,- | 89 | MVFSP 380NR 80 | 4252 2730 | C | 1.636,- | 90 |
| MVFSP 2100NR 125 | 4251 2830 | C | 2.156,- | 89 | MVFX 315/3 | 4242 3000 | C | 97,- | 88 |
| MVFSP 2100NR 80 | 4251 2810 | C | 2.156,- | 89 | MVFX 315NR 1,5 | 4242 3070 | C | 112,- | 88 |
| MVFSP 2125/250 | 4251 2900 | C | 2.752,- | 88 | MVFX 320/6 | 4242 3100 | C | 104,- | 88 |
| MVFSP 2125NR 125 | 4251 2910 | C | 2.925,- | 89 | MVFX 325/9 | 4242 3200 | C | 106,- | 88 |
| MVFSP 2125NR 160 | 4251 2920 | C | 2.752,- | 89 | MVFX 332/14 | 4242 3300 | C | 130,- | 88 |
| MVFSP 2125NR 200 | 4251 2930 | C | 2.925,- | 89 | MVP 25-204 | P1012 1180 | C | 721,- | 125 |
| MVFSP 215/4 | 4251 2000 | C | 558,- | 88 | MVP 25-205 | P1012 1190 | C | 739,- | 125 |
| MVFSP 2150/400 | 4251 3000 | C | 3.721,- | 88 | MVP 25-206 | P1012 1200 | C | 811,- | 125 |
| MVFSP 2150NR 200 | 4251 3010 | C | 3.894,- | 89 | MVP 25-207 | P1012 1210 | C | 833,- | 125 |
| MVFSP 2150NR 250 | 4251 3020 | C | 3.721,- | 89 | MVP 25-208 | P1012 1220 | C | 950,- | 125 |
| MVFSP 2150NR 315 | 4251 3030 | C | 3.894,- | 89 | MVP 25-210 | P1012 1230 | C | 994,- | 125 |
| MVFSP 215NR 0,16 | 4251 2010 | C | 639,- | 88 | MVP 25-212 | P1012 1240 | C | 1.156,- | 125 |
| MVFSP 215NR 0,25 | 4251 2020 | C | 639,- | 88 | MVP 25-214 | P1012 1250 | C | 1.219,- | 125 |
| MVFSP 215NR 0,4 | 4251 2030 | C | 639,- | 88 | MVP 25-216 | P1012 1260 | C | 1.370,- | 125 |
| MVFSP 215NR 0,63 | 4251 2040 | C | 639,- | 88 | MVP 25-218 | P1012 1270 | C | 1.414,- | 125 |
| MVFSP 215NR 1,0 | 4251 2050 | C | 639,- | 88 | MVP 25-220 | P1012 1280 | C | 1.501,- | 125 |
| MVFSP 215NR 1,25 | 4251 2060 | C | 639,- | 88 | MVP 32 412 | P1012 1350 | C | 1.269,- | 126 |
| MVFSP 215NR 1,6 | 4251 2070 | C | 639,- | 89 | MVP 32-404 | P1012 1290 | C | 748,- | 125 |
| MVFSP 215NR 2,5 | 4251 2090 | C | 639,- | 89 | MVP 32-405 | P1012 1300 | C | 765,- | 126 |
| MVFSP 220/6,3 | 4251 2100 | C | 639,- | 88 | MVP 32-406 | P1012 1310 | C | 896,- | 126 |
| MVFSP 220NR 2,5 | 4251 2110 | C | 742,- | 89 | MVP 32-407 | P1012 1320 | C | 920,- | 126 |
| MVFSP 220NR 4,0 | 4251 2120 | C | 639,- | 89 | MVP 32-408 | P1012 1330 | C | 1.010,- | 126 |
| MVFSP 220NR 5,0 | 4251 2130 | C | 742,- | 89 | MVP 32-410 | P1012 1340 | C | 1.054,- | 126 |
| MVFSP 225/10 | 4251 2200 | C | 653,- | 88 | MVP 32-414 | P1012 1360 | C | 1.325,- | 126 |
| MVFSP 225NR 5,0 | 4251 2210 | C | 755,- | 89 | MVP 32-416 | P1012 1370 | C | 1.516,- | 126 |
| MVFSP 225NR 6,3 | 4251 2220 | C | 653,- | 89 | MVP 32-418 | P1012 1380 | C | 1.628,- | 126 |
| MVFSP 225NR 8,0 | 4251 2230 | C | 755,- | 89 | MVP 40 810 | P1012 1440 | C | 1.450,- | 126 |
| MVFSP 232/16 | 4251 2300 | C | 682,- | 88 | MVP 40-804 | P1012 1390 | C | 914,- | 126 |
| MVFSP 232NR 10 | 4251 2320 | C | 682,- | 89 | MVP 40-805 | P1012 1400 | C | 1.018,- | 126 |
| MVFSP 232NR 12,5 | 4251 2330 | C | 792,- | 89 | MVP 40-806 | P1012 1410 | C | 1.094,- | 126 |
| MVFSP 232NR 8,0 | 4251 2310 | C | 792,- | 89 | MVP 40-807 | P1012 1420 | C | 1.235,- | 126 |
| MVFSP 240/25 | 4251 2400 | C | 709,- | 88 | MVP 40-808 | P1012 1430 | C | 1.266,- | 126 |
| MVFSP 240NR 12,5 | 4251 2410 | C | 826,- | 89 | MVP 40-811 | P1012 1450 | C | 1.556,- | 126 |
| MVFSP 240NR 16 | 4251 2420 | C | 709,- | 89 | MVP 40-813 | P1012 1460 | C | 1.891,- | 126 |

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| MVP 40-815 | P1012 1470 | C | 2.004,- | 126 |
| MVP 40-817 | P1012 1480 | C | 2.239,- | 126 |
| MVP 40-819 | P1012 1490 | C | 2.364,- | 126 |
| MVP 50-1603 F | P1012 2010 | C | 1.109,- | 126 |
| MVP 50-1604 F | P1012 2020 | C | 1.353,- | 126 |
| MVP 50-1605 F | P1012 2030 | C | 1.796,- | 126 |
| MVP 50-1606 F | P1012 2040 | C | 1.961,- | 126 |
| MVP 50-1607 F | P1012 2050 | C | 2.158,- | 126 |
| MVP 50-1608 F | P1012 2060 | C | 2.198,- | 126 |
| MVP 50-1609 F | P1012 2070 | C | 2.713,- | 126 |
| MVP 50-1610 F | P1012 2080 | C | 2.779,- | 126 |
| MVP 50-1611 F | P1012 2090 | C | 2.946,- | 126 |
| MVP 50-1612 F | P1012 2100 | C | 3.255,- | 126 |
| MVP 50-1614 F | P1012 2110 | C | 3.625,- | 126 |
| MVP 50-1616 F | P1012 2120 | C | 3.945,- | 126 |
| MVP 65-3202 F | P1012 2130 | C | 1.749,- | 126 |
| MVP 65-3203 F | P1012 2140 | C | 2.281,- | 126 |
| MVP 65-3204 F | P1012 2150 | C | 2.563,- | 126 |
| MVP 65-3205 F | P1012 2160 | C | 3.190,- | 126 |
| MVP 65-3206 F | P1012 2170 | C | 3.515,- | 126 |
| MVP 65-3207 F | P1012 2180 | C | 4.430,- | 126 |
| MVP 65-3208 F | P1012 2190 | C | 4.638,- | 126 |
| MVP 65-3209 F | P1012 2200 | C | 5.026,- | 126 |
| MVP 65-3210 F | P1012 2210 | C | 5.394,- | 126 |
| MVP 65-3212 F | P1012 2220 | C | 5.949,- | 126 |
| MVP 80-4801 F | P1012 2230 | C | 1.819,- | 126 |
| MVP 80-4802 F | P1012 2240 | C | 2.231,- | 126 |
| MVP 80-4803 F | P1012 2250 | C | 2.625,- | 126 |
| MVP 80-4804 F | P1012 2260 | C | 3.300,- | 126 |
| MVP 80-4805 F | P1012 2270 | C | 3.818,- | 126 |
| MVP 80-4806 F | P1012 2280 | C | 4.209,- | 126 |
| MVP 80-4807 F | P1012 2290 | C | 4.921,- | 126 |
| MVP 80-4808 F | P1012 2300 | C | 5.625,- | 126 |
| MVP-4 25-204 | P1013 1010 | C | 716,- | 127 |
| MVP-4 25-205 | P1013 1020 | C | 733,- | 127 |
| MVP-4 25-206 | P1013 1030 | C | 788,- | 127 |
| MVP-4 25-207 | P1013 1040 | C | 809,- | 127 |
| MVP-4 25-208 | P1013 1050 | C | 903,- | 127 |
| MVP-4 25-210 | P1013 1060 | C | 948,- | 127 |
| MVP-4 25-212 | P1013 1070 | C | 1.058,- | 127 |
| MVP-4 25-214 | P1013 1080 | C | 1.120,- | 127 |
| MVP-4 25-216 | P1013 1090 | C | 1.208,- | 127 |
| MVP-4 25-218 | P1013 1100 | C | 1.251,- | 127 |
| MVP-4 25-220 | P1013 1110 | C | 1.339,- | 127 |
| MVP-4 32-404 | P1013 1120 | C | 724,- | 127 |
| MVP-4 32-405 | P1013 1130 | C | 740,- | 127 |
| MVP-4 32-406 | P1013 1140 | C | 849,- | 127 |
| MVP-4 32-407 | P1013 1150 | C | 873,- | 127 |
| MVP-4 32-408 | P1013 1160 | C | 911,- | 127 |
| MVP-4 32-410 | P1013 1170 | C | 956,- | 127 |
| MVP-4 32-412 | P1013 1180 | C | 1.105,- | 127 |
| MVP-4 32-414 | P1013 1190 | C | 1.163,- | 127 |
| MVP-4 32-416 | P1013 1200 | C | 1.304,- | 127 |
| MVP-4 32-418 | P1013 1210 | C | 1.423,- | 127 |
| MVP-4 40-804 | P1013 1220 | C | 866,- | 127 |
| MVP-4 40-805 | P1013 1230 | C | 919,- | 127 |
| MVP-4 40-806 | P1013 1240 | C | 996,- | 127 |
| MVP-4 40-807 | P1013 1250 | C | 1.071,- | 127 |
| MVP-4 40-808 | P1013 1260 | C | 1.104,- | 127 |
| MVP-4 40-810 | P1013 1270 | C | 1.244,- | 127 |
| MVP-4 40-811 | P1013 1280 | C | 1.350,- | 127 |
| MVP-4 40-813 | P1013 1290 | C | 1.570,- | 127 |
| MVP-4 40-815 | P1013 1300 | C | 1.709,- | 127 |
| MVP-4 40-817 | P1013 1310 | C | 1.823,- | 127 |
| MVP-4 40-819 | P1013 1320 | C | 1.948,- | 127 |
| MVP-4 50-1603 F | P1013 2010 | C | 1.069,- | 127 |
| MVP-4 50-1604 F | P1013 2020 | C | 1.263,- | 127 |
| MVP-4 50-1605 F | P1013 2030 | C | 1.591,- | 127 |
| MVP-4 50-1606 F | P1013 2040 | C | 1.756,- | 127 |
| MVP-4 50-1607 F | P1013 2050 | C | 1.830,- | 127 |
| MVP-4 50-1608 F | P1013 2060 | C | 1.870,- | 127 |
| MVP-4 50-1609 F | P1013 2070 | C | 2.109,- | 127 |
| MVP-4 50-1610 F | P1013 2080 | C | 2.174,- | 127 |
| MVP-4 50-1611 F | P1013 2090 | C | 2.343,- | 127 |
| MVP-4 50-1612 F | P1013 2100 | C | 2.406,- | 127 |
| MVP-4 50-1614 F | P1013 2110 | C | 2.778,- | 127 |
| MVP-4 50-1616 F | P1013 2120 | C | 2.940,- | 127 |
| MVP-4 65-3202 F | P1013 2130 | C | 1.659,- | 127 |
| MVP-4 65-3203 F | P1013 2140 | C | 2.076,- | 127 |
| MVP-4 65-3204 F | P1013 2150 | C | 2.235,- | 127 |
| MVP-4 65-3205 F | P1013 2160 | C | 2.586,- | 127 |
| MVP-4 65-3206 F | P1013 2170 | C | 2.911,- | 127 |
| MVP-4 65-3207 F | P1013 2180 | C | 3.581,- | 127 |
| MVP-4 65-3208 F | P1013 2190 | C | 3.790,- | 127 |
| MVP-4 65-3209 F | P1013 2200 | C | 4.021,- | 127 |
| MVP-4 65-3210 F | P1013 2210 | C | 4.389,- | 127 |
| MVP-4 65-3212 F | P1013 2220 | C | 4.750,- | 127 |
| MVP-4 80-4803 F | P1013 2230 | C | 2.298,- | 127 |
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| MVP-4 80-4805 F | P1013 2250 | C | 2.969,- | 127 |
| MVP-4 80-4806 F | P1013 2260 | C | 3.360,- | 127 |
| MVP-4 80-4807 F | P1013 2270 | C | 3.916,- | 127 |
| MVP-4 80-4808 F | P1013 2280 | C | 4.360,- | 127 |
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| MVP-B 25-204 | P1011 1160 | C | 633,- | 125 |
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| MVP-B 25-206 | P1011 1180 | C | 699,- | 125 |
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| MVP-B 32-404 | P1011 1220 | C | 634,- | 125 |
| MVP-B 32-405 | P1011 1230 | C | 654,- | 125 |
| MVP-B 32-406 | P1011 1240 | C | 676,- | 125 |
| MVP-B 32-407 | P1011 1250 | C | 705,- | 125 |
| MVP-B 32-408 | P1011 1260 | C | 743,- | 125 |
| MVP-B 32-410 | P1011 1270 | C | 783,- | 125 |
| MVP-B 40-804 | P1011 1280 | C | 829,- | 125 |
| MVP-B 40-805 | P1011 1290 | C | 673,- | 125 |
| MVP-B 40-806 | P1011 1300 | C | 694,- | 125 |
| MVP-BM 25-203 | P1011 1010 | C | 629,- | 125 |
| MVP-BM 25-204 | P1011 1020 | C | 649,- | 125 |
| MVP-BM 25-205 | P1011 1030 | C | 669,- | 125 |
| MVP-BM 25-206 | P1011 1040 | C | 719,- | 125 |
| MVP-BM 25-207 | P1011 1050 | C | 745,- | 125 |
| MVP-BM 25-208 | P1011 1060 | C | 790,- | 125 |
| MVP-BM 25-210 | P1011 1070 | C | 836,- | 125 |
| MVP-BM 32-403 | P1011 1080 | C | 654,- | 125 |
| MVP-BM 32-404 | P1011 1090 | C | 674,- | 125 |
| MVP-BM 32-405 | P1011 1100 | C | 696,- | 125 |
| MVP-BM 32-406 | P1011 1110 | C | 731,- | 125 |
| MVP-BM 32-407 | P1011 1120 | C | 768,- | 125 |
| MVP-BM 40-803 | P1011 1130 | C | 699,- | 125 |
| MVP-BM 40-804 | P1011 1140 | C | 719,- | 125 |
| MVP-M 25-204 | P1012 1010 | C | 799,- | 125 |
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| MVP-M 25-206 | P1012 1030 | C | 891,- | 125 |
| MVP-M 25-207 | P1012 1040 | C | 913,- | 125 |
| MVP-M 25-208 | P1012 1050 | C | 1.026,- | 125 |
| MVP-M 25-210 | P1012 1060 | C | 1.070,- | 125 |
| MVP-M 25-212 | P1012 1070 | C | 1.239,- | 125 |
| MVP-M 25-214 | P1012 1080 | C | 1.301,- | 125 |
| MVP-M 32-404 | P1012 1090 | C | 828,- | 125 |
| MVP-M 32-405 | P1012 1100 | C | 844,- | 125 |
| MVP-M 32-406 | P1012 1110 | C | 973,- | 125 |
| MVP-M 32-407 | P1012 1120 | C | 996,- | 125 |
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| MVP-M 32-410 | P1012 1140 | C | 1.138,- | 125 |
| MVP-M 40-804 | P1012 1150 | C | 990,- | 125 |
| MVP-M 40-805 | P1012 1160 | C | 1.100,- | 125 |
| MVP-M 40-806 | P1012 1170 | C | 1.178,- | 125 |
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| NM 230A | 4103 2010 | C | 114,- | 68 |
| NM 230A-S | 4103 2020 | C | 137,- | 68 |
| NM 24A | 4103 2030 | C | 111,- | 68 |
| NM 24A-S | 4103 2040 | C | 134,- | 68 |
| NM 24A-SR | 4103 2050 | C | 169,- | 68 |
| NMT 20/40-130 | P1002 1110 | C | 260,- | 118 |
| NMT 20/40-180 | P1002 1210 | C | 262,- | 118 |
| NMT 20/60-130 | P1002 1140 | C | 286,- | 118 |
| NMT 20/60-180 | P1002 1240 | C | 287,- | 118 |
| NMT 25/40-130 | P1002 1120 | C | 260,- | 118 |
| NMT 25/40-180 | P1002 1220 | C | 262,- | 118 |
| NMT 25/60-130 | P1002 1150 | C | 286,- | 118 |
| NMT 25/60-180 | P1002 1250 | C | 287,- | 118 |
| NMT 32/40-130 | P1002 1130 | C | 260,- | 118 |
| NMT 32/40-180 | P1002 1230 | C | 262,- | 118 |
| NMT 32/60-130 | P1002 1160 | C | 286,- | 118 |
| NMT 32/60-180 | P1002 1260 | C | 287,- | 118 |
| NMT 40 | P1002 2110 | C | 1.524,- | 119 |
| NMT 50 | P1002 2120 | C | 1.817,- | 119 |
| NMT 65 | P1002 2130 | C | 2.055,- | 119 |
| NMT 80 /10 | P1002 2150 | C | 2.544,- | 119 |
| NMT 80 /6 | P1002 2140 | C | 2.544,- | 119 |
| NMTD 40 | P1002 2210 | C | 3.006,- | 119 |
| NMTD 50 | P1002 2220 | C | 3.565,- | 119 |
| NMTD 65 | P1002 2230 | C | 4.054,- | 119 |
| NMTD 80 /10 | P1002 2250 | C | 5.032,- | 119 |
| NMTD 80 /6 | P1002 2240 | C | 5.032,- | 119 |
| NP 100-200A | P1015 1660 | C | 8.144,- | 134 |
| NP 100-200B | P1015 1650 | C | 7.096,- | 134 |
| NP 100-200C | P1015 1640 | C | 5.686,- | 134 |
| NP 100-200D | P1015 1630 | C | 4.638,- | 134 |
| NP 100-200E | P1015 1620 | C | 4.121,- | 134 |
| NP 100-250A | P1015 1680 | C | 13.789,- | 134 |
| NP 100-250B | P1015 1670 | C | 10.379,- | 134 |
| NP 32-125A | P1015 1030 | C | 1.563,- | 134 |
| NP 32-125D | P1015 1020 | C | 1.543,- | 134 |

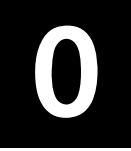


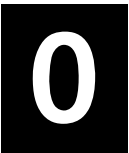
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| NP 32-125F | P1015 1010 | C | 1.526,- | 134 |
| NP 32-125S | P1015 1040 | C | 1.615,- | 134 |
| NP 32-160A | P1015 1060 | C | 1.705,- | 134 |
| NP 32-160B | P1015 1050 | C | 1.629,- | 134 |
| NP 32-200A | P1015 1090 | C | 2.056,- | 134 |
| NP 32-200D | P1015 1070 | C | 1.784,- | 134 |
| NP 32-3200C | P1015 1080 | C | 1.924,- | 134 |
| NP 40- 250 A | P1015 1220 | C | 3.261,- | 134 |
| NP 40-125A | P1015 1120 | C | 1.704,- | 134 |
| NP 40-125C | P1015 1110 | C | 1.629,- | 134 |
| NP 40-125F | P1015 1100 | C | 1.576,- | 134 |
| NP 40-160A | P1015 1150 | C | 2.010,- | 134 |
| NP 40-160B | P1015 1140 | C | 1.876,- | 134 |
| NP 40-160C | P1015 1130 | C | 1.738,- | 134 |
| NP 40-200 AR | P1015 1180 | C | 2.249,- | 134 |
| NP 40-200A | P1015 1190 | C | 2.380,- | 134 |
| NP 40-200B | P1015 1170 | C | 2.249,- | 134 |
| NP 40-200C | P1015 1160 | C | 2.109,- | 134 |
| NP 40-250B | P1015 1210 | C | 3.000,- | 134 |
| NP 40-250C | P1015 1200 | C | 2.793,- | 134 |
| NP 50-125A | P1015 1250 | C | 2.024,- | 134 |
| NP 50-125D | P1015 1240 | C | 1.890,- | 134 |
| NP 50-125F | P1015 1230 | C | 1.751,- | 134 |
| NP 50-160A | P1015 1270 | C | 2.350,- | 134 |
| NP 50-160B | P1015 1260 | C | 2.219,- | 134 |
| NP 50-200A | P1015 1290 | C | 2.885,- | 134 |
| NP 50-200B | P1015 1280 | C | 2.678,- | 134 |
| NP 50-250A | P1015 1320 | C | 3.625,- | 134 |
| NP 50-250B | P1015 1310 | C | 3.321,- | 134 |
| NP 50-250C | P1015 1300 | C | 3.059,- | 134 |
| NP 50MVC | P1015 1350 | C | 3.779,- | 134 |
| NP 50MD | P1015 1340 | C | 3.474,- | 134 |
| NP 50ME | P1015 1330 | C | 3.213,- | 134 |
| NP 65-125A | P1015 1380 | C | 2.399,- | 134 |
| NP 65-125C | P1015 1370 | C | 2.268,- | 134 |
| NP 65-125E | P1015 1360 | C | 2.128,- | 134 |
| NP 65-160A | P1015 1430 | C | 3.136,- | 134 |
| NP 65-160B | P1015 1420 | C | 2.874,- | 134 |
| NP 65-160C | P1015 1410 | C | 2.668,- | 134 |
| NP 65-160D | P1015 1400 | C | 2.408,- | 134 |
| NP 65-160E | P1015 1390 | C | 2.276,- | 134 |
| NP 65-200A | P1015 1460 | C | 4.029,- | 134 |
| NP 65-200B | P1015 1450 | C | 3.513,- | 134 |
| NP 65-200C | P1015 1440 | C | 3.209,- | 134 |
| NP 65-250A | P1015 1490 | C | 7.049,- | 134 |
| NP 65-250B | P1015 1480 | C | 5.638,- | 134 |
| NP 65-250C | P1015 1470 | C | 4.590,- | 134 |
| NP 80-1 60 A | P1015 1540 | C | 3.563,- | 134 |
| NP 80-160B | P1015 1530 | C | 3.258,- | 134 |
| NP 80-160C | P1015 1520 | C | 2.996,- | 134 |
| NP 80-160D | P1015 1510 | C | 2.789,- | 134 |
| NP 80-160E | P1015 1500 | C | 2.529,- | 134 |
| NP 80-200A | P1015 1560 | C | 5.598,- | 134 |
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| NP 80-250A | P1015 1610 | C | 10.298,- | 134 |
| NP 80-250B | P1015 1600 | C | 8.193,- | 134 |
| NP 80-250C | P1015 1590 | C | 7.145,- | 134 |
| NP 80-250D | P1015 1580 | C | 5.735,- | 134 |
| NP 80-250E | P1015 1570 | C | 4.688,- | 134 |
| NP-4 100-200A | P1015 2600 | C | 3.185,- | 135 |
| NP-4 100-200B | P1015 2590 | C | 3.043,- | 135 |
| NP-4 100-200C | P1015 2580 | C | 2.885,- | 135 |
| NP-4 100-250A | P1015 2620 | C | 3.851,- | 135 |
| NP-4 100-250B | P1015 2610 | C | 3.521,- | 135 |
| NP-4 100-315A | P1015 2650 | C | 5.175,- | 135 |
| NP-4 100-315B | P1015 2640 | C | 4.698,- | 135 |
| NP-4 100-315C | P1015 2630 | C | 4.111,- | 135 |
| NP-4 100-400A | P1015 2680 | C | 9.373,- | 135 |
| NP-4 100-400B | P1015 2670 | C | 7.894,- | 135 |
| NP-4 100-400C | P1015 2660 | C | 6.516,- | 135 |
| NP-4 125,250D | P1015 2700 | C | 3.678,- | 135 |
| NP-4 125,250C | P1015 2710 | C | 4.006,- | 135 |
| NP-4 125-250A | P1015 2730 | C | 4.593,- | 136 |
| NP-4 125-250B | P1015 2720 | C | 4.006,- | 135 |
| NP-4 125-250E | P1015 2690 | C | 3.471,- | 135 |
| NP-4 125-315A | P1015 2760 | C | 7.741,- | 136 |
| NP-4 125-315B | P1015 2750 | C | 6.365,- | 136 |
| NP-4 125-315C | P1015 2740 | C | 6.065,- | 136 |
| NP-4 125-400A | P1015 2790 | C | 12.078,- | 136 |
| NP-4 125-400B | P1015 2780 | C | 10.465,- | 136 |
| NP-4 125-400C | P1015 2770 | C | 9.539,- | 136 |
| NP-4 150-315A | P1015 2830 | C | 9.443,- | 136 |
| NP-4 150-315B | P1015 2820 | C | 7.964,- | 136 |
| NP-4 150-315C | P1015 2810 | C | 6.588,- | 136 |
| NP-4 150-315D | P1015 2800 | C | 6.289,- | 136 |
| NP-4 150-400A | P1015 2860 | C | 15.270,- | 136 |
| NP-4 150-400B | P1015 2850 | C | 12.771,- | 136 |
| NP-4 150-400C | P1015 2840 | C | 11.159,- | 136 |
| NP-4 32-125A | P1015 2030 | C | 1.525,- | 135 |

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| NP-4 32-125D | P1015 2020 | C | 1.525,- | 135 |
| NP-4 32-125F | P1015 2010 | C | 1.525,- | 135 |
| NP-4 32-160A | P1015 2050 | C | 1.540,- | 135 |
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| NP-4 32-200A | P1015 2070 | C | 1.695,- | 135 |
| NP-4 32-200B | P1015 2060 | C | 1.633,- | 135 |
| NP-4 40-125A | P1015 2100 | C | 1.539,- | 135 |
| NP-4 40-125C | P1015 2090 | C | 1.539,- | 135 |
| NP-4 40-125F | P1015 2080 | C | 1.539,- | 135 |
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| NP-4 40-160B | P1015 2120 | C | 1.586,- | 135 |
| NP-4 40-160C | P1015 2110 | C | 1.571,- | 135 |
| NP-4 40-200A | P1015 2150 | C | 1.776,- | 135 |
| NP-4 40-200B | P1015 2140 | C | 1.776,- | 135 |
| NP-4 40-250A | P1015 2180 | C | 2.330,- | 135 |
| NP-4 40-250B | P1015 2170 | C | 2.096,- | 135 |
| NP-4 40-250C | P1015 2160 | C | 1.960,- | 135 |
| NP-4 50-125A | P1015 2210 | C | 1.663,- | 135 |
| NP-4 50-125D | P1015 2200 | C | 1.600,- | 135 |
| NP-4 50-125F | P1015 2190 | C | 1.586,- | 135 |
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| NP-4 50-250A | P1015 2290 | C | 2.546,- | 135 |
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| NP-4 50-250C | P1015 2270 | C | 2.155,- | 135 |
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| NP-4 65-125E | P1015 2300 | C | 1.766,- | 135 |
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| NP-4 65-160B | P1015 2340 | C | 1.804,- | 135 |
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| NP-4 65-200A | P1015 2370 | C | 2.276,- | 135 |
| NP-4 65-200B | P1015 2360 | C | 2.043,- | 135 |
| NP-4 65-250A | P1015 2390 | C | 3.138,- | 135 |
| NP-4 65-250B | P1015 2380 | C | 2.995,- | 135 |
| NP-4 65-315A | P1015 2420 | C | 3.998,- | 135 |
| NP-4 65-315B | P1015 2410 | C | 3.668,- | 135 |
| NP-4 65-315C | P1015 2400 | C | 3.461,- | 135 |
| NP-4 80-160A | P1015 2450 | C | 2.091,- | 135 |
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| NP-4 80-200B | P1015 2470 | C | 2.796,- | 135 |
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| NP-4 80-250B | P1015 2500 | C | 3.235,- | 135 |
| NP-4 80-250C | P1015 2490 | C | 3.091,- | 135 |
| NP-4 80-315A | P1015 2540 | C | 4.600,- | 135 |
| NP-4 80-315B | P1015 2530 | C | 4.014,- | 135 |
| NP-4 80-315C | P1015 2520 | C | 4.014,- | 135 |
| NP-4 80-400A | P1015 2570 | C | 7.645,- | 135 |
| NP-4 80-400B | P1015 2560 | C | 6.269,- | 135 |
| NP-4 80-400C | P1015 2550 | C | 5.970,- | 135 |
| NTH 100 | 2001 1220 | C | 56,- | 56 |
| NTH 200 | 2001 1250 | C | 55,- | 56 |
| NTH 280 | 2001 1270 | C | 53,- | 56 |
| NTHK 100 | 6001 1220 | C | 56,- | 111 |
| NTHK 100 x 17 | 6001 3220 | C | 55,- | 111 |
| NTHK 200 | 6001 1250 | C | 49,- | 111 |
| NTHK 200 x 17 | 6001 3250 | C | 60,- | 111 |
| NTHK 280 | 6001 1270 | C | 51,- | 111 |
| NTUltraW 230 | 8609 1000 | C | 74,- add. | 148 |
| NTUltraW 24 | 8609 1000 | C | 72,- add. | 148 |
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| PL 100-007 | P1002 0110 | C | 619,- | 120 |
| P1000A | 4103 5540 | C | 56,- | 71 |
| P140A | 4103 5520 | C | 56,- | 71 |
| P2800A | 4103 5550 | C | 56,- | 71 |
| P32/10 | P1009 1020 | C | 198,- | 123 |
| P32/8 | P1009 1010 | C | 153,- | 123 |
| P40/10G | P1009 1030 | C | 369,- | 123 |
| P50/10 N | P1009 1040 | C | 368,- | 123 |
| P5000A | 4103 5560 | C | 56,- | 71 |
| P500A | 4103 5530 | C | 56,- | 71 |
| PGAS/O | 1005 1010 | C | on req. | 43 |
| PGAS/150 | 1005 1020 | C | on req. | 43 |
| PGAS/AS | 1005 1040 | C | on req. | 43 |
| PGAS/ER | 1005 1030 | C | on req. | 43 |
| PGAS/K | 1005 1050 | C | on req. | 43 |
| PGAS/SET | 1005 1000 | C | on req. | 43 |
| PULSEUltraW | 8609 1000 | C | 35,- add. | 148 |
| PULSEUltraW | 8609 1000 | C | 35,- add. | 148 |
| PV - 32-2/60 | P1004 3060 | C | 727,- | 121 |
| PV - 32-2/70 | P1004 3050 | C | 727,- | 121 |
| PV - 32-2/80 | P1004 3040 | C | 727,- | 121 |

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| PV - 32-4/60 | P1004 3030 | C | 769,- | 121 |
| PV - 32-4/70 | P1004 3020 | C | 769,- | 121 |
| PV - 32-4/80 | P1004 3010 | C | 769,- | 121 |
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| QUITT | 1005 0300 | C | 27,- | 43 |
| R | | | | |
| R+S FM17PF | 1901 8100 | C | on req. | 45 |
| R+S FM19PF | 1901 9100 | C | on req. | 45 |
| R+S FM22PF | 1901 1200 | C | on req. | 45 |
| R+S LZP | 1901 1000 | C | on req. | 45 |
| R+S LZP-LF | 1901 3100 | C | on req. | 45 |
| R+S TP-PC | 1901 1100 | C | on req. | 45 |
| RADIOmat | 8110 3010 | C | on req. | 139 |
| RADIOultraW | 8609 1000 | C | 93,- add. | 148 |
| RADIOXultraW | 8609 1000 | C | 107,- add. | 148 |
| RAH 230 | 4611 2300 | C | 69,- | 100 |
| RAH 24 | 4611 2400 | C | 69,- | 100 |
| RF 1 | 2104 4000 | A | 70,- | 52 |
| RF | 2104 2000 | A | 70,- | 52 |
| RG 215/4,0 | 4501 5000 | C | 132,- | 97 |
| RG 215NR 0,1 | 4501 5010 | C | 132,- | 97 |
| RG 215NR 0,16 | 4501 5020 | C | 132,- | 97 |
| RG 215NR 0,25 | 4501 5030 | C | 132,- | 98 |
| RG 215NR 0,4 | 4501 5040 | C | 132,- | 98 |
| RG 215NR 0,63 | 4501 5050 | C | 132,- | 98 |
| RG 215NR 1,0 | 4501 5060 | C | 132,- | 98 |
| RG 215NR 1,6 | 4501 5070 | C | 132,- | 98 |
| RG 215NR 2,5 | 4501 5080 | C | 132,- | 98 |
| RG 220/6,3 | 4501 5100 | C | 236,- | 97 |
| RG 220NR 1,0 | 4501 5110 | C | 236,- | 98 |
| RG 220NR 1,6 | 4501 5120 | C | 236,- | 98 |
| RG 220NR 2,5 | 4501 5130 | C | 236,- | 98 |
| RG 220NR 4,0 | 4501 5140 | C | 236,- | 98 |
| RG 225/8,0 | 4501 5200 | C | 241,- | 97 |
| RG 225NR 1,0 | 4501 5210 | C | 241,- | 98 |
| RG 225NR 1,6 | 4501 5220 | C | 241,- | 98 |
| RG 225NR 2,5 | 4501 5230 | C | 241,- | 98 |
| RG 225NR 4,0 | 4501 5250 | C | 241,- | 98 |
| RG 232/16 | 4501 5300 | C | 361,- | 97 |
| RG 240/20 | 4501 5400 | C | 409,- | 97 |
| RG 250/25 | 4501 5500 | C | 445,- | 97 |
| RG-A 15 | 4501 6100 | C | 19,- | 98 |
| RG-A 20 | 4501 6110 | C | 33,- | 98 |
| RG-A 25 | 4501 6120 | C | 41,- | 98 |
| RG-A 32 | 4501 6130 | C | 64,- | 98 |
| RG-A 40 | 4501 6140 | C | 86,- | 98 |
| RG-A 50 | 4501 6150 | C | 121,- | 98 |
| RG-AG 15 | 4501 6000 | C | 19,- | 98 |
| RG-AG 20 | 4501 6010 | C | 33,- | 98 |
| RG-AG 25 | 4501 6020 | C | 41,- | 98 |
| RG-AG 32 | 4501 6030 | C | 64,- | 98 |
| RG-AG 40 | 4501 6040 | C | 86,- | 98 |
| RG-AG 50 | 4501 6050 | C | 121,- | 98 |
| RG-F 15 | 4501 6200 | C | 129,- | 98 |
| RG-F 20 | 4501 6210 | C | 152,- | 98 |
| RG-F 25 | 4501 6220 | C | 170,- | 98 |
| RG-F 32 | 4501 6230 | C | 190,- | 98 |
| RG-F 40 | 4501 6240 | C | 194,- | 99 |
| RG-F 50 | 4501 6250 | C | 227,- | 99 |
| RGV 215/4 | 4231 2000 | C | 108,- | 86 |
| RGV 215NR 0,63 | 4231 2040 | C | 108,- | 86 |
| RGV 215NR 1,25 | 4231 2060 | C | 108,- | 86 |
| RGV 215NR 1,6 | 4231 2070 | C | 108,- | 86 |
| RGV 215NR 2,5 | 4231 2090 | C | 108,- | 86 |
| RGV 220/6,3 | 4231 2100 | C | 110,- | 86 |
| RGV 220NR 5 | 4231 2110 | C | 110,- | 86 |
| RGV 225/10 | 4231 2200 | C | 125,- | 86 |
| RGV 225NR 8 | 4231 2210 | C | 125,- | 86 |
| RGV 232/16 | 4231 2300 | C | 150,- | 86 |
| RGV 232NR 12,5 | 4231 2310 | C | 150,- | 86 |
| RGV 240/25 | 4231 2400 | C | 185,- | 86 |
| RGV 240NR 20 | 4231 2410 | C | 185,- | 86 |
| RGV 250/40 | 4231 2500 | C | 235,- | 86 |
| RGV 250NR 31,5 | 4231 2510 | C | 235,- | 86 |
| RGV 315/4 | 4232 2000 | C | 108,- | 87 |
| RGV 315NR 0,63 | 4232 2040 | C | 108,- | 87 |
| RGV 315NR 1,25 | 4232 2060 | C | 108,- | 87 |
| RGV 315NR 1,6 | 4232 2070 | C | 108,- | 87 |
| RGV 315NR 2,5 | 4232 2090 | C | 108,- | 87 |
| RGV 320/6,3 | 4232 2100 | C | 110,- | 87 |
| RGV 320NR 5 | 4232 2110 | C | 110,- | 87 |
| RGV 325/10 | 4232 2200 | C | 125,- | 87 |
| RGV 325NR 8 | 4232 2210 | C | 125,- | 87 |
| RGV 332/16 | 4232 2300 | C | 150,- | 87 |
| RGV 332NR 12,5 | 4232 2310 | C | 150,- | 87 |
| RGV 340/25 | 4232 2400 | C | 185,- | 87 |
| RGV 340NR 20 | 4232 2410 | C | 185,- | 87 |

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| RGV 350/40 | 4232 2500 | C | 235,- | 87 |
| RGV 350NR 31,5 | 4232 2510 | C | 235,- | 87 |
| roomBASE A1.230 | 1503 2220 | C | 42,- | 36 |
| roomBASE A1.24 | 1503 2120 | C | 80,- | 36 |
| roomBASE A6.230 | 1503 2210 | C | 94,- | 36 |
| roomBASE A6.24 | 1503 2110 | C | 123,- | 36 |
| roomBASE EB12 | 1503 2320 | C | 1.048,- | 37 |
| roomBASE EB6 | 1503 2310 | C | 714,- | 36 |
| roomBASE F12 | 1503 2420 | C | 452,- | 37 |
| roomBASE F6 | 1503 2410 | C | 343,- | 37 |
| roomMOD 2PM230 | 1503 3240 | C | 97,- | 37 |
| roomMOD 2PM24 | 1503 3140 | C | 92,- | 37 |
| roomMOD AM.230 | 1503 3210 | C | 50,- | 37 |
| roomMOD AM.24 | 1503 3110 | C | 50,- | 37 |
| roomMOD HK.24 | 1503 3150 | C | 97,- | 37 |
| roomMOD MS | 1503 3400 | C | 4,- | 37 |
| roomMOD PM.230 | 1503 3230 | C | 72,- | 37 |
| roomMOD PM.24 | 1503 3130 | C | 72,- | 37 |
| roomMOD RM.230 | 1503 3220 | C | 44,- | 37 |
| roomMOD RM.24 | 1503 3120 | C | 44,- | 37 |
| roomMOD S | 1503 3320 | C | on req. | 37 |
| roomMOD T | 1503 3310 | C | 157,- | 37 |
| roomMOD T | 1503 3310 | C | 157,- | 104 |
| roomUNIT 20.230 | 1503 1220 | C | 30,- | 35 |
| roomUNIT 20.24 | 1503 1210 | C | 30,- | 35 |
| roomUNIT 21.230 | 1503 1240 | C | 40,- | 35 |
| roomUNIT 21.230x | 1503 1260 | C | 62,- | 35 |
| roomUNIT 21.24 | 1503 1230 | C | 40,- | 35 |
| roomUNIT 21.24HK | 1503 1270 | C | 73,- | 35 |
| roomUNIT 21.24x | 1503 1250 | C | 62,- | 35 |
| roomUNIT 22.230 | 1503 1320 | C | 137,- | 35 |
| roomUNIT 22.24 | 1503 1310 | C | 137,- | 35 |
| roomUNIT 23.24HK | 1503 1330 | C | 65,- | 35 |
| roomUNIT 24.24HK | 1503 1340 | C | 74,- | 35 |
| roomUNIT 25.EB | 1503 1410 | C | 244,- | 36 |
| roomUNIT 26.F | 1503 1510 | C | 77,- | 36 |
| roomUNIT 26.Fx | 1503 1520 | C | 95,- | 36 |
| RPTR1 | 1903 6100 | C | 606,- | 49 |
| RS232ultraW | 8609 1000 | C | 29,- add. | 148 |
| RSTH 100/00 | 1002 1210 | C | 54,- | 50 |
| RSTH 12/00 | 1002 1010 | C | 40,- | 50 |
| RSTH 20/00 | 1002 1410 | C | 47,- | 50 |
| RSTH 200/00 | 1002 1310 | C | 72,- | 50 |
| RSTH 50/00 | 1002 1110 | C | 46,- | 50 |
| RT 1 | 5101 2000 | A | 138,- | 104 |
| RT 5 | 5102 2000 | A | 82,- | 104 |
| RU 62-00-010 | 1166 1100 | C | 670,- | 10 |
| RU 62-00-100 | 1166 2100 | C | 670,- | 10 |
| RU 63-1F-110 | 1165 2100 | C | 760,- | 10 |
| RU 63-1K-110 | 1165 1100 | C | 760,- | 10 |
| RU 64-00-020 | 1164 2100 | C | 820,- | 9 |
| RU 64-00-210 | 1164 3100 | C | 820,- | 9 |
| RU 64-1F-110 | 1164 4100 | C | 820,- | 9 |
| RU 64-1K-110 | 1164 1100 | C | 820,- | 9 |
| RU 65-00-040 | 1163 4100 | C | 1.190,- | 9 |
| RU 65-00-210 | 1163 3100 | C | 1.190,- | 9 |
| RU 65-1F-110 | 1163 2100 | C | 1.190,- | 9 |
| RU 65-1K-110 | 1163 1100 | C | 1.190,- | 9 |
| RU 66-00-130 | 1162 3100 | C | 1.470,- | 8 |
| RU 66-00-220 | 1162 4100 | C | 1.470,- | 8 |
| RU 66-1F-120 | 1162 2100 | C | 1.470,- | 8 |
| RU 66-1K-120 | 1162 1100 | C | 1.470,- | 8 |
| RU 67-00-040 | 1161 1100 | C | 1.540,- | 7 |
| RU 67-1F-030 | 1161 8100 | C | 1.540,- | 7 |
| RU 67-1K-030 | 1161 5100 | C | 1.540,- | 7 |
| RU 67-2F-010 | 1161 6100 | C | 1.540,- | 7 |
| RU 67-2F-100 | 1161 7100 | C | 1.540,- | 7 |
| RU 67-2K-010 | 1161 3100 | C | 1.540,- | 7 |
| RU 67-2K-100 | 1161 4100 | C | 1.540,- | 7 |
| RU 68-3E-240 | 1168 1100 | C | 1.920,- | 6 |
| RU 68-ER | 1168 2100 | C | 1.920,- | 6 |
| RU 69-2L2 | 1169 2100 | C | 1.720,- | 6 |
| RU 69-L2 | 1169 1100 | C | 1.390,- | 6 |
| RU 94.00-010 | 1453 1100 | C | 470,- | 29 |
| RU 94.00-100 | 1454 1100 | C | 470,- | 30 |
| RU 94.1F-110 | 1452 3100 | C | 470,- | 29 |
| RU 94.1K-110 | 1451 3100 | C | 470,- | 28 |
| RU 96.00-020 | 1453 1400 | C | 500,- | 29 |
| RU 96.1F-110 | 1452 2100 | C | 500,- | 29 |
| RU 96.1K-110 | 1451 2100 | C | 600,- | 28 |
| RU 96.1K-120 | 1451 2200 | C | 650,- | 28 |
| RU 96.CO/GM | 1497 1100 | C | 530,- | 31 |
| RU 96.CO/GM | 1497 1100 | C | 530,- | 42 |
| RU 96.L2 | 1455 1200 | C | 500,- | 30 |
| RU 98.1F-110 | 1452 1100 | C | 510,- | 28 |
| RU 98.1F-120 | 1452 1200 | C | 550,- | 29 |
| RU 98.1K-120 | 1451 1200 | C | 700,- | 28 |
| RU 98.1W-110 | 1458 1100 | C | 500,- | 31 |
| RU 98.CO/GM | 1497 1200 | C | 550,- | 31 |





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| RU 98.CO/GM | 1497 1200 | C | 550,- | 42 |
| RU 98.ER | 1456 1100 | C | 500,- | 30 |
| RU 98.L2 | 1455 1100 | C | 550,- | 30 |
| RU 98.MB | 1497 2100 | C | 530,- | 149 |
| RU 9SA.dap | 1410 1000 | C | 85,- | 32 |
| RU 9S.CS | 1459 2200 | C | 80,- | 32 |
| RU 9S.LON | 1459 4100 | C | on req. | 32 |
| RU 9SM | 1459 3000 | C | 120,- | 32 |
| RU 9SSK | 1459 1000 | C | 100,- | 32 |
| RU6S-CSM | 1167 2300 | C | 100,- add. | 11 |
| RV 5027 | 1501 0100 | A | 499,- | 33 |
| RV 7010N | 1501 1140 | C | 482,- | 34 |
| RV 9010 | 1501 0600 | A | 368,- | 33 |
| RV 9020 | 1501 0700 | A | 412,- | 33 |
| RW 5 | 5102 3000 | A | 111,- | 104 |
| RW 8* | 5103 4010 | A | 146,- | 104 |
| RW 9-E PLUS | 5103 6020 | C | 146,- | 104 |

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| S1A | 4103 5500 | C | 36,- | 71 |
| S2A | 4103 5510 | C | 49,- | 71 |
| SA 48 -/+ | 3101 0000 | C | 2,10 | 57 |
| SA 48 0/10 | 3101 0060 | C | 2,10 | 57 |
| SA 48 0/100 | 3101 0020 | C | 2,10 | 57 |
| SA 48 0/40 | 3101 0080 | C | 2,10 | 57 |
| SA 48 0/50 | 3101 0240 | C | 2,10 | 57 |
| SA 48 0/AUS/10 | 3101 0070 | C | 2,10 | 57 |
| SA 48 0/AUS/100 | 3101 0030 | C | 2,10 | 57 |
| SA 48 0/AUS/40 | 3101 0090 | C | 2,10 | 57 |
| SA 48 -10/10 | 3101 0210 | C | 2,10 | 57 |
| SA 48 10/50 | 3101 0220 | C | 2,10 | 57 |
| SA 48 10/N/35 | 3101 0200 | C | 2,10 | 57 |
| SA 48 100/150 | 3101 0180 | C | 2,10 | 57 |
| SA 48 100/AUS/150 | 3101 0190 | C | 2,10 | 57 |
| SA 48 -15/20 | 3101 0120 | C | 2,10 | 57 |
| SA 48 15/25 | 3101 0100 | C | 2,10 | 57 |
| SA 48 -15/AUS/20 | 3101 0130 | C | 2,10 | 57 |
| SA 48 15/AUS/25 | 3101 0110 | C | 2,10 | 57 |
| SA 48 -20/25 | 3101 0230 | C | 2,10 | 57 |
| SA 48 25/75 | 3101 0040 | C | 2,10 | 57 |
| SA 48 25/AUS/75 | 3101 0050 | C | 2,10 | 57 |
| SA 48 40/80 | 3101 0140 | C | 2,10 | 57 |
| SA 48 40/AUS/80 | 3101 0150 | C | 2,10 | 57 |
| SA 48 7,5/N/A/32,5 | 3101 0010 | C | 2,10 | 57 |
| SA 48 80/120 | 3101 0160 | C | 2,10 | 57 |
| SA 48 80/AUS/120 | 3101 0170 | C | 2,10 | 57 |
| SAN 15/15 B | P1003 1010 | C | 143,- | 120 |
| SAN 15/15 BT | P1003 1020 | C | 185,- | 120 |
| SAN 15/15 BTR | P1003 1030 | C | 221,- | 120 |
| SAN 15/40-130 | P1003 2010 | C | 135,- | 120 |
| SAN 15/60-130 | P1003 2040 | C | 137,- | 120 |
| SAN 20/40-130 | P1003 2020 | C | 135,- | 120 |
| SAN 20/40-150 | P1003 2110 | C | 154,- | 120 |
| SAN 20/60-130 | P1003 2050 | C | 137,- | 120 |
| SAN 20/60-150 | P1003 2130 | C | 155,- | 120 |
| SAN 20/70-130 | P1003 2070 | C | 165,- | 120 |
| SAN 25/40-130 | P1003 2030 | C | 135,- | 120 |
| SAN 25/40-150 | P1003 2120 | C | 157,- | 120 |
| SAN 25/60-130 | P1003 2060 | C | 137,- | 120 |
| SAN 25/60-ISO | P1003 2140 | C | 158,- | 120 |
| SAN 25/70-130 | P1003 2080 | C | 165,- | 120 |
| SAN 40-120 F | P1003 3010 | C | 1.136,- | 120 |
| SAN 40-70 F | P1003 3020 | C | 1.106,- | 120 |
| SAN 50-120 F | P1003 3030 | C | 1.321,- | 120 |
| SAN 50-70 F | P1003 3040 | C | 1.245,- | 120 |
| SAN 65-120 F | P1003 3050 | C | 1.441,- | 120 |
| SAN 65-70 F | P1003 3060 | C | 1.343,- | 120 |
| SBT100-0 | 4220 0100 | C | 379,- | 92 |
| SBT100-1 | 4220 0110 | C | 519,- | 92 |
| SBT200-0 | 4220 0200 | C | 557,- | 92 |
| SBT200-1 | 4220 0210 | C | 762,- | 92 |
| SCADA-1000 | 1902 4010 00 | C | on req. | 45 |
| SCADA-1500 | 1902 4015 00 | C | on req. | 45 |
| SCADA-200 | 1902 4000 00 | C | on req. | 45 |
| SCADA-2000 | 1902 4020 00 | C | on req. | 45 |
| SCADA-3000 | 1902 4025 00 | C | on req. | 45 |
| SCADA-4000 | 1902 4030 00 | C | on req. | 46 |
| SCADA-500 | 1902 4005 00 | C | on req. | 45 |
| SCADA-5000 | 1902 4035 00 | C | on req. | 46 |
| SCADA-CR | 1902 4205 00 | C | on req. | 46 |
| SCADA-EMAIL | 1902 4215 00 | C | on req. | 46 |
| SCADA-EXCEL | 1902 4220 00 | C | on req. | 46 |
| SCADA-FAX | 1902 4210 00 | C | on req. | 46 |
| SCADA-MM | 1902 4200 00 | C | on req. | 46 |
| SCADA-PL1 | 1902 4300 00 | C | on req. | 46 |
| SCADA-PL1-WEB | 1902 4300 10 | C | on req. | 46 |
| SCADA-PL2-4 | 1902 4305 00 | C | on req. | 46 |
| SCADA-PL2-4-WEB | 1902 4305 10 | C | on req. | 46 |
| SCADA-PL5-10 | 1902 4310 00 | C | on req. | 46 |

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| SCADA-PL5-10-WEB | 1902 4310 10 | C | on req. | 46 |
| SCADA-TREIBER | 1902 4240 00 | C | on req. | 46 |
| SCADA-TREIBER1000 | 1902 4235 00 | C | on req. | 46 |
| SCADA-TREIBER200 | 1902 4230 00 | C | on req. | 46 |
| SCADA-WEBSEVER | 1902 4225 00 | C | on req. | 46 |
| SDBAM 16 | 6302 1020 | C | 328,- | 110 |
| SDBAM 6 | 6302 1010 | C | 370,- | 110 |
| SF | 2601 0000 | C | 509,- | 55 |
| SGA 24 | 4103 5570 | C | 75,- | 71 |
| SH MP | 1221 2001 | - | (net) 80,- | 15 |
| SH RU 9X | 1411 2001 | - | (net) 54,- | 32 |
| SH UPK 1 | 1310 3001 | - | (net) 55,- | 25 |
| SH UPK 2 | 1310 3101 | - | (net) 44,- | 25 |
| SH UPK 3 | 1310 3201 | - | (net) 44,- | 25 |
| SI/MHyK | 2202 2100 | C | 43,- | 54 |
| SM 1500 | 4102 2000 | C | 237,- | 65 |
| SM 1500/24 | 4102 2020 | C | 248,- | 65 |
| SM 2010 | 4102 7500 | C | 130,- | 65 |
| SM 2010 /L | 4102 7510 | C | 130,- | 65 |
| SM 230A | 4103 3010 | C | 134,- | 69 |
| SM 230A-S | 4103 3020 | C | 166,- | 69 |
| SM 24A | 4103 3030 | C | 130,- | 69 |
| SM 24A-S | 4103 3040 | C | 166,- | 69 |
| SM 24A-SR | 4103 3050 | C | 195,- | 69 |
| SM 4007 | 4102 8200 | C | 97,- | 65 |
| SM 4007/24 | 4102 8210 | C | 103,- | 65 |
| SM 4007/24/SR | 4102 8220 | C | 140,- | 65 |
| SM 4018 | 4102 8000 | C | 175,- | 66 |
| SM 4018/24 | 4102 8010 | C | 179,- | 66 |
| SM 4018/24/SR | 4102 8020 | C | 256,- | 66 |
| SM 4020 | 4102 8100 | C | 195,- | 66 |
| SM 4020/24 | 4102 8110 | C | 199,- | 66 |
| SM 4020/24/SR | 4102 8120 | C | 263,- | 66 |
| SM 500 | 4102 1000 | C | 282,- | 65 |
| SM 6000 | 4102 3000 | C | 252,- | 65 |
| SM 6000/24 | 4102 3020 | C | 276,- | 65 |
| SM 6025 | 4102 4000 | C | 232,- | 65 |
| SM E100 | 4102 6000 | C | on req. | 65 |
| SM E60 | 4102 5000 | C | on req. | 65 |
| SPG 40 | P1007 1010 | C | 138,- | 123 |
| SPG 50 | P1007 1020 | C | 201,- | 123 |
| SPH24-0 | 4210 1000 | C | 174,- | 91 |
| SPH24-1 | 4210 1100 | C | 263,- | 91 |
| SPN 40 | P1007 1030 | C | 157,- | 123 |
| SPN 50 | P1007 1040 | C | 254,- | 123 |
| SPN 60 | P1007 1050 | C | 332,- | 123 |
| SS100 | 4220 1280 | C | 625,- | 91 |
| SS125 | 4220 1290 | C | 884,- | 91 |
| SS150 | 4220 1300 | C | 1.197,- | 91 |
| SS15-25 | 4220 1200 | C | 211,- | 91 |
| SS32 | 4220 1230 | C | 234,- | 91 |
| SS40 | 4220 1240 | C | 234,- | 91 |
| SS50 | 4220 1250 | C | 260,- | 91 |
| SS65 | 4220 1260 | C | 356,- | 91 |
| SS80 | 4220 1270 | C | 447,- | 91 |
| SSU | 1903 3100 | C | 1.052,- | 48 |
| SSU 1 | 1903 3200 | C | 455,- | 48 |
| SSU-ESA | 1903 3500 | C | 300,- | 48 |
| SSU-ESA2 | 1903 3700 | C | 400,- | 48 |
| SSU-ESW | 1903 3600 | C | 600,- | 48 |
| SSU-M250 | 1303 2200 | C | 2049,- | 25 |
| SSU-M60 | 1303 2100 | C | 581,- | 25 |
| ST/MVF 125-150 | 4003 3020 | C | 140,- | 103 |
| ST/MVF 15-100 | 4003 3010 | C | 100,- | 103 |
| ST/MVF-O/15-100 | 4003 3030 | C | 100,- | 103 |
| ST/MVG(X) | 4003 2010 | C | 19,- | 103 |
| STB 20/150-150 | 6106 5240 | C | on req. | 107 |
| STB 20/150-200 | 6106 5250 | C | on req. | 107 |
| STB 30/110-150 | 6106 5210 | C | 101,- | 107 |
| STB 30/110-200 | 6106 5220 | C | on req. | 107 |
| STB 60/130-150 | 6106 5230 | C | on req. | 107 |
| STN/HMVF 15-50 | 4003 1100 | C | 22,- | 103 |
| STN/HMVF 65-100 | 4003 1200 | C | 50,- | 103 |
| STROMUltra 230 | 8219 1050 | C | o. add. | 140 |
| STROMUltra 24 | 8219 1060 | C | o. add. | 140 |
| STROMUltra X230 | 8219 1020 | C | 10,- add. | 141 |
| STROMUltra X24 | 8219 1030 | C | 10,- add. | 141 |
| STW 20/150-150 | 6106 3030 | C | 95,- | 107 |
| STW 20/90-100V4A | 6106 3040 | C | 112,- | 107 |
| STW 60/130-150 | 6106 3010 | C | 95,- | 107 |

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| TH 100 | 2001 1120 | C | 21,- | 55 |
| TH 15/100 V4A | 6001 2220 | C | 32,- | 111 |
| TH 15/120 V4A | 6001 2230 | C | on req. | 111 |
| TH 15/150 MS | 6001 2140 | C | on req. | 110 |
| TH 15/150 V4A | 6001 2240 | C | 34,- | 111 |
| TH 15/200 V4A | 6001 2250 | C | on req. | 111 |
| TH 15/250 V4A | 6001 2260 | C | on req. | 111 |

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| TH 200 | 2001 1150 | C | 23,- | 55 |
| TH 280 | 2001 1170 | C | 31,- | 55 |
| TH 55 | 2001 1110 | C | 18,- | 55 |
| TH 8/150 MS | 6001 0140 | C | on req. | 110 |
| TH 8/150 V4A | 6001 0240 | C | on req. | 111 |
| TH 8/200 V4A | 6001 0250 | C | on req. | 111 |
| TH 8/300 V4A | 6001 0280 | C | on req. | 111 |
| TH/MS | 2001 1100 | C | 33,- | 55 |
| TH/MTF 120 V4A | 2001 2220 | C | 37,- | 56 |
| TH/MTF 170 V4A | 2001 2240 | C | 39,- | 56 |
| TH/MTF 220 V4A | 2001 2250 | C | 42,- | 56 |
| TH/MTF 310 V4A | 2001 2260 | C | 46,- | 56 |
| TH/V4A | 2001 1200 | C | 90,- | 55 |
| thermoCLOCK A1 | 6102 2120 | C | 156,- | 106 |
| thermoCLOCK AH1 | 6102 2220 | C | 182,- | 106 |
| TR 20/90-100 | 6106 1210 | C | 84,- | 107 |
| TR 20/90-300 | 6106 1220 | C | 88,- | 107 |
| TR 30/110-100 | 6106 1230 | C | on req. | 107 |
| TR 30/110-150 | 6106 1240 | C | on req. | 107 |
| TR 50/150-150 | 6106 1260 | C | on req. | 107 |
| TR/STB 0/70-150 | 6107 3310 | C | on req. | 108 |
| TR/STB 0/70-250 | 6107 3320 | C | on req. | 108 |
| TR/STB 20/120-150 | 6107 3340 | C | 147,- | 108 |
| TR/STB 20/150-150 | 6107 3350 | C | 147,- | 108 |
| TR/STB 30/110-150 | 6107 3330 | C | 147,- | 108 |
| TR/STB 30-100/110-120 | 6107 3220 | C | on req. | 108 |
| TR/STB 30-90/100-120 | 6107 3210 | C | on req. | 108 |
| TR/STB 40-110/120-120 | 6107 3230 | C | on req. | 108 |
| TR/STW 0/70-150 | 6107 5010 | C | 136,- | 108 |
| TR/STW 0/70-250 | 6107 5020 | C | on req. | 108 |
| TR/STW 20/150-150 | 6107 5050 | C | 136,- | 108 |
| TR/STW 30/110-150 | 6107 5030 | C | 136,- | 108 |
| TR/STW 60/130-150 | 6107 5040 | C | 136,- | 108 |
| TW 0/50-100 | 6106 2210 | C | 81,- | 107 |
| TW 20/90-100 | 6106 2220 | C | 81,- | 107 |
| TW 30/110-100 | 6106 2230 | C | 81,- | 107 |
| TW 30/110-200 | 6106 2240 | C | 83,- | 107 |
| TW 50/150-150 | 6106 2250 | C | on req. | 107 |
| TW 50/150-200 | 6106 2260 | C | on req. | 107 |
| TW/STB 30/110-150 | 6107 6010 | C | 151,- | 108 |
| TW/STB 30/110-250 | 6107 6020 | C | 150,- | 108 |
| TW/STW 30/110-150 | 6107 7030 | C | on req. | 109 |

U

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| UDO | 5120 1000 | A | 6,- | 104 |
| ÜSBUS | 1004 4010 | C | 196,- | 50 |
| UF | 2105 2100 | A | 41,- | 52 |
| UF 3 TH MS | 2106 4200 | C | 92,- | 53 |
| UF 3 TH V4A | 2106 4100 | C | 223,- | 53 |
| UF-SOL 1 | 2105 3200 | C | 19,- | 52 |
| UF-SOL 3 | 2105 3300 | C | 47,- | 52 |
| UFTH MS | 2106 3200 | A | 100,- | 53 |
| UFTH V4A | 2106 3100 | A | 192,- | 53 |
| UPK00-130 SM | 1301 0311 40 | C | 1.831,- | 22 |
| UPK00-160 SM | 1301 0314 40 | C | 2.639,- | 22 |
| UPK1F-120 | 1301 0211 00 | C | 1.723,- | 21 |
| UPK1F-120 SMS | 1301 0211 60 | C | 1.886,- | 21 |
| UPK1F-130 | 1301 0212 00 | C | 1.995,- | 21 |
| UPK1F-130 SMS | 1301 0212 60 | C | 2.253,- | 21 |
| UPK1F-140 | 1301 0213 00 | C | 2.082,- | 22 |
| UPK1F-140 SMS | 1301 0213 60 | C | 2.340,- | 22 |
| UPK1F-150 | 1301 0214 00 | C | 2.318,- | 22 |
| UPK1F-150 SMS | 1301 0214 60 | C | 2.575,- | 22 |
| UPK1K-11L2 S | 1301 0511 30 | C | 1.844,- | 23 |
| UPK1K-11L2 SMS | 1301 0511 60 | C | 2.003,- | 23 |
| UPK1K-120 | 1301 0111 00 | C | 1.727,- | 19 |
| UPK1K-120 SMS | 1301 0111 60 | C | 1.889,- | 19 |
| UPK1K-130 | 1301 0112 00 | C | 1.768,- | 19 |
| UPK1K-130 SMS | 1301 0112 60 | C | 1.959,- | 19 |
| UPK1K-140 | 1301 0113 00 | C | 2.552,- | 20 |
| UPK1K-140 SMS | 1301 0113 60 | C | 2.808,- | 20 |
| UPK1K-150 | 1301 0114 00 | C | 2.639,- | 20 |
| UPK1K-150 SMS | 1301 0114 60 | C | 2.897,- | 20 |
| UPK2K-030 | 1301 0121 00 | C | 2.786,- | 20 |
| UPK2K-030 SMS | 1301 0121 60 | C | 3.045,- | 20 |
| UPK2K-120 | 1301 0122 00 | C | 2.786,- | 20 |
| UPK2K-120 SMS | 1301 0122 60 | C | 3.045,- | 20 |
| UPK2K-130 | 1301 0123 00 | C | 3.460,- | 21 |
| UPK2K-130 SMS | 1301 0123 60 | C | 3.718,- | 21 |
| UPK2L2.1 S | 1301 0423 30 | C | 1.919,- | 23 |
| UPK2L2.1 SM | 1301 0423 40 | C | 2.011,- | 23 |
| UPK3K-110 | 1301 0131 00 | C | 3.314,- | 21 |
| UPK3K-110 SMS | 1301 0131 60 | C | 3.572,- | 21 |
| UPK.CO S | 1301 0021 30 | C | on req. | 42 |
| UPK.CO/GM | 1301 0021 00 | C | on req. | 42 |
| UPK.CO/GM S | 1301 0021 30 | C | on req. | 24 |
| UPKL2.0 S | 1301 0413 30 | C | 1.441,- | 23 |
| UPKL2.0 SM | 1301 0413 40 | C | 1.720,- | 23 |

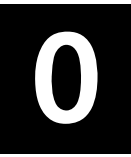
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| UPKServ | 1301 0030 00 | C | 49,- | 24 |
| UPKX2 | 1301 0611 00 | C | on req. | 24 |
| UPKX2 SMS | 1301 0611 60 | C | on req. | 24 |
| USV/10 | 1005 0220 | C | on req. | 43 |
| USV/5 | 1005 0200 | C | on req. | 43 |
| USV/7 | 1005 0210 | C | on req. | 43 |
| UW 6 | 5105 1000 | A | 146,- | 104 |
| UWZdate | 8110 2010 | C | 75,- | 139 |
| UWZm-bus | 8110 2030 | C | on req. | 139 |
| UWZpulse | 8110 2020 | C | 34,- | 139 |
| UWZradio | 8110 2000 | C | on req. | 139 |

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| VF | 2102 2000 | A | 50,- | 51 |
| VFTH 120 MS | 2103 5100 | A | 85,- | 52 |
| VFTH 120V2A | 2103 5200 | A | 118,- | 52 |
| VFTH 310 MS | 2103 6100 | A | 113,- | 52 |
| VFTH 310V2A | 2103 6200 | A | 163,- | 52 |
| VPE 3 - 45 | P1010 1010 | C | 700,- | 124 |
| VPE 3 - 70 | P1010 1020 | C | 788,- | 124 |
| VPE 3 - 90 | P1010 1030 | C | 900,- | 124 |
| VPE 4 - 120/5 | P1010 1110 | C | 713,- | 124 |
| VPE 4 - 125/8 | P1010 1140 | C | 875,- | 124 |
| VPE 4 - 150/2 | P1010 1050 | C | 688,- | 124 |
| VPE 4 - 175/5 | P1010 1120 | C | 938,- | 124 |
| VPE 4 - 300/3 | P1010 1090 | C | 1.050,- | 124 |
| VPE 4 - 50/20 | P1010 1170 | C | 825,- | 124 |
| VPE 4 - 60/5 | P1010 1100 | C | 500,- | 124 |
| VPE 4 - 60/8 | P1010 1130 | C | 600,- | 124 |
| VPE 4 - 75/2 | P1010 1040 | C | 500,- | 124 |
| VPE 4 - 75/3 | P1010 1070 | C | 475,- | 124 |
| VPE 4 -150/3 | P1010 1080 | C | 650,- | 124 |
| VPE 4 -230/2 | P1010 1060 | C | 913,- | 124 |
| VPE 4 -55/12 | P1010 1150 | C | 638,- | 124 |
| VPE 4 -SO/ 12 | P1010 1160 | C | 800,- | 124 |
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| VPT 3 - 45 | P1010 1180 | C | 688,- | 124 |
| VPT 3 - 70 | P1010 1190 | C | 775,- | 124 |
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| VPT 4 - 150/2 | P1010 1230 | C | 688,- | 124 |
| VPT 4 - 175/5 | P1010 1300 | C | 850,- | 124 |
| VPT 4 - 230/2 | P1010 1240 | C | 888,- | 124 |
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| VPT 4 - 50/20 | P1010 1390 | C | 763,- | 124 |
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| VPT 4 - 70/20 | P1010 1400 | C | 938,- | 124 |
| VPT 4 - 80/12 | P1010 1360 | C | 700,- | 124 |
| VPT 4 - 95/20 | P1010 1410 | C | 1.275,- | 124 |
| VPT 4 - 120/5 | P1010 1290 | C | 663,- | 124 |
| VPT 4 -130/20 | P1010 1420 | C | 1.575,- | 124 |
| VPT 4 -145/12 | P1010 1370 | C | 1.188,- | 124 |
| VPT 4 -170/20 | P1010 1430 | C | 1.950,- | 124 |
| VPT 4 -205/12 | P1010 1380 | C | 1.425,- | 124 |
| VPT 4 -205/8 | P1010 1340 | C | 1.338,- | 124 |
| VPT 4 -300/3 | P1010 1270 | C | 863,- | 124 |
| VPT 4 -55/12 | P1010 1350 | C | 588,- | 124 |
| VPT 4 -60/5 | P1010 1280 | C | 488,- | 124 |
| VPT 4 -75/3 | P1010 1250 | C | 463,- | 124 |
| VPT 4 -ISO/ 3 | P1010 1260 | C | 625,- | 124 |
| VPT 4-75/2 | P1010 1220 | C | 488,- | 124 |
| VSultraF 0,6 | 8210 2000 | C | 363,- | 140 |
| VSultraF 1,5 | 8210 2010 | C | 363,- | 140 |
| VSultraF 10,0 | 8210 2050 | C | 965,- | 140 |
| VSultraF 2,5 | 8210 2020 | C | 363,- | 140 |
| VSultraF 3,5 | 8210 2030 | C | 631,- | 140 |
| VSultraF 6,0 | 8210 2040 | C | 631,- | 140 |
| VSultraG 0,6 | 8210 1000 | C | 272,- | 140 |
| VSultraG 1,5 | 8210 1010 | C | 281,- | 140 |
| VSultraG 10,0 | 8210 1050 | C | 701,- | 140 |
| VSultraG 2,5 | 8210 1020 | C | 292,- | 140 |
| VSultraG 3,5 | 8210 1030 | C | 526,- | 140 |
| VSultraG 6,0 | 8210 1040 | C | 526,- | 140 |
| VSultraXF 0,6 | 8210 4000 | C | 363,- | 141 |
| VSultraXF 1,5 | 8210 4010 | C | 363,- | 141 |
| VSultraXF 10,0 | 8210 4050 | C | 965,- | 141 |
| VSultraXF 2,5 | 8210 4020 | C | 363,- | 141 |
| VSultraXF 3,5 | 8210 4030 | C | 631,- | 141 |
| VSultraXF 6,0 | 8210 4040 | C | 631,- | 141 |
| VSultraXG 0,6 | 8210 3000 | C | 272,- | 141 |
| VSultraXG 1,5 | 8210 3010 | C | 281,- | 141 |
| VSultraXG 10,0 | 8210 3050 | C | 701,- | 141 |
| VSultraXG 2,5 | 8210 3020 | C | 292,- | 141 |
| VSultraXG 3,5 | 8210 3030 | C | 526,- | 141 |
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| WAHU | 1005 0100 | C | 48,- | 43 |
| WBLG/1 | 1005 0020 | C | 353,- | 43 |



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| WBLG/2 | 1005 0040 | C | 449,- | 43 |
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| WBLG/4 | 1005 0080 | C | 353,- | 43 |
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| WFX | 2501 1000 | C | 419,- | 54 |
| WMultraF 0,6 | 8601 2000 | C | 413,- | 148 |
| WMultraF 1,5 | 8601 2010 | C | 413,- | 148 |
| WMultraF 10,0 | 8601 2050 | C | 933,- | 148 |
| WMultraF 2,5 | 8601 2020 | C | 413,- | 148 |
| WMultraF 3,5 | 8601 2030 | C | 610,- | 148 |
| WMultraF 6,0 | 8601 2040 | C | 660,- | 148 |
| WMultraG 0,6 | 8601 1000 | C | 313,- | 148 |
| WMultraG 1,5 | 8601 1010 | C | 323,- | 148 |
| WMultraG 10,0 | 8601 1050 | C | 699,- | 148 |
| WMultraG 2,5 | 8601 1020 | C | 337,- | 148 |
| WMultraG 3,5 | 8601 1030 | C | 510,- | 148 |
| WMultraG 6,0 | 8601 1040 | C | 510,- | 148 |
| WR 81009 | 6109 1030 | C | 115,- | 109 |
| WR 81029 | 6109 1020 | C | 96,- | 109 |
| WR 81101 | 6109 2010 | C | 110,- | 109 |
| WR 81109 | 6109 2020 | C | 110,- | 109 |
| WWZmess 1,5 | 8110 1100 | C | 27,- | 139 |
| WWZmess 2,5 | 8110 1110 | C | 35,- | 139 |

Z

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| ZAD 24 | 4103 5580 | C | 312,- | 71 |
| ZHM SR/24 | 4106 1060 | C | 159,- | 73 |
| ZHM SR/24 | 4106 1060 | C | 159,- | 102 |
| ZHM24 | 4106 1030 | C | 122,- | 73 |
| ZHM24 | 4106 1030 | C | 122,- | 102 |
| ZHMTU | 4106 2010 | C | 26,- | 73 |
| ZHMTU | 4106 2010 | C | 26,- | 102 |
| ZHMTU/24 | 4106 2040 | C | 26,- | 73 |
| ZHMTU/24 | 4106 2040 | C | 26,- | 102 |
| zoneADAP xx | 4106 9xxx | C | on req. | 73 |
| zoneVALVE NC230 | 4106 3100 | C | 26,- | 73 |
| zoneVALVE NC24 | 4106 3000 | C | 26,- | 73 |
| zoneVALVE NC.SR | 4106 3200 | C | 59,- | 73 |
| zoneVALVE NC.SRP | 4106 3300 | C | 56,- | 73 |
| zoneVALVE NO.230 | 4106 3110 | C | 26,- | 73 |
| zoneVALVE NO.24 | 4106 3010 | C | 26,- | 73 |
| ZTA.1 | 6101 1000 | C | 33,- | 106 |
| ZV 210 | 4621 1900 | C | 15,- | 101 |
| ZV 210/V | 4621 1910 | C | 12,- | 101 |
| ZV 215 | 4621 2000 | C | 16,- | 101 |
| ZV 215/V | 4621 2010 | C | 14,- | 101 |
| ZV 220 | 4621 2100 | C | 21,- | 101 |
| ZV 220/V | 4621 2110 | C | 18,- | 101 |
| ZV 225 | 4621 2200 | C | 34,- | 101 |
| ZV 232 | 4621 2300 | C | 55,- | 101 |
| ZV 315 | 4622 3000 | C | 50,- | 101 |
| ZV 320 | 4622 3100 | C | 55,- | 101 |
| ZV 325 | 4622 3200 | C | 68,- | 101 |
| ZV3SN15 | 4601 3000 | C | 1,- | 102 |
| ZV3SN20 | 4601 3100 | C | 3,- | 102 |
| ZV3SN25 | 4601 3200 | C | 4,- | 102 |
| ZVM 215 | 4611 2000 | C | 26,- | 100 |
| ZVM 220 | 4611 2100 | C | 33,- | 100 |
| ZVM 225 | 4611 2200 | C | 53,- | 100 |
| ZVM 315 | 4612 2000 | C | 39,- | 100 |
| ZVM 320 | 4612 2100 | C | 40,- | 100 |
| ZVM 325 | 4612 2200 | C | 52,- | 100 |

1. Electronic Controllers and Control Systems

| | | |
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| | Ventilation Controller for up to 2 Ventilation Systems (je 4 sequences) | |
| | Single room controller for up to 12 Rooms (heating/cooling) | |
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| | Boiler Controller for up to 2 Boiler | |
| | District Heating Controller for up to 2 heat exchanger | |
| | Controller for up to 4 mixed heating circuits | |
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| | Boiler Controller | |
| | District Heating Controller | |
| | Controller for up to 3 mixed heating circuits | |
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| | Boiler Controller | |
| | District Heating Controller | |
| | Controller for up to 4 heating circuits (2-point) | |
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| | Boiler Controller | |
| | District Heating Controller | |
| | Controller for up to 2 mixed heating circuits | |
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1.0 DDC-Regel UNIT 5X



The DDC-RegelUNIT 5X were „the“ digital compact controller in the last years. The simple operation, the easy operating manual and the absolute reliability were the main factors for the great success of this controller. Our customers loved it, our competitors dreaded the functionality and tried to copy it. The logical solution was to top the compact controllers with a new development with the DDC-RegelUNIT 6X series, based on the DDC-Regel UNIT 5X. You can still get a certain amount of the DDC-RegelUNIT 5X (as long as controllers are available) but the new controller is absolutely compatible to the older version. Because of the additional functions in the new version, you could add functionality to existing systems. (New Functions, new interfaces etc.)

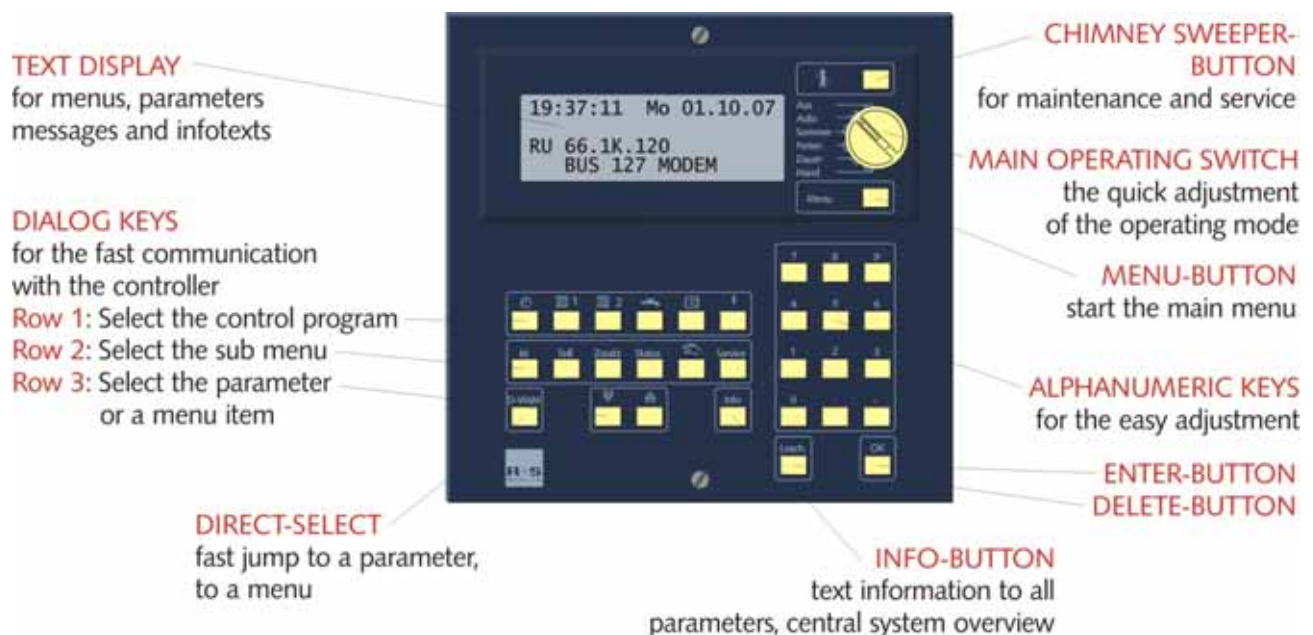
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| RU 57-00-040 (M) | RU 67-00-040 | RU 56-1F-120 (V) | RU 66-1F-120 | RU 54-1F-110 (B) (V) | RU 64-1F-110 |
| RU 57-2K-010 | RU 67-2K-010 | RU 56-00-130 | RU 66-00-130 | RU 54-00-020 | RU 64-00-020 |
| RU 57-2K-100 | RU 67-2K-100 | RU 56-00-220 | RU 66-00-220 | RU 54-00-210 | RU 64-00-210 |
| RU 57-1K-030 | RU 67-1K-030 | RU 55-1K-110 (B) | RU 65-1K-110 | RU 53-1K-110 (B) | RU 63-1K-110 |
| RU 57-2F-010 | RU 67-2F-010 | RU 55-1F-110 (B) (V) | RU 65-1F-110 | RU 53-1F-110 (B) (V) | RU 63-1F-110 |
| RU 57-2F-100 | RU 67-2F-100 | RU 55-00-210 | RU 65-00-210 | RU 52-00-010 (B) | RU 62-00-010 |
| RU 57-1F-030 (V) | RU 67-1F-030 | RU 55-00-040 | RU 65-00-040 | RU 52-00-100 (B) | RU 62-00-100 |
| RU 56-1K-120 | RU 66-1K-120 | RU 54-1K-110 (B) | RU 64-1K-110 | | |

We are happy to introduce to you the successor to the DDC-Regel UNIT 5X.

1.1 DDC-Regel UNIT 6X



The DDC-Regel UNIT RU 6X can be used in boiler systems, in district heating systems, with heat pumps in valvation systems etc. or you can combine up to 3 different heating sources and control them most effectively (i.e. oil boiler, heat pump, solar). They can be used in all kinds of projects i.e. public houses, office buildings, apartment blocks, housing projects or private homes.



The DDC-RegelUNITs 6X has a number of basic functions and numerous additional service functions, which can be activated, to configure the controller exactly as needed in your plant. There are functions which raise the comfort or which help to conserve energy (selflearning adaptation etc.) The dialog is simple, the menu structure is clear. The new controller series replaces not only the known DDC-RegelUNIT 5X but offers a number of new possibilities due to the new hardware and software configuration, i.e. 3 boiler plants, valvation systems with up to 4 sequences.

The new controller DDC-RegelUNIT 6X is able to replace the older version without any changes to the wiring. (Maybe rewiring the ground, if needed). On top you have the possibility to include additional tasks into your system, which were not possible because of missing I/O terminals. The DDC-RegelUNIT 6X can be equipped with a CAN-interface, enabling you to connect additional CAN-IO-Moduls with additional I/O terminals.

HARDWARE UPGRADE:

The Upgrade of the **DDC-RegelUNIT** includes a number of changes in the hardware, that improve the functionality of the controller: The text display with 4 rows of text is now backlit, giving you a much look into the heart of the controller even in dark cellars. You never again have to change a battery; the controller is equipped with a condenser, keeping the real time clock up to date for at least 5 days. You also never again have to change an EPROM if you want to update your controller. The operating system and the program library are in Flash-Memory, which can be upgraded any time by connecting a PC or a notebook. The hardware offers also 2 continuous outputs and 4 multifunctional terminals, which can be used either als inputs or as outputs

INTERFACES + ADDITIONAL PROGRAMS:

The service-interface at the front of the controller to communicate with a PC or a notebook has been adapted from the **DDC-RegelUNIT 9X**. In addition all **DDC-RegelUNIT 6X** family are equipped with the SSK1-interface (PC, Bus, Modem).

Optional you can include a central interface card into the new controller equipped with the M-Bus interface and/or CAN-Bus-interface. The CAN-Bus interface can be used to connect remote control units or additional **CAN-IO-Moduls** to expand the number of I/O terminals. All **CAN-IO-Moduls** have up to 16 terminals. You can choose between input moduls and output moduls or mixed moduls with 8 inputs and 8 outputs

To connect any kind of meter (electricity, gas, heat, water etc.) the controller can be equipped with a M-Bus interface.

The software package was extended with a number of additional programs:

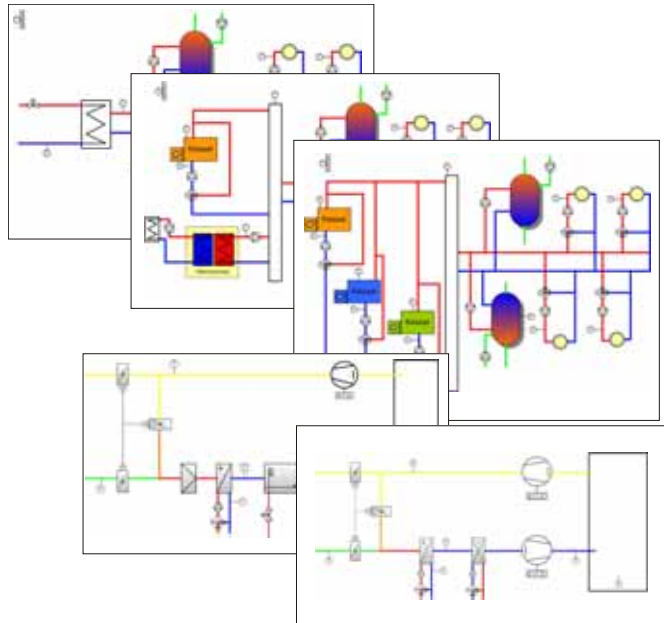
10 x trend recording, 2 x PID-universalcontroller, 8 x maintenance message and 20 x virtual terminal.



SOFTWARE DEVELOPMENT

Thanks to the hardware upgrade the controller is able to run up to **9 control programs**. As a heat producer, the controller can control not only boilers and district heating units but also heat pumps. To run these heat producers in an effective way, the controller has an additional strategy circuit which is responsible that you always run a most sufficient heating system.

The connection between heat producer and heat consumer is the **energy manager**. This program monitors the heat demand of the consumer circuits and calculates the heat demand for the heat producers. The heat consumers can be heating circuits, domestic hot water circuits or external demands. The **DDC-RegelUNIT 6X** is also available as a valvation controller, which can control up to **2 valvation circuits with up to 4 sequences each**. With the additional programs like PID-universal controller, trend and maintenance message program, the **DDC-RegelUNIT 6X** can be adapted optimal to your system.

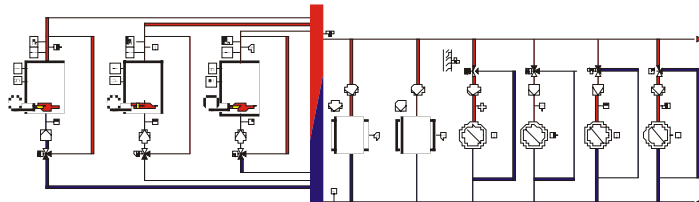


If the **Info button** is pressed for a longer period, you will see the central system overview on the display, which shows the most important parameters (current values, setpoints, status) and an overview of the connected **CAN-IO-Moduls**.

1.1.0 DDC-RegelUNIT 68 and 69 with interface (RS232) for PC, Modem, Printer

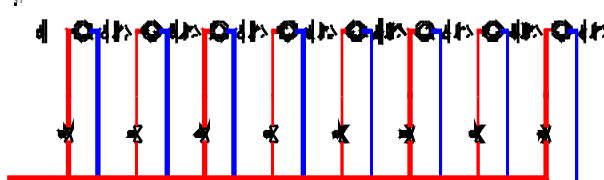
The DDC-RegelUNIT 6X family has not only controllers, which substitute the controllers of the DDC-RegelUNIT 5X family ersetzen, but also has a number of controllers, which can control bigger system i.e. systems with **3 heat producers**, **4 heating circuits** and **2 domestic hot water circuits** (RU 68-3E-240) or single room control for up to 12 rooms. To distinguish between the successors of the DDC-RegelUNIT 5X-controllers and these new versions we have created the DDC-RegelUNIT 68-controllers for the **heating systems** and the DDC-RegelUNIT 69-controllers for the **valveation systems**.

1.1.0.1 DDC-RegelUNIT 68 for Heating Systems

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| RU 68-3E-240 |  | 1168 1100 | C | 1.920,- |

DDC-Regel UNIT, 3 freely selectable heat producers (boiler, district heating, heat pump), 2 domestic hot water circuits, 4 heating circuits, 27 inputs / outputs, service interface

1.1.0.2 DDC-RegelUNIT 68 for Single room control

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|-----------|----|-----------|
| RU 68-ER* |  | 1168 2100 | C | 1.920,- |

DDC-RegelUNIT for single room control with the following options:

- 12 rooms heating (2-point)
- 6 rooms heating (3-point)
- 6 rooms heating / cooling

dew point limitation, energy management, 27 inputs / outputs, 230V AC, service interface

1.1.0.3 DDC-RegelUNIT 69 for Ventilation Systems

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|---|-----------|----|-----------|
| RU 69-L2* |  | 1169 1100 | C | 1.390,- |

DDC-Regel UNIT, 1 valvection circuit with 4 sequences, 27 inputs / outputs, service interface

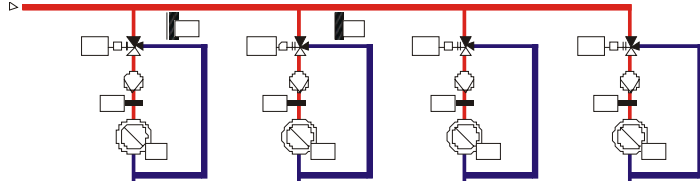
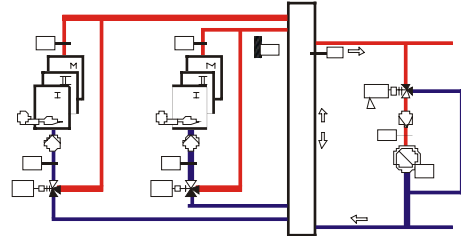
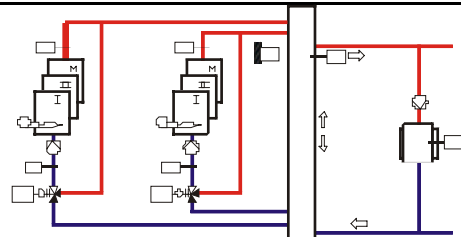
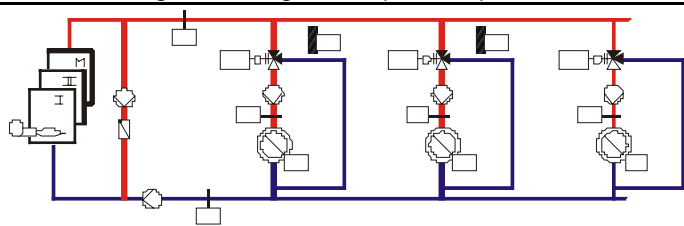
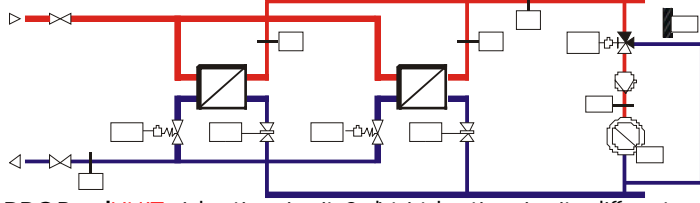
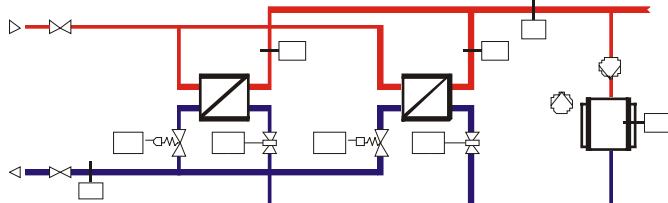
| | | | | |
|------------|---|-----------|---|---------|
| RU 69-2L2* |  | 1169 2100 | C | 1.720,- |
|------------|---|-----------|---|---------|

DDC-Regel UNIT, 2 valvection circuits with 4 sequences each, 27 inputs / outputs, service interface

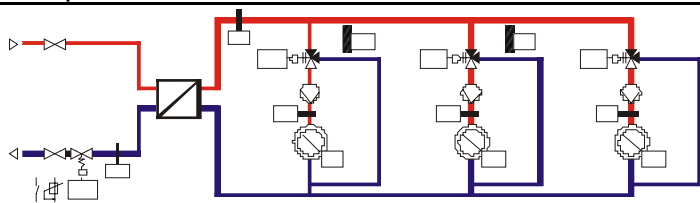
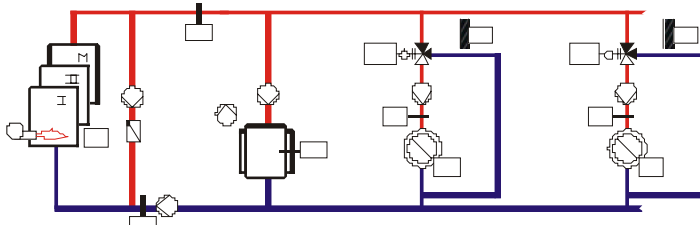
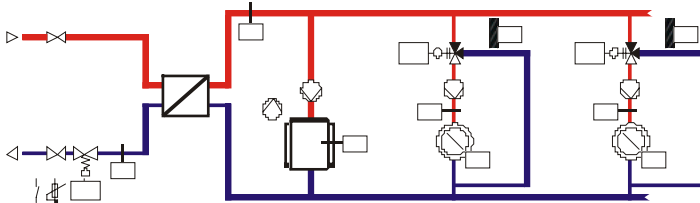
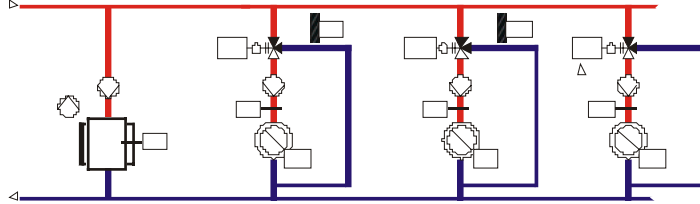
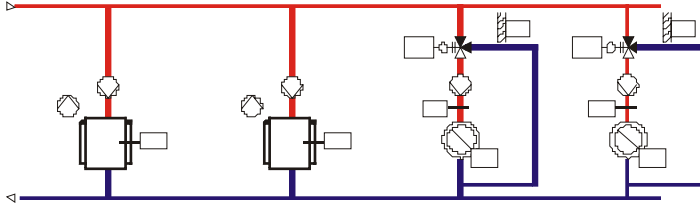
* available II. half of 2008

1.1.1

DDC-RegelUNIT 67 with interface (RS232) for PC, Modem, Drucker

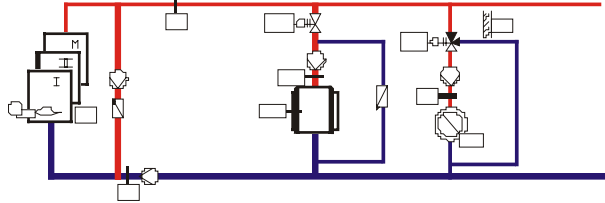
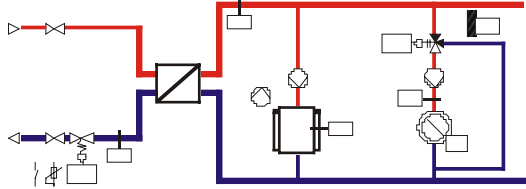
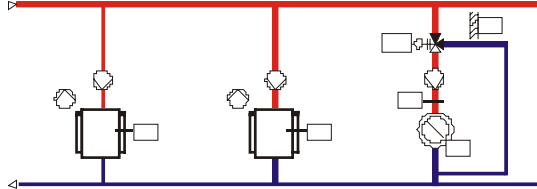
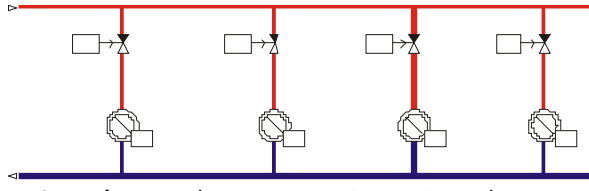
| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---|-----------|----|-----------|
| RU 67-00-040 |  <p>DDC-RegelUNIT, 4 heating circuits, 27 inputs / outputs, service interface</p> | 1161 1100 | C | 1.540,- |
| RU 67-2K-010 |  <p>DDC-RegelUNIT, 1 heating circuit, 2 boiler circuits with 1-stage, 2-stage or modulating burner, free combinable, different boiler series and changeover strategies, 27 inputs / outputs, service interface</p> | 1161 3100 | C | 1.540,- |
| RU 67-2K-100 |  <p>DDC-RegelUNIT, 1 domestic hot water circuit, 2 boiler circuits with 1-stage, 2-stage or modulating burner, free combinable, different boiler series and changeover strategies, 27 inputs / outputs, service interface</p> | 1161 4100 | C | 1.540,- |
| RU 67-1K-030 |  <p>DDC-RegelUNIT, 3 heating circuits, 1 boiler circuit with 1-stage, 2-stage or modulating burner, 27 inputs / outputs, service interface</p> | 1161 5100 | C | 1.540,- |
| RU 67-2F-010 |  <p>DDC-RegelUNIT, 1 heating circuit, 2 district heating circuits, different heat exchanger series and changeover strategies, 27 inputs / outputs, service interface</p> | 1161 6100 | C | 1.540,- |
| RU 67-2F-100 |  <p>DDC-RegelUNIT, 1 domestic hot water circuit, 2 district heating circuits, different heat exchanger series and changeover strategies, 27 inputs / outputs, service interface</p> | 1161 7100 | C | 1.540,- |



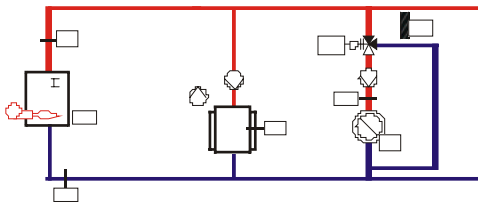
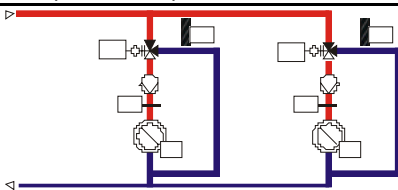
| Type | Description | Art.-Nr. | PG | Price EUR |
|---|---|-----------|----|-----------|
| RU 67-1F-030 |  <p>DDC-RegelUNIT, 3 heating circuits, 1 district heating circuit, 27 inputs / outputs, service interface</p> | 1161 8100 | C | 1.540,- |
| 1.1.2 DDC-RegelUNIT 66 with interface (RS232) for PC, Modem, Drucker | | | | |
| Type | Description | Art.-Nr. | PG | Price EUR |
| RU 66-1K-120 |  <p>DDC-RegelUNIT, 2 heating circuits, 1 domestic hot water circuit, 1 boiler circuit with 1-stage, 2-stage or modulating burner, 27 inputs / outputs, service interface</p> | 1162 1100 | C | 1.470,- |
| RU 66-1F-120 |  <p>DDC-RegelUNIT, 2 heating circuits, 1 district heating circuit, 1 domestic hot water circuit, 27 inputs / outputs, service interface</p> | 1162 2100 | C | 1.470,- |
| RU 66-00-130 |  <p>DDC-RegelUNIT, 3 heating circuits, 1 domestic hot water circuit, 27 inputs / outputs, service interface</p> | 1162 3100 | C | 1.470,- |
| RU 66-00-220 |  <p>DDC-RegelUNIT, 2 heating circuits, 2 domestic hot water circuits, 27 inputs / outputs, service interface</p> | 1162 4100 | C | 1.470,- |

1

1.1.3 DDC-RegelUNIT 65 with interface (RS232) for PC, Modem, Drucker

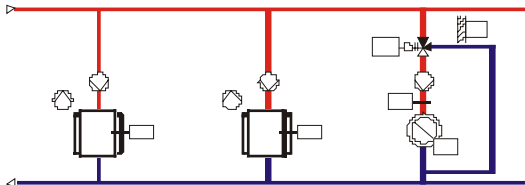
| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| RU 65-1K-110 |  <p>DDC-RegelUNIT, 1 heating circuit, 1 boiler circuit with 1-stage, 2-stage or modulating burner, 1 domestic hot water circuit, 24 inputs / outputs, service interface</p> | 1163 1100 | C | 1.190,- |
| RU 65-1F-110 |  <p>DDC-RegelUNIT, 1 heating circuit, 1 district heating circuit, 1 domestic hot water circuit, 24 inputs / outputs, service interface</p> | 1163 2100 | C | 1.190,- |
| RU 65-00-210 |  <p>DDC-RegelUNIT, 1 heating circuit, 2 domestic hot water circuits, 24 inputs / outputs, service interface</p> | 1163 3100 | C | 1.190,- |
| RU 65-00-040 |  <p>DDC-RegelUNIT, 4 heating circuits (2-point) or 3 heating circuits (3-Pnt), 24 inputs / outputs, service interface</p> | 1163 4100 | C | 1.190,- |

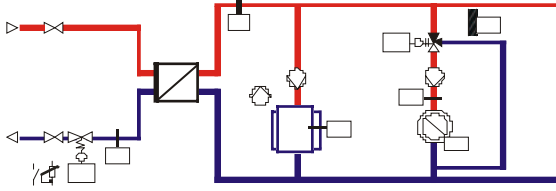
1.1.4 DDC-RegelUNIT 64 with interface (RS232) for PC, Modem, Drucker

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| RU 64-1K-110 |  <p>DDC-RegelUNIT, 1 heating circuit, 1 boiler circuit with 1-stage, 2-stage or modulating burner, 1 domestic hot water circuit, 13 inputs / 7 outputs, service interface</p> | 1164 1100 | C | 820,- |
| RU 64-00-020 |  <p>DDC-RegelUNIT, 2 heating circuits, 13 inputs / 7 outputs, service interface</p> | 1164 2100 | C | 820,- |

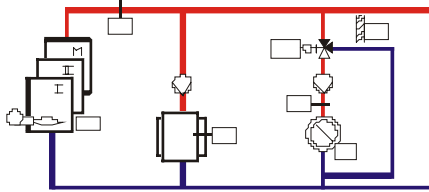


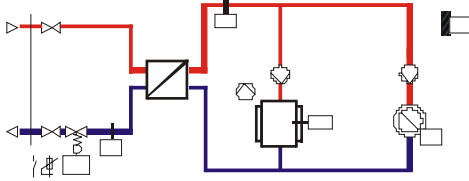
1

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---|-----------|----|-----------|
| RU 64-00-210 |  DDC-Regel UNIT, 1 heating circuit, 2 domestic hot water circuits, 13 inputs / 7 outputs, service interface | 1164 3100 | C | 820,- |

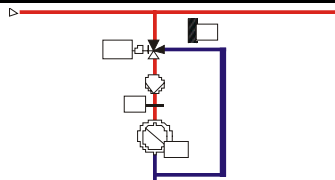
| | | | | |
|--------------|--|-----------|---|-------|
| RU 64-1F-110 |  DDC-Regel UNIT, 1 heating circuit, 1 domestic hot water circuit, 1 district heating circuit, 13 inputs / 7 outputs, service interface | 1164 4100 | C | 820,- |
|--------------|--|-----------|---|-------|

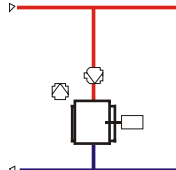
1.1.5 DDC-RegelUNIT 63 with interface (RS232) for PC, Modem, Drucker

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| RU 63-1K-110 |  DDC-Regel UNIT, 1 heating circuit, 1 boiler circuit with 1-stage, 2-stage or modulating burner, 1 domestic hot water circuit, 10 inputs / 5 outputs, service interface | 1165 1100 | C | 760,- |

| | | | | |
|--------------|--|-----------|---|-------|
| RU 63-1F-110 |  DDC-Regel UNIT, 1 heating circuit, 1 district heating circuit, 1 domestic hot water circuit, 10 inputs / 5 outputs, service interface | 1165 2100 | C | 760,- |
|--------------|--|-----------|---|-------|

1.1.6 DDC-RegelUNIT 62 with interface (RS232) for PC, Modem, Drucker

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| RU 62-00-010 |  DDC-Regel UNIT, 1 heating circuit, 10 inputs / 4 outputs, service interface | 1166 1100 | C | 670,- |

| | | | | |
|--------------|---|-----------|---|-------|
| RU 62-00-100 |  DDC-Regel UNIT, 1 domestic hot water circuit, 10 inputs / 4 outputs, service interface | 1166 2100 | C | 670,- |
|--------------|---|-----------|---|-------|

1.1.7 Interface DDC-RegelUNIT 6X

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|------------|
| RU6S-CSM | Interface card with CAN-Bus-interface for R+S High Speed CAN remote control units and CAN-IO-Moduls as well as M-Bus interface to connect all kinds of meters (Electricity, Gas, Heat, Water etc) | 1167 2300 | C | add. 100,- |

1.1.10 Accessories

| Type | Description | Art.-Nr. | PG | Price EUR |
|------|-----------------------------|-----------|----|-----------|
| BAT | Battery 3V (only for RU 5X) | 1220 1000 | C | 6,- |

1.1.11 Documentation

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------|---|-----------|----|------------|
| BH RU | Operating manual for DDC-Regel UNIT, (please indicate Controller Type with your order. One manual is enclosed with your Controller) | 1111 0xx1 | - | (net) 12,- |



1.2

DDC-19"- Cassette Controller modular PLUS

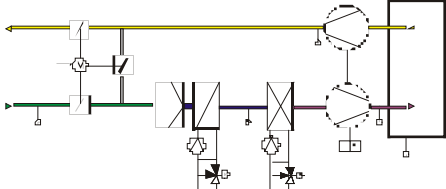
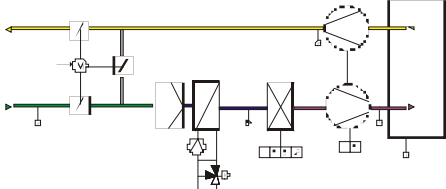
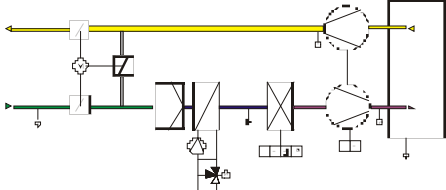
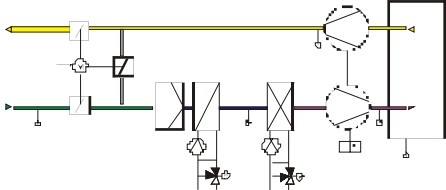
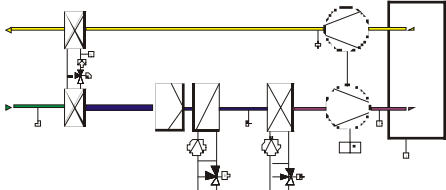


The controllers of the system **modular PLUS** are microprocessor controller units, with an operation based on analog controllers

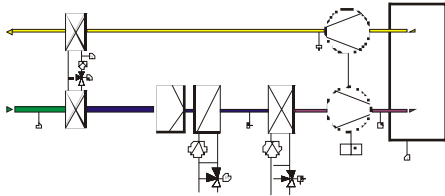
The controllers of the system **modular PLUS** can be used in the entire building technology.

The controllers of the system **modular PLUS** have a number of additional functions, which can be activated. The operation is simple and clear, thanks to the module oriented design.

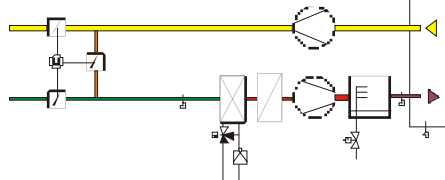
1.2.1 Ventilation Controller

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| MP 19.122K-LS* |  <p>Ventilation Controller with modules for mixing flap 0..10V output, heater 3-point output, cooler 3-point output, cascade, interface for printer/modem/bus/personal computer</p> | 1201 1310 | C | 1.099,- |
| MP 19.124K-LS* |  <p>Ventilation Controller with modules for mixing flap 0..10V output, heater 3-point output, multistage cooler (up to 3 stages or binary), cascade, interface for printer/modem/bus/personal computer</p> | 1201 1410 | C | 1.099,- |
| MP 19.224K-LS* |  <p>Ventilation Controller with modules for mixing flap 3-point output, heater 3-point output, multistage cooler (up to 3 stages or binary), cascade, interface for printer/modem/bus/personal computer</p> | 1201 2610 | C | 1.099,- |
| MP 19.111K-LS* |  <p>Ventilation Controller with modules for mixing flap 0..10V output, heater 0..10V output, cooler 0..10V, cascade, interface for printer/modem/bus/personal computer</p> | 1201 1290 | C | 1.099,- |
| MP 19.W121K-LS* |  <p>Ventilation Controller with modules for HRS-(Heat Recovery System) plants 0..10V output, heater 3-point output, cooler 0..10V output, cascade, interface for printer/modem/bus/personal computer</p> | 1201 6730 | C | 1.099,- |

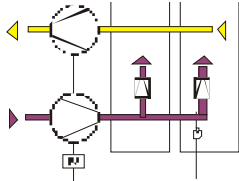
* Soon out of production

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|---|-----------|----|-----------|
| MP 19.W122K-LS* |  <p>Ventilation Controller with modules for HRS-(Heat Recovery System) plants 0.10V output, heater 3-point output, cooler 3-point output, cascade, interface for printer/modem/bus/personal computer</p> | 1201 6010 | C | 1.099,- |

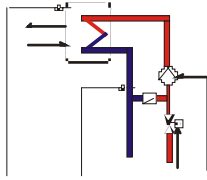
1.2.2 Humidity Controller

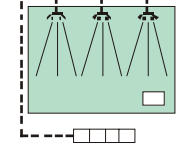
| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|---|-----------|----|-----------|
| MP 19.1D10B-FS* |  <p>Humidity Controller with modules for cooler 0.10V output, steam humidifier 0.10V output, limitation, interface for printer/modem/bus/personal computer</p> | 1202 1210 | C | 968,- |

1.2.3 Pressure Controller ¹⁾

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|---|-----------|----|-----------|
| MP 19.1000-DS* |  <p>Pressure Controller with a module for control output 0.10V, interface for printer/modem/bus/personal computer</p> | 1203 1110 | C | 753,- |

1.2.5 Temperature Controller

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|---|-----------|----|-----------|
| MP 19.2B00-T* |  <p>Temperature Controller with modules for control output 3-point, universal limitation</p> | 1205 2100 | C | 710,- |

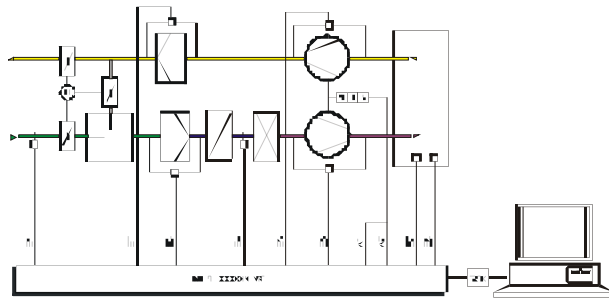
| | | | | |
|----------------|--|-----------|---|-------|
| MP 19.4B00-TS* |  <p>Temperature controller with modules for control output multistage (up to 3 stages or binary), universal limitation, interface for printer/modem/bus/personal computer</p> | 1205 4510 | C | 837,- |
|----------------|--|-----------|---|-------|

* soon out of production



1.2.12

Multifunction Controller



The multifunction controller **MP19.11115 MS** can be used for the display of digital signals. The signals occur via multicoloured LEDs on the front of the controller. With a customer-specific engraving up to 30 signals can be shown in a very compact form. *Functions:* Signals, collective signals (Collective error signals, collective operating status), switching (max. 2x), lamp test, alarm protocol in combination with the BMS (building management system). Acknowledgement is possible via a button on the controller.

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|--|-----------|----|-----------|
| MP 19.11115-MS | Multifunction Controller with 30 contact inputs, 36 LED and module for collective signals with 2 triac outputs, 2 buttons, 2 E24V inputs, 2 relay outputs , interface for the connection to a personal computer, printer, Modem, Bus; Front panel and front frame in blue | 1212 0110 | C | 1.128,- |

The multifunction controller **MP19.13335 MS** can be used for the display of digital signals and setting of digital outputs. The signalling occurs via multicoloured LED. By means of switches a manual operation of the digital outputs can be achieved. With a customer specific engraving any possible status can be shown in the plant in a very compact form. *Functions:* Signals, collective signals (Collective error signals, collective system signals), switching, lamp test, alarm protocol in combination with the BMS. Acknowledgement is possible via a button on the controller.

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|--|-----------|----|-----------|
| MP 19.13335-MS | Multifunction controller with 18 Contact inputs, 12 triac outputs, 12 switches, 36 LED and collective signal module with 2 triac outputs, 2 push buttons, 2 E24V inputs, 2 relay outputs , interface for the connection to personal computer, Printer, Modem, Bus ; Front panel and front frame in blue | 1212 0210 | C | 1.251,- |

The **MP19.133YYS MS multifunction controller** can be used for the display of digital signals, rewiring of analogous input values and the setting of analogous and digital outputs. The signalling occurs via multi-coloured LED. By means of switches and poti a manual operation of the digital outputs can be achieved. With a customer specific engraving any possible status can be shown in the plant in a very compact form. *Functions:* Signals, collective signals (Collective error signals, collective system signals), switching measuring, setting, lamp test, alarm protocol in combination with the BMS. Acknowledgement is possible via a button on the controller.

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|---|-----------|----|-----------|
| MP19.133YYS-MS | Multifunction controllers with 12 Contact inputs, 4 analogous inputs, 6 triac outputs, 4 analogous outputs, 10 switches, 4 pots, 36 LED and collective signal module with 2 triac outputs, 2 push buttons, 2 E24V inputs, 2 relay outputs , interface for the connection to personal computer, Printer, Modem, Bus ; Front panel and front frame in blue | 1212 0310 | C | 1.251,- |

The multifunction controller **MP19.111XXS MS** can be used for the display of digital signals and the rewiring of analogous input variables. The signalling occurs via multi-coloured LED. With a customer specific engraving any possible status can be shown in the plant in a very compact form. *Functions:* Signals, collective signals (Collective error signals, collective system signals), switching (2x), measuring, lamp test, alarm protocol in combination with the BMS. Acknowledgement is possible via a button on the controller.

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|---|-----------|----|-----------|
| MP19.111XXS-MS | Multifunction controller with 18 Contact inputs, 8 analogous inputs, 32 LED and collective signal module with 2 triac outputs, 2 push buttons, 2 E24V inputs, 2 relay outputs , interface for the connection to personal computer, Printer, Modem, Bus ; Front panel and front frame in blue | 1212 0410 | C | 1.251,- |

The multifunction controller **MP19.688YYS MS** can be used for the display of digital signals and the rewiring of analogous input values. The signalling occurs via multi-coloured LED. By means of switches and poti a manual operation of the analogous and digital outputs can be achieved. With a customer specific engraving any possible status can be shown in the plant in a very compact form. *Functions:* Signals, collective signals (Collective error signals, collective system signals), switching, measuring, setting, lamp test, alarm protocol in combination with the BMS. Acknowledgement is possible via a button on the controller.

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|---|-----------|----|-----------|
| MP 19.688YYS-MS | Multifunction controllers with 12 E24V inputs, 26 LEDs, 4 analogous inputs, 4 continuous outputs, 4 pots, 10 switches, 6 triac outputs and collective signal module with 2 x 24 inputs, 2 triac outputs as well as 2 relay outputs, 2 push buttons and 6 LED , interface for printer/modem/bus/personal computer | 1212 8200 | C | 1.251,- |

1.2.20 Accessories

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|---|-----------|----|-----------|
| BAT | Battery 3V | 1220 1000 | C | 6,- |
| K-GRAV-MP | Specially manufactured front panel for modular PLUS | 1220 4000 | C | on req. |

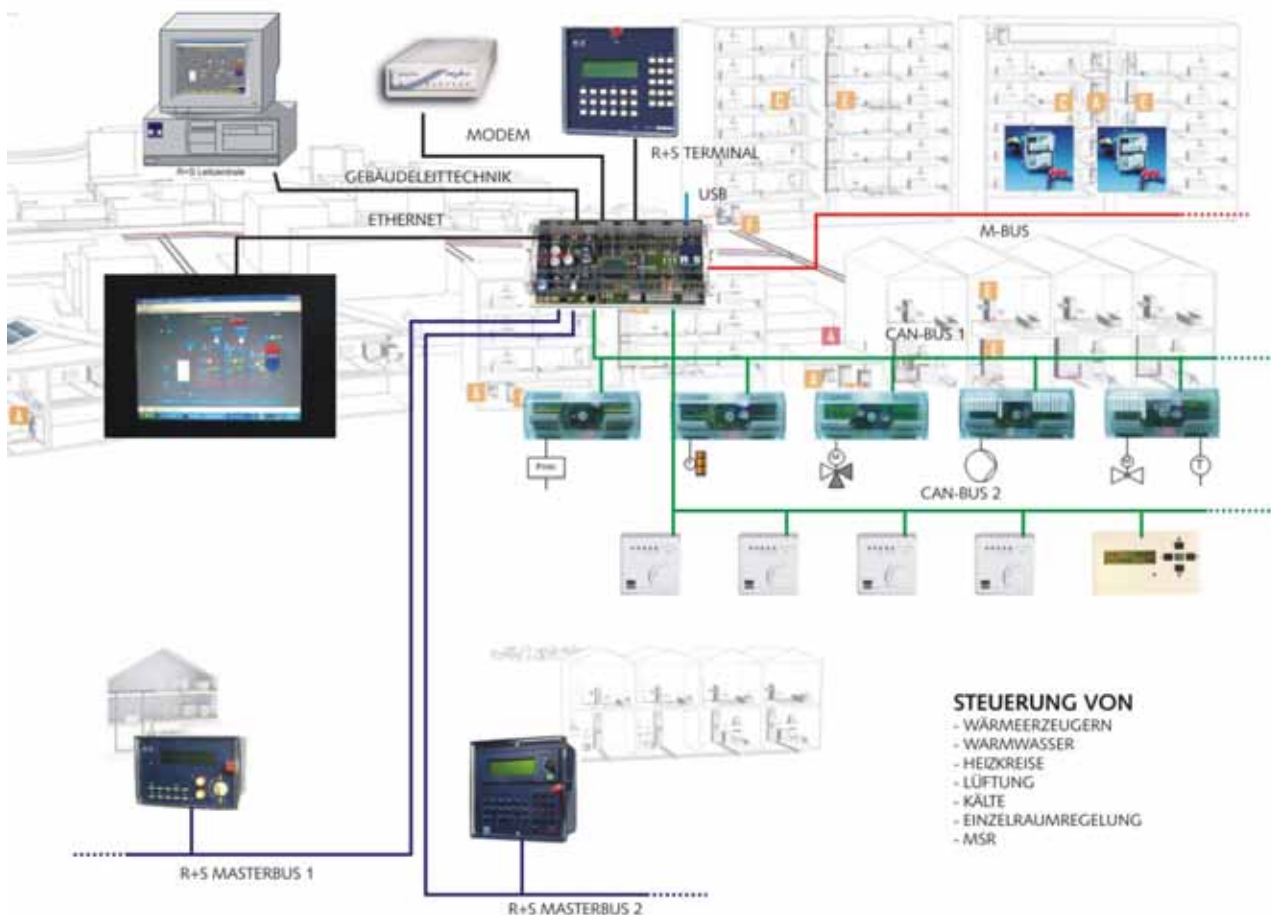
1.2.21 Documentation

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------|--|-----------|----|------------|
| BH MP | Operating manual for DDC controller of the system modular PLUS (one copy will be delivered with the controller) | 1221 1xx1 | - | (net) 12,- |
| SH MP | System manual modular PLUS (includes all system components) | 1221 2001 | - | (net) 80,- |



1.3
1.3.0

DDC-Control Systems
CLEVER system



1

The new control System of R+S **CLEVER system** is a microprocessor controlled DDC-system, which can be used as a central master or a sub station to control, regulate, measure and monitor all kinds of components in a technical plant. You can not only use it to control heating, valvation, climatising or cooling but also other technical systems in a building like light, shades, access control, elevators etc. The systems consists of the following components:

CLEVER master : The brain of the system is equipped with a powerfull processor, lots of memory and all kinds of interfaces. The configuration is established with special software tools. Even more clever is the easy menu structure and the intuitive operation, which you also find in all of our compact controllers **DDC-RegelUNIT 9X** and **6X**.

CLEVER control: The easy and clear operating unit in 19"-technology with a backlit display gives you the possibility to control and operate up to 127 R+S controllers. This can be the **CLEVER master** or any other controller from R+S like the **DDC-RegelUNIT 9X** or **6X**.

CLEVER grafic: The free programmable touch-panel with a grafical display of 10" offers a display of system diagrams and a grafical control/operation of the **CLEVER master** or any other controller from R+S like the **DDC-RegelUNIT 9X** or **6X**. You can also display and view trend diagrams. The menu structure can be grafical or text oriented. The industrial version of the touch panel garantees duration and a high persistence.

CLEVER library: In each **CLEVER master** there is the complete range of library programs already included. This means, that you always have the complete range of programs available even if you have to make changes due to changes of components during the installation etc. Just activate or deactivate additional software packages or fundions. The R+S philosophy „Everything included, just activate!“ has been realised in the CLEVER system like in all the other compact controllers from R+S. Some oft he functions are configured automatically during the initial installation. The following software modules are available today: (more are being developed):

- Time: timeswitch, timer, school timer, schedule
- energy producer: boiler circuit, district heating circuit, heat pump, strategy circuit, solar circuit, CHP units, cooling circuit, humidity circuit, energy manager
- energy consumer: heating circuit, domestic hot water circuit, valvation circuit, universal controller, pump control, multi-stage controller, dimatising controller
- control etc: sequential control, overview, selfcleaning reset, signals, measuring, metering, counting, switching, setting, collective signal, monitoring, recording
- miscellaneous: In addition there are a number of SPS fundions in combination with virtual terminals (parameters, variables)

For the inputs and outputs R+S offers a number of clever **CAN-I/O-Moduls**. You can connect up to **32 moduls** on one **CLEVER master**. All in all the **CLEVER master** can control up to **512 inputs and outputs**.

Plan your **CLEVER** system on your PC or notebook with the R+S configuration-software and order the necessary hardware. The configuration software will produce automatically the configuration, which can be downloaded into the controller – the system is ready to run!

1.3.0.1 Central unit



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------------|--|-----------|----|-----------|
| CLEVER master* | DDC-master unit to control, regulate and monitor complex control systems in building management technology. Software library with up to 30 control programs to control up to 40 MCR-functions Inputs / outputs: max. 512 on 32 CAN-I/O-Moduls, virtual terminals: 512, interfaces: LAN (Ethernet), Modem, SSK-Bus, M-Bus, 2 x CAN-Bus, 2 x R+S MASTER-Bus, USB-Host, remote control units: max. 50 pcs, panel mounting on DIN rail, 24V AC | 1300 0100 | C | on req. |

1.3.0.2 operating/display unit



| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------------|--|-----------|----|-----------|
| CLEVER control* | Operating/display unit for CLEVER master or compact controllers like DDC-RegelUNIT 6x or 9x with typical R+S dialog, 4- row backlit text display and 33 keys, SSK-service interface, R+S MASTER-Bus to control up to 127 controllers, panel door mounting, 24V AC | 1300 0200 | C | on req. |



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------------|--|-----------|----|-----------|
| CLEVER grafic | Grafical operating/display unit for CLEVER master or any other compact controller like DDC-RegelUNIT 6x or 9x , free configurable touch- panel with operating menu for the R+S building management software IRMA system , interfaces: RS232, LAN (Ethernet), USB, panel door mounting, 230V AC | 1300 0300 | C | on req. |

* Can be delivered end of 2008

The **CAN-IO-moduls** are in chapter 1.8

The **CAN-remotoe control units** are in chapter 3



1.3.1 unit PLUS system

The **unit PLUS system** is a microprocessor controlled DDC-unit which functions as Substation to control, regulate and supervise heating and air conditioning plants. Each unit PLUS system will be combined from hardware and software modules according to your individual request. This concept allows custom-made solutions for practically every application within the heating-, valveation- and air conditioning-plants



| Hardware modules | Software modules | | | |
|---|---|--|---|--|
| Input-modules Output modules Interfaces | Time switch, School timer, Schedule | Boiler circuit, District heating circuit, Heat pump, Strategy circuit Energy manager | Heating circuit, Domestic hot water circuit, Solar circuit, Ventilation circuit, Universal controller, Circulating pump control, Stage controller | Timer regulation, Survey, Self cleaning Signals, measuring, metering, switching setting, Collective signals, recording |

1

Plan your unit PLUS system at your PC with the R+S configurations software. Send us your configuration for an individual offer.

1.3.1.1 Central unit

| Type | Description | Art.-Nr. | PG | Price EUR |
|---|---|----------|----|-----------|
| UPBG19B.X..X-X..X (Type ist zu spezifizieren) | <p>DDC-controller with text display and integrated control panel for the complex control, regulation and supervision of technical plants in buildings. Operates universally as an autonomous Substation or as an autonomous DDC Substation, or within a building-automation system as a DDC central station.</p> <p>Operating system for the configuration and addressing of up to 256 inputs, outputs and virtual terminals per unit. Extensive program library for the automatic operation and supervision of heat supply systems and special room air demands.</p> <ul style="list-style-type: none"> - Front-panel interface for the flexible communication with an operator terminal or to connect a local printer for protocol. - SSK-Bus-interface for the networking of R+S DDC - units to communicate with an overriding building automation system. - M-Bus interface for the connection of heat-meter. - CAN-Bus-interface for the link-up with intelligent R+S emergency servicing modules for a DDC- independent service and observation of the technical plants of buildings as well as for the connection of bus-capable remote controls and detectors. - R+S master bus interface for the communication with subordinate R+S DDC units or for the connection of the <i>Grandfos</i> pump bus - Modular E/A- Card system for the project-specific realization of up to 68 input- and output-terminals for following signal types: <p>Analogous input signals 0..10V / 0(4)-20 mA/M detector/Ni1000 / 0-10 kilowatt / mod. PT 1000 / PT 1000</p> <p>binary input signals 24 AC / 24 DC or 15V DC contact inputs</p> <p>analogous output signals 0..10V / 0(4)-20 mA / 20V AC phase gating control</p> <p>binary output signals Relay- / triac outputs</p> <p>General technical data: Operating voltage: 24V AC • 10 % Power consumption:12 VA (without field units) Power consumption:32 VA (with field units) Protection level: IP 30 according to EN60529 Temperature range: 5 C .. 40 C Data security: 10 years Mounting Panel-mounting Measurements: 132 x 142 x 220 mm (HxWxD)</p> | - | C | on req. |

1.3.1.10 unit PLUS compact

The product group unit PLUS compact includes DDC Substations for the control, regulation and supervision of heating and valvation plants. It offers a great number of possible applications in public and industrial buildings, offices or apartment buildings as well as in boiler plants for the supply of district heating systems.



The unit PLUS compact distinguishes itself through a particularly easy way of installation: After input of the desired type of system a self-parameterisation automatically takes place. After that the unit PLUS compact immediately is ready for action.

unit PLUS compact for boiler plants (UPK1K, 2 K, 3 K): for one-boiler-plants with 2 to 5 heating circuits and heating of domestic hot water as well as for Two- or Three boiler plants

unit PLUS compact for district heating plants (UPK1F): for district heat circuits with 2 to 5 heating circuits with the most different kinds of heating of domestic hot water

unit PLUS compact for the expansion of heating systems (UPK00): for the expansion of boiler plants and district heating plants of 3 or 6 heating circuits each and a hot water circuit

unit PLUS compact for plants with special room air demands (UPKL, 2L, X2): for 1, 2 partial air conditioning plants or full climatizing with up to 6 aggregates

unit PLUS compact for boiler plants with special room air demands (UPK.1K-1L2): for 1 boiler and 1 air conditioning unit

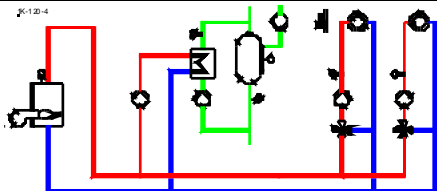
unit PLUS compact as M-Bus Control Centers (UPKxxxMS): for 4, 60 or 250 M-Bus participants

unit PLUS compact as Gas-Monitor Control Centers (UPKCO): for monitoring up to 112 gas sensors

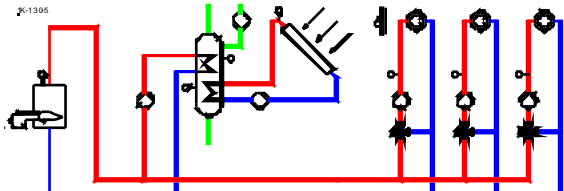
1.3.1.10.1 DDC Substation for Boiler Plants

1.3.1.10.1.1 DDC Substation for Boiler Plants with 1 Boiler

1.3.1.10.1.1.1 DDC Substation for 1 Boiler Circ., 1 DHW Circuit and 2 Heating Circuits

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|---|--------------|----|-----------|
| UPK.1K-120 |  <p>DDC Substation for 1 boiler circuit, 1 domestic hot water circuit, 2 heating circuits, with 4 timers, Energy management, AE: 2 x 0..10V, 10 (M-detector), DE: 10 (EK), DA: 12 (relays, 42 AC), interface: CAN</p> | 1301 0111 00 | C | 1.727,- |
| UPK.1K-120 SMS | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM | 1301 0111 60 | C | 1.889,- |

1.3.1.10.1.1.2 DDC Substation for 1 Boiler Circuit, 1 DHW Circuit and 3 Heat. Circuits

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|--|--------------|----|-----------|
| UPK.1K-130 |  <p>DDC Substation for 1 boiler circuit, 1 domestic hot water circuit, 3 heating circuits, with 5 timers, Energy management, AE: 3 x 0..10V, 11 (M-detector), DE: 12 (EK), DA: 16 (relays, 42 AC), interface: CAN</p> | 1301 0112 00 | C | 1.768,- |
| UPK.1K-130 SMS | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM | 1301 0112 60 | C | 1.959,- |

1.3.1.10.1.13 DDC Substation for 1 Boiler Circuit, 1 DHW Circuit and 4 Heat. Circuits

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---|--------------|----|-----------|
| UPK.1K-140 |  | 1301 0113 00 | C | 2.552,- |

DDC Substation for 1 boiler circuit, 1 domestic hot water circuit, 4 heating circuits, with 6 timers, Energy management, AE: 3 x 0..10V, 12 (M-detector), DE: 14 (EK), DA: 20 (relays, 42 AC), interface: CAN

| | | | | |
|----------------|---|--------------|---|---------|
| UPK.1K-140 SMS | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM | 1301 0113 60 | C | 2.808,- |
|----------------|---|--------------|---|---------|

1.3.1.10.1.14 DDC Substation for 1 Boiler Circuit, 1 DHW Circuit and 5 Heat. Circuits

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---|--------------|----|-----------|
| UPK.1K-150 |  | 1301 0114 00 | C | 2.639,- |

DDC Substation for 1 boiler circuit, 1 domestic hot water circuit, 5 heating circuits, with 7 timers, Energy management, AE: 3 x 0..10V, 13 (M-detector), DE: 16 (EK), DA: 24 (relays, 42 AC), interface: CAN

| | | | | |
|----------------|---|--------------|---|---------|
| UPK.1K-150 SMS | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM | 1301 0114 60 | C | 2.897,- |
|----------------|---|--------------|---|---------|

1.3.1.10.1.2 DDC Substation for Boiler Plants with 2 Boilers

1.3.1.10.1.2.1 DDC Substation for 2 Boiler Circuits and 3 Heating Circuits

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---|--------------|----|-----------|
| UPK.2K-030 |  | 1301 0121 00 | C | 2.786,- |

DDC- Substation for 2 boiler circuits, 3 heating circuits, with 5 timers, Energy management, AE: 3 x 0..10V, 12 (M-detector), DE: 16 (EK), DA: 20 (relays, 42 AC), interface: CAN

| | | | | |
|----------------|---|--------------|---|---------|
| UPK.2K-030 SMS | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM | 1301 0121 60 | C | 3.045,- |
|----------------|---|--------------|---|---------|

1.3.1.10.1.2.2 DDC Substation for 2 Boiler Circuits, 1 DHW Circuit and 2 Heat. Circuits

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---|--------------|----|-----------|
| UPK.2K-120 |  | 1301 0122 00 | C | 2.786,- |

DDC Substation for 2 boiler circuits, 1 domestic hot water circuit, 2 heating circuits, with 5 timers, Energy management, AE: 3 x 0..10V, 12 (M-detector), DE: 16 (EK), DA: 20 (relays, 42 AC), interface: CAN

| | | | | |
|----------------|---|--------------|---|---------|
| UPK.2K-120 SMS | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM | 1301 0122 60 | C | 3.045,- |
|----------------|---|--------------|---|---------|

1.3.1.10.1.2.3 DDC Substation for 2 Boiler Circuits, 1 DHW Circuit and 3 Heat. Circuits

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---|--------------|----|-----------|
| UPK.2K-130 |  | 1301 0123 00 | C | 3.460,- |

DDC Substation for 2 boiler circuits, 1 domestic hot water circuit, 3 heating circuits, with 6 timers, Energy management, AE: 3 x 0..10V, 13 (M-detector), DE: 16 (EK), DA: 24 (relays, 42 AC), interface: CAN

| | | | | |
|----------------|---|--------------|---|---------|
| UPK.2K-130 SMS | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM | 1301 0123 60 | C | 3.718,- |
|----------------|---|--------------|---|---------|

1.3.1.10.1.3 DDC Substation for Boiler Plants with 3 Boilers

1.3.1.10.1.3.1 DDC Substation for 3 Boiler Circuits, 1 DHW circuit and 1 Heating Circuit

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---|--------------|----|-----------|
| UPK.3K-110 |  | 1301 0131 00 | C | 3.314,- |

DDC Substation for 3 boiler circuits, 1 domestic hot water circuit, 1 heating circuit, with 4 timers, Energy management, AE: 3 x 0..10V, 13 (M-detector), DE: 16 (EK), DA: 24 (relays, 42 AC), interface: CAN

| | | | | |
|----------------|---|--------------|---|---------|
| UPK.3K-110 SMS | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM | 1301 0131 60 | C | 3.572,- |
|----------------|---|--------------|---|---------|

1.3.1.10.2 DDC Substation for District Heating Plants

1.3.1.10.2.1.1 DDC Substation for 1 District Heating C., 1 DHW Circuit and 2 Heat. Circuits

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---|--------------|----|-----------|
| UPK.1F-120 |  | 1301 0211 00 | C | 1.723,- |

DDC Substation for 1 district heating circuit, 1 domestic hot water circuit, 2 heating circuits with 4 timers, Energy management, AE: 2x0..10V, 10 (M-detector), DE: 10 (EK), DA: 12 (relays, 42 AC), interface: CAN

| | | | | |
|----------------|---|--------------|---|---------|
| UPK.1F-120 SMS | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM | 1301 0211 60 | C | 1.886,- |
|----------------|---|--------------|---|---------|

1.3.1.10.2.1.2 DDC Substation for 1 District Heating Circuit, 1 DHW Circ. and 3 Heating Circ.

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---|--------------|----|-----------|
| UPK.1F-130 |  | 1301 0212 00 | C | 1.995,- |

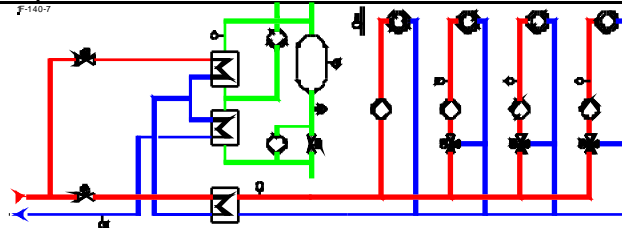
DDC Substation for 1 district heating circuit, 1 domestic hot water circuit, 3 heating circuits, with 5 timers, Energy management, AE: 3 x 0..10V, 11 (M-detector), DE: 12 (EK), DA: 16 (relays, 42 AC), interface: CAN

| | | | | |
|----------------|---|--------------|---|---------|
| UPK.1F-130 SMS | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM | 1301 0212 60 | C | 2.253,- |
|----------------|---|--------------|---|---------|



1.3.1.102.13 DDC Substation for 1 District Heating Circ., 1 DHW Circ. and 4 Heating Circ.

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|--------------------|--------------|----|-----------|
| UPK.1F-140 | ^{F-140-7} | 1301 0213 00 | C | 2.082,- |

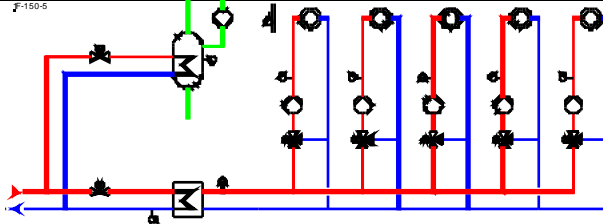


DDC Subst. for 1 district heating circuit, 1 domestic hot water circuit, 4 heating circuits, with 6 timers, Energy management, AE: 3 x 0..10V, 12 (M-detector), DE: 14 (EK), DA: 20 (relays, 42 AC), interface: CAN
As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM

| | | | | |
|----------------|--|--------------|---|---------|
| UPK.1F-140 SMS | | 1301 0213 60 | C | 2.340,- |
|----------------|--|--------------|---|---------|

1.3.1.102.14 DDC Substation for 1 District Heating C., 1 DHW Circuit and 5 Heating Circ.

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|--------------------|--------------|----|-----------|
| UPK.1F-150 | ^{F-150-5} | 1301 0214 00 | C | 2.318,- |



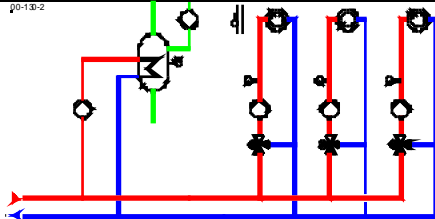
DDC Subst. for 1 district heating circuit, 1 domestic hot water circuit, 5 heating circuits with 7 timers, Energy management, AE: 3 x 0..10V, 13 (M-detector), DE: 16 (EK), DA: 24 (relays, 42 AC), interface: CAN
As described before, however with following interfaces: SSK, Fu, CAN, M-Bus, SSKM

| | | | | |
|----------------|--|--------------|---|---------|
| UPK.1F-150 SMS | | 1301 0214 60 | C | 2.575,- |
|----------------|--|--------------|---|---------|

1.3.1.103 DDC Substation for the Expansion of Heating Systems

1.3.1.103.1.1 DDC Substation for 1 DHW Circuit and 3 Heating Circuits

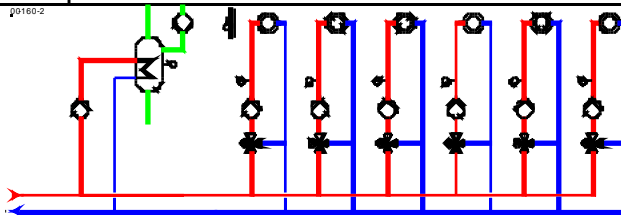
| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|---------------------|--------------|----|-----------|
| UPK.00-130 SM | ^{po-130-2} | 1301 0311 40 | C | 1.831,- |



DDC Substation for 1 domestic hot water circuit, 3 heating circuits with 5 timers, Energy management, AE: 2 x 0..10V, 10 (M-detector), DE: 8 (EK), DA: 12 (relays, 42 AC), interfaces: SSK, Fu, CAN, M-Bus

1.3.1.103.1.4 DDC Substation for 1 DHW Circuit and 6 Heating Circuits

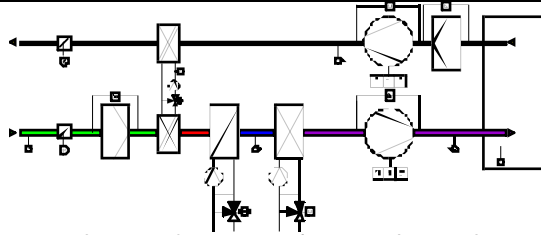
| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|--------------------|--------------|----|-----------|
| UPK.00-160 SM | ^{po160-2} | 1301 0314 40 | C | 2.639,- |



DDC Substation for 1 domestic hot water circuit, 6 heating circuits with 8 timers, Energy management, AE: 3 x 0..10V, 12 (M-detector), DE: 14 (EK), DA: 24 (relays, 42 AC), interfaces: SSK, Fu, CAN, M-Bus

1.3.1.10.4 DDC Substation for Air Conditioning-Plants
1.3.1.10.4.1 DDC Substation for 1 Air Conditioning Plant
1.3.1.10.4.1.3 DDC Substation for 1 Air Conditioning Plant with 1 or 2-Point Fans

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|-------------|--------------|----|-----------|
| UPK.L2.0 S | | 1301 0413 30 | C | 1.441,- |

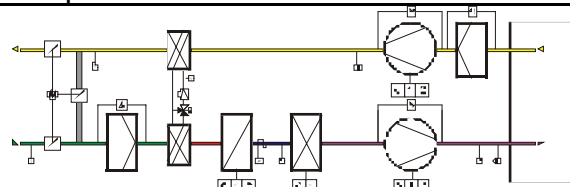


DDC Substation for 1 air conditioning plant, with 3 aggregates (WRG/ MK, 1 ERH, 1 KUEH), two-stage fans, 2 timers, AE: 2x 0..10V, 5 (M-detector), DE: 10 (EK), AA: 4 x 0..10V, DA: 8 (relays, 42 AC), interfaces: SSK, CAN

| | | | | |
|-------------|---|--------------|---|---------|
| UPK.L2.0 SM | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus | 1301 0413 40 | C | 1.720,- |
|-------------|---|--------------|---|---------|

1.3.1.10.4.2 DDC Substation for 2 Air Conditioning Plants
1.3.1.10.4.2.3 DDC Substation for 2 Air Conditioning Plants with Extended Functions

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|-------------|--------------|----|-----------|
| UPK.2L2.1 S | | 1301 0423 30 | C | 1.919,- |

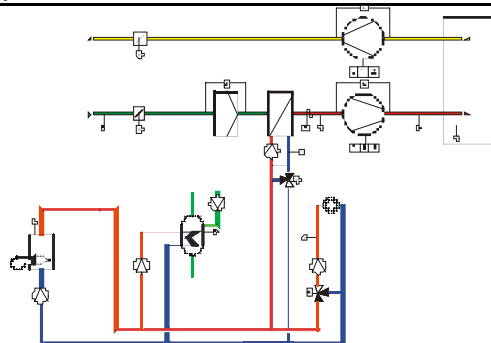


DDC Substation for 2 air conditioning plants, each with 4 aggregates (WRG, MK, ERH, KUEH), with 4 timers, Energy management, AE: 6 x 0..10V, 10 (M-detector), DE: 26 (EK), AA: 8 x 0..10V, DA: 18 (Triac, 24 AC), interface: SSK, CAN

| | | | | |
|--------------|---|--------------|---|---------|
| UPK.2L2.1 SM | As described before, however with following interfaces: SSK, Fu, CAN, M-Bus | 1301 0423 40 | C | 2.011,- |
|--------------|---|--------------|---|---------|

1.3.1.10.5.1 DDC Substation for Heating, Boiler, DHW and 1 Air Conditioning Plant

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|-------------|--------------|----|-----------|
| UPK.1K-11L2 S | | 1301 0511 30 | C | 1.844,- |



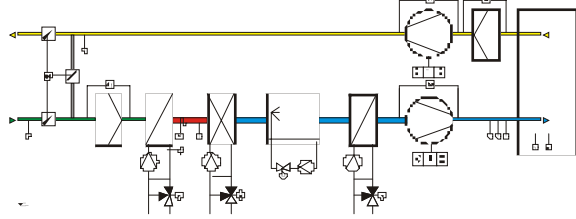
DDC Substation for 1 boiler circuit, 1 domestic hot water circuit, 1 heating circuit, 1 air conditioning plant with 4 plant aggregates and two-stage fan, with 4 timers, Energy management, AE: 3 x 0..10V, 13 (M-detector), DE: 10 (EK), AA: 4 x 0..10V, DA: 12 (relay 42 AC), interface: SSK, CAN

| | | | | |
|-----------------|---|--------------|---|---------|
| UPK.1K-11L2 SMS | As described before, however with following interfaces: SSK, FU, CAN, M-Bus, SSKM | 1301 0511 60 | C | 2.003,- |
|-----------------|---|--------------|---|---------|



1.3.1.10.6.1 DDC-Substation for a full air conditioning plant

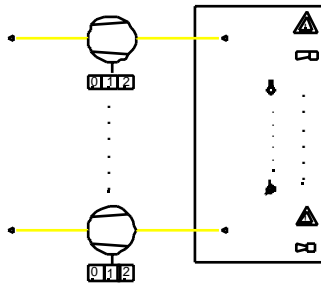
| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|-------------|--------------|----|------------|
| UPK.X2 | | 1301 0611 00 | C | on request |



DDC-substation for 1 full air conditioning plant with 6 Aggregates (HRS, MF, pre-heater, post-heater, cooler, humidifier, 2-stage valveators, 2 timers, energy management, AE: 6 (0-10V), 10 (M-detector), DE: 18 (EK), AA: 8 (0-10V), DA: 18 (Triac 24V AC), interface: CAN

| | | | | |
|------------|---|--------------|---|------------|
| UPK.X2 SMS | As described before, however with following interfaces: SSK, FU, CAN, M-Bus, SSKM | 1301 0611 60 | C | on request |
|------------|---|--------------|---|------------|

1.3.1.10.7 Gas-Monitor



- tested and certified according to VDI Rules 2053 vom January 2004
- Cert. Number 487441 from 06.10.2004

| Typ | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|--------------|----|-----------|
| UPK.CO/GM | DDC-Substation as Gas-Monitor, 8 gas measuring functions with up to 4 limits and 2 x one-stage or 1 x two-stage valveator, 8 timers, 1 maintenance alarm, AI: 112 via max 16 CAN-IO-modules, DI: 12 (EK), DO: 16 (Relays), Interface: CAN | 1301 0021 00 | C | on req. |
| UPK.CO/GM S | DDC-Substation as Gas-Monitor, 8 gas measuring functions with up to 4 limits and 2 x one-stage or 1 x two-stage valveator, 8 timers, 1 maintenance alarm, AI: 112 via max 16 CAN-IO-modules, DI: 12 (EK), DO: 16 (Relays), Interface: SSK, Fu, CAN | 1301 0021 30 | C | on req. |

More information about CAN-IO-Modul can be found in chapter 1.8

Accessories like warning signs, horns, fireman switches etc for a CO Monitoring system can be found in chapter 1.7.7

1.3.1.10.10 Special Units

1.3.1.10.10.3 Accessories

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|-----------------------------|--------------|----|-----------|
| UPK.Serv | Special front panel for UPK | 1301 0030 00 | C | 49,- |

1.3.3 System Components



1.3.3.2 M-Bus-Components

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| SSU-M60 | unit PLUS M-Bus transformer for max. 60 M-Bus users, 24 DC/AC, C rail- or wall mounting, short-circuit protection | 1303 2100 | C | 581,- |
| SSU-M250 | unit PLUS M-Bus transformer for max. 250 M-Bus users, plug-in power unit 230 AC, wall mounting, lightning protection, short-circuit protection | 1303 2200 | C | 2.049,- |

1.3.10 Documentation

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|---|-----------|----|------------|
| BH UPBG S | Operating manual for Base Units of the DDC system unit PLUS , contains all information for mounting, wiring operation and initiation of the controller. (One copy delivered with the unit) | 1310 1001 | - | (net) 16,- |
| BH UPBG K | Operating manual for Base Units of the DDC system unit PLUS compact , contains all information for mounting, wiring operation and initiation of the controller. (One copy delivered with the unit) | 1310 1xx1 | - | (net) 16,- |
| SH UPK 1 | System manual volume 1, for DDC Substations unit PLUS compact , contains an extensive description of the Base Unit as well as the available library programs of the system for controlling, regulating and supervision of heating- and air conditioning plants | 1310 3001 | - | (net) 55,- |
| SH UPK 2 | System manual volume 2, for DDC Substations unit PLUS compact in heating plants, the description of the available various plants with hydraulic schemes, wiring diagrams and survey of functions | 1310 3101 | - | (net) 44,- |
| SH UPK 3 | System manual volume 3, for DDC Substations unit PLUS compact in air conditioning plants, the description of the available various plants with RLT-schemes, wiring diagrams and survey of functions | 1310 3201 | - | (net) 44,- |









1.4 DDC-Regel UNIT 9X compact

The **DDC-Regel UNIT 9X compact** is a powerful and flexible heating/valveation controller with a very good price-performance ratio. You can choose between controllers for **district heating systems**, **boiler systems** or **systems for heat pumps** with up to 2 heating circuits and a domestic hot water circuit for all possible DHW systems, also for a **fast domestic hot water control in a flow-through system**. There are versions for valveation systems. All versions with DHW control also have the control for a solar circuit included. There is also a version for single room control for up to 8 rooms. The **DDC-Regel UNIT 9X compact** was especially developed as a stand-alone-controller for single- or multi-family houses with a very simple and easy menu structure. But the controllers can also be used as a DDC-substation in a R+S DDC-system with **CLEVER system**.



OPERATION



-  **POTENTIOMETER**
a simple way to adjust your set points
-  **FULL TEXT DISPLAY**
for menus, parameters, messages and info texts
-  **INFO-TASTE**
shows additional information for a selected parameter
-  **HOT WATER/LOADING KEY**
starts the loading of the domestic hot water tank
-  **HEATING CIRC./OVERTIME KEY**
lengthens the occupancy time
-  **CHIMNEY SWEEPER KEY**
for repairs / maintenance

NEW HARDWARE

The **DDC-RegelUNIT 9X** is equipped with a backlit text display with 2 rows. No exchange of battery is needed! Now a new 5-day-capacitor feeds the system clock. No more changes of EPROMs. The complete software is in a FLASH and can be updated via interface instead of change of EPROM. There are now 2 additional multidunctional terminals with continuous signal, which can be used as inputs or outputs.

INTERFACES

The service interface, which is used mainly for the communication between a PC/notebook and the controller for maintenance reasons is by standard in every **DDC-RegelUNIT 9X** at the front behind the front cover.

Optionally the controller can be equipped with 3 additional interfaces. To connect remote control units and/or one **CAN-IO-modul** with additional I/O terminals the controller can be equipped with a **CAN-interface**. The **CAN-IO-moduls** have 16 terminals, with which you can collect digital or analog signals. To connect any kind of meter (heat, water, gas, electricity etc.) the controller can be equipped with an optional **M-Bus interface**. Naturally the controller can also be equipped with a **SSK-interface**, enabling a connection to a building management system via Bus or Modem.



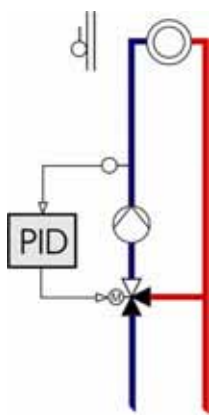
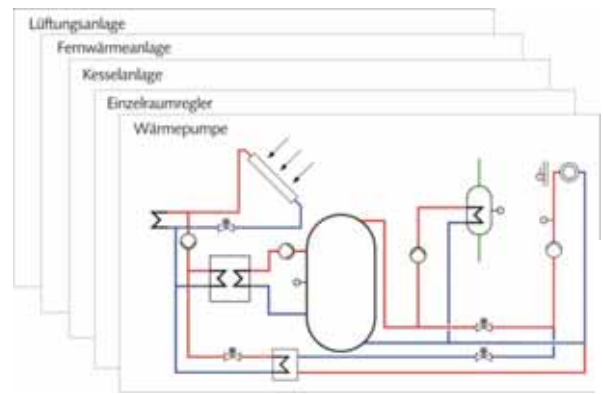
SOFTWARE DEVELOPMENT

Because of the new hardware, we were able to include also new software packages into the controller. The **DDC-RegelUNIT 9x** can control up to 4 control circuits. As a heat producer we can control not only a boiler or a district heating station but also a **heat pump**.

In between the heat producer and the heat consumers the controller is equipped with an **energy manager**. The energy manager collects the heat demand from the consumer circuits (heating circuit, DHW circuit) and calculates the perfect heat production for the heat producer.

The **DDC-RegelUNIT 9X** is also available as a **valveation controller**, which can control up to **4 sequences**. With the additional programs universal controller, maintenance messages and trend recording the controller can be optimally adapted to your system.

If the **info button** is pressed for a longer duration, a complete system overview is displayed. The system overview can be adapted by yourself and shows the most important parameters (current values, set points, status) and the current values from the connected **CAN-IO-module**.



Using the **universal controller** you can add all kinds of additional control tasks to the tasks of the controller, if there are enough terminals available. With the maintenance program you have 8 additional maintenance or warning messages available, which can be used to send a signal or an alarm, sending a free configurable message to the display or the building management system. The message can be sent on a certain date (maintenance needed!) or if a signal contact is activated. The R+S building management software **IRMA system** can receive these messages and react accordingly.

With the program **trend recording** you can monitor and record a number of parameter values over a certain time.

The **DDC-RegelUNIT 9X** has a number of **virtual terminals**, which can be used to realize certain SPS functions. The following functions are available: **digital – digital, switch-on delay, switch-off delay, FlipFlop, AND, OR, analog – analog, minimum value, maximum value, average value, difference value, threshold value switch**

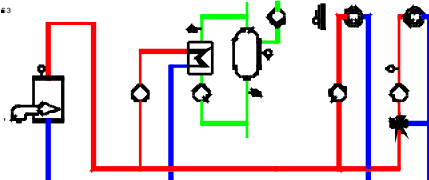
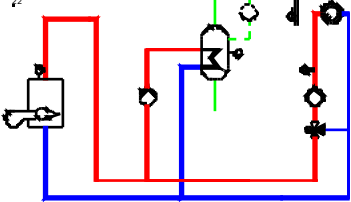
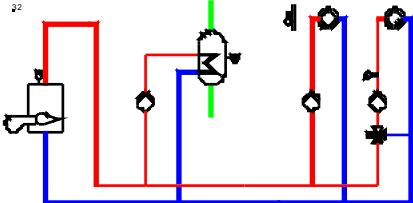
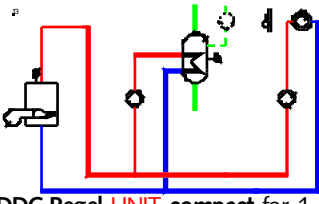
THE TYPES

| Types | District heating | Boiler | Heat pump | External Heat source to a buffer tank* | | heating circuit | DHW/solar | Gas Monitor | Ventilation |
|--------------|------------------|--------|-----------|--|----------------|-----------------|-----------|-------------|-------------|
| | | | | Solar* | Pellet* boiler | | | | |
| RU 94.00-100 | | | | • | • | | • | | |
| RU 94.00-010 | | | | | | • | | | |
| RU 94.1F-110 | • | | | • | • | • | • | | |
| RU 94.1K-110 | | • | | • | • | • | • | | |
| RU 96.GM | | | | | | | | • | |
| RU 96L.2 | | | | | | | | | • |
| RU 96.00-020 | | | | | | 2• | | | |
| RU 96.1F-110 | • | | | • | • | • | • | | |
| RU 96.1K-110 | | • | | • | • | • | • | | |
| RU 96.1K-120 | | • | | • | • | 2• | • | | |
| RU 98.GM | | | | | | | | • | |
| RU 98L.2 | | | | | | | | | • |
| RU 98.1W-110 | | | • | • | • | • | • | | |
| RU 98.1F-110 | • | | | • | • | • | • | | |
| RU 98.1F-120 | • | | | • | • | 2• | • | | |
| RU 98.1K-120 | | • | | • | • | 2• | • | | |
| RU 98.ER | | | | | | 8• | | | |

* Solar and Pellet boiler integration is in preparation

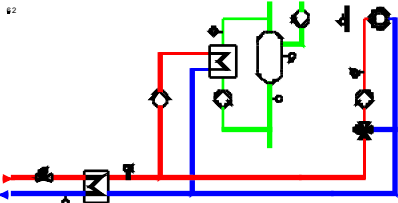
1.4.1

DDC-Regel UNIT 9X compact for Boiler Plants

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---|-----------|----|-----------|
| RU 98.1K-120 |  <p>DDC-Regel UNIT compact for 1 boiler circuit, 1 domestic hot water circuit, 1 mixed and 1 unmixed heating circuit, energy management, 9 types of system, 8 relay outputs, 2 transistor outputs, Service interface</p> | 1451 1200 | C | 700,- |
| RU 96.1K-110 |  <p>DDC-Regel UNIT compact for 1 boiler circuit, 1 domestic hot water circuit, 1 heating circuit, energy management, 6 types of system, 6 relay outputs, 1 transistor output, service interface</p> | 1451 2100 | C | 600,- |
| RU 96.1K-120 |  <p>DDC-Regel UNIT compact for 1 boiler circuit, 1 domestic hot water circuit, 1 mixed and 1 unmixed heating circuit, energy management, 8 types of system, 6 relay outputs, 1 transistor output, Service interface</p> | 1451 2200 | C | 650,- |
| RU 94.1K-110 |  <p>DDC-Regel UNIT compact for 1 boiler circuit, 1 domestic hot water circuit, 1 heating circuit, energy management, 4 types of system, 4 relay outputs, service interface</p> | 1451 3100 | C | 470,- |

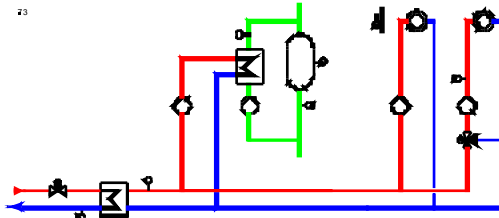
1.4.2

DDC-Regel UNIT 9X compact for District Heating Plants

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| RU 98.1F-110 |  <p>DDC-Regel UNIT compact for 1 district heating circuit, 1 domestic hot water circuit, 1 heating circuit, energy management, 12 types of system, 8 relay outputs, 2 transistor outputs, Service interface</p> | 1452 1100 | C | 510,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|------|-------------|----------|----|-----------|
|------|-------------|----------|----|-----------|

RU 98.1F-120



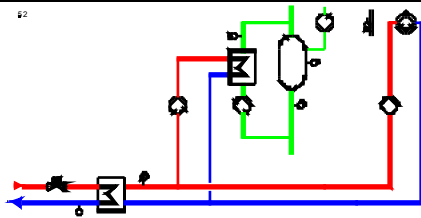
1452 1200

C

550,-

DDC-Regel **UNIT compact** for 1 district heating circuit, 1 domestic hot water circuit, 1 mixed and 1 unmixed heating circuit, energy management, 9 types of system, 8 relay outputs, 2 transistor outputs, Service interface

RU 96.1F-110



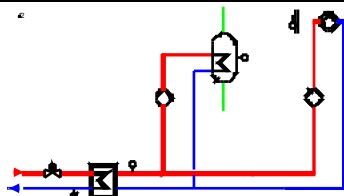
1452 2100

C

500,-

DDC-Regel **UNIT compact** for 1 district heating circuit, 1 domestic hot water circuit, 1 heating circuit, energy management, 5 types of system, 6 relay outputs, 1 transistor output, service interface

RU 94.1F-110



1452 3100

C

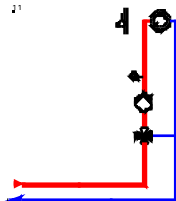
470,-

DDC-Regel **UNIT compact** for 1 district heating circuit, 1 domestic hot water circuit, 1 heating circuit, energy management, 2 types of system, 4 relay outputs, service interface

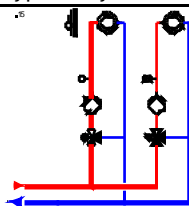
1.4.3

DDC-Regel **UNIT 9X compact** for Plants with Heating Circuits

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---------------|-----------|----|-----------|
| RU 94.00-010 | ²¹ | 1453 1100 | C | 470,- |
| RU 96.00-020 | ²⁵ | 1453 1400 | C | 500,- |



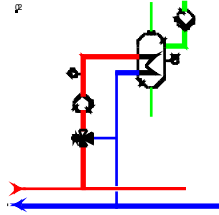
DDC-Regel **UNIT compact** for 1 heating circuit, energy management, 2 types of system, 4 relay outputs, service interface



DDC-Regel **UNIT compact** for 2 heating circuits, energy management, 2 types of system, 6 relay outputs, service interface



1.4.4 DDC-Regel UNIT 9X compact for Plants with Domestic Hot Water Circuit

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---|-----------|----|-----------|
| RU 94.00-100 |  | 1454 1100 | C | 470,- |

DDC-Regel UNIT compact for 1 domestic hot water circuit, energy management, 5 types of system, 4 relay outputs, service interface

1.4.5 DDC-Regel UNIT 9X compact for Ventilation Systems

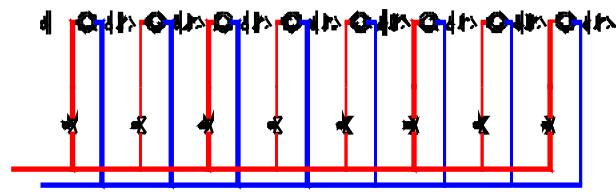
| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| RU 98.L2 |  | 1455 1100 | C | 550,- |

DDC-Regel UNIT compact for 1 valvation circuit, energy management, 8 types of system, 8 relay outputs, 2 transistor outputs, service interface

| | | | | |
|----------|--|-----------|---|-------|
| RU 96.L2 |  | 1455 1200 | C | 500,- |
|----------|--|-----------|---|-------|

DDC-Regel UNIT compact for 1 valvation circuit, energy management, 2 types of system, 7 inputs, 6 relay outputs, 1 transistor output, service interface

1.4.6 DDC-Regel UNIT 9X compact for Single Room Control

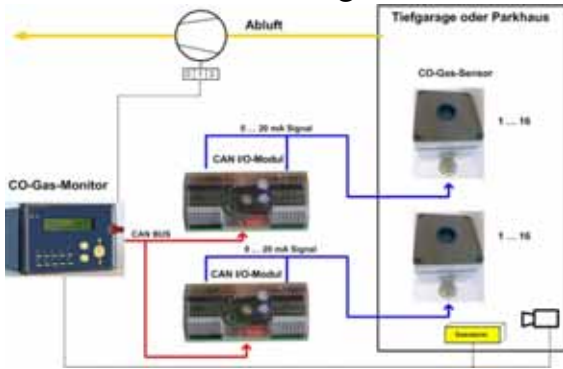
| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| RU 98.ER |  | 1456 1100 | C | 500,- |

DDC-Regel UNIT compact for the single room control for 8 rooms (2-point output) or 4 rooms (3-point-output), energy management, 4 types of system, 8 relay outputs, 2 transistor outputs, service interface



1.4.7

DDC-Regel UNIT 9X compact for Gas Monitoring, especially for parking houses



- tested and approved according to VDI guideline 2053 January 2004
- Certification No. 487441 from 10-06-2004
- Additional components can be found in chapter 1.10.5

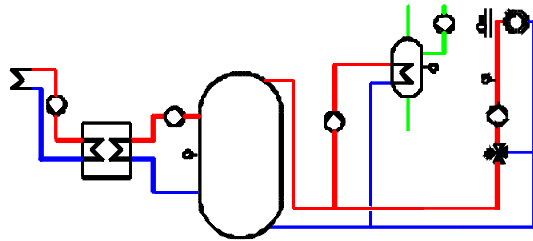
| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|-----------|
| RU 96.CO/GM | DDC-Regel UNIT compact for monitoring CO-Gas for up to 32 Gas-Sensors, upper and lower limit control, average value, control of 4 different limit values and alarm signal via a message output, contact output to a 2 stage valveator or two 1-stage valveators, 6 relay outputs, service interface | 1497 1100 | C | 530,- |
| RU 98.CO/GM | DDC-Regel UNIT compact for monitoring CO-Gas for up to 32 Gas-Sensors, upper and lower limit control, average value, control of 4 different limit values and alarm signal via a message output, contact output to a 2 stage valveator or two 1-stage valveators, 8 relay outputs, service interface | 1497 1200 | C | 550,- |

You will find more information for the CAN-IO-Modules in chapter 1.8

Accessories like warning signs, horns, fireman switches etc for a CO Monitoring system can be found in chapter 1.7.7

1.4.8 DDC-Regel UNIT 9X compact for Heat Pumps

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|-------------|-----------|----|-----------|
| RU 98.1W-110 | | 1458 1100 | C | 500,- |



DDC-Regel UNIT compact for 1 heat pump, 1 domestic hot water circuit, 1 heating circuit, energy management, 7 system diagrams, 8 Relay outputs, 2 transistor outputs, service interface



1.4.9 Interfaces for DDC-Regel UNIT 9X compact

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|---|-----------|----|-----------|
| RU 9S.SSK | interface for PC, Modem, Bus | 1459 1000 | C | 100,- |
| RU 9S.CS | CAN-interface for R+S High Speed CAN-remote control units or CAN-IO-modules, cable length 150 m | 1459 2200 | C | 80,- |
| RU 9S.M | M-Bus interface | 1459 3000 | C | 120,- |
| RU 9S.LON** | LON-Bus interface (in preparation with new hardware) | 1459 4100 | C | on req. |

1.4.10 Accessories for DDC-Regel UNIT 9X compact

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|-----------------------------------|-----------|----|-----------|
| BAT | Battery 3 V | 1220 1000 | C | 6,- |
| RU 9S.Adap | PC-Adapter for service- interface | 1410 1000 | C | 85,- |

1.4.11 Documentation

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|------------|
| BH RU 9X | Operating manual for DDC-Regel UNIT compact, consisting of part 1 and part 2 (please indicate controller type, one copy will be delivered with the unit. | 1411 1xx1 | - | (net) 12,- |
| SH RU 9X | System manual for DDC-Regel UNIT compact | 1411 2001 | - | (net) 54,- |

** in preparation



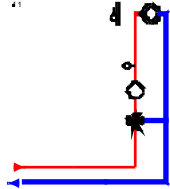
1.5
1.5.1

Compact Controller with Analog Signal Processing
Weather Dependent Flow Temperature Controllers

The compact controller **RV 5027** is a weather dependent flow temperature controller for the heating control of single homes or apartment buildings, office buildings, schools, hospitals, etc. it has a 3-point output with PI control characteristic for the regulation of flipper-valves, a lift-valve and an output for the circulating pump. On request the controller will be delivered with a time-switch. There are 5 different types of time-switches available, analogous or digital, with or without battery backup, with daily or weekly programs. With these timers individual heating programs can be achieved. The built-in circulating pump on/off-switch causes the switch-off of the circulating pump when flow is closed, or when the outside temperature will not allow anymore heating of spaces.



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|-------------|-----------|----|-----------|
| RV 5027 | " | 1501 0100 | A | 499,- |



Central controller with 3-point output, PI-characteristic, circulating pump logic and multiple use of time switch. (Price without time switch)

The compact controller **RV 9010.1** as a weather-dependant heating controller with boiler, minimal temperature limitation will be used for heat pump or single stage boiler. If required the remote setting-unit will be replaced by a room temperature adjuster, to lower the flow-temperature when external heat influence prevails. The control unit has a 2-point output to switch on/off a circulating pump or a burner. The program-switch allows to select between 6 different operation modes.

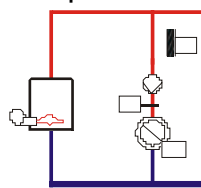


The compact controller **RV 9020.1** is used as an weather dependent flow temperature controller. If required the remote setting-unit will be replaced by a room temperature adjuster, to lower the flow-temperature when external heat influence prevails. The controller has one 3-point output to regulate a motorized flipper valve or lift valve. The program-switch allows to select between 6 different operation modes.



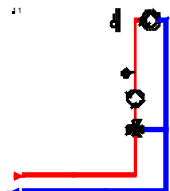
The time switch is selected according to demand, allows daily or weekly programs. Without time-switch the control unit operates with the reduced heating temperature mode. The controller is suitable for all heating plants single homes, apartment buildings, office buildings, schools, hospitals etc. The heat curve is set to 1.2 at delivery and can be changed according to the local facts, whereby the control unit can be used with normal or low temperature heating plants. When the outside detector has a multiple use for the units RV 9010, RV 9020 or RV 8020, the internal bridge switch should be open.

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|-------------|-----------|----|-----------|
| RV 9010 | " | 1501 0600 | A | 368,- |



Compact controller, 2-point output, circulating pump terminals and boiler min-limitation (Price without time-switch)

| | | | | |
|---------|---|-----------|---|-------|
| RV 9020 | " | 1501 0700 | A | 412,- |
|---------|---|-----------|---|-------|



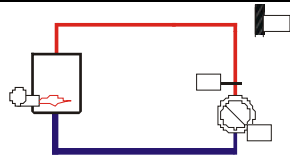
Compact controller, 3-point output, PI-characteristic, circulating pump terminals, (Price without time switch)



The compact controllers **RV 7010. N** is a weather-dependant flow temperature controller used to regulate a burner, gas-operated water heater or a thermal valve. The unit runs with a time-switch with battery backup, daily and weekly program. The unit can be mounted in living quarters or boiler rooms. The program switch allows 3 operational modes. Aside from the automatic time program a manual programming can be achieved at any time. The controlled flow-temperature will be determined by the corresponding outside temperature and the set value



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|-------------|-----------|----|-----------|
| RV 7010N | | 1501 1140 | C | 482,- |



Mini controller, 2-point output, time switch with daily and weekly program, battery backup, mode switch, **incl. outside and flow temperature sensor**. When exchanging for previous model RV 7010.R you have to exchange the sensors.

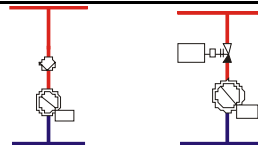
1.5.2 Room Temperature Controller

The **room temperature controllers AWRU-N** operates with net power and the type **AWRU-B** operates with batteries. Battery operated controllers can be operated with a 2- or 3-lead circuit. Net power operated types should provide 3 or 4 leads. To mount the controllers to a wall they will need a plug-in base. The life-expectancy of the battery will be approx. 1 year and a necessary change of batteries will be indicated.

The controllers allow the programming of 8 utilization times with free choice of weekdays and free set-values between 5 and 30 C in 0,2 C steps. A vacation program can be programmed for 99 days. Manually utilization-time or non-utilization-time can be selected. Frost protection and pump blocking-protection are available. Operating point and switching-differential are adjustable, summer/winter time correction occurs automatically.

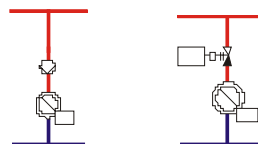


| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|-------------|-----------|----|-----------|
| AWRU-N | | 1502 0600 | C | 146,- |



Electronic room temperature controller 5-30 C with change-over contact and digital weekly time switch, 16 memory spaces, operating **voltage 230 AC**, battery backup approx 20 h, vacation program, temperature display, automatic summer/winter change-over, colour: white

| | | | | |
|--------|--|-----------|---|-------|
| AWRU-B | | 1502 0610 | C | 137,- |
|--------|--|-----------|---|-------|



Electronic room temperature controller 5-30 C with change-over contact and digital weekly time switch, 16 memory spaces, **battery operation with 2 x Mignon alkaline**, battery service life approx. 1 year, vacation program, temperature display, automatic summer/winter change-over, colour: white

1.5.3 Zone Controllers



The room temperature control system **roomUNIT** is a complete of room temperature controllers in connection with IO-moduls and very small actuators which were designed especially for manifolds (underfloor heating, BEKA capillary heating system etc.) or for radiator valves. The controllers are available for systems with heating control or heating/cooling control. The power supply can be 24V, 230V or battery powered. You can choose between versions with 2-point control, 3-point control, 0.10V control, EIB or even radio controlled. If needed the controller can be equipped with a pluggable digital time switch.

Characteristics: high control precision (+/- 0,2K), screwless terminal technology, 12 colors, extraordinary design, 1-2-3 mounting concept. PI-controller, temperature-potentiometer with 1/4° soft notch scale positioning, overcharge protection, mechanical limitation of set point temperature range, selectable operating mode ((not with version 20): „day“, „night“ or „automatic“), automatic temperature reduction from external switching signal, frost and valve protection functions, connection of thermal valves (powerless closed or powerless open) or proportional actuators (0.10V) or actuators with EIB-protocol. The radio controlled controllers are equipped with the innovative 868 MHz technology.

1.5.3.1 roomUNIT - room temperature controller



| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|--|-----------|----|-----------|
| roomUNIT 20.24* | Room temperature controller for the control of surface heating systems with thermal valve-drive actuators, operating power 24V | 1503 1210 | C | 30,- |
| roomUNIT 20.230* | Room temperature controller for the control of surface heating systems with thermal valve-drive actuators, operating power 230V | 1503 1220 | C | 30,- |

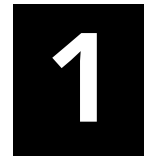


| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|---|-----------|----|-----------|
| roomUNIT 21.24* | Room temperature controller for the control of surface heating systems with thermal actuators, operating power 24V , operating switch | 1503 1230 | C | 40,- |
| roomUNIT 21.230* | Room temperature controller for the control of surface heating systems with thermal drive actuators, operating power 230V , operating switch | 1503 1240 | C | 40,- |
| roomUNIT 21.24x | Room temperature controller for the control of surface heating systems with thermal actuators, operating power 24V , operating switch, external sensor with 3m cable (under floor heating temperature) | 1503 1250 | C | 62,- |
| roomUNIT 21.230x | Room temperature controller for the control of surface heating systems with thermal actuators, operating power 230V , operating switch, external sensor with 3m cable (under floor heating temperature) | 1503 1260 | C | 62,- |
| roomUNIT 21.24HK* | Room temperature controller for the control of surface heating systems with thermal actuators (i.e. BEKA capillary system) for Heating and Cooling , pulse amplitude modulation, operating power 24V , operating switch, automatic change-over between heating and cooling. Display of cooling operation. | 1503 1270 | C | 73,- |



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|---|-----------|----|-----------|
| roomUNIT 22.24* | Room temperature controller for the control of surface heating systems with thermal actuators, operating power 24V, operating switch, digital timer (removable), day and week program, 7 day power reserve, 1 channel, 28 memory places, free block formation, automatic summer time adjustment. | 1503 1310 | C | 137,- |
| roomUNIT 22.230* | Room temperature controller for the control of surface heating systems with thermal actuators, operating power 230V, operating switch, digital timer (removable), day and week program, 7 day power reserve, 1 channel, 28 memory places, free block formation, automatic summer time adjustment. | 1503 1320 | C | 137,- |
| roomUNIT 23.24HK* | Room temperature controller for the control of surface heating systems with thermal actuators (i.e. BEKA capillary system) for heating and cooling, 2 separate 0.10V outputs, power supply 24V, adjustable neutral zone, fixed energy saving value 4K | 1503 1330 | C | 65,- |
| roomUNIT 24.24HK* | Room temperature controller for the control of surface heating systems with proportional actuators (i.e. BEKA capillary system) for heating and cooling, 2 separate 0.10V outputs, power supply 24V, adjustable neutral zone, fixed energy saving value 4K, operating switch | 1503 1340 | C | 74,- |

* Needs mounting socket **room MOD MS**





| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|---|-----------|----|-----------|
| roomUNIT 25.EIB | Room temperature controller for single room temperature control with EIB Technology, control of EIB-usable actuators, i.e. actuators via the base station roomBASE EIB. With integrated bus connector, temperature adjustment, absolute or relative scale, status-LED: Standby, night reduction, frost protection, cooling. | 1503 1410 | C | 244,- |



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|---|-----------|----|-----------|
| roomUNIT 26.F | Room temperature controller in combination with base station roomBASE Fx, communication via radio frequency 868 MHz. The base station is being used as a receiver and controls the actuators, operating switch, battery powered (approx. 5 Jahre), range approx. 30m inside a building. | 1503 1510 | C | 77,- |

| | | | | |
|----------------|--|-----------|---|------|
| roomUNIT 26.Fx | Room temperature controller in combination with base station roomBASE Fx, communication via radio frequency 868 MHz. The base station is being used as a receiver and controls the actuators, operating switch, battery powered (approx. 5 Jahre), range approx. 30m inside a building, with external sensor 3m cable. | 1503 1520 | C | 95,- |
|----------------|--|-----------|---|------|



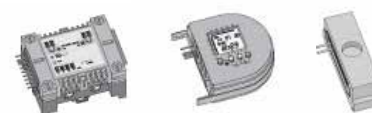
1.5.3.2 roomBASE Base Station

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| roomBASE A6.24 | Basisstation, Connection system for roomUNIT xx.24 and zoneVALVE actuators, optimal for heating circuit distributors. Quick installation due to screwless connection technique (plug-in/clamping connections). Clear arrangement of the connection lines with cable grip. Wrong connections avoided by unambiguous colour codes. Can be modularly extended by additional modules via the integrated interface. With plugged-in system transformer 24 V. Possibility of automatic setback of 2 heating programs C1 and C2 by means of timer, operating power 24V, integrated transformer 230V/24V. Control/power supply for upto 6 room temperature controllers | 1503 2110 | C | 123,- |
| roomBASE A1.24 | Basisstation, Connection system for roomUNIT xx.24 and zoneVALVE actuators, optimal for heating circuit distributors. Quick installation due to screwless connection technique (plug-in/clamping connections). Clear arrangement of the connection lines with cable grip. Wrong connections avoided by unambiguous colour codes. Can be modularly extended by additional modules via the integrated interface. With plugged-in system transformer 24 V. Possibility of automatic setback of 2 heating programs C1 and C2 by means of timer, operating power 24V, integrated transformer 230V/24V. Control/power supply for 1 room temperature controller | 1503 2120 | C | 80,- |
| roomBASE A6.230 | Basisstation, Connection system for roomUNIT xx.230 and zoneVALVE actuators, optimal for heating circuit distributors. Quick installation due to screwless connection technique (plug-in/clamping connections). Clear arrangement of the connection lines with cable grip. Wrong connections avoided by unambiguous colour codes. Can be modularly extended by additional modules via the integrated interface. With plugged-in system transformer 24 V. Possibility of automatic setback of 2 heating programs C1 and C2 by means of timer, operating power 230V. Control/power supply for upto 6 room temperature controllers | 1503 2210 | C | 94,- |
| roomBASE A1.230 | Basisstation, Connection system for roomUNIT xx.230 and zoneVALVE actuators, optimal for heating circuit distributors. Quick installation. Clear arrangement of the connection lines with cable grip. Wrong connections avoided by unambiguous colour codes. Can be modularly extended by additional modules via the integrated interface. With plugged-in system transformer 24 V. Possibility of automatic setback of 2 heating programs C1 and C2 by means of timer, operating power 230V. Control/power supply for 1 room temperature controller | 1503 2220 | C | 42,- |
| roomBASE EIB6 | Basisstation, Connection system for roomUNIT xx.EIB and zoneVALVE actuators. Quick installation due to screwless connection technique (plug-in/clamping connections). Clear arrangement of the connection lines with cable grip. Wrong connections avoided by unambiguous colour codes. Can be modularly extended by additional modules via the integrated interface. System trafo 24 V. Control for upto 6 room temperature controllers | 1503 2310 | C | 714,- |



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|---|-----------|----|-----------|
| roomBASE EIB12 | Basisstation, Connection system for roomUNIT xx.EIB and zoneVALVE actuators. Quick installation due to screwless connection technique (plug-in/clamping connections). Clear arrangement of the connection lines with cable grip. Wrong connections avoided by unambiguous colour codes. Can be modularly extended by additional modules via the integrated interface. System trafo 24 V. Control for upto 12 room temperature controllers | 1503 2320 | C | 1.048,- |
| roomBASE F6 | Basisstation, Connection system for roomUNIT F and zoneVALVE actuators. The room temperature value is transferred via 868MHz Frequenz. The base station supplies the power supply for the connected actuators. The system is mainly used in combination with heating manifolds(i.e. underfloor heating). You can connect all kinds of additional moduls (i.e timer). Systemtrafo 24V. Control of upto 6 room temperature controllers | 1503 2410 | C | 343,- |
| roomBASE F12 | Basisstation, Connection system for roomUNIT F and zoneVALVE actuators. The room temperature value is transferred via 868MHz Frequenz. The base station supplies the power supply for the connected actuators. The system is mainly used in combination with heating manifolds(i.e. underfloor heating). You can connect all kinds of additional moduls (i.e timer). Systemtrafo 24V. Control of upto 12 room temperature controllers | 1503 2420 | C | 452,- |

1.5.3.3 roomMOD – Expansion Modules



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| roomMOD AM.24 | Actuator Modul for roomBASE xx.24, Expansion for upto 8 actuators. The actuators can be used by one or two controllers | 1503 3110 | C | 50,- |
| roomMOD RM.24 | Control Modul for roomBASE xx.24, Expansion for upto 2 room temperature controllers with upto 4 actuators each. | 1503 3120 | C | 44,- |
| roomMOD PM.24 | Pump-/Performance Modul for roomBASE xx.24, roomBASE EIB or roomBASE F, Expansion to switch a heating pump or any other electrical consumer, potential free contact 230V, 5A | 1503 3130 | C | 72,- |
| roomMOD 2PM.24 | Double Pump Modul for roomBASE xx.24, roomBASE EIB or roomBASE F, Expansion to switch a heating pump and any other electrical consumer, 2 potential free contacts 230V, 5A | 1503 3140 | C | 92,- |
| roomMOD HK.24 | Heating/Cooling Modul for roomBASE xx.24 or roomBASE F, Expansion for the function heating/cooling for all controllers connected tot he base station. | 1503 3150 | C | 97,- |
| roomMOD AM.230 | Actuator Modul for roomBASE xx.230, Expansion for upto 8 actuators. The actuators can be used by one or two controllers | 1503 3210 | C | 50,- |
| roomMOD RM.230 | Control Modul for roomBASE xx.230, Expansion for upto 2 room temperature controllers with upto 4 actuators each. | 1503 3220 | C | 44,- |
| roomMOD PM.230 | Pump-/Performance Modul for roomBASE xx.230, Expansion to switch a heating pump or any other electrical consumer, potential free contact 230V, 5A | 1503 3230 | C | 72,- |
| roomMOD 2PM.230 | Double Pump Modul for roomBASE xx.230, Expansion to switch a heating pump and any other electrical consumer, 2 potential free contacts 230V, 5A | 1503 3240 | C | 97,- |
| roomMOD T | Timer-/clock Modul for roomBASE xx.24 or roomBASE xx.230, 2 week programs (C1/C2) 42 memory locations, automatic summer/ winter change-over, power reserve 120h | 1503 3310 | C | 157,- |
| roomMOD S | Programming plug for roomBASE xx.24 or roomBASE xx.230 to combine the 2 heating programs C1 and C2 into one central heating program. | 1503 3320 | C | on req. |
| roomMOD MS | Mounting socket | 1503 3400 | C | 4,- |

Please contact us for **package prices** and **OEM conditions**.

1.6 Controllers in Modular Design

The characteristic of these controllers is the modular design with a clip for DIN-rail mounting and standard dimensions (45mm) with a width of 105mm and 160mm. These analog controllers were designed for inexpensive solutions for standard heating end valve systems.



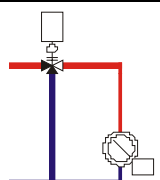
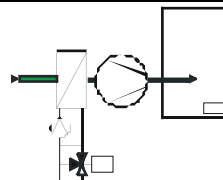
1.6.1 Modular Controller

1.6.1.2 Fixed value control with 3-point output

The module contains a complete controller for the continuous control of flow-temperature, valving-temperature or room-temperature via valve actuators or flap actuators. Other than R + S actuators should have a running time of 2min to guarantee a faultless operation. In sequence- and frequency-controlling several amplifiers can be connected. The controller is particularly useful for low-priced fixed value controlling in valvation plants. It controls universally any kind of constant temperature.



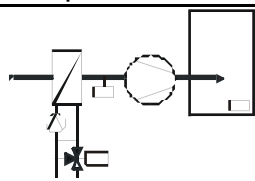
For time-setting a separate time-switch can be connected in combination with a remote set-point poti or a fixed resistor.

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| 105.122M |  Module controller, fixed value, 5 .. 40 C, PI-characteristic, 3-point output | 1601 2200 | C | 284,- |
| 105.124M |  Module controller, fixed value, 40 ..100 C, PI-characteristic, 3-point output | 1601 2300 | C | 284,- |

1.6.1.6 Cascade control

Module controller for the cascade control of the room- or extract-air-temperature by regulating an actuated valve with absolute min.-limitation of the supply air temperature. 3-point output with P/PI-characteristic. The module is especially suitable for plants with little air change (large neutral times) or with proportionally high amount of external heat.



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| 160.163M |  Module controller, cascade control of the room or extract air temperature, min.-limitation, PI-characteristic, 3-point output | 1601 6100 | C | 398,- |

1.6.2 Bridge Modules

Controlling of temperature or humidity and connection of the sensors or feed-back poti with position limitation. Temperature limits are absolute and carried along for min./max.-limitation.



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|-----------|----|-----------|
| 105.611M* | Bridge module, temperature with min./max.-limitation | 1602 2000 | C | 284,- |

1.6.3 Booster Modules

With LED display and output relay for the connection of actuators or other aggregates, depending on output-characteristic PI or 2-point, 2-stage.



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| 105.912* | Booster module, 2-point output, 2-stage | 1603 2000 | C | 284,- |
| 105.921* | Booster module, 3-point output, PI-characteristic | 1603 3000 | C | 284,- |

* soon out of production

1.6.4 Additional Modules

1.6.4.3 Transformer / limit switch

Electronic relay for the conversion of a continuous signal into a 2-point signal. Module for rail mounting NS 35 / EN 50022. Strong potential-free change-over contact.



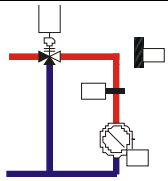
| Type | Description | Art.-Nr. | PG | Price EUR |
|------|--|-----------|----|-----------|
| GS-U | Transformer 0...10V, 2-point (limit switch) | 1604 1310 | C | 105,- |
| GS-I | Transformer 0 ... 20 m A, 2-point (limit switch) | 1604 1320 | C | 105,- |

1.6.5 Heating Controller in Modular Design

1.6.5.2 Heating controller, weather-dependent, 3-point output

Heating controller in modular design for weather-dependent flow temperature control with 3-point output, PI-characteristic for hot water plants for up to 110 °C with static radiators for under-floor heating and for the pre-control in valving systems. Within the modular system additional modules can be connected to the heating-controller to extend the functions of the controller.



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| 105.020* |  Heating controller, weather-dependent, PI-characteristic, 3-point output | 1605 2000 | A | 284,- |

1.6.5.4 Heating controller, room- or fixed-value controller, 3-point output

The heating controller 105.121 is a room- fixed value controller with 3-point output and PI-characteristic. It is used for the controlling of the flow-supply air, mixed air or room-temperatures via valve-actuators or flap-actuators.



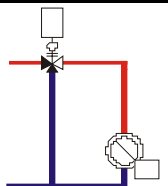
1. Room temperature control

Suitable for the controlling of buildings with one main room, for instance bungalows, halls, restaurants, greenhouses etc. The controller offers the possibility of averaging the temperature with several sensors, set-point remote setting and night-reduction via a separate time-switch in combination with 2 remote set-point pots.

At long-distance heating-operation the connection of a flow-temperature detector is advisable for a more rapid temperature adjustment.

2. Fixed value control (only with remote set-point adjuster EFV 48 or FVC possible)

Suitable for every kind of continuous flow temperature control, as for example in under floor-heatings, swimming pool controls, flow-temperature control, domestic water control or as a low-priced supply-air control in valvation plants.

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| 105.121* |  Heating controller, room- and fixed-value controller, 3-point output | 1605 4000 | A | 284,- |

* soon out of production



1.7 Special Systems

1.7.6 Prepayment System (Chipcard)

1.7.6.1 ENERGY master 200 (Base unit)

The ENERGY master 200 is an integral part of a modern and multi-functional accounting system for the distribution of heat. It serves as a cashless prepayment solution and provides a means to keep up with the challenges of a liberal market. It helps to ensure a trouble-free payment of the product heat in advance and at the same time offers a flow of information in both directions between the customer and the provider. Tariffs, credits, extra credits etc. are transported to the PrePayment device and e.g. consumption readings, rest credits, and consumption maxima are transferred into the provider's database. An inexpensive chip card solution was selected to provide a transportation medium that offers a high standard of security by means of a 24 bits non readable password protection plus an error counter with an irreversible lock after eight abusive unlock attempts.



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------------|--|-----------|----|-----------|
| ENERGY master 200 | Prepayment System (Chipcard), multifunctional accounting system for the distribution of all kinds of energy (i.e. heat, electricity, gas, water). Connection of any kind of meter with puls output (i.e. heat meter, electricity meter, gas meter, water meter) and any kind of shut-off mechanism (i.e.valve, relay etc). | 1706 1000 | C | on req. |
| E master 200 /10 | 1..10 units | 1706 1010 | C | on req. |
| E master 200 /20 | 11..20 units | 1706 1020 | C | on req. |
| E master 200 /50 | 21..50 units | 1706 1030 | C | on req. |
| E master 200 /100 | 51..100 units | 1706 1040 | C | on req. |
| E master 200 /200 | 101..200 units | 1706 1050 | C | on req. |
| E master 200 /500 | 201..500 units | 1706 1060 | C | on req. |
| E master 200 /1000 | 501..1000 units | 1706 1070 | C | on req. |

1.7.6.10 Accessories

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---------------------------------|-----------|----|-----------|
| EM Chipkarte | Chip card for ENERGY master 200 | 1706 0100 | C | on req. |



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| EM P-Station PC | Programming station for chip cards, USB interface for connection to PC or notebook | 1706 0200 | C | on req. |



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|---|-----------|----|-----------|
| EM P-Station SCPU | Programming station SCPU for Chip cards, incl 1x licence, incl Software MECONA for Windows 9x/Me/XP/2000/NT | 1706 0300 | C | on req. |
| EM Lizenz | Another licence | 1706 0400 | C | on req. |



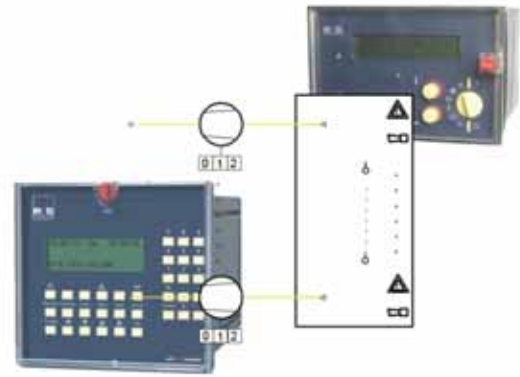
1.7.7 Gas Monitor (mit TÜV-Prüfzertifikat)

RICCIUS + SOHN is offering two modern monitoring systems for carbon monoxide: the **GAS Monitor RU 9X.CO/GM** and **UPKCO/GM** for a very competitive price.

The R+S monitoring system consists of the following components::

- **RU 96.CO/GM, RU 98.CO/GM** or **UPK.CO/GM (GAS Monitor)**,
- **CAN-IO-16G20** (Sensor-Input-Module),
- **COF** (carbon monoxid sensor).

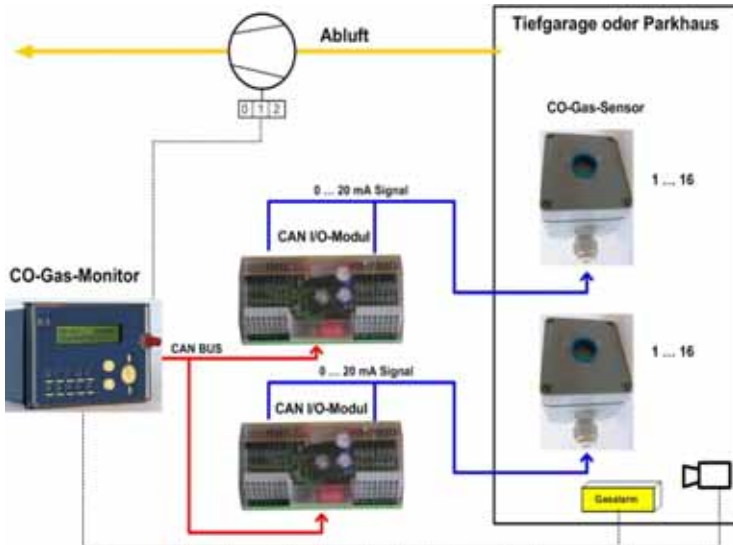
The whole system was tested according to the demands of the VDI guidelines 2053, (new version) from January 2004 and was certified by the TÜV Süd in October 2004 (alarm handling). All R+S Gas Monitors can monitor the carbon monoxide in parking houses, tunnels and underground car parks. The Gas Monitor evaluates the incoming data from the CAN-IO-Modules and controls valveators as well as acustic and visual alarm signals.



The **GAS Monitor RU 9X.CO/GM** ist designed for smaller systems for upto **32** carbon monoxide sensors. In bigger systems (upto 112 carbon monoxide sensors) the controller **UPK.CO/GM** is used. Each sensor input module **CAN-IO-16G20** can have upto 16 carbon monoxide sensors **COF** connected. You can connect max 2 CAN-IO-Modules to the Gas Monitor **RU 9X.CO/GM** . You can connect max. 10 CAN-IO-Modules to the controller **UPKCO/GM** Both types of **GAS Monitors** have the same functions and operating systems (yearly time switch, gas monitoring function, trend functions and maintenance functions) which will be completely preprogrammed when choosing the system diagram (during the startup procedure).

For R+S the system diagram consists of all components in a gas monitoring system:

- Configuration of every CO sensor input terminal (via CAN Bus).
- Configuration of all output terminals for the control of valveators, akustic signals, visual signals ans alarm signals.
- Configuration of limit set points according to VDI guideline 2053 for Germany or ÖNORM M 9418/19 for Austria



General Characteristics of the R+S GAS Monitors:

Easy operation: Asystem overview in normal text, info button for help function and visualizing additional parameter information, acknowledge button to reset any alarms, access protection with 4 access levels with individual codes

Functionality: 2 preprogrammed system diagrams (with either limit set points for Germany or Austria), alarm and/or maintenance message on display, on output terminal or to R+S BMS, f.i. limit was violated or yearly maintenance is necessary.

Communication: service interface at the front of the controller for printer or PC, CAN-interface, interface card SSK for PC, Modem (remote control, remote maintenance, alarm messaging R+S BMS) via R+S Bus, for **RU 9X.CO/GM** optional, in **UPKCO/GM S** always included.

Special Characteristics of the R+S GAS Monitore RU 9X.CO/GM:

Functionality: Connection of max. **32 sensors** via maximal 2 CAN-I/O-Modules, 4 gas monitoring functions to evaluate the signals and control of actuators for maximal 4 monitoring areas, 1 yearly time switch, to control the valveators time dependant f.i. exchanging air with forced activation of valveator, trend recording maximal 5 datapoints like measuring values or limit violation **6 or 8 Relay outputs**, 230V AC (upto 1A inductive) for the control of valveators as well as visual or acustical signals, wall mounting, panel mounting or DIN-rail mounting, protection class IP 54 (front)

Special Characteristics of the R+S GAS Monitore UPK.CO/GM:

Functionality: Connection of max. **112 sensors** via maximal 10 CAN-I/O-Modules, 8 gas monitoring fundions to evaluate the signals and control of actuators for maximal 8 monitoring areas, 8 yearly time switches, to control the valveators time dependant f.i. exchanging air with forced activation of valveator, trend recording maximal 5 datapoints like measuring values or limit violation **16 Relay outputs**, for the control of valveators as well as visual or acustical signals, panel mounting

1.7.7.1 GAS Monitor RU 9X.CO/GM



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|-----------|
| RU 96.CO/GM | DDC-Regel UNIT compact for monitoring CO-Gas for up to 32 Gas-Sensors, uooper and lower limit control, average value, contrrrol of 4 different limit values and alarm signal via a message output, contact output to a 2 stage valveator or two 1-stage valveators, 6 relay outputs, service interface | 1497 1100 | C | 530,- |
| RU 98.CO/GM | DDC-Regel UNIT compact for monitoring CO-Gas for up to 32 Gas-Sensors, uooper and lower limit control, average value, contrrrol of 4 different limit values and alarm signal via a message output, contact output to a 2 stage valveator or two 1-stage valveators , 8 relay outputs, service interface | 1497 1200 | C | 550,- |



1.7.7.2 GAS Monitor UPK.CO/GM



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|--------------|----|-----------|
| UPK.CO/GM | DDC-Substation as Gas- Monitor, 8 gas measuring functions with up to 4 limits and 2 x one-stage or 1 x two-stage valveator, 8 timers, 1 maintenance alarm, AI: 112 via max. 16 CAN-IO-modules, DI: 12 (EK), DO: 16 (Relays), Interface: CAN | 1301 0021 00 | C | on req. |
| UPK.CO S | DDC-Substation as Gas- Monitor, 8 gas measuring functions with up to 4 limits and 2 x one-stage or 1 x two-stage valveator, 8 timers, 1 maintenance alarm, AI: 112 via max. 16 CAN-IO-modules, DI: 12 (EK), DO: 16 (Relays), Interface: SSK, Fu, CAN | 1301 0021 30 | C | on req. |

1.7.7.3 Input Module for CO-Gas-Sensors with TÜV-certificate



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---|-----------|----|-----------|
| CAN-IO-16G20 | CAN-IO-Modul, for Gasmonitor 16 x 0.20mA inputs | 1804 1200 | C | 241,- |

1.7.7.4 Gas-Sensor

| Type | Description | Art.-Nr. | PG | Price EUR |
|------|--|-----------|----|-----------|
| COF | CO-sensor for CO-monitoring-systems for andergroand carpark (s chap. 1.7.7), output signal 4.20mA, power supply 24V, wall mounting | 2801 3000 | C | 184,- |

1.7.7.10 Accessories for Plants for CO-Gas Monitoring

R+S is offering Accessories for their TÜV-certified CO-Gas Control Centers. A plant for CO-Gas Monitoring consists of the controller (DDC-RegelUNIT 9X.CO/GM or unit PLUS kompakt UPK.CO) in connection with the CAN-I/O-Moduls and the CO-sensors COF. To complete the plant, R+S is offering warning signs, horns, acknowledge switches and fireman switches etc.:

1.7.7.10.0**Warning Signs**

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|--|-----------|----|-----------|
| WBLK/1 | Warning sign, blinking one sided, yellow, small, „Danger of Poisoning! Leave Garage immediately!“ | 1005 0010 | C | 191,- |
| WBLG/1 | Warning sign, blinking one sided, yellow, big „Danger of Poisoning! Leave Garage immediately!“ | 1005 0020 | C | 353,- |
| WBLK/2 | Warning sign, blinking two sided, yellow, small, „Danger of Poisoning! Leave Garage immediately!“ | 1005 0030 | C | 245,- |
| WBLG/2 | Warning sign, blinking two sided, yellow, big „Danger of Poisoning! Leave Garage immediately!“ | 1005 0040 | C | 449,- |
| WBLK/3 | Warning sign, blinking one sided, red, small, „NO ENTRY! Danger of Poisoning!“ | 1005 0050 | C | 191,- |
| WBLG/3 | Warning sign, blinking one sided, red, big „NO ENTRY! Danger of Poisoning!“ | 1005 0060 | C | 353,- |
| WBLK/4 | Warning sign, blinking one sided, red, small, „NO ENTRANCE! Danger of Poisoning!“ | 1005 0070 | C | 191,- |
| WBLG/4 | Warning sign, blinking one sided, red, big „NO ENTRANCE! Danger of Poisoning!“ | 1005 0080 | C | 353,- |

1.7.7.10.1**Signal Horn**

| Type | Description | Art.-Nr. | PG | Price EUR |
|------|--------------------------------------|-----------|----|-----------|
| WAHU | Signal Horn, 230V, Noise Level 92 dB | 1005 0100 | C | 48,- |

1.7.7.10.2**Stand-by Battery Power Supply**

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|--|-----------|----|------------|
| USV/5 | Stand-by Battery Power Supply 230V, 500VA | 1005 0200 | C | on request |
| USV/7 | Stand-by Battery Power Supply 230V, 700VA | 1005 0210 | C | on request |
| USV/10 | Stand-by Battery Power Supply 230V, 1000VA | 1005 0220 | C | on request |

1.7.7.10.3**Acknowledge Button**

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------|-------------------------------------|-----------|----|-----------|
| QUITT | Acknowledge Button acc. to VDI 2053 | 1005 0300 | C | 27,- |

1.7.7.10.4**Fireman Switch**

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|--|-----------|----|-----------|
| FEUERS | Fireman Switch behind glass for valve control „Manual-Off-Auto“ | 1005 0400 | C | 109,- |

1.7.7.10.5**Miscellaneous Accessories**

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|------------|
| PGAS/SET | Testing and calibrating set to test the functionality at the initial installation or during maintenance | 1005 1000 | C | on request |
| PGAS/0 | Test gas 0 ppm CO | 1005 1010 | C | on request |
| PGAS/150 | Test gas 150 ppm CO | 1005 1020 | C | on request |
| PGAS/ER | Gas extraction controller for test gas | 1005 1030 | C | on request |
| PGAS/AS | Tube between gas extraction controller and testing cap | 1005 1040 | C | on request |
| PGAS/K | Testing cap for CO-sensor | 1005 1050 | C | on request |



1.8 CAN-IO-Modules

The **CAN-IO-Modules** are used to enhance the range of existing controller systems like **DDC-Regel UNIT** and **unit PLUS**. With these modules you have the possibility to enhance the number of inputs and outputs. All CAN-IO-Moduls are delivered with a clear cover to have an overview of the LEDs..



1.8.1 Inputs

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| CAN-IO-16X | CAN-IO-module, 16 x X-input, M-sensor, 0.10V, 0.20mA | 1801 1200 | C | 224,- |
| CAN-IO-16EK | CAN-IO-module, 16 x EK-input | 1801 2200 | C | 235,- |
| CAN-IO-16E24 | CAN-IO-module, 16 x E24-input | 1801 3200 | C | 239,- |

1.8.2 Outputs

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| CAN-IO-16Y10 | CAN-IO-module, 16 x 0.10V-outputs | 1802 1200 | C | 274,- |
| CAN-IO-16R | CAN-IO-Modul, 16 x relay-outputs (potential free, 230V/24V (can't be used mixed) | 1802 5200 | C | 274,- |

1.8.3 Mixed Modules

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|---|-----------|----|-----------|
| CAN-IO-8R8X | CAN-IO-module, 8 x relay-outputs (potential free), 230V,/24V (can't be used mixed), 8 x X-inputs, M-sensor, 0.10V, 0.20mA | 1803 2200 | C | 265,- |

1.8.4 Special Moduls

1.8.4.1 Input Modul for CO-Gas-Sensors with TÜV-certificate

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| CAN-IO-16G20 | CAN-IO-module, for gasmonitor 16 x 0.20mA Inputs | 1804 1200 | C | 241,- |

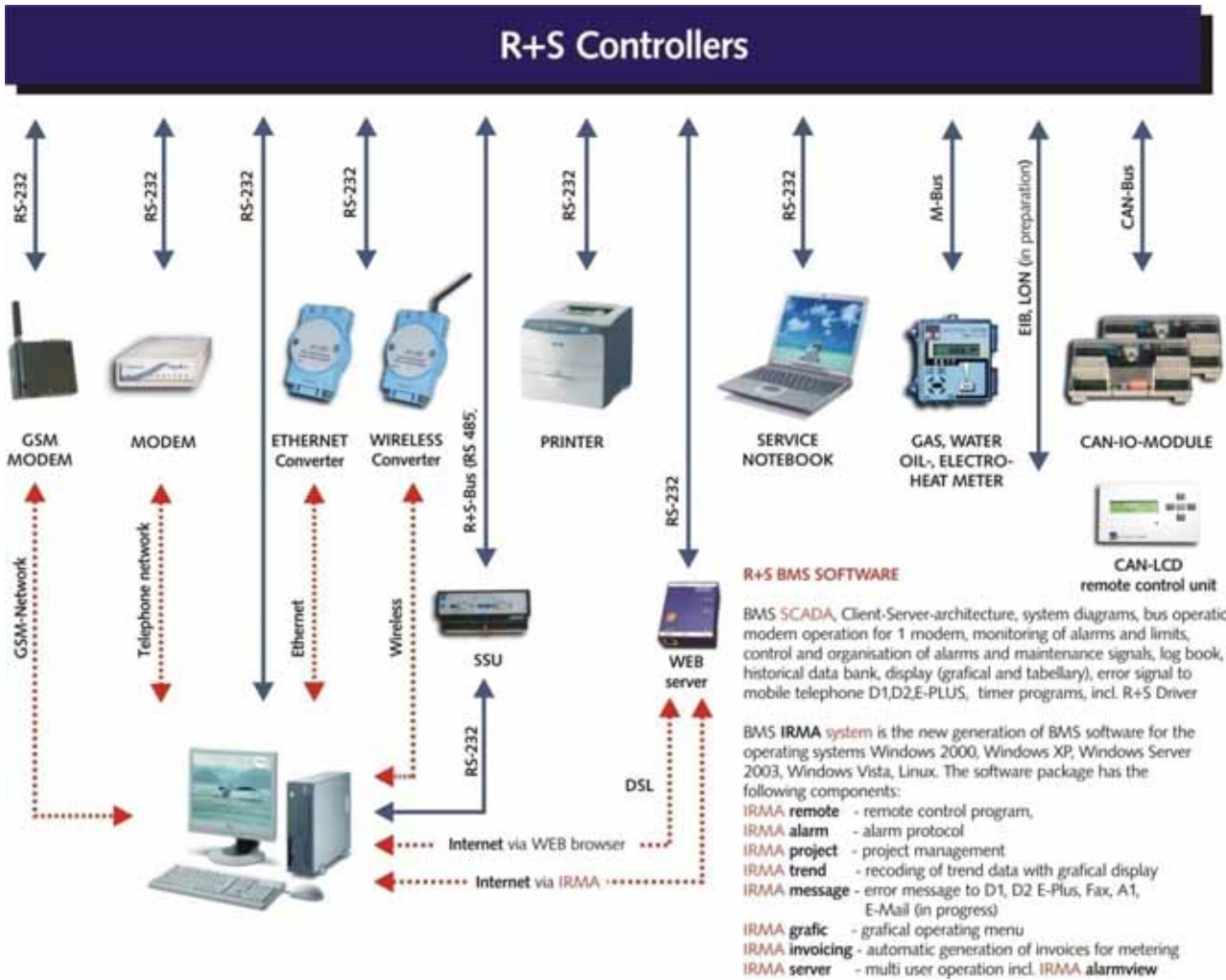
Further Applications

The TÜV-Certificate is valid for CO-Gas-Monitoring with **DDC-RegelUNIT 9X.CO/GM** and **unit PLUS compact** with the appropriate CO-sensors (COF) for parking houses.

But there are a lot of applications, where you can use the controllers and sensors without the TÜV-Certificate f.i. :

- oxygen in shafts and wells.
- monitoring of all kinds of gases like: Acetyline, ammonia, gasoline, butane, chlorine, hydrogen chloride, dichlorine ethane, ethane, ethanol, ethylene, frigene, heptane, hexane, carbon dioxide, carbon monoxide, methane/natural gas, methanol, methyl ethyl ketone, nonane, ozone, phosphine, propane, oxygen, sulphur dioxide, sulphur hexa fluoride, hydrogen sulphide, silane, dinitrogen monoxide, nitric oxide, styrene, toluol, tetrahydrofuran, hydrogen etc. – every sensor, that has a 0.20mA output
- monitoring dangerous gases in wine cellars, paintshops etc.

You can receive corresponding sensors on request



1.9.1 Hardware / Display and Operating Units

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|--|-----------|----|-----------|
| R+S LZP | R+S Building Management System PLUS: Personal computer, mini-tower without monitor, technical data and software on request | 1901 1000 | C | on req. |
| R+S LZP-LF | R+S Building Management System PLUS: Notebook, TFT-colour-display, technical data and software on request | 1901 3100 | C | on req. |
| R+S FM17PF | R+S LCD 17" PLUS, 17"-LCD, TFT-Flat-Screen monitor for BMS program PLUS | 1901 6100 | C | on req. |
| R+S FM19PF | R+S LCD 19" PLUS, 19"-LCD, TFT-Flat-Screen monitor for BMS program PLUS | 1901 7100 | C | on req. |
| R+S FM22PF | R+S LCD 22" PLUS, 22"-LCD, TFT-Flat-Screen monitor for BMS program PLUS | 1901 1200 | C | on req. |
| R+S TP-PC | R+S Touch-panel-PC with Touchmonitor, 3 seriellen, 1 parallelen interface, VGA, connection PS/2 Maus and Tastatur, optional Arbeitsspeicher and Festplatte zur Visualisierung von gebäudetechnischen Anlagen zB. with IRMA system | 1901 1100 | C | on req. |

1.9.2 Software for Building Management
1.9.2.2 BMS Software for MS WINDOWS 95 / 98

For the program GLT-WIN there will only be extensions for existing systems available. All other components of this software system are not available. There are special rates for updates from GLT-Win to IRMA system available (s. chapter 1.9.2.5) Please contact your system partner from R+S.

1.9.23 SCADA – Building Management Software for MS WIN XP / 2000

1.9.23.1 Run-time-version

Building management system **SCADA**, client-server architecture, system schemata, bus operation, modem operation for 1 modem, alarm- and limit monitoring signal management for alarms, maintenance signal, log book, historical data bank (grafic and text)), error routing to mobile telephone D1,D2 or E-PLUS, timer, incl R+S Driver

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---|--------------|----|------------|
| SCADA-200 | BMS SCADA -200: 200 data points like described above | 1902 4000 00 | C | on request |
| SCADA-500 | BMS SCADA -500: 500 data points like described above | 1902 4005 00 | C | on request |
| SCADA-1000 | BMS SCADA -1000: 1000 data points like described above | 1902 4010 00 | C | on request |
| SCADA-1500 | BMS SCADA -1500: 1500 data points like described above | 1902 4015 00 | C | on request |
| SCADA-2000 | BMS SCADA -2000: 2000 data points like described above | 1902 4020 00 | C | on request |
| SCADA-3000 | BMS SCADA -3000: 3000 data points like described above | 1902 4025 00 | C | on request |
| SCADA-4000 | BMS SCADA -4000: 4000 data points like described above | 1902 4030 00 | C | on request |
| SCADA-5000 | BMS SCADA -5000: 5000 data points like described above | 1902 4035 00 | C | on request |

1.9.23.2 Development Package

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|--------------|----|------------|
| SCADA-GE | Development tool to include data points in the grafic and in the data bank, maintenance of the data bank, automatic creation of the documentation, animated system schemata with grafic sybnols via ActiveX-components, additional tools for the analisys of the data. | 1902 4100 00 | C | on request |

1.9.23.3 Additional Functions

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|---|--------------|----|------------|
| SCADA-MM | Additional function for modem operation for more than 1 modem | 1902 4200 00 | C | on request |
| SCADA-CR | Additional function for error routing to city call receiver (alphanumeric) | 1902 4205 00 | C | on request |
| SCADA-FAX | Additional function for error routing to fax | 1902 4210 00 | C | on request |
| SCADA-EMAIL | Additional function for error routing via email | 1902 4215 00 | C | on request |
| SCADA-EXCEL | Additional function for evaluation of the recorded data, export to MS-Excel. | 1902 4220 00 | C | on request |
| SCADA-WEBSEVER | Additional function to use the SCADA -Server as a WEB-Server. | 1902 4225 00 | C | on request |
| SCADA-TREIBER200 | Driver for controllers from other manufacturers for max 200 Data points. Please ask for the current valid driver list from R+S. | 1902 4230 00 | C | on request |
| SCADA-TREIBER1000 | Driver for controllers from other manufacturers for max 1000 Data points. Please ask for the current valid driver list from R+S. | 1902 4235 00 | C | on request |
| SCADA-TREIBER | Driver for controllers from other manufacturers for unlimited data points. Please ask for the current valid driver list from R+S. | 1902 4240 00 | C | on request |

1.9.23.4 Additional User Terminals

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|---|--------------|----|------------|
| SCADA-PL1 | One additional user terminal. Connection to the SCADA -Server via the Intranet . | 1902 4300 00 | C | on request |
| SCADA-PL1-WEB | One additional user terminal. Connection to the SCADA -Server via the Internet . | 1902 4300 10 | C | on request |
| SCADA-PL2-4 | 2 to 4 additional user terminals. Connection to the SCADA -Server via the Intranet . | 1902 4305 00 | C | on request |
| SCADA-PL2-4-WEB | 2 to 4 additional user terminals. Connection to the SCADA -Server via the Internet . | 1902 4305 10 | C | on request |
| SCADA-PL5-10 | 5 to 10 additional user terminals. Connection to the SCADA -Server via the Intranet . | 1902 4310 00 | C | on request |
| SCADA-PL5-10-WEB | 5 to 10 additional user terminals. Connection to the SCADA -Server via the Internet . | 1902 4310 10 | C | on request |

1.9.2.5 IRMA system – Intelligent Remote Management System for Windows 2000 and Windows XP

IRMA system is the new building management software for the operating system MS Windows 2000, MS Windows XP and MS Windows Server 2003. The software combines a number of very useful functions, which makes your daily work with your HVAC-system much easier. A difficult and hazardous installation is not necessary. The configuration can be done with simple standard tools like a text editor, which is available in any operating system by default.

The **IRMA server** enables not only simultaneous operation of every program of the program package but also a simultaneous operation of the same program on other workstations, that are connected in the network via Ethernet. It is a true multitasking, multioperational software package.

IRMA invoice is a program which will enable you to generate consumption invoices for each tenant automatically.

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------------------|--|--------------|----|-----------|
| IRMA control | Program package consisting of the following programs IRMA remote – remote control via bus, modem, radio, IRMA alarm – alarm handling and protocol IRMA project – project management IRMA trend – trend and recording with grafic display For more than one R+S controller in German and English | 1902 5000 00 | C | 500,- |
| IRMA message | Additional program: alarm transmission to all kinds of medias like alphanumeric city call, mobile handys (SMS) for D1, D2, E-Plus, transmission to Fax and email. | 1902 5100 00 | C | on req. |
| IRMA grafic | Additional program: grafic and schematic display to visualize project specific data from any kind of plant in a building mainly in the area of heating, valvation adn air conditioning The program can only be used in connection with IRMA grafic plus . | 1902 5200 00 | C | on req. |
| IRMA grafic plus | program extension for visualizing 50 additional data points in the program IRMA grafics | 1902 5210 00 | C | on req. |
| IRMA editor | Additional program grafic editor for editing and configuring data points in schematic diagrams and other grafics | 1902 5220 00 | C | on req. |
| IRMA server | Multi-user system for IRMA grafic and IRMA alarmview In each IRMA server you automatically have the program IRMA alarmview | 1902 5240 00 | C | on req. |
| IRMA server dongle | IRMA server Dongle. For the multi-user program you need an IRMA server Dongle on each terminal. | 1902 5240 10 | C | on req. |
| IRMA invoice | IRMA invoice enables the user to prepare the data to generate invoices for each tenant automatically, with address- and Tariff organization. Application in combination with IRMA trend | 1902 5250 00 | C | on req. |

1.9.3 Additional Accessories for the Building Management System

1.9.3.1 Modem / City-call Receiver



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|-----------|----|-----------|
| MOD 3 | MODEM 3, 9600 bauds, dial line operation, for R+S BMS program PLUS (Personal computer), including parameterisation on PC | 1903 1310 | C | on req. |
| MOD 3-R | MODEM 3-R, 9600 bauds, dial line operation, for SSU or R+S DDC controller, including parameterisation on the controller | 1903 1320 | C | on req. |
| MOD 3-RS | MODEM 3-RS, 9600 bauds, dial line operation, for SSU or R+S DDC controller, including parameterisation, suitable for rail-mounting; Adm.: Interference of error according to EN 50081-2, error rewiring according to EN 50082-2; Environmental conditions: -5 ... 70 C | 1903 1330 | C | on req. |
| MOD 5 | MODEM 5, 9600 bauds, on-line operation, for R+S BMS program PLUS (Personal computer), including parameterisation on PC | 1903 1410 | C | on req. |
| MOD 5-R | Modem 5-R, 9600 bauds, on-line operation, for SSU or R+S DDC controller, including parameterisation on the controller | 1903 1420 | C | on req. |
| MOD 6 * | MODEM 6, radio modem, 9600 bauds, for R+S BMS program PLUS (Personal computer), including parameterisation on PC | 1903 1430 | C | on req. |
| MOD 6 R * | Modem 6, radio modem, 9600 bauds, for SSU or R+S DDC controller, including parameterisation on the controller | 1903 1440 | C | on req. |

* depending on the mobile connection available

1.9.32 Printer

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|------------|
| DR 24 SP | Printer of protocols with serial and parallel interface for the connection to R+S DDC controller or R+S BMS program (PC) | 1903 2300 | C | on request |
| DR TS | Ink jet printer as event printer with parallel interface for the connection to R+S BMS program PLUS (PC) | 1903 2400 | C | on request |

1.9.33 Interface Converter



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| SSU | Interface converter, 1 x RS-232 to 4 x RS-485, desk-top unit | 1903 3100 | C | 1.052,- |
| SSU 1 | Interface converter, 1 x RS-232 to 1 x RS-485, rail mounting | 1903 3200 | C | 455,- |
| SSU-ESA | Interface converter, Ethernet to 1 x RS-232, 24V DC, wall mounting or DIN-rail mounting | 1903 3500 | C | 300,- |
| SSU-ESW | Interface converter, 802.11b Wireless LAN interface to 1 x RS-232, 24V DC, wall mounting or DIN-rail mounting | 1903 3600 | C | 600,- |
| SSU-ESA2 | Interface converter, Ethernet to 2 x RS-232, 24V DC, wall mounting or DIN-rail | 1903 3700 | C | 400,- |

1.9.34 Power supply for bus operation



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|--------------------------------|-----------|----|-----------|
| 105.SVB | Power supply for bus operation | 1903 4100 | C | 203,- |

1.9.35 Cable

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|---|-----------|----|-----------|
| K10 PC 9 | Cable to connect personal computer to SSU or R+S DDC controller, 9-pole PC-plug at the PC, length 10 m | 1903 5110 | C | 72,- |
| K2 PC 9 | Cable to connect personal computer to SSU or R+S DDC controller, 9-pole PC-plug at the PC, length 2 m | 1903 5120 | C | 31,- |
| K2 PC 9 ST1 | Cable to connect PC to DDC-Regel UNIT 9X compact , terminal-connection at controller, 9-pole PC-plug length 2m | 1903 5130 | C | 44,- |
| K10 PC 9 ST1 | Cable to connect PC to DDC-Regel UNIT 9X compact , terminal connection at controller, 9-pole PC-plug length 10 m | 1903 5140 | C | 77,- |
| K10 PC 25 | Cable to connect PC to SSU or R+S DDC controller, 25-pole PC-plug length 10 m | 1903 5210 | C | 81,- |
| K2 PC 25 | Cable to connect PC to SSU or R+S DDC controller, 25-pole PC-plug length 2 m | 1903 5220 | C | 53,- |
| Type | Description | Art.-Nr. | PG | Price EUR |
| K10 MOD | Cable to connect MODEM to SSU or R+S DDC controller, 25-pole Modem-plug, length 10 m | 1903 5310 | C | 71,- |
| K2 MOD | Cable to connect MODEM to SSU or R+S DDC controller, 25-pole Modem-plug, length 2 m | 1903 5320 | C | 55,- |
| K10 MOD 9 | Cable to connect MODEM to SSU or R+S DDC controller, 9-pole Modem-plug, length 10 m | 1903 5330 | C | 66,- |
| K2 MOD 9 | Cable to connect MODEM to SSU or R+S DDC controller, 9-pole Modem-plug, length 2 m | 1903 5340 | C | 43,- |
| K10 MOD 9 ST1 | Cable to connect modem to DDC-Regel UNIT 9X compact , terminal connection at controller, 9-pole Modem-plug, length 10 m | 1903 5350 | C | 63,- |
| K2 MOD 9 ST1 | Cable to connect modem to DDC-Regel UNIT 9X compact , terminal connection at controller, 9-pole Modem-plug, length 2 m | 1903 5360 | C | 44,- |
| K10 MOD 25 ST1 | Cable to connect modem to DDC-Regel UNIT 9X compact , terminal connection at controller, 25-pole Modem-plug, length 10 m | 1903 5370 | C | 63,- |
| K2 MOD 25 ST1 | Cable to connect modem to DDC-Regel UNIT 9X compact , terminal connection at controller, 25-pole Modem-plug, length 2 m | 1903 5380 | C | 44,- |
| K10 DR S | Cable to connect R+S DDC controller to serial printer of protocol DR 24 SP (active serial interface), length 10 m | 1903 5410 | C | 67,- |

| | | | | |
|-----------|--|-----------|---|------------|
| K2 DR S | Cable to connect R+S DDC controller to serial printer of protocol DR 24 SP (active serial interface), length 2 m | 1903 5420 | C | 43,- |
| K DR P | Centronics-cable to connect personal computer to parallel printer of protocol DR 24 SP (active parallel interface), length 1,5 m | 1903 5510 | C | 38,- |
| KSTBUS | Bus-cable to connect R+S DDC controller to SSU, including 2 plugs length 10 m | 1903 5610 | C | 113,- |
| KBUS-E | Bus-cable for andergroand-installation, without plugs, halo-gene-free, | 1903 5720 | C | on request |
| KBUS-F | Bus-cable for flexible inside-installation to switch board, without plugs | 1903 5730 | C | on request |
| KST1BUS.1 | Bus-cable to connect R+S DDC controller or SSU to terminal block, including 1 plug, length 10 m. | 1903 5810 | C | 108,- |
| K2ST1BUS | Bus-cable to connect R+S DDC controller to terminal block, including 1 plug, length 2 m | 1903 5910 | C | 53,- |
| K2 SCH 1 | Extension-cable from R+S DDC-controller- interface inside the cabinet-switchboard to the diagnosis-socket, including 1 plug/1 socket, length 1,5 m | 1903 5920 | C | 82,- |
| K2 SCH 2 | Cable to connect R+S DDC controller to terminals inside cabinet, including 1 plug, length 2 m | 1903 5930 | C | 71,- |
| K1 RPTR | Cable for repeaters, including 2 plugs, length 1m | 1903 5960 | C | 47,- |
| BS9 | Bus-9-pole-plug in connection with KBUS-F (incl manual) | 1903 5010 | C | 7,- |
| MON R+S | Monitor cable for R+S bus length 1,5 m | 1903 5020 | C | 67,- |

1.9.3.6 Repeater

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------|---|-----------|----|-----------|
| RPTR1 | Repeater for the prolongation of the max. bus cable length of an additional 1200 m, rail mounting | 1903 6100 | C | 606,- |

1.9.21 Documentation

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------------|---|-----------|----|------------|
| BH GLT-DOS | Operating manual for BMS program software TP0, TP1, TP2, GLT0 and GLT1, ⁴⁾ | 1921 0007 | - | (net) 10,- |
| BH GLT-WIN | Operating manual for BMS program software TP0-WIN, TP1-WIN, TP2-WIN and GLT1-WIN, ⁴⁾ | 1921 2007 | - | (net) 12,- |
| BH SCADA | Operating manual for BMS program software SCADA , ⁴⁾ | 1921 3007 | - | on request |
| BH IRMA control | Operating manual for BMS program software IRMA control , ⁴⁾ | 1921 4007 | - | (net) 15,- |
| BH IRMA grafic | Operating manual for BMS program software IRMA grafic , ⁴⁾ | 1921 4008 | - | (net) 20,- |
| BH IRMA message | Operating manual for BMS program software IRMA message , ⁴⁾ | 1921 4009 | - | (net) 5,- |
| BH IRMA invoice | Operating manual for BMS program software IRMA message , ⁵⁾ | 1921 4010 | - | (net) 15,- |

⁴⁾ One copy of the manual will be delivered with the BMS-software.

⁵⁾ The software is beeing delivered with operating manual in pdf format



1.10 Accessories

1.10.1 Relays

Couple relays have a potential-free and high load change-over contact. The relays operate with 24V AC or DC. Up to 3 couple-relays can be used with each DDC-Regel **UNIT**, when the existing number of switching-outputs should be increased. This will be necessary for plants with DDC-19"-controller modular **PLUS** when additional relays for instance for the connection of circulating pumps, multistage electric appliances etc. are wanted. The Type KR 24-2W is in particular suitable for the changeover-switching between M-sensors.



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| KR 24-1W-S | Couple-relay, 24V AC / DC, 1 change-over switch, LED display, switch on/off/auto, safe separation of DIN VDE 0106-101 and DIN VDE 0160 | 1001 1100 | C | 25,- |
| KRDC 24-2Wau | Couple-relay, 24V DC, 2 change-over switch, LED display, switch on/off/auto, safe separation of DIN VDE 0106-101 and DIN VDE 0160 | 1001 1500 | C | 14,- |
| KRAC 24-2Wau | Couple-relay, 24V AC, 2 change-over switch, LED display, switch on/off/auto, safe separation of DIN VDE 0106-101 and DIN VDE 0160 | 1001 1600 | C | 15,- |
| KRAC 230-2W | Couple-relay, 230V AC, 2 change-over switch, LED display, switch on/off/auto, safe separation of DIN VDE 0106-101 and DIN VDE 0160 | 1001 2600 | C | 15,- |

1.10.2 Transformer

The safety transformers are designed according to EN 60742 and/or VDE 0551. They are used in systems with 24V AC. In particular these transformers will be installed in systems modular **PLUS** and unit **PLUS**. At operating voltage of 230 / 50 Hz, from 12 VA up to 200 VA are available. Into the connection terminal block, already a secondary fuse is integrated.



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|---|-----------|----|-----------|
| RSTH 12/00 | Safety transformer according to VDE 0551, IP 00, 230V / 24V, with secondary fuse, 12 VA, 35 mm rail-mounting | 1002 1010 | C | 40,- |
| RSTH 50/00 | Safety transformer according to VDE 0551, IP 00, 230V / 24V, with secondary fuse, 50 VA, 35 mm rail-mounting | 1002 1110 | C | 46,- |
| RSTH 100/00 | Safety transformer according to VDE 0551, IP 00, 230V / 24V, with secondary fuse, 100 VA, 35 mm rail-mounting | 1002 1210 | C | 54,- |
| RSTH 200/00 | Safety transformer according to VDE 0551, IP 00, 230V / 24V, with secondary fuse, 200 VA, 35 mm rail-mounting | 1002 1310 | C | 72,- |
| RSTH 20/00 | Safety transformer according to VDE 0570, IP 00, 230V / 12V, with secondary fuse, 20 VA, 35 mm rail-mounting (power supply for modem MOD 3RS) | 1002 1410 | C | 47,- |

1.10.3 Power Supply for Couple-Relays

Power supply for couple-relays with possible connection of at least 10 relays, operating voltage 230V AC, output voltage 24V DC.



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|---------------------------------------|-----------|----|-----------|
| 105.SVK | Power supply 24V DC for couple-relays | 1003 1100 | C | 87,- |

1.10.4 Interference Elimination and Protection Unit

1.10.4.4 Protection of Data Transfer

The protection UESBUS serves the R+S DDC controller **DDC-Regel UNIT** in a modular **PLUS** and unit **PLUS** against exceeding voltages on the RS-485 Bus. It should be used especially in branched-out plants with RS-485 Bus coupling. First the Bus-cable will be connected with in the wiring cabinet to the high-voltage deviator. On the other end of the cable an additional protection should be provided. The power-supply through the module 105.SVB to the interface, and also when the interface SSU is used, requires a potential compensation for the correct function of the deviator. Protected and unprotected cables should not be installed side by side. They should be separated by space or shielded. This way exceeded voltage coupling from unprotected to protected cables should be impossible.



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|-------------------------------------|-----------|----|-----------|
| UESBUS | Protection for data transfer RS-485 | 1004 4010 | C | 196,- |

2. Sensors51

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2.1 Temperature Sensor

2.1.1 Outside Temperature Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|---|-----------|----|-----------|
| MAF | M-outside temperature sensors, - 30 .. + 50 C | 2101 1000 | C | 46,- |
| AF | Outside temperature sensors, - 20 .. + 25 C | 2101 2000 | A | 50,- |

2.1.2 Clamp-on Temperature Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|---|-----------|----|-----------|
| MALF | M-clamp-on temperature sensor, 0 .. 120 C | 2102 1000 | C | 46,- |
| VF | Clamp-on temperature sensor, 5 .. 110 C | 2102 2000 | A | 50,- |

2.1.3 Immersion Temperature Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|---|-----------|----|-----------|
| MTF 120 MS | M-immersion temperature sensor with protective pocket (brass), 120 mm length, - 40 C .. + 125 C | 2103 1100 | C | 58,- |
| MTF 120 V2A | M-immersion temperature sensor with protective pocket (stainless steel), 120 mm length, - 40 C .. + 125 C | 2103 1200 | C | 99,- |
| MTF 170 MS | M-immersion temperature sensor with protective pocket (brass), 170 mm length, - 40 C .. + 125 C | 2103 2100 | C | 99,- |
| MTF 170 V2A | M-immersion temperature sensor with protective pocket (stainless steel), 170 mm length, - 40 C .. + 125 C | 2103 2200 | C | 148,- |
| MTF 220 MS | M-immersion temperature sensor with protective pocket (brass), 220 mm length, - 40 C .. + 125 C | 2103 3100 | C | 98,- |
| MTF 220 V2A | M-immersion temperature sensor with protective pocket (stainless steel), 220 mm length, - 40 C .. + 125 C | 2103 3200 | C | 148,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---|-----------|----|-----------|
| MTF 310 MS | M-immersion temperature sensor with protective pocket (brass), 310 mm length, - 40 C .. + 125 C | 2103 4100 | C | 101,- |
| MTF 310 V2A | M-immersion temperature sensor with protective pocket (stainless steel), 310 mm length, - 40 C .. + 125 C | 2103 4200 | C | 148,- |
| VFTH 120 MS | Immersion temperature sensor with protective pocket (brass), length 120 mm, 5 .. 110 C | 2103 5100 | A | 85,- |
| VFTH 120 V2A | Immersion temperature sensor with protective pocket (stainless steel), length 120 mm, 5 .. 110 C | 2103 5200 | A | 118,- |
| VFTH 310 MS | Immersion temperature sensor with protective pocket (brass), length 310 mm, 5 .. 110 C | 2103 6100 | A | 113,- |
| VFTH 310 V2A | Immersion temperature sensor with protective pocket (stainless steel), length 310 mm, 5 .. 110 C | 2103 6200 | A | 163,- |

2.1.4 Room Temperature Sensor



2.1.4.1 Room Temperature Sensor for Wall Mounting

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------|---|-----------|----|-----------|
| MR | M-room temperature sensor, 0 .. 40 C | 2104 1000 | C | 53,- |
| MR-CS | M-room temperature sensor, 0 .. 40 C with CAN-Bus interface, long-distance area | 2104 1220 | C | 88,- |
| RF | Room temperature sensor, 5 .. 50 C | 2104 2000 | A | 70,- |
| RF 1 | Room temperature sensor, 0 .. 40 C | 2104 4000 | A | 70,- |

2.1.4.2 Flush Mounted Room Temperature Sensor

2.1.4.2.1 Flush Mounted Room Temperature Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|--|-----------|----|-----------|
| MR/U | M-room temperature sensor, 0 .. 40 C X suitable for switching programs of Bush-Jaeger | 2104 220x | C | 66,- |

2.1.4.2.2 Flush Mounted Temperature Sensor with CAN-Bus Interface



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|---|-----------|----|------------|
| MR-CS/U | M-room temperature sensor 10 .. 40 C with CAN-Bus interface, long-distance area X suitable for switching programs of Bush-Jaeger | 2104 222x | C | on request |

2.1.5 Temperature Sensor without Protective Pocket

2.1.5.1 Cable Temperature Sensor

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| MUF | M-general-purpose cable temperature sensor, - 40 .. + 125 C, 1,6 m Silicone connecting cable | 2105 1110 | C | 39,- |
| MUF 2,5 | M-general-purpose cable temperature sensor, - 40 .. + 125 C, 2,5 m Silicone connecting cable | 2105 1120 | C | 40,- |
| MUF 3 | M-general-purpose cable temperature sensor, - 40 .. + 125 C, 3 m Silicone connecting cable | 2105 1130 | C | 42,- |
| MUF 3,5 | M-general-purpose cable temperature sensor, - 40 .. + 125 C, 3,5 m Silicone connecting cable | 2105 1140 | C | 43,- |
| MUF 4,5 | M-general-purpose cable temperature sensor, - 40 .. + 125 C, 4,5 m Silicone connecting cable | 2105 1150 | C | 48,- |
| MUF 5 | M-general-purpose cable temperature sensor, - 40 .. + 150 C, silicone connecting cable 1,6 m | 2105 1210 | C | 55,- |
| UF | General-purpose cable temperature sensor, 5..100 C, PVC cable 1,6m | 2105 2100 | A | 41,- |
| UF-SOL 1 | General-purpose solar temperature sensor, - 50 .. + 250 C, 2,5m connecting cable | 2105 3200 | C | 19,- |
| UF-SOL 3 | Modified Pt of 1000 solar temperature sensor, - 50 ... + 250 C; connecting cable 2,5 m | 2105 3300 | C | 47,- |



2.1.52 Screw-in Temperature Sensor

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|---|-----------|----|-----------|
| MUF-HS 35 | M-screw-in temperature sensor in stainless steel, high speed Type with very short reaction times; -10 ...105 C; connecting cable 5 m, 35 mm immersion depth | 2105 4000 | C | 57,- |
| MUF-HS 55 | M-screw-in temperature sensor in stainless steel, high speed Type with very short reaction times; -10 ...105 C; connecting cable 5 m, 55 mm immersion depth | 2105 4100 | C | 57,- |
| MUF-HS 80 | M-screw-in temperature sensor in stainless steel, high speed Type with very short reaction times; -10 ...105 C; connecting cable 5 m, 80 mm immersion depth | 2105 4200 | C | 58,- |

Further immersion depths for specific applications on request

2.1.6 Temperature Sensor with Protective Pocket

2.1.6.1 Cable Temperature Sensor with Protective Pocket



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------------------|---|-----------|----|-----------|
| MUFTH STAINLESS STEEL | M-cable temperature sensor with protective pocket (stainless steel), PN 100, - 40 ... + 125 C, silicone connecting cable 1,6 m | 2106 1100 | C | 117,- |
| MUFTH STAINLESS STEEL S. | M-cable temperature sensors with protective pocket (stainless steel), PN 100, - 40...+150 C, silicone connecting cable 1,6 m | 2106 1200 | C | 174,- |
| MUFTH MS | M-cable temperature sensor with protective pocket (brass), PN 100, - 40 ... + 125 C, silicone connecting cable 1,6 m | 2106 2100 | C | 68,- |
| MUFTH MS S. | M-cable temperature sensor with protective pocket (brass), PN 100, - 40 ... + 150 C, silicone connecting cable 1,6 m | 2106 2200 | C | 109,- |
| UFTH STAINLESS STEEL | Cable-temperature sensor with protective pocket (stainless steel), PN 100, 5 ... 100 C, silicone connecting cable 1,6 m | 2106 3100 | A | 192,- |
| UF H MS | Cable-temperature sensor with protective pocket (brass), PN 100, 5 ... 100 C, silicone connecting cable 1,6 m | 2106 3200 | A | 100,- |
| UF 3 TH STAINLESS STEEL | Modified Pt 1000- cable temperature sensor with protective pocket (stainless steel), PN 100, -100 C .. +260 C, connecting cable 1,6 m | 2106 4100 | C | 223,- |
| UF 3 TH MS | Modified Pt 1000- cable temperature sensor with protective pocket (brass), PN 100, -100 C .. +260 C, connecting cable 1,6 m | 2106 4200 | C | 92,- |

2.1.7 Air-Duct Temperature Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|--|-----------|----|-----------|
| MKF 310 | M-air-duct temperature sensor, max immersion depth 310 mm, - 20...+ 50 C | 2107 1000 | C | 56,- |
| KF 310 | Air-duct temperature sensor, max immersion depth 310 mm, - 20...+ 50 C | 2107 2000 | A | 72,- |

2.1.8 Humidity-Room Temperature Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|--|-----------|----|-----------|
| MGF | M-humidity-room temperature sensor (hanging Type), 0..50 C, cable with terminal box 1.6 m. | 2108 1000 | C | 120,- |
| GF | Humidity-room temperature sensor (hanging Type), 0..50 C, cable with terminal box 1.6 m. | 2108 2000 | A | 136,- |

2.1.9 Surface Temperature Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|--|-----------|----|-----------|
| MOF | M-surface temperature sensor, - 35 ... + 50 C, 1,6 m silicone-connecting cable | 2109 1000 | C | 66,- |

2.1.10 Exhaust-Temperature Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|---|-----------|----|-----------|
| AGF | Exhaust-temperature sensor, -20 ...+320 C, 1,6 m silicone- connecting cable | 2110 1000 | C | 259,- |

2.2

Combined Sensors for Temperature and Relative Humidity



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|--|-----------|----|-----------|
| MHyR | Room humidity sensor 0..100% r.H. corresponding output signal 0..10V DC, combined with M-temperature sensor 0.. 50 C, operating voltage 15.. 18V DC or 24 V AC, wall mounting | 2201 2000 | C | 167,- |
| MHyK | Air-duct humidity sensor 0..100 % r.H. corresponding output signal 0..10V DC, combined with M-temperature sensor -5.. +50 C, operating voltage 15.. 18V DC or 24 V AC, air-duct mounting | 2202 2000 | C | 236,- |
| SI/MHyK | Sintered metal protective cage for air-duct humidity sensor, to set in 10 m/s flow velocity | 2202 2100 | C | 43,- |

2.4

Pressure Sensor

2.4.2

Pressure Sensor with Resonance-Sensor for Incombustible Gases



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|--|-----------|----|-----------|
| DDS-1 | Pressure sensor, air medium, measuring range 0.. 1 mbar, with mounting Accessories, output 0.. 10V | 2402 0100 | C | 183,- |
| DDS-1,5 | Pressure sensor, air medium, measuring range 0.. 1,5 mbar, with mounting Accessories, output 0.. 10V | 2402 0200 | C | 183,- |
| DDS-5 | Pressure sensor, air medium, measuring range 0.. 5 mbar, with mounting Accessories, output 0.. 10V | 2402 0300 | C | 183,- |
| DDS-10 | Pressure sensor, air medium, measuring range 0.. 10 mbar, with mounting Accessories, output 0.. 10V | 2402 0400 | C | 183,- |
| DDS-15 | Pressure sensor, air medium, measuring range 0.. 15 mbar, with mounting Accessories, output 0.. 10V | 2402 0500 | C | 183,- |

2.4.5 Pressure Transmitter for Neutral Gases and Liquids, Relative Pressure



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|-----------|
| DT691/6 | Pressure transmitter for relative pressure 0.. 6 bar, operating voltage 24 V AC; outp.sig. 0..10V DC, outer thread G 1/2", incl. DIN- socket | 2405 0080 | C | 309,- |
| DT691/10 | Pressure transmitter for relative pressure 0.. 10 bar, operating voltage 24 V AC; outp.sig 0..10V DC, outer thread G 1/2", incl. DIN- socket | 2405 0090 | C | 309,- |

2.4.6 Pressure Transmitter for Neutral Gases and Liquids, Differential Pressure



| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---|-----------|----|-----------|
| DDT692/0,5 | Pressure transmitter for differential pressures 0.. 0,5 bar, operating voltage 24 V AC; output signal 0.. 10V DC, pipe screw 6 mm, including DIN socket | 2406 0100 | C | 512,- |
| DDT692/1 | Pressure transmitter for differential pressures 0.. 1 bar, operating voltage 24 V AC; output signal 0.. 10V DC, pipe screw 6 mm, including DIN socket | 2406 0200 | C | 512,- |
| DDT692/2,5 | Pressure transmitter for differential pressures 0.. 2,5 bar, operating voltage 24 V AC; output signal 0.. 10V DC, pipe screw 6 mm, including DIN socket | 2406 0500 | C | 512,- |
| DDT692/4 | Pressure transmitter for differential pressures 0.. 4 bar, operating voltage 24 V AC; output signal 0.. 10V DC, pipe screw 6 mm, including DIN socket | 2406 0600 | C | 512,- |

2.5

Wind Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|--|-----------|----|-----------|
| WFX | Wind sensor, 0.. 20 m/s, output 0.. 10V, power supply necessary (See 2.10.3) | 2501 0000 | C | 419,- |

2.6 Sun Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|--|-----------|----|-----------|
| SF | Sun sensor, 0 .. 1200 W/m ² , output 0 .. 10, power supply necessary (See 2.10.3) | 2601 0000 | C | 509,- |

2.7 Air-flow Sensor

2.7.1 Air-Flow Thermostat with Switching Output



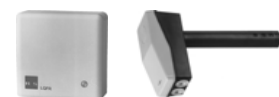
| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| INT 511 | Air flow-thermostat with potential-free switching output, 230 V AC, 0,2 .. 8 m/s | 2701 1100 | C | 233,- |
| INT 511/24 V | Air flow-thermostat with potential-free switching output, 24 V AC, 0,2 .. 8 m/s | 2701 1200 | C | 233,- |

2.7.2 Air-Flow Measuring Sonde with Continuous Output



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---|-----------|----|-----------|
| INT 510 | Air-flow measuring sonde with continuous output 0 .. 10, 230V AC, 0,2 .. 10 m/s | 2702 1100 | C | 313,- |
| INT 510/24 V | Air-flow measuring sonde with continuous output 0 .. 10, 24 V AC, 0,2 .. 10 m/s | 2702 1200 | C | 313,- |

2.8 Air Quality Sensor / Gas-Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|--|-----------|----|-----------|
| LQFK | Air duct air quality sensor as mixed gas sensors | 2801 1000 | C | 389,- |
| LQFR | Room air-quality sensor as mixed gas sensors with continuous output 0 .. 10V, power supply 24 V AC, wall mounting | 2801 2000 | C | 343,- |
| COF | CO-sensor for room monitoring in parking houses etc. (see Chap. 1.7.7), output signal 4..20mA, power supply 24 V AC, wall mounting | 2801 3000 | C | 184,- |

2.10 Accessories

2.10.1 Protective Pockets

2.10.1.1 Protective Pockets, Brass



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|---|-----------|----|-----------|
| TH/MS | Protective pocket 120 mm for MUF, G 1/2", brass, PN 100 | 2001 1100 | C | 33,- |
| TH 55 | Protective pocket 55 mm for MUF, G 1/2" copper galvanized, PN 20 | 2001 1110 | C | 18,- |
| TH 100 | Protective pocket 100 mm for MUF, G 1/2", copp. galvanized, PN 20 | 2001 1120 | C | 21,- |
| TH 200 | Protective pocket 200 mm for MUF, G 1/2", copp. galvanized, PN 20 | 2001 1150 | C | 23,- |
| TH 280 | Protective pocket 280 mm for MUF, G 1/2", copp. galvanized, PN 20 | 2001 1170 | C | 31,- |

2

2.10.1.2 Protective Pockets, Stainless Steel



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------------|--|-----------|----|-----------|
| TH/STAINLESS STEEL | Protective pocket 120 mm for MUF, G 1/2", stainless steel, PN 100 | 2001 1200 | C | 90,- |
| NTH 100 | Protective pocket 100 mm for MUF, G 1/2", stainless steel, PN 40 | 2001 1220 | C | 56,- |
| NTH 200 | Protective pocket 200 mm for MUF, G 1/2", stainless steel, PN 40 | 2001 1250 | C | 55,- |
| NTH 280 | Protective pocket 280 mm for MUF, G 1/2", stainless steel, PN 40 | 2001 1270 | C | 53,- |
| TH/MTF 120 V4A | Protective pocket for MTF 120, G 1/2" ø 15 mm, stainless steel, PN 45, length 100 mm | 2001 2220 | C | 37,- |
| TH/MTF 170 V4A | Protective pocket for MTF 170, G 1/2" ø 15 mm, stainless steel, PN 45, length 150 mm | 2001 2240 | C | 39,- |
| TH/MTF 220 V4A | Protective pocket for MTF 220, G 1/2" ø 15 mm, stainless steel, PN 45, length 200 mm | 2001 2250 | C | 42,- |
| TH/MTF 310 V4A | Protective pocket for MTF 310, G 1/2" ø 15 mm, stainless steel, PN 45, length 310 mm | 2001 2260 | C | 46,- |

2.102 Sleeves for Welding



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|---|-----------|----|-----------|
| EH-MUF | Sleeves for welding with inner Pg-thread and heat-conducting paste for MUF, to 150 C, PN 45 | 2002 1100 | C | 17,- |

2.103 Power Supply for Wind- and Sun-Sensor



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|-----------|
| 105.SVWS | Power supply unit with adaptation booster for wind- and sun-sensor | 2003 1000 | C | 209,- |

2

3. Remote Set point Potentiometer and Remote Operating Units57

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3.1 Remote Set-Point potentiometer

3.1.1 Remote Set-Point potentiometer for Front Mounting



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------------|---|-----------|----|-----------|
| EFV 48-10 | Remote set-point potentiometer, front-panel, 10 kilowatt, without scale and cover | 3101 1090 | C | 61,- |
| EFV 48-300/25 | Remote set-point potentiometer, front-panel mounting, without scale and cover | 3101 1100 | C | 61,- |
| EFV 48-300/250 | Remote set-point potentiometer, front-panel mounting, without scale and cover | 3101 1110 | C | 61,- |
| SA 48 -/+ | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from - .. + | 3101 0000 | C | 2,10 |
| SA 48 7,5/N/A/32,5 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 7,5 to 32,5, non-use-operation at far left setting, automatic operation at far right setting | 3101 0010 | C | 2,10 |
| SA 48 0/100 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 0 .. 100 | 3101 0020 | C | 2,10 |
| SA 48 0/OFF/100 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 0 .. 100, OFF at far left setting | 3101 0030 | C | 2,10 |
| SA 48 25/75 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 25 .. 75 | 3101 0040 | C | 2,10 |
| SA 48 25/OFF | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 25 .. 75, OFF far left setting | 3101 0050 | C | 2,10 |
| SA 48 0/10 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 0 .. 10 | 3101 0060 | C | 2,10 |
| SA 48 0/OFF/10 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 0 .. 10, OFF far left setting | 3101 0070 | C | 2,10 |
| SA 48 0/40 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 0 .. 40 | 3101 0080 | C | 2,10 |
| SA 48 0/OFF | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 0 .. 40, OFF far left setting | 3101 0090 | C | 2,10 |
| SA 48 15/25 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 15 .. 25 | 3101 0100 | C | 2,10 |
| SA 48 15/OFF/25 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 15 .. 25, OFF at far left setting | 3101 0110 | C | 2,10 |
| SA 48 -15/20 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from -15 .. +20 | 3101 0120 | C | 2,10 |
| SA 48 -15/OFF/20 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from -15 .. +20, OFF at far left setting | 3101 0130 | C | 2,10 |
| SA 48 40/80 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 40 .. 80 | 3101 0140 | C | 2,10 |
| SA 48 40/OFF/80 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 40 .. 80, OFF at far left setting | 3101 0150 | C | 2,10 |
| SA 48 80/120 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 80 .. 120 | 3101 0160 | C | 2,10 |
| SA 48 80/OFF/120 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 80 .. 120, OFF at far left setting | 3101 0170 | C | 2,10 |
| SA 48 100/150 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 100 .. 150 | 3101 0180 | C | 2,10 |
| SA 48 100/OFF/150 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 100 .. 150, OFF at far left setting | 3101 0190 | C | 2,10 |
| SA 48 10/N/35 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 10 .. 35, non-use operation at far left setting | 3101 0200 | C | 2,10 |
| SA 48 -10/10 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from - 10 .. + 10 | 3101 0210 | C | 2,10 |
| SA 48 10/50 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 10 .. 50 | 3101 0220 | C | 2,10 |
| SA 48 -20/25 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from - 20 .. + 25 | 3101 0230 | C | 2,10 |
| SA 48 0/50 | Scale and cover for remote set-point potentiometer, front-panel mounting, scale from 0 .. 50 | 3101 0240 | C | 2,10 |

3.1.2

Remote Set-Point potentiometer For Surface Mounting



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|---|-----------|----|-----------|
| FV | Remote set-point potent., surface mounting, 50..550 Ohm, -..+ | 3102 1100 | C | 63,- |
| FVm* | Remote set-point potentiometer, surface mounting 5 .. 45 C | 3102 3500 | C | 66,- |
| FV10 | Remote set-point potentiometer, surface mounting 10 KW | 3102 4100 | C | 65,- |

3.2

Remote Control Unit for Surface mounting without Timer



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|--|-----------|----|-----------|
| FVS | Remote set-point potentiometer with switch, • 20 K | 3201 0000 | C | 70,- |
| MR-FVS1 | Remote set-point potentiometer for controls with DDC-Regel UNIT with M-room-temperature sensor 0..40 C, party-bottom and switch: Day/night/automatic | 3205 0000 | C | 93,- |
| MR-FVS2 | Remote set-point potentiometer with M-room temperature sensor 0..40 C for control with DDC-Regel UNIT , switch: Day/night/automatic | 3206 0000 | C | 93,- |
| MR-FVS3 | Remote set-point potentiometer with M-room temperature sensor 0..40 C for controls with DDC-Regel UNIT , unit PLUS or DDC-controller modular PLUS | 3207 0000 | C | 93,- |
| MR-FVS4 | Remote set-point potentiometer with M-room temperature sensor 0..40 C for controls with DDC-Regel UNIT , unit PLUS or DDC-controller modular PLUS , switch: day/night | 3208 0000 | C | 93,- |
| MR-FVS5 | Remote set-point potentiometer with M-room temperature sensor 0..40 C for controls with DDC-Regel UNIT , unit PLUS or DDC-controller modular PLUS , switch: 0 / 1 | 3209 0000 | C | 93,- |

3.4

Remote Control Units with CAN-Bus Interface

3.4.1

Remote Control Unit for Surface Mounting with CAN-Bus



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|-----------|
| FR1-CS | Remote control unit with room temperature sensor 10..40 C, push button, 4 LEDs, CAN-Bus interface | 3401 1220 | C | 113,- |
| FR2-CS | Remote control unit with set-point potentiometer, room temperature sensor, 10 .. 40 C, CAN-Bus interface | 3401 1240 | C | 106,- |
| FR3-CS | Remote control unit with set-point potentiometer, room temperature sensor, 10 .. 40 C, push button, 4 LEDs, CAN-Bus interface | 3401 1260 | C | 113,- |
| FTR1-CS | Remote control unit with room temperature sensor 10 .. 40 C, push button, LED, CAN-Bus interface | 3401 3220 | C | 109,- |
| FTR2-CS | Remote control unit with set-point potentiometer, room temperature sensor, 10 .. 40 C, push button, LED, CAN-Bus interface | 3401 3240 | C | 113,- |
| FDR1-CS | Remote control unit with room temperature sensor 10 .. 40 C, switch: Day/night/auto, LED and CAN-Bus interface, | 3401 4220 | C | 120,- |
| FDR2-CS | Remote control unit with set-point potentiometer, room temperature sensor, 10 .. 40 C, switch: Day/night/auto, LED, CAN-Bus interface | 3401 4240 | C | 113,- |
| FVR1-CS | Push button remote control unit for fan regulation, 5 LEDs, room temperature sensor 10 .. 40 C, CAN-Bus interface | 3401 5420 | C | 120,- |
| FVR2-CS | Remote control unit with set-point potentiometer, room temperature sensor, 10 .. 40 C, push button for fan regulation, 5 LEDs, CAN-Bus interface, | 3401 5440 | C | 113,- |
| FVR2S-CS | Remote control unit with push button for fan regulation and 4 LEDs, SM-LED, set-point potentiometer, room temperature sensor and CAN-Bus interface | 3401 6440 | C | 113,- |



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|--|-----------|----|-----------|
| FLCD-CS | Remote control unit with display, overtime button for heating circuit or button for valve control, alarm LED, setpoint potentiometer, room temperature sensor, CAN-Bus interface, (at the moment only suitable for DDC-RegelUNIT 9X compact and DDC RegelUNIT 6X) | 3401 7420 | C | 233,- |

3.4.2

Flush Mounted Remote Control Unit with CAN-Bus Interface



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|------------|
| FR2-CS/U* | Remote control unit with set-point potentiometer, room temperature sensor, 10 .. 40 C, CAN-Bus interface, long-distance area | 3402 124x | C | on request |
| FR3-CS/U* | Remote control unit with set-point potentiometer, room temperature sensor, 10 .. 40 C, push button, 4 LEDs, CAN-Bus interface, long-distance area | 3402 126x | C | on request |
| FTR2-CS/U* | Remote control unit with set-point potentiometer, room temperature sensor, 10 .. 40 C, push button, LED, CAN-Bus interface, long-distance area | 3402 324x | C | on request |
| FDR2-CS/U* | Remote control unit with set-point potentiometer, room temperature sensor, 10 .. 40 C, switch: Day/night/auto, LED, CAN-Bus interface, long-distance area | 3402 424x | C | on request |
| FVR2-CS/U* | Remote control unit with set-point potentiometer, room temperature sensor, 10 .. 40 C, push button for fan regulation, 5 LEDs, CAN-Bus interface, long-distance area | 3402 544x | C | on request |
| FVR2S-CS/U* | Remote control unit with push button for fan regulation and 4 LEDs, SM-LED, set-point potentiometer, room temperature sensor and CAN-Bus interface, long-distance area | 3402 644x | C | on request |

Available for the controller program of Bush-Jaeger

*Soon out of production

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4.1.1 Lifting Actuators

| | Lifting power | Run. time | Cast Iron | | | Cast Steel | Red Brass, Brass | | Nodular Cast Iron |
|----------|---------------|-----------|-----------|------|------|------------|------------------|------|-------------------|
| | | | MVF | HMVF | MVFL | MFVS | RGV | MVGX | MVFSP |
| HM 2025 | 250 | 2min | • | • | | • | • | • | • |
| HM 2030 | 300 | 25/66s | | | • | | | | |
| HM 2040 | 400 | 2min | • | • | | • | • | • | • |
| HM 2060X | 600 | 2min | • | • | | • | • | • | • |
| HM 1090X | 900 | 1min | • | • | | • | • | | • |
| HM 2090X | 900 | 2min | • | • | | • | • | | • |
| HM 1150X | 1500 | 1min | • | • | | • | • | | • |
| HM 2250X | 2500 | 2min | • | • | | • | | | • |
| HM 2500 | 5000 | | • | | | • | | | • |
| HM 2100 | 10000 | | • | | | | | | • |

4.1.1.1 Lifting actuators between 250 and 600 N

4.1.1.1.1 Lifting actuator HM 20..X with 250, 400 and 600 N

The lifting actuators HM20.. operate on all kinds of lifting valves and are practically maintenance-free. They have a 2-hole console on the valve side. The actuator is actuator by a reversible AC synchronized motor. Lifting is achieved by a self-locking threaded spindle. Manual emergency setting is provided by a cranking handle. In case of manual emergency setting, the power supply can be switched off by a switch in the actuator cover. The switch-off at the ends of the lifting process will be load-dependent. Optional switch between ends, additional load-dependent end-switching and potentiometers with a resistance of 10 kOhm are available. The actuators HM20...SR/24 V have an electronic setting controller and run on 24 V AC. Here the intern potentiometer will be used for the setting feed-back.



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|---|-----------|----|-----------|
| HM 2025 | Lifting actuator 230 V / 50 Hz, lifting power 250 N | 4101 1100 | C | 242,- |
| HM 2025 RP | Lifting actuator 230 V / 50 Hz, lifting power 250 N, with feed-back potentiometer 10 kOhm | 4101 1110 | C | 291,- |
| HM 2025 W | Lifting actuator 230 V / 50 Hz, lifting power 250 N, with way switch | 4101 1120 | C | 282,- |
| HM 2025 RP/E/W | Lifting actuator 230 V / 50 Hz, lifting power 250 N, with end- and way switch, with feed-back potentiometer 10 kOhm | 4101 1130 | C | 355,- |
| HM 2025/24 | Lifting actuator 24 V / 50 Hz, lifting power 250 N | 4101 1200 | C | 253,- |
| HM 2025 RP/24 | Lifting actuator 24 V / 50 Hz, lifting power 250 N, with feed-back potentiometer 10 kOhm | 4101 1210 | C | 315,- |
| HM 2025 W/24 | Lifting actuator 24 V / 50 Hz, lifting power 250 N, with way switch | 4101 1220 | C | 302,- |
| HM 2025 RP/E/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 250 N, with end and way switch, with feed-back potentiometer 10 kOhm | 4101 1230 | C | 379,- |
| HM 2025 SR/24 | Lifting actuator 24 V / 50 Hz, lifting power 250 N, position signal 0(2)..10V / 0(4)..20 mA | 4101 1300 | C | 280,- |
| HM 2025 SR/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 250 N, position signal 0(2)..10V / 0(4)..20 mA, with way switch | 4101 1310 | C | 327,- |
| HM 2025 SR/E/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 250 N, position signal 0(2) ... 10 / 0(4) ...20 mA, with end- and way switch | 4101 1320 | C | 365,- |
| HM 2040 | Lifting actuator 230 V / 50 Hz, lifting power 400 N | 4101 2100 | C | 245,- |
| HM 2040 RP | Lifting actuator 230 V / 50 Hz, lifting power 400 N, with feed-back potentiometer 10 kOhm | 4101 2110 | C | 327,- |
| HM 2040 W | Lifting actuator 230 V / 50 Hz, lifting power 400 N, with way switch | 4101 2120 | C | 311,- |
| HM 2040 RP/E/W | Lifting actuator 230 V / 50 Hz, lifting power 400 N, with end- and way switch, with feed-back potentiometer 10 kOhm | 4101 2130 | C | 391,- |
| HM 2040/24 | Lifting actuator 24 V / 50 Hz, lifting power 400 N | 4101 2200 | C | 265,- |
| HM 2040 RP/24 | Lifting actuator 24 V / 50 Hz, lifting power 400 N, with feed-back potentiometer 10 kOhm | 4101 2210 | C | 344,- |

4

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------------|---|-----------|----|-----------|
| HM 2040 W/24 | Lifting actuator 24 V / 50 Hz, lifting power 400 N, with way switch | 4101 2220 | C | 330,- |
| HM 2040 RP/E/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 400 N, with end and way switch, with feed-back potentiometer 10 kOhm | 4101 2230 | C | 410,- |
| HM 2040 SR/24 | Lifting actuator 24 V / 50 Hz, lifting power 400 N, position signal 0(2)..10V / 0(4)..20 mA | 4101 2300 | C | 294,- |
| HM 2040 SR/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 400 N, position signal 0(2)..10V / 0(4)..20 mA, with way switch | 4101 2310 | C | 352,- |
| HM 2040 SR/E/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 400 N, position signal 0(2)..10V / 0(4)..20 mA, with end- and way switch | 4101 2320 | C | 387,- |
| HM 2060 X | Lifting actuator 230 V / 50 Hz, lifting power 600 N | 4101 3100 | C | 283,- |
| HM 2060 XRP | Lifting actuator 230 V / 50 Hz, lifting power 600 N, with feed-back potentiometer 10 kOhm | 4101 3110 | C | 355,- |
| HM 2060 XW | Lifting actuator 230 V / 50 Hz, lifting power 600 N, with way switch | 4101 3120 | C | 360,- |
| HM 2060 XRP/E/W | Lifting actuator 230 V / 50 Hz, lifting power 600 N, with end and way switch, with Feed-back potentiometer 10k Ohm | 4101 3130 | C | 418,- |
| HM 2060 X/24 | Lifting actuator 24 V / 50 Hz, lifting power 600 N | 4101 3200 | C | 294,- |
| HM 2060 XRP/24 | Lifting actuator 24 V / 50 Hz, lifting power 600 N, with Feed-back potentiometer 10 kOhm | 4101 3210 | C | 368,- |
| HM 2060 XW/24 | Lifting actuator 24 V / 50 Hz, lifting power 600 N, with way switch | 4101 3220 | C | 366,- |
| HM 2060 XRP/E/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 600 N, with end and way switch, with Feed-back potentiometer 10 kOhm | 4101 3230 | C | 429,- |
| HM 2060 XSR/24 | Lifting actuator 24 V / 50 Hz, lifting power 600 N, 0(2)..10V / 0(4)..20 actuator signal mA | 4101 3300 | C | 358,- |
| HM 2060 XSR/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 600 N, actuator signal mA 0(2)..10V / 0(4)..20, with way switches | 4101 3310 | C | 415,- |
| HM 2060 XSR/E/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 600 N, setting signal mA 0(2)..10V / 0(4)..20, with end and way switches | 4101 3320 | C | 448,- |

4.1.1.1.2 Lifting Actuator HM 2030 with 300N for all MVFL compact valves

Electromechanical actuators **HM 2030**... are designed to control the regulating valves **MVFL kompakt** series from R+S. Its connection to the valve ensures a zero clearance between stem of the actuator and the valve so the precise regulating ability is ensured even for minimal position changes. The actuators are self-adaptive. The limit positions are limited by the valve stroke. To communicate with a control system, the actuators are equipped with either standard 3-point control or direct control (options: 0-10 V, 2-10 V, 0-20 mA or 4-20 mA). All types are equipped with a hand wheel for manual operation. Characteristics: Easy assembly to the valve without a necessity for adjusting. No tools required, self-adaptive function fixing the stroke of the actuator in relation to the stroke of the valve, hand wheel for an emergency operating, stroke indicator, intelligent microprocessor for control (for actuators with direct control), high service reliability and life time thanks to a simple design and selection of high quality materials for mechanically stressed parts, possibility to equip the actuator with resistance feedback (for actuators with 3-point control)



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|---|-----------|----|-----------|
| HM 2030 | Lifting actuator 230V/50 Hz, lifting power 300N, I-time 66s, 3-point | 4101 1500 | C | 125,- |
| HM 2030/24 | Lifting actuator 24V/50Hz, lifting power 300N, I-time 66s, 3-point | 4101 1510 | C | 125,- |
| HM 2030 SR/24 | Lifting actuator 24V/50Hz, lifting power 300N, I-time 25s, 0..10V DC, continuous | 4101 1520 | C | 183,- |
| HM 2030/W | Lifting actuator 230V/50Hz, lifting power 300N, I-time 66s, 3-point, micro switch | 4101 1530 | C | 154,- |
| HM 2030/24/W | Lifting actuator 24V/50Hz, lifting power 300N, I-time 66s, 3-point, micro switch | 4101 1540 | C | 154,- |

4.1.12 Lifting Actuator between 900 and 2500 N

The lifting actuators HM1090X, 2090X, 1150X, 2250x operate on all kinds of lifting valves and are practically maintenance-free. They have a 2-hole console on the valve side. The actuator is actuated by a reversible AC synchronized motor. Lifting is achieved by a self-locking threaded spindle. Manual emergency setting is provided by a cranking handle. In case of manual emergency setting, the power supply can be switched off by a switch in the actuator cover.

The switch-off at the ends of the lifting process will be load-dependent. Optional switch between ends, additional load-dependent end-switching and potentiometers with a resistance of 10 kOhm are available.

These options can be delivered as a complete unit or as a kit to complete the unit.

The actuators HM1090XSR/24 V have an electronic setting controller and run on 24 V AC. Here the internal potentiometer will be used for the setting feed-back.



| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|--|-----------|----|-----------|
| HM 1090 X | Lifting actuator 230 V / 50 Hz, lifting power 900 N | 4101 4400 | C | 365,- |
| HM 1090 XRP | Lifting actuator 230 V / 50 Hz, lifting power 900 N with feed-back potentiometer 10 kOhm | 4101 4410 | C | 468,- |
| HM 1090 XW | Lifting actuator 230 V / 50 Hz, lifting power 900 N with way switch | 4101 4420 | C | 424,- |
| HM 1090 XRP/W | Lifting actuator 230 V / 50 Hz, lifting power 900 N with way switch and feed-back potentiometer 10 kOhm | 4101 4430 | C | 496,- |
| HM 1090 X/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N | 4101 4500 | C | 388,- |
| HM 1090 XRP/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N, with feed-back potentiometer 10 kOhm | 4101 4510 | C | 484,- |
| HM 1090 XW/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N, with way switch | 4101 4520 | C | 446,- |
| HM 1090 XRP/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N, with feed-back potentiometer 10 kOhm | 4101 4530 | C | 537,- |
| HM 1090 XSR/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N, setting signal 0(2)..10V / 0(4)..20 mA | 4101 4600 | C | 550,- |
| HM 1090 XSR/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N, setting signal 0(2)..10V / 0(4)..20 mA, with way switch | 4101 4610 | C | 609,- |
| HM 2090 X | Lifting actuator 230 V / 50 Hz, lifting power 900 N | 4101 4700 | C | 335,- |
| HM 2090 XRP | Lifting actuator 230 V / 50 Hz, lifting power 900 N with feed-back potentiometer 10 kOhm | 4101 4710 | C | 408,- |
| HM 2090 XW | Lifting actuator 230 V / 50 Hz, lifting power 900 N with way switch | 4101 4720 | C | 393,- |
| HM 2090 XRP/W | Lifting actuator 230 V / 50 Hz, lifting power 900 N with way switch sentence and Feed-back potentiometer 10 kOhm | 4101 4730 | C | 466,- |
| HM 2090 X/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N | 4101 4800 | C | 352,- |
| HM 2090 XRP/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N, with feed-back potentiometer 10 kOhm | 4101 4810 | C | 438,- |
| HM 2090 XW/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N, with way switch | 4101 4820 | C | 437,- |
| HM 2090 XRP/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N, with feed-back potentiometer 10 kOhm | 4101 4830 | C | 492,- |
| HM 2090 XSR/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N, setting signal 0(2)..10V / 0(4)..20 mA. | 4101 4900 | C | 456,- |
| HM 2090 XSR/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 900 N, setting signal mA 0(2)..10V / 0(4)..20, with way switch sentence | 4101 4910 | C | 517,- |
| HM 1150 X | Lifting actuator 230 V / 50 Hz, lifting power 1500 N | 4101 5300 | C | 383,- |
| HM 1150 XRP | Lifting actuator 230 V / 50 Hz, lifting power 1500 N with feed-back potentiometer 10 kOhm | 4101 5310 | C | 472,- |
| HM 1150 XW | Lifting actuator 230 V / 50 Hz, lifting power 1500 N with way switch | 4101 5320 | C | 471,- |
| HM 1150 XRP/W | Lifting actuator 230 V / 50 Hz, lifting power 1500 N with way switch sentence and Feed-back potentiometer 10 kOhm | 4101 5330 | C | 524,- |
| HM 1150 X/24 | Lifting actuator 24 V / 50 Hz, lifting power 1500 N | 4101 5400 | C | 405,- |
| HM 1150 XRP/24 | Lifting actuator 24 V / 50 Hz, lifting power 1500 N with feed-back potentiometer 10 kOhm | 4101 5410 | C | 486,- |
| HM 1150 XW/24 | Lifting actuator 24 V / 50 Hz, lifting power 1500 N with way switch | 4101 5420 | C | 486,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|--|-----------|----|-----------|
| HM 1150 XRP/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 1500 N with feed-back potentiometer 10 kOhm | 4101 5430 | C | 537,- |
| HM 1150 XSR/24 | Lifting actuator 24 V / 50 Hz, lifting power 1500 N setting signal 0(2)..10V / 0(4)..20 mA | 4101 5500 | C | 587,- |
| HM 1150 XSR/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 1500 N actuator signal 0(2)..10V / 0(4)..20 mA, with way switch | 4101 5510 | C | 647,- |
| HM 2250 X | Lifting actuator 230 V / 50 Hz, lifting power 2500 N | 4101 7100 | C | 399,- |
| HM 2250 XRP | Lifting actuator 230 V / 50 Hz, lifting power 2500 N with feed-back potentiometer 10 kOhm | 4101 7110 | C | 472,- |
| HM 2250 XW | Lifting actuator 230 V / 50 Hz, lifting power 2500 N with way switch | 4101 7120 | C | 458,- |
| HM 2250 XRP/W/24 | Lifting actuator 230 V / 50 Hz, lifting power 2500 N with way switch and feed-back potentiometer 10 kOhm | 4101 7130 | C | 560,- |
| HM 2250 X/24 | Lifting actuator 24 V / 50 Hz, lifting power 2500 N | 4101 7200 | C | 429,- |
| HM 2250 XRP/24 | Lifting actuator 24 V / 50 Hz, lifting power 2500 N with feed-back potentiometer 10 kOhm | 4101 7210 | C | 521,- |
| HM 2250 XW/24 | Lifting actuator 24 V / 50 Hz, lifting power 2500 N with way switch | 4101 7220 | C | 520,- |
| HM 2250 XRP/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 2500 N with feed-back potentiometer 10 kOhm, with way switch | 4101 7230 | C | 574,- |
| HM 2250 XSR/24 | Lifting actuator 24 V / 50 Hz, lifting power 2500 N setting signal 0(2)..10V / 0(4)..20 mA | 4101 7300 | C | 622,- |
| HM 2250 XSR/W/24 | Lifting actuator 24 V / 50 Hz, lifting power 2500 N setting signal 0(2)..10V / 0(4)..20 mA, with way switch | 4101 7310 | C | 680,- |

4.1.13 Lifting Actuators between 5000 and 10000 N

The lifting actuators HM 2500.. and HM 2100.. are electrical lifting actuators with microcontroller and are used in combination with 2-way or 3-way valves. They can be controlled via a 2-point or 3-point controllers or controllers with continuous signal. Because of the extreme lifting power these motors can be used in combination with MVF-valves with DN 80 up to 150. Inputsignal: 2-point or 3-point or 0(2)...10 VDC (77kOhm) or 0(4)...20mA (0,51 kOhm), power supply 230 VAC or 24 VAC

HM 2500

Running time 5 to 2,5 s/mm (choosable), lifting power 5000N, max. lift 60mm

HM 2100

Running time 1 s/mm, lifting power 10000N max. lift 80mm



| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---|-----------|----|-----------|
| HM 2500 | Lifting actuator 230V/50Hz, Lifting power 5 kN, for MVF..-Valves, DN80-150 | 4101 9200 | C | 1.200,- |
| HM 2500/24 | Lifting actuator 24V/50Hz, Lifting power 5 kN, for MVF..-Valves, DN 80-150 | 4101 9220 | C | 1.143,- |
| HM 2100 | Lifting actuator 230V/50 Hz, Lifting power 10 kN, for MVF..-Valves, DN 80-150 | 4101 9300 | C | 1.929,- |
| HM 2100/24 | Lifting actuator 24V/50 Hz, Lifting power 10 kN, for MVF..-Valves DN 80-150 | 4101 9320 | C | 1.828,- |

4.1.2 Rotary actuators

| | Lifting power NM | Throttle or Shut-off valves | Hora-flipper valves | Flipper valves G3xx/G4xx | Flipper valves Gxxx MS | Flipper valves GM / FM | other flipper valves |
|---------|------------------|-----------------------------|---------------------|--------------------------|------------------------|------------------------|----------------------|
| SM 500 | 7,8 | • | • (Ersatz) | | | | |
| SM 1500 | 20 | • | • (Ersatz) | | | | |
| SM 6000 | 40 | • | • (Ersatz) | | | | |
| SM 6026 | 25 | • | • (Ersatz) | | | | |
| SM E60 | 100 | • | | | | | |
| SM E100 | 400 | • | | | | | |
| SM 4007 | 7 | | | • | | | |
| SM 2010 | 10 | | | | • | | • |
| SM 4018 | 18 | | | | | • | |
| SM 4020 | 20 | | | | | • >DN65 | |

4.1.2.1 Rotary actuators for throttle-/shut-off valves and big air duct dampers as a replacement for actuators for Hora-flipper valves

The Rotary actuators SM 500, 1500, 6000 and 6025 are used with their necessary consoles and Accessories for flipper valves, butterfly-valves or air-duct dampers. The actuators SM 500, 1500, 6000 can also be delivered with feed-back potentiometer.

The SM 1500 and 6000 can be operated with a power supply of 230 V or 24 V AC. All actuators can be supplied with an optional way-end switch.



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|-----------|
| SM 500 | Rotary actuator 230V / 50 Hz, max. torque 7,8 Nm | 4102 1000 | C | 282,- |
| SM 1500 | Rotary actuator 230V / 50Hz, max. torque 20 Nm | 4102 2000 | C | 237,- |
| SM 1500/24 | Rotary actuator 24V / 50 Hz, max. torque 20 Nm | 4102 2020 | C | 248,- |
| SM 6000 | Rotary actuator 230V / 50 Hz, max. torque 40 Nm | 4102 3000 | C | 252,- |
| SM 6000/24 | Rotary actuator 24V / 50 Hz, max. torque 40 Nm | 4102 3020 | C | 276,- |
| SM 6025 | Rotary actuator 230V / 50 Hz, max. torque 25 Nm, up to DN 65 | 4102 4000 | C | 232,- |
| E (Bausatz) | Way and end position switches for SM-rotary actuators 500, 1500, 6000 and 6025 | 4102 9010 | C | 25,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|---|-----------|----|-----------|
| SM E60 | Rotary actuator 230V / 50 Hz for MAK 2125 10/16 bar, MAK 2150 10 bar, 100Nm | 4102 5000 | C | on req. |
| SM E100 | Rotary actuator 230V / 50 Hz for MAK 2150 16 bar, 400Nm | 4102 6000 | C | on req. |



4.1.2.2 Rotary actuators for compact flipper valves

4.1.2.2.1 Rotary actuators for R+S compact flipper valves G3xx and G4xx

The rotary actuators SM 4007 need an additional mounting set to be connected to the flipper valves Type Gxxx. These actuators are available with 230V, 24V power supply and with 3-point control or modulating control 0..10V.



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|---|-----------|----|-----------|
| SM 4007 | Rotary actuator 230V / 50 Hz, max. torque 7 Nm, control signal 3-point, running time 120sek | 4102 8200 | C | 97,- |
| SM 4007/24 | Rotary actuator 24V / 50 Hz, max. torque 7 Nm, control signal 3-point, running time 120sek | 4102 8210 | C | 103,- |
| SM 4007/24/SR | Rotary actuator 24V / 50 Hz, max. torque 7 Nm, control signal 0.10V modulating, running time 120sek | 4102 8220 | C | 140,- |
| MAS SM4007/GG | SM4007 mounting set for R+S 3-way-compact flipper valves G3xx/GG | 4702 0500 | C | 12,- |
| MAS SM4007/MS | SM4007 mounting set for R+S 3/4-way-compact flipper valves Gxxx/MS | 4702 0510 | C | 12,- |

4.1.2.2 Rotary actuators for all kinds of compact flipper valves

The Rotary actuators SM 2010 and SM 2010 /L are used with the necessary consoles and Accessories for flipper valves or butterfly valves. These actuators can be operated by any controller / compensator with a 3-point output. They operate with 230V and have a rotary power of 10Nm. They can turn flipper valves up to DN 80. Types with 24V power supply are available on request



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|--|-----------|----|-----------|
| SM 2010 | Rotary actuator AC 230V, 50/60 Hz, 3-point , for Flipper valves, running time 140s, 10Nm | 4102 7500 | C | 130,- |
| SM 2010 /L | Rotary actuator AC 230V, 50/60 Hz, 3-point , for Flipper valves, running time 280s, 10Nm | 4102 7510 | C | 130,- |
| MAS SM2010/3 | SM2010 mounting set for R+S 3-way-compact flipper valves G3xx MS | 4702 0420 | C | 4,20 |
| MAS SM2010/4 | SM2010 mounting set for R+S 4-way-compact flipper valves G4xx MS | 4702 0440 | C | 4,20 |
| MAS SM2010 C-DRU | SM2010 mounting set for Centra-Flipper valves DRU | 4702 0430 | C | 37,- |
| MAS SM2010 C-DRZR | SM2010 mounting set for Centra-Flipper valves DR and ZR | 4702 0450 | C | 8,50 |
| MAS SM2010 ESBE | SM2010 mounting set for ESBE-Flipper valves | 4702 0460 | C | 7,30 |
| MAS SM2010 Siem | SM2010 mounting set for Siemens-Flipper valves | 4702 0470 | C | 4,20 |
| MAS SM2010 Cent | SM2010 mounting set for Oventrop-Flipper valves | 4702 0480 | C | 4,20 |
| MAS SM2010 xxx-C | SM2010 mounting set for Flipper valves anderer Hersteller | 4702 04xx | C | on req. |

4.1.2.3 Rotary actuators for R+S flipper valves GMxxx and FMxxx up to nominal size DN50

The rotary actuators SM 4018 don't need any mounting set to be connected to flipper valves Type FM and GM. Actuators available with 230V, 24V and 24V in combination with 0...10V control signal



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|---|-----------|----|-----------|
| SM 4018 | Rotary actuator 230V / 50 Hz, max. torque 18 Nm, running time 220sec. | 4102 8000 | C | 175,- |
| SM 4018/24 | Rotary actuator 24V / 50Hz, max. torque 18 Nm, running time 220sec. | 4102 8010 | C | 179,- |
| SM 4018/24/SR | Rotary actuator 24V / 50Hz, max. torque 18 Nm, running time 80sec. control signal 0...10V | 4102 8020 | C | 256,- |

4.1.2.4 Rotary actuators for R+S Flipper valves GMxxx and FMxxx For actuators with a nominal size of DN65 and higher

The rotary actuators SM 4020 don't need an additional mounting set to be connected to the flipper valves Type FM and GM. The actuators are available with 230V, 24V and 24V in combination with 0...10V control signal.



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|--|-----------|----|-----------|
| SM 4020 | Rotary actuator 230V / 50 Hz, max. torque 20 Nm, running time 220 Sec. | 4102 8100 | C | 195,- |
| SM 4020/24 | Rotary actuator 24V / 50 Hz, max. torque 20 Nm, running time 220 Sec. | 4102 8110 | C | 199,- |
| SM 4020/24/SR | Rotary actuator 24V / 50 Hz, max. torque 20 Nm, running time 240 Sec. Control signal 0...10V | 4102 8120 | C | 263,- |

4

4.1.3 Damper actuators

| | Lifting power NM | Fail-Safe Function | Electronic return | 0,8m ² | 1m ² | 2m ² | 3m ² | 4m ² | 6m ² |
|-------|------------------|--------------------|-------------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| KM4A | 4 | | | | • | | | | |
| LM | 5 | | | | • | | | | |
| KM5 | 5 | | | | • | | | | |
| NM | 10 | | | | | • | | | |
| KM10K | 10 | | | | | • | | | |
| KM15K | 15 | | | | | | • | | |
| SM | 20 | | | | | | | • | |
| KM20K | 20 | | | | | | | • | |
| KM4F | 4 | • | | • | • | | | | |
| KM10E | 10 | | • | | | • | | | |
| KM15E | 15 | | • | | | | • | | |
| LF | 4 | | | • | | | | | |
| AF | 15 | | | | | | • | | |
| GM | 30 | | | | | | | | • |

4.1.3.1 Damper actuators for dampers without spring

4.1.3.1.1 Damper actuators for dampers up to approx.1m² (4NM), without spring

damper actuator (without spring, 90 sec/ 90°) with cable terminal (row terminal), 4 Nm

All actuators are delivered with: mounting adapter, anti rotation strap, operating manual



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|---|-----------|----|-----------|
| KM 4A/24 | damper actuator, 24V AC/DC, open-close / 3 pnt, IP20 | 4104 1110 | C | 72,- |
| KM 4A/230 | damper actuator, 120/230 V AC, open-close / 3 pnt, IP20 | 4104 1120 | C | 75,- |
| KM 4A/24S | damper actuator, 24V AC/DC, 2..10V, without return signal, IP20 | 4104 1130 | C | 109,- |

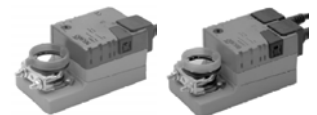
damper actuator (without spring, 90 sec/ 90°) with cable (Kabellänge 0,9 m), 4 Nm

All actuators are delivered with: mounting adapter, anti rotation strap, operating manual



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| KM 4/24 | damper actuator, 24V AC/DC, open-close / 3 pnt, IP55 | 4104 1140 | C | 76,- |
| KM 4/230 | damper actuator, 120/230 V AC, open-close / 3 pnt, IP55 | 4104 1150 | C | 79,- |
| KM 4/24P | damper actuator, 24V AC/DC, open-close / 3 pnt, IP55, with potentiometer 5000 Ohm | 4104 1160 | C | 104,- |
| KM 4/24S | damper actuator, 24V AC/DC, 2..10V, IP55 | 4104 1170 | C | 114,- |

4.1.3.1.2.1 Damper actuators for dampers up to 1 m² (5 Nm) without spring



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|---|-----------|----|-----------|
| LM 230A | damper actuator 230V AC, 5 Nm, up to 1 m ² control signal: open-close or 3-point | 4103 1010 | C | 91,- |
| LM 230A-S | damper actuator 230V AC, 5 Nm, up to 1 m ² , with integrated switch, control signal: open-dose or 3-point | 4103 1020 | C | 104,- |
| LM 24A | damper actuator 24V AC / DC, 5 Nm, up to 1 m ² , control signal: open-close or 3-point | 4103 1030 | C | 91,- |
| LM 24A-S | damper actuator 24V AC / DC, 5 Nm, up to 1m ² , with integrated switch, control signal: open-dose or 3-point | 4103 1040 | C | 104,- |
| LM 24A-SR | damper actuator 24V AC / DC, 5 Nm, up to 1 m ² , control signal: continuous 0..10V, return signal DC 2...10V | 4103 1050 | C | 130,- |

damper actuator (without spring, 90 sec/ 90°) with cable, 5 Nm

All actuators are delivered with: mounting adapter, anti rotation strap, tool for manual operation, Accessories, (positioning display, way point limiter, damping ring), operating manual



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|-----------|
| KM 5K/24 | damper actuator, 24V AC/DC, open-close / 3 pnt, IP 55 | 4104 1310 | C | 89,- |
| KM 5K/230 | damper actuator, 120/230 V AC, open-close / 3 pnt, IP 55 | 4104 1320 | C | 94,- |
| KM 5K/24S | damper actuator, 24V AC/DC, 0/2..10V, IP 55 | 4104 1330 | C | 131,- |
| KM 5K/230S | damper actuator, 230V AC, 0/2..10V, IP 55 | 4104 1340 | C | 148,- |
| KM 5K/24X | damper actuator, 24V AC/DC, open-close / 3 pnt, IP 66 | 4104 1350 | C | 100,- |
| KM 5K/230X | damper actuator, 120/230 V AC, open-close / 3 pnt, IP 66 | 4104 1360 | C | 105,- |
| KM 5K/24SX | damper actuator, 24V AC/DC, 0/2..10V, IP 66 | 4104 1370 | C | 143,- |
| KM 5K/230SX | damper actuator, 230V AC, 0/2..10V, IP 66 | 4104 1380 | C | 160,- |

4.1.3.1.2.2 Damper actuators for dampers up to 1 m² (5 Nm) without spring, fast runner**damper actuator (without spring, 30 sec/ 90°) with cable, fast runner, 5 Nm**

All actuators are delivered with: mounting adapter, anti rotation strap, tool for manual operation, Accessories-beutel , (positioning display, way point limiter, clamping ring), operating manual



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| KM 5KS/24 | damper actuator, 24V AC/DC, open-close / 3 pnt, IP 55 | 4104 1410 | C | 113,- |
| KM 5KS/230 | damper actuator, 120/230 V AC, open-close / 3 pnt, IP 55 | 4104 1420 | C | 123,- |
| KM 5KS/24S | damper actuator, 24V AC/DC, 0/2..10V, IP 55 | 4104 1430 | C | 162,- |
| KM 5KS/230S | damper actuator, 230V AC, 0/2..10V, IP 55 | 4104 1440 | C | 185,- |
| KM 5KS/24X | damper actuator, 24V AC/DC, open-close / 3 pnt, IP 66 | 4104 1450 | C | 125,- |
| KM 5KS/230X | damper actuator, 120/230 V AC, open-close / 3 pnt, IP 66 | 4104 1460 | C | 135,- |
| KM 5KS/24SX | damper actuator, 24V AC/DC, 0/2..10V, IP 66 | 4104 1470 | C | 173,- |
| KM 5KS/230SX | damper actuator, 230V AC, 0/2..10V, IP 66 | 4104 1480 | C | 197,- |

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4.1.3.2 Damper actuators for dampers up to 2 m², 10 Nm, without spring

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|-----------|----|-----------|
| NM 230A | damper actuator 230V AC, control signal: open-close or 3-point | 4103 2010 | C | 114,- |
| NM 230A-S | damper actuator 230V AC, with integrated switch, control signal: open-close or 3-point | 4103 2020 | C | 137,- |
| NM 24A | damper actuator 24V AC/DC, control signal: open-close or 3-point | 4103 2030 | C | 111,- |
| NM 24A-S | damper actuator 24V AC / DC, with integrated switch, control signal: open-close or 3-point | 4103 2040 | C | 134,- |
| NM 24A-SR | damper actuator 24V AC / DC, control signal: continuous 0..10V, return signal DC 2...10V | 4103 2050 | C | 169,- |

damper actuator (without spring, 90 sec / 90 °) with cable, 10Nm:

All actuators are delivered with: mounting adapter, anti rotation strap, tool for manual operation, Accessories, (positioning display, way point limiter, damping ring), operating manual



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| KM 10K/24 | damper actuator, 24V AC/DC, open-close / 3 pnt, IP 55 | 4104 1510 | C | 94,- |
| KM 10K230 | damper actuator, 120/230 V AC, open-close / 3 pnt, IP 55 | 4104 1520 | C | 99,- |
| KM 10K/24S | damper actuator, 24V AC/DC, 0/2..10V, IP 55 | 4104 1530 | C | 136,- |
| KM 10K230S | damper actuator, 230V AC, 0/2..10V, IP 55 | 4104 1540 | C | 155,- |
| KM 10K/24X | damper actuator, 24V AC/DC, open-close / 3 pnt, IP 66 | 4104 1550 | C | 105,- |
| KM 10K/230X | damper actuator, 120/230 V AC, open-close / 3 pnt, IP 66 | 4104 1560 | C | 110,- |
| KM 10K/24SX | damper actuator, 24V AC/DC, 0/2..10V, IP 66 | 4104 1570 | C | 148,- |
| KM 10K/230SX | damper actuator, 230V AC, 0/2..10V, IP 66 | 4104 1580 | C | 167,- |

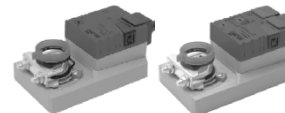
4.1.3.1.4 Damper actuators for dampers up to 3 m², 15 Nm, without spring damper actuator (without spring, 90 sec/ 90°) with cable 15Nm:

All actuators are delivered with: mounting adapter, anti rotation strap, tool for manual operation, Accessories, (positioning display, way point limiter, damping ring), operating manual



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| KM 15K/24 | damper actuator, 24V AC/DC, open-close / 3 pnt, IP 55 | 4104 1610 | C | 106,- |
| KM 15K/230 | damper actuator 120/230 V AC, open-close / 3 pnt, IP 55 | 4104 1620 | C | 111,- |
| KM 15K/24S | damper actuator, 24V AC/DC, 0/2..10V, IP 55 | 4104 1630 | C | 162,- |
| KM 15K/230S | damper actuator, 230V AC, 0/2..10V, IP 55 | 4104 1640 | C | 185,- |
| KM 15K/24X | damper actuator, 24V AC/DC, open-close / 3 pnt, IP 66 | 4104 1650 | C | 118,- |
| KM 15K/230X | damper actuator, 120/230 V AC, open-close / 3 pnt, IP 66 | 4104 1660 | C | 123,- |
| KM 15K/24SX | damper actuator, 24V AC/DC, 0/2..10V, IP 66 | 4104 1670 | C | 173,- |
| KM 15K/230SX | damper actuator, 230V AC, 0/2..10V, IP 66 | 4104 1680 | C | 197,- |

4.1.3.1.5 Damper actuators for dampers up to 4 m², 20 Nm, without spring



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|-----------|----|-----------|
| SM 230A | damper actuator 230V AC, max. torque 20 Nm, up to 4 m ² control signal: open-close or 3-point | 4103 3010 | C | 134,- |
| SM 230A-S | damper actuator 230V AC, max. torque 20 Nm, up to 4 m ² , with integrated switch, control signal: open-close or 3-point | 4103 3020 | C | 166,- |
| SM 24A | damper actuator 24V AC / DC, max. torque 20 Nm, up to 4 m ² , control signal: open-dose or 3-point | 4103 3030 | C | 130,- |
| SM 24A-S | damper actuator 24V AC / DC, max. torque 20 Nm, up to 4 m ² , with integrated switch, control signal: open-close or 3-point | 4103 3040 | C | 166,- |
| SM 24A-SR | damper actuator 24V AC / DC, max. torque 20 Nm, up to 4 m ² , control signal: continous 0..10V, return signal DC 2...10V | 4103 3050 | C | 195,- |

damper actuator (without spring, 90 sec/ 90°) with cable, max. torque 20Nm

All actuators are delivered with: mounting adapter, anti rotation strap, tool for manual operation, Accessories (positioning display, way point limiter, damping ring), operating manual



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| KM 20K/24 | damper actuator, 24V AC/DC, open-close / 3 pnt, IP 55 | 4104 1710 | C | 114,- |
| KM 20K/230 | damper actuator, 120/230 V AC, open-close / 3 pnt, IP 55 | 4104 1720 | C | 119,- |
| KM 20K/24S | damper actuator, 24V AC/DC, 0/2..10V, IP 55 | 4104 1730 | C | 170,- |
| KM 20K/230S | damper actuator, 230V AC, 0/2..10V, IP 55 | 4104 1740 | C | 193,- |
| KM 20K/24X | damper actuator, 24V AC/DC, open-close / 3 pnt, IP 66 | 4104 1750 | C | 126,- |
| KM 20K/230X | damper actuator, 120/230 V AC, open-close / 3 pnt, IP 66 | 4104 1760 | C | 131,- |
| KM 20K/24SX | damper actuator, 24V AC/DC, 0/2..10V, IP 66 | 4104 1770 | C | 182,- |
| KM 20K/230SX | damper actuator, 230V AC, 0/2..10V, IP 66 | 4104 1780 | C | 205,- |

4.1.3.2 Damper actuators m. Fail-Safe-function, (return in safety position)

4.1.3.2.1 Damper actuators m. Fail-Safe-function for dampers up to 1m² (4NM)

damper actuator with mechanical spring return function (90 sec./ 90°) with cable, 4 Nm

All actuators are delivered with: mounting adapter, anti rotation strap, tool for manual operation, Accessories, (positioning display, way point limiter, damping ring), operating manual



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|---|-----------|----|-----------|
| KM 4KF/24 | damper actuator, 24V AC/DC, open-close, IP55 | 4104 2110 | C | 121,- |
| KM 4KF/230 | damper actuator, 120/230 V AC, open-close, IP55 | 4104 2120 | C | 132,- |
| KM 4KF/24-3 | damper actuator, 24V AC/DC, 3 pnt, IP55 | 4104 2130 | C | 132,- |
| KM 4KF/230-3 | damper actuator, 120/230 V AC, 3 pnt, IP55 | 4104 2140 | C | 143,- |
| KM 4KF/24S | damper actuator, 24V AC/DC, 0/2..10V, IP55 | 4104 2150 | C | 168,- |
| KM 4KF/230S | damper actuator, 120/230 V AC, 0/2..10V, IP55 | 4104 2160 | C | 196,- |
| KM 4KF/24X | damper actuator, 24V AC/DC, open-close, IP66 | 4104 2210 | C | 134,- |
| KM 4KF/230X | damper actuator, 120/230 V AC, open-close, IP66 | 4104 2220 | C | 145,- |
| KM 4KF/24-3X | damper actuator, 24V AC/DC, 3 pnt, IP66 | 4104 2230 | C | 145,- |
| KM 4KF/230-3X | damper actuator, 120/230 V AC, 3 pnt, IP66 | 4104 2240 | C | 156,- |
| KM 4KF/24SX | damper actuator, 24V AC/DC, 0/2..10V, IP66 | 4104 2250 | C | 180,- |
| KM 4KF/230SX | damper actuator, 120/230 V AC, 0/2..10V, IP66 | 4104 2260 | C | 207,- |



4.1.3.2 Damper actuators m. Fail-Safe-function for damp. up to 1m² (4NM), fast runner

damper actuator with mechanical spring return function fast runner, (30 sec/ 90°) with cable, 4 Nm

All actuators are delivered with: mounting adapter, anti rotation strap, tool for manual operation, Accessories (positioning display, way point limiter, damping ring), operating manual



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|---|-----------|----|-----------|
| KM 4KFS/24 | damper actuator, 24V AC/DC, open-close, IP55 | 4104 2310 | C | 121,- |
| KM 4KFS/230 | damper actuator, 120/230 V AC, open-close, IP55 | 4104 2320 | C | 132,- |
| KM 4KFS/24-3 | damper actuator, 24V AC/DC, 3 pnt, IP55 | 4104 2330 | C | 132,- |
| KM 4KFS/230-3 | damper actuator, 120/230 V AC, 3 pnt, IP55 | 4104 2340 | C | 143,- |
| KM 4KFS/24S | damper actuator, 24V AC/DC, 0/2..10V, IP55 | 4104 2350 | C | 168,- |
| KM 4KFS/230S | damper actuator, 230 V AC, 0/2..10V, IP55 | 4104 2360 | C | 196,- |
| KM 4KFS/24X | damper actuator, 24V AC/DC, open-close, IP66 | 4104 2410 | C | 134,- |
| KM 4KFS/230X | damper actuator, 120/230 V AC, open-close, IP66 | 4104 2420 | C | 145,- |
| KM 4KFS/24-3X | damper actuator, 24V AC/DC, 3 pnt, IP66 | 4104 2430 | C | 145,- |
| KM 4KFS/230-3X | damper actuator, 120/230 V AC, 3 pnt, IP66 | 4104 2440 | C | 156,- |
| KM 4KFS/24SX | damper actuator, 24V AC/DC, 0/2..10V, IP66 | 4104 2450 | C | 180,- |
| KM 4KFS/230SX | damper actuator, 230 V AC, 0/2..10V, IP66 | 4104 2460 | C | 207,- |

4.1.3.3 Damper actuators with electronic return

4.1.3.3.1 Damper actuators for dampers up to 2 m², 10 Nm, with electronic return



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|--|-----------|----|-----------|
| KM 10KE/24-2 | damper actuator, 24V AC/DC, open-close / 2-Ltg, IP 55 | 4104 3110 | C | 216,- |
| KM 10KE/230-2 | damper actuator, 120/230 V AC, open-close / 2-Ltg, IP 55 | 4104 3120 | C | 226,- |
| KM 10KE/24-3 | damper actuator, 24V AC/DC, open-close / 3-Ltg, IP 55 | 4104 3130 | C | 221,- |
| KM 10KE/230-3 | damper actuator, 230V AC, open-close / 3-Ltg, IP 55 | 4104 3140 | C | 231,- |
| KM 10KE/24 | damper actuator, 24V AC/DC, 3 pnt, IP 55 | 4104 3150 | C | 229,- |
| KM 10KE/230 | damper actuator, 230V AC, open-close / 3 pnt, IP 55 | 4104 3160 | C | 239,- |
| KM 10KE/24S | damper actuator, 24V AC/DC, 0/2..10V, IP 55 | 4104 3170 | C | 278,- |
| KM 10KE/230S | damper actuator, 230V AC, 0/2..10V, IP 55 | 4104 3180 | C | 302,- |
| KM 10KE/24-2X | damper actuator, 24V AC/DC, open-close / 2-Ltg, IP 66 | 4104 3210 | C | 228,- |
| KM 10KE/230-2X | damper actuator, 120/230 V AC, open-close / 2-Ltg, IP 66 | 4104 3220 | C | 238,- |
| KM 10KE/24-3X | damper actuator, 24V AC/DC, open-close / 3 Ltg, IP 66 | 4104 3230 | C | 233,- |
| KM 10KE/230-3X | damper actuator, 230V AC, open-close / 3 Ltg, IP 66 | 4104 3240 | C | 243,- |
| KM 10KE/24X | damper actuator, 24V AC/DC, 3 pnt, IP 66 | 4104 3250 | C | 241,- |
| KM 10KE/230X | damper actuator, 230V AC, 3 pnt, IP 66 | 4104 3260 | C | 251,- |
| KM 10KE/24SX | damper actuator, 24V AC/DC, 0/2..10V, IP 66 | 4104 3270 | C | 290,- |
| KM 10KE/230SX | damper actuator, 230V AC, 0/2..10V, IP 66 | 4104 3280 | C | 313,- |

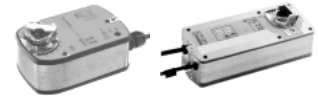
4.1.3.3.2 Damper actuators for dampers up to 3 m², 15 Nm, with electronic return

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|--|-----------|----|-----------|
| KM15KE/24-2 | damper actuator, 24V AC/DC, open-close / 2-Ltg, IP 55 | 4104 3310 | C | 245,- |
| KM15KE/230-2 | damper actuator, 120/230 V AC, open-close / 2-Ltg, IP 55 | 4104 3320 | C | 255,- |
| KM15KE/24-3 | damper actuator, 24V AC/DC, open-close / 3 Ltg, IP 55 | 4104 3330 | C | 250,- |
| KM15KE/230-3 | damper actuator, 230V AC, open-close / 3 Ltg, IP 55 | 4104 3340 | C | 260,- |
| KM15KE/24 | damper actuator, 24V AC/DC, 3 pnt, IP 55 | 4104 3350 | C | 259,- |
| KM15KE/230 | damper actuator, 230V AC, 3 pnt, IP 55 | 4104 3360 | C | 269,- |
| KM15KE/24S | damper actuator, 24V AC/DC, 0/2..10V, IP 55 | 4104 3370 | C | 307,- |
| KM15KE/230S | damper actuator, 230V AC, 0/2..10V, IP 55 | 4104 3380 | C | 331,- |
| KM15KE/24-2X | damper actuator, 24V AC/DC, open-close / 2-Ltg, IP 66 | 4104 3410 | C | 257,- |
| KM15KE/230-2X | damper actuator, 120/230 V AC, open-close / 2-Ltg, IP 66 | 4104 3420 | C | 267,- |
| KM15KE/24-3X | damper actuator, 24V AC/DC, open-close / 3 Ltg, IP 66 | 4104 3430 | C | 267,- |
| KM15KE/230-3X | damper actuator, 230V AC, open-close / 3 Ltg, IP 66 | 4104 3440 | C | 272,- |
| KM15KE/24X | damper actuator, 24V AC/DC, 3 pnt, IP 66 | 4104 3430 | C | 271,- |
| KM15KE/230X | damper actuator, 230V AC, 3 pnt, IP 66 | 4104 3440 | C | 281,- |
| KM15KE/24SX | damper actuator, 24V AC/DC, 0/2..10V, IP 66 | 4104 3470 | C | 319,- |
| KM15KE/230SX | damper actuator, 230V AC, 0/2..10V, IP 66 | 4104 3480 | C | 343,- |

4

4.1.3.4

Damper actuators m. spring return function for dampers up to 0,8m² bzw. 3,0 m², max. torque 4 Nm or 15 Nm



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| LF 230 | damper actuator 230V AC, 4Nm, up to 0,8m ² , contr. signal: open-close | 4103 3110 | C | 172,- |
| LF 230-S | damper actuator 230V AC, 4Nm, up to 0,8m ² , with integrated switch, control signal: open-dose | 4103 3120 | C | 196,- |
| LF 24 | damper actuator 24V AC/DC, 4Nm, up to 0,8m ² , control signal: open-close | 4103 3210 | C | 160,- |
| LF 24-S | damper actuator 24V AC/DC, 4Nm, up to 0,8m ² , with integrated switch, control signal: open-dose | 4103 3220 | C | 184,- |
| LF 24 SR | damper actuator 24V AC/DC, 4Nm, up to 0,8m ² , control signal: 0(2) .. 10V | 4103 3240 | C | 234,- |
| AF 230 | damper actuator 230V AC, 15Nm, up to 3m ² , contr. signal: open-close | 4103 3100 | C | 260,- |
| AF 24 | damper actuator 24V AC/DC, 15Nm, up to 3m ² , control signal: open-close | 4103 3200 | C | 226,- |
| AF 24 SR | damper actuator 24V AC, 15Nm, up to 3m ² , control signal 0(2) .. 10V, control signal: 0(2) ...10V | 4103 3300 | C | 294,- |
| AF 230-S | damper actuator 230V AC, 15Nm, up to 3m ² , with integrated switch | 4103 3500 | C | 284,- |
| AF 24-S | damper actuator 24V AC / DC, 15Nm, up to 3m ² , with integrated switch | 4103 3600 | C | 251,- |

4.1.3.5

Damper actuators for dampers up to 6 m², 30 Nm



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| GM 230A | damper actuator 230V AC, 30Nm, up to 6 m ² control signal open-close | 4103 4100 | C | 228,- |
| GM 24A | damper actuator 24V AC/DC, 30Nm, up to 6 m ² control signal open-close | 4103 4200 | C | 225,- |
| GM 24ASR | damper actuator 24V AC, 30 Nm, up to 6 m ² , control signal: 0(2) .. 10V | 4103 4300 | C | 286,- |

4.1.3.6

Supplementary Accessories for damper actuators

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|---|-----------|----|-----------|
| S1A | 1 additional switch for all damper actuators LM..A., NM..A., SM..A. and GM..A. | 4103 5500 | C | 36,- |
| S2A | 2 additional switches for all damper actuators LM..A., NM..A., SM..A. and GM..A. | 4103 5510 | C | 49,- |
| P140A | return potentiometer for all damper actuators LM..A., NM..A., SM..A. and GM..A., 140 Ohm | 4103 5520 | C | 56,- |
| P500A | return potentiometer for all damper actuators LM..A., NM..A., SM..A. and GM..A., 500 Ohm | 4103 5530 | C | 56,- |
| P1000A | return potentiometer for all damper actuators LM..A., NM..A., SM..A. and GM..A., 1000 Ohm | 4103 5540 | C | 56,- |
| P2800A | return potentiometer for all damper actuators LM..A., NM..A., SM..A. and GM..A., 2800 Ohm | 4103 5550 | C | 56,- |
| P5000A | return potentiometer for all damper actuators LM..A., NM..A., SM..A. and GM..A., 5000 Ohm | 4103 5560 | C | 56,- |
| SGA 24 | positioning indicator | 4103 5570 | C | 75,- |
| ZAD 24 | digital positioning indicator (with display) | 4103 5580 | C | 312,- |

Further Accessories are available on request.

4.1.3.7

Mounting Accessories for damper actuators

Further Accessories like terminal blocks, limiter or universal shaft extensions... on request

4.1.3.9 Options for damper actuators KM5., KM10., KM15., KM20. and KM4F..

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------|--|-----------|----|-----------|
| ----- | all Actuators are delivered with self centering mounting clamp, anti rotation strap, (Model with 15Nm without end positioning device), Installation and operating manual | | | |
| /-Z | Without Accessories; you will get no self centering mounting clamp and no anti rotation strap. | 4103 9110 | C | -10,- |
| /T | Version for animal stable or pen. Like standard version but self centering mounting clamp and anti rotation strap with anti corrosion coating | 4103 9120 | C | 10,- |
| /5 | Cable length 5m | 4103 9130 | C | 20,- |
| /I20 | Set point input 0/4..20mA output for current position 0/2..10V | 4103 9140 | C | 10,- |
| /U50 | Set point input 0/1..5V output for current position 0/1..5V | 4103 9150 | C | 10,- |

4.1.3.10 Accessories for damper actuators KM5., KM10., KM15., KM20. and KM4F..

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|--|-----------|----|------------|
| KM SAB | Standard Accessories (normally included with actuator) | 4103 0110 | C | 4,- |
| KM SAB15 | Standard Accessories(normally included with Actuator with 15NM) | 4103 0120 | C | 3,- |
| KM SCA | Self centering mounting clamp | 4103 0130 | C | 10,- |
| KM SCA2 | Self centering mounting clamp (protected with anti corrosion coating) | 4103 0140 | C | 17,- |
| KM ABJ | Ball joint | 4103 0150 | C | 10,- |
| KM ACR | Crank arm, stainless steel (bent) | 4103 0160 | C | 17,- |
| KM ACR2 | Crank arm, stainless steel (flat) | 4103 0170 | C | 15,- |
| KM ACRL | Crank arm, stainless steel 200mm (bent) | 4103 0180 | C | 19,- |
| KM ACRS | Crank arm set (stainless steel): 1xACR, 1xAMB, 4 M3 screws, 2xABJ | 4103 0190 | C | 66,- |
| KM ACRS2 | Crank arm set (stainless steel), flat: 1xACR2, 1xAMB2, 4 M3 screws, 2xABJ | 4103 0200 | C | 66,- |
| KM AF08 | Form fit adapter 8mm | 4103 0210 | C | 3,- |
| KM AF10 | Form fit adapter 10mm | 4103 0220 | C | 3,- |
| KM AF12 | Form fit adapter 12mm | 4103 0230 | C | 3,- |
| KM AF14 | Form fit adapter 14mm | 4103 0240 | C | 3,- |
| KM AFL | Form fit adapter half round | 4103 0250 | C | 3,- |
| KM AF08F | Form fit adapter 8mm, lockable | 4103 0260 | C | 6,- |
| KM AF10F | Form fit adapter 10mm, lockable | 4103 0270 | C | 6,- |
| KM AF12F | Form fit adapter 12mm, lockable | 4103 0280 | C | 6,- |
| KM AF14F | Form fit adapter 14mm, lockable | 4103 0290 | C | 6,- |
| KM AFLF | Form fit adapter half round, lockable | 4103 0300 | C | 6,- |
| KM AHW25 | 2,5mm Imbus wrench for manual adjustment | 4103 0310 | C | 7,- |
| KM AHW30 | 3mm Imbus wrench for manual adjustment | 4103 0320 | C | 7,- |
| KM ALS | mech. way limitation (ring, 2 screws, 2 nuts) | 4103 0330 | C | 3,- |
| KM AMB | Mounting bracket stainless steel (L-form) | 4103 0340 | C | 28,- |
| KM AMB2 | Mounting bracket stainless steel (flat) | 4103 0350 | C | 23,- |
| KM AMFB | Foot mounting bracket (bracket, 4 screws 8") | 4103 0360 | C | 25,- |
| KM AMR | Mounting ring | 4103 0370 | C | 2,- |
| KM AMV1 | Valve bracket (Standard DIN5211 – Valve) | 4103 0380 | C | on request |
| KM AMV2 | Valve bracket (Mixing valve f.i. Danfoss / ESBE) | 4103 0390 | C | on request |
| KM AP10000 | Potentiometer 10kOhm | 4103 0400 | C | 56,- |
| KM AP1000 | Potentiometer 1kOhm | 4103 0410 | C | 56,- |
| KM ARS | Standard anti rotation strap | 4103 0420 | C | 2,- |
| KM ARS2 | Standard anti rotation strap (protected with anti corrosion coating) | 4103 0430 | C | 5,- |
| KM ARSL | Large anti rotation strap, stainless steel | 4103 0440 | C | 16,- |
| KM AS1 | 1 external switch | 4103 0450 | C | 40,- |
| KM AS2 | 2 external switches | 4103 0460 | C | 50,- |
| KM AVC12 | Voltage converter 12V (for connection to SM-technology) | 4103 0470 | C | 15,- |
| KM AZ | Red positioning indicator | 4103 0480 | C | 2,- |

4.1.5 actuators with safety function

4.1.5.1 actuators for RG... Valves TÜV 500N



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| MFR 50-7,5 | Lifting actuator with safety fund. for RG... Valves, DN 15 – 25, 500N | 4501 4000 | C | 295,- |
| MFR 50-12 | Lifting actuator with safety fund. for RG... Valves, DN 32 – 50, 500N | 4501 4100 | C | 335,- |
| MFR 50-7,5 SR24 | Lifting actuator with safety fund. for RG... Valves, DN 15 – 25, 500N, positioning controller, 0.10V | 4501 4010 | C | 457,- |
| MFR 50-12 SR24 | Lifting actuator with safety fund. for RG... Valves, DN 32 – 50, 500N, positioning controller, 0.10V | 4501 4110 | C | 497,- |

More actuators available on request

4.1.6 Actuators for Zone Valves

The actuators **ZHM/24** and **ZHM SR/24** are used for 2-way- or 3-way zone valves.

They operate with corresponding controllers in heating-, ventilation- and air-condition plants. Due to their low power consumption the actuators operate on widely branched nets with cables with small cross-sections. The actuator-valve combination are suitable for radiators, convectors, heat-circuit distribution, floor-heating, ceiling cooling systems and ceiling radiator heating as well as fan convectors and induction units in 2- and 4-line systems.



The thermal actuators **ZHMTU** and **ZHMTU/24** are used in combination with R+S zone-valves ZV 2... and ZV 3. for 2-point control in heating, ventilation and air-condition plants, especially when high differential pressures prevail.



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|-----------|----|-----------|
| ZHM/24 | Actuator for zone valve 24 V / 50Hz, | 4106 1030 | C | 122,- |
| ZHM SR/24 | Actuator for zone valve 24 V / 50 Hz, actuator signal 0 .. 10, | 4106 1060 | C | 159,- |
| ZHMTU | Actuator for zone valve 230 V / 50 Hz, electro-thermal actuator, powerless in closed position / in open position adjustable, | 4106 2010 | C | 26,- |
| ZHMTU/24 | Actuator for zone valve 24 V / 50 Hz, electro-thermal actuator, powerless in closed position / in open position adjustable, | 4106 2040 | C | 26,- |
| KZHMTU | Protective cover for electro-thermal actuators for Type ZHMTU(/24), (Especially for buildings for local authorities) | 4106 2210 | C | 26,- |

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4.1.6.3 zoneVALVE Actuator for the control system room UNIT



| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|---|-----------|----|-----------|
| zoneVALVE NC.24 | Thermoelectric actuator – powerless in closed position, 24V | 4106 3000 | C | 26,- |
| zoneVALVE NO.24 | Thermoelectric actuator – powerless in open position, 24V | 4106 3010 | C | 26,- |
| zoneVALVE NC.230 | Thermoelectric actuator – powerless in closed position, 24V | 4106 3100 | C | 26,- |
| zoneVALVE NO.230 | Thermoelectric actuator – powerless in open position, 24V | 4106 3110 | C | 26,- |



| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|--|-----------|----|-----------|
| zoneVALVE NCSR | Proportional thermoelectric actuator, control signal via 0.10V, powerless in closed position | 4106 3200 | C | 59,- |
| zoneVALVE NCSR.P | Pulse-proportional thermoelectric actuator, control signal via 0.10V, powerless in closed position, parallel operation with other actuators is possible. | 4106 3300 | C | 56,- |



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|-----------|
| zoneADAP xx | Valve-adapter for all possible valves on request | 4106 9xxx | C | on req. |

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4.2.1 Cast Iron

4.2.1.1 2-way valves

4.2.1.1.1 2-way valves, GG, PN 16, Spindelabd. PTFE-PTFE-Gasket up to 200°C

The 2-way valves operate as control- or throttle-valves for all heating and air-condition plants up to PN 16 with a continuous temperature control. They are suitable for hot water- or steam-operation.

Features: Standard- and reduced flow for all kinds of Kvs-values, special valves -40 C up to 300 C, from size DN 125 to DN 150, gasket and control plug made of corrosion-resistant material, characteristic curve constant in percent or in percent modified, on request linear, optimized coupling of R+S lifting actuator between valve and actuator.



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|--|-----------|----|-----------|
| MVF 2125/250 | 2-way valve, flange, DN 125, Kvs 250 | 4211 4900 | C | 2.513,- |
| MVF 2150/400 | 2-way valve, flange, DN 150, Kvs 400 | 4211 5000 | C | 3.407,- |
| MVF 2125NR 125 | 2-way valve, reduced flow, flange, DN 125, Kvs 125 | 4211 4910 | C | 2.686,- |
| MVF 2125NR 160 | 2-way valve, reduced flow, flange, DN 125, Kvs 160 | 4211 4920 | C | 2.513,- |
| MVF 2125NR 200 | 2-way valve, reduced flow, flange, DN 125, Kvs 200 | 4211 4930 | C | 2.686,- |
| MVF 2150NR 200 | 2-way valve, reduced flow, flange, DN 150, Kvs 200 | 4211 5010 | C | 3.580,- |
| MVF 2150NR 250 | 2-way valve, reduced flow, flange, DN 150, Kvs 250 | 4211 5020 | C | 3.407,- |
| MVF 2150NR 315 | 2-way valve, reduced flow, flange, DN 150, Kvs 315 | 4211 5030 | C | 3.580,- |

nominal sizes DN 200/250/300 auf Anfrage

Closing Pressure

| Size / Kvs-value | | | | actuator - max. closing pressure | | | | |
|---------------------------------|------|----------|--------------|----------------------------------|--|--|----------|----------|
| DN | Lift | Standard | Reduced flow | | | | HM 2500 | HM 2100 |
| [mm] | [mm] | [m³/h] | [m³/h] | | | | Δp [bar] | Δp [bar] |
| 125 | 60 | 250 | 125-200 | | | | 2,5 | 4,5 |
| 150 | 60 | 400 | 200-315 | | | | 1,5 | 3 |
| running time for 10 mm Lift [s] | | | | | | | 25 | 10 |
| maximal lift [mm] | | | | | | | 60 | 80 |
| max lift [N] | | | | | | | 5000 | 10000 |
| Consumption [VA] | | | | | | | 47 | 70 |
| Protection level | | | | | | | IP 54 | IP 54 |

4.2.1.1.2 2-way valves, GG, PN 6, 130°C, watertight closure

The 2-way valves are used in heating-, ventilation- and air conditioning- plants with temperature control.

Features: Cast-iron casing with flanges, gasket, with double-O-ring, Additional O-ring gasket allows the exchange of the bushing without emptying of the plant. Characteristic curve between ways A → to AB constant in percent, all kinds of Kvs values. Optimized coupling of R+S lift actuator between valve and actuator.



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|--|-----------|----|-----------|
| HMVF 215/4-6 | 2-way valve, flange, DN 15, Kvs 4 | 4211 0000 | C | 185,- |
| HMVF 220/6,3-6 | 2-way valve, flange, DN 20, Kvs 6,3 | 4211 0100 | C | 198,- |
| HMVF 225/10-6 | 2-way valve, flange, DN 25, Kvs 10 | 4211 0200 | C | 208,- |
| HMVF 232/16-6 | 2-way valve, flange, DN 32, Kvs 16 | 4211 0300 | C | 253,- |
| HMVF 240/25-6 | 2-way valve, flange, DN 40, Kvs 25 | 4211 0400 | C | 270,- |
| HMVF 250/40-6 | 2-way valve, flange, DN 50, Kvs 40 | 4211 0500 | C | 288,- |
| HMVF 265/63-6 | 2-way valve, flange, DN 65, Kvs 63 | 4211 0600 | C | 505,- |
| HMVF 280/100-6 | 2-way valve, flange, DN 80, Kvs 100 | 4211 0700 | C | 668,- |
| HMVF 2100/160-6 | 2-way valve, flange, DN 100, Kvs 160 | 4211 0800 | C | 855,- |
| HMVF 215NR 0,63-6 | 2-way valve, reduced flow, flange, DN 15, Kvs 0,63 | 4211 0040 | C | 185,- |
| HMVF 215NR 1,25-6 | 2-way valve, reduced flow, flange, DN 15, Kvs 1,25 | 4211 0060 | C | 185,- |
| HMVF 215NR 1,6-6 | 2-way valve, reduced flow, flange, DN 15, Kvs 1,6 | 4211 0070 | C | 185,- |
| HMVF 215NR 2,5-6 | 2-way valve, reduced flow, flange, DN 15, Kvs 2,5 | 4211 0090 | C | 185,- |
| HMVF 220NR 5-6 | 2-way valve, reduced flow, flange, DN 20, Kvs 5 | 4211 0110 | C | 198,- |
| HMVF 225NR 8-6 | 2-way valve, reduced flow, flange, DN 25, Kvs 8 | 4211 0210 | C | 208,- |
| HMVF 232NR 12,5-6 | 2-way valve, reduced flow, flange, DN 32, Kvs 12,5 | 4211 0310 | C | 253,- |
| HMVF 240NR 20-6 | 2-way valve, reduced flow, flange, DN 40, Kvs 20 | 4211 0410 | C | 270,- |
| HMVF 250NR 31,5-6 | 2-way valve, reduced flow, flange, DN 50, Kvs 31,5 | 4211 0510 | C | 288,- |
| HMVF 265NR 50-6 | 2-way valve, reduced flow, flange, DN 65, Kvs 50 | 4211 0610 | C | 505,- |
| HMVF 280NR 80-6 | 2-way valve, reduced flow, flange, DN 80, Kvs 80 | 4211 0710 | C | 668,- |
| HMVF 2100NR125-6 | 2-way valve, reduced flow, flange, DN 100, Kvs 125 | 4211 0810 | C | 855,- |

4

Closing Pressure

| nominal size, Kvs-Value | | | | actuator - max. closing pressure | | | | | |
|---------------------------------|------|----------|--------------|----------------------------------|---------|----------|----------------------|----------|----------|
| DN | Lift | standard | reduced flow | HM 2025 | HM 2040 | HM 2060X | HM 1090X HM 2090X | HM 1150X | HM 2250X |
| [mm] | [mm] | [m³/h] | [m³/h] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] |
| 15 | 14 | 4 | 0,63 | 3,8 | 6 | 6 | 6 | - | - |
| 15 | 14 | - | 1,25 | 3,8 | 6 | 6 | 6 | - | - |
| 15 | 14 | - | 1,6 | 3,8 | 6 | 6 | 6 | - | - |
| 15 | 14 | - | 2,5 | 3,8 | 6 | 6 | 6 | - | - |
| 20 | 14 | 6,3 | 5 | 2,9 | 6 | 6 | 6 | - | - |
| 25 | 14 | 10 | 8 | 1,4 | 3,5 | 6 | 6 | - | - |
| 32 | 14 | 16 | 12,5 | 0,5 | 1,9 | 4,2 | 6 | - | - |
| 40 | 14 | 25 | 20 | - | 0,9 | 2,5 | 4,6 | 8,5 | - |
| 50 | 14 | 40 | 31,5 | - | 0,4 | 1,4 | 2,7 | 5,5 | - |
| 65 | 30 | 63 | 50 | - | - | - | 1,4 | 3,0 | 5,8 |
| 80 | 30 | 100 | 80 | - | - | - | - | 1,9 | 3,6 |
| 100 | 30 | 160 | 125 | - | - | - | - | 1,1 | 2,3 |
| running time for 10 mm Lift [s] | | | | 80 | 80 | 80 | 40; 80 | 40 | 80 |
| max Lift [mm] | | | | 21 | 21 | 21 | 30* | 30* | 30* |
| max lift [N] | | | | 250 | 400 | 600 | 900 | 1500 | 2500 |
| Consumption [VA] | | | | 5,5 | 5,5 | 5,5 | 10,4; 4,8 | 10,4 | 10,4 |
| Protection level | | | | IP54 | IP54 | IP54 | IP54 | IP54 | IP54 |

*On this Type with feed-back potentiometer or continuous setting signal, the lift can be limited to 15 ± 1 mm or 20 ± 1 mm.

4.2.1.1.3 2-way valves, GG, PN 16, 130°C, watertight closure

The 2-way valves are used in heating-, ventilation- and air conditioning- plants with temperature control. Features: Cast-iron casing with flanges, gasket, with double-O-ring. Additional O-ring gasket allows the exchange of the bushing without emptying of the plant. Characteristic curve between ways A → to AB constant in percent, all kinds of Kvs values. Optimized coupling of R+S lift actuator between valve and actuator.



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| HMVF 215/4 | 2-way valve, flange, DN 15, Kvs 4 | 4211 2000 | C | 213,- |
| HMVF 220/6,3 | 2-way valve, flange, DN 20, Kvs 6,3 | 4211 2100 | C | 220,- |
| HMVF 225/10 | 2-way valve, flange, DN 25, Kvs 10 | 4211 2200 | C | 233,- |
| HMVF 232/16 | 2-way valve, flange, DN 32, Kvs 16 | 4211 2300 | C | 273,- |
| HMVF 240/25 | 2-way valve, flange, DN 40, Kvs 25 | 4211 2400 | C | 295,- |
| HMVF 250/40 | 2-way valve, flange, DN 50, Kvs 40 | 4211 2500 | C | 335,- |
| HMVF 265/63 | 2-way valve, flange, DN 65, Kvs 63 | 4211 2600 | C | 553,- |
| HMVF 280/100 | 2-way valve, flange, DN 80, Kvs 100 | 4211 2700 | C | 775,- |
| HMVF 2100/160 | 2-way valve, flange, DN 100, Kvs 160 | 4211 2800 | C | 960,- |
| HMVF 215NR 0,63 | 2-way valve, reduced flow, flange, DN 15, Kvs 0,63 | 4211 2040 | C | 213,- |
| HMVF 215NR 1,25 | 2-way valve, reduced flow, flange, DN 15, Kvs 1,25 | 4211 2060 | C | 213,- |
| HMVF 215NR 1,6 | 2-way valve, reduced flow, flange, DN 15, Kvs 1,6 | 4211 2070 | C | 213,- |
| HMVF 215NR 2,5 | 2-way valve, reduced flow, flange, DN 15, Kvs 2,5 | 4211 2090 | C | 213,- |
| HMVF 220NR 5 | 2-way valve, reduced flow, flange, DN 20, Kvs 5 | 4211 2110 | C | 220,- |
| HMVF 225NR 8 | 2-way valve, reduced flow, flange, DN 25, Kvs 8 | 4211 2210 | C | 233,- |
| HMVF 232NR 12,5 | 2-way valve, reduced flow, flange, DN 32, Kvs 12,5 | 4211 2310 | C | 273,- |
| HMVF 240NR 20 | 2-way valve, reduced flow, flange, DN 40, Kvs 20 | 4211 2410 | C | 295,- |
| HMVF 250NR 31,5 | 2-way valve, reduced flow, flange, DN 50, Kvs 31,5 | 4211 2510 | C | 335,- |
| HMVF 265NR 50 | 2-way valve, reduced flow, flange, DN 65, Kvs 50 | 4211 2610 | C | 553,- |
| HMVF 280NR 80 | 2-way valve, reduced flow, flange, DN 80, Kvs 80 | 4211 2710 | C | 775,- |
| HMVF 2100NR 125 | 2-way valve, reduced flow, flange, DN 100, Kvs 125 | 4211 2810 | C | 960,- |
| HMVF 2125/125 | 2-way valve, reduced flow, flange, DN 125, Kvs 125 | 4211 2910 | C | 2.323,- |
| HMVF 2150/315 | 2-way valve, reduced flow, flange, DN 150, Kvs 315 | 4211 3010 | C | 2.775,- |

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Closing Pressure

| nominal size / Kvs-Value | | | | actuator - max. closing pressure | | | | | |
|---------------------------------|------|----------|--------------|----------------------------------|---------|----------|----------------------|----------|----------|
| DN | Lift | standard | reduced flow | HM 2025 | HM 2040 | HM 2060X | HM 1090X HM 2090X | HM 1150X | HM 2250X |
| [mm] | [mm] | [m³/h] | [m³/h] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] |
| 15 | 14 | 4 | 0,63 | 3,8 | 7,9 | 15 | 16 | - | - |
| 15 | 14 | - | 1,25 | 3,8 | 7,9 | 15 | 16 | - | - |
| 15 | 14 | - | 1,6 | 3,8 | 7,9 | 15 | 16 | - | - |
| 15 | 14 | - | 2,5 | 3,8 | 7,9 | 15 | 16 | - | - |
| 20 | 14 | 6,3 | 5 | 2,9 | 6,3 | 12 | 16 | - | - |
| 25 | 14 | 10 | 8 | 1,4 | 3,5 | 7,3 | 12,3 | 16 | - |
| 32 | 14 | 16 | 12,5 | 0,5 | 1,9 | 4,2 | 7,4 | 13,5 | - |
| 40 | 14 | 25 | 20 | - | 0,9 | 2,5 | 4,6 | 8,5 | - |
| 50 | 14 | 40 | 31,5 | - | 0,4 | 1,4 | 2,7 | 5,5 | - |
| 65 | 30 | 63 | 50 | - | - | - | 1,4 | 2,5 | 5,0 |
| 80 | 30 | 100 | 80 | - | - | - | - | 1,5 | 3,5 |
| 100 | 30 | 160 | 125 | - | - | - | - | 1,0 | 2,0 |
| running time for 10 mm Lift [s] | | | | 80 | 80 | 80 | 40; 80 | 40 | 80 |
| max Lift [mm] | | | | 21 | 21 | 21 | 30* | 30* | 30* |
| max lift [N] | | | | 250 | 400 | 600 | 900 | 1500 | 2500 |
| Consumption [VA] | | | | 5,5 | 5,5 | 5,5 | 10,4; 4,8 | 10,4 | 10,4 |
| Protection level | | | | IP54 | IP54 | IP54 | IP54 | IP54 | IP54 |

*On this Type with feed-back potentiometer or continuous setting signal the lift can be limited to 15 • 1 mm or 20 • 1 mm.

4.2.1.1.6 2-way valves, GG PN 16, 150°C, MVFL compact

The valve series **MVFL compact**... are control valves of a compact construction with external threaded coupling connection. The valves excel with minimum dimensions and weight, quality control function and a high tightness in closed position. Thanks to an unique flow characteristic which has been optimized for thermodynamic processes control, the valves are ideal for applications in heating and airconditioning. In regard of a sophisticated design of internal parts and long service life of packing, the valves fulfill every demand for a long-time service without necessary maintenance. The valves are optionally manufactured either two-way or three-way. The part of the delivery is a screw joint enabling a quick and easy installation to an appliance. Assembled with electromechanic actuators, the valve can be controlled with 3-point or continuous signal. The part of the delivery is also a hand wheel which can be used for the valve control until assembling with an actuator. Used materials for throttling trim which consist of plug made of high-quality stainless steel and soft sealing elements, ensure a hermetic tightness in both ports and enable the valves to be used not only in common warm-water and hot-water regulation circuits in heating but also in applications with special characteristic features of process medium such as in refrigerating industry and air-conditioning. The valves series RV 111 are suitable for applications where process medium is water or air. Further they can be used for refrigerating media and other non-aggressive liquids or gases with temperature ranging from +2 C to +150 C. The valves are not applicable to conditions with cavitation. Sealing surfaces of control trim are resistant to common sludge or water impurities. Yet it is recommended to pipe a strainer in front of valve to ensure a reliable function and tightness in case there are abrasive particles present.



You can find the suitable actuator HM 2030 in chapter 4.1.1.1

4.2.1.1.6.1 2-way valves, GG PN 16, 150°C, MVFL compact, with thread

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------------|--|-----------|----|-----------|
| MVFL compact 215/8T | 2-way valve, compact design, thread, DN 15, KVs 0,16 | 4211 6100 | C | 67,- |
| MVFL compact 215/7T | 2-way valve, compact design, thread, DN 15, KVs 0,25 | 4211 6110 | C | 67,- |
| MVFL compact 215/6T | 2-way valve, compact design, thread, DN 15, KVs 0,4 | 4211 6120 | C | 67,- |
| MVFL compact 215/5T | 2-way valve, compact design, thread, DN 15, KVs 0,63 | 4211 6130 | C | 67,- |
| MVFL compact 215/4T | 2-way valve, compact design, thread, DN 15, KVs 1,0 | 4211 6140 | C | 67,- |
| MVFL compact 215/3T | 2-way valve, compact design, thread, DN 15, KVs 1,6 | 4211 6150 | C | 67,- |
| MVFL compact 215/2T | 2-way valve, compact design, thread, DN 15, KVs 2,5 | 4211 6160 | C | 67,- |
| MVFL compact 215/1T | 2-way valve, compact design, thread, DN 15, KVs 4,0 | 4211 6170 | C | 67,- |
| MVFL compact 220/T | 2-way valve, compact design, thread, DN 20, KVs 6,3 | 4211 6180 | C | 73,- |
| MVFL compact 225/T | 2-way valve, compact design, thread, DN 25, KVs 10,0 | 4211 6190 | C | 81,- |
| MVFL compact 232/T | 2-way valve, compact design, thread, DN 32, KVs 16,0 | 4211 6200 | C | 101,- |
| MVFL compact 240/T | 2-way valve, compact design, thread, DN 40, KVs 25,0 | 4211 6210 | C | 112,- |



4.2.1.1.6.2 2-way valves, GG PN 16, 150°C, MVFL compact, with Schwhiteenden

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------------|---|-----------|----|-----------|
| MVFL compact 215/8W | 2-way valve, compact design, welded unions, DN 15, KVs 0,16 | 4211 6300 | C | 70,- |
| MVFL compact 215/7W | 2-way valve, compact design, welded unions, DN 15, KVs 0,25 | 4211 6310 | C | 70,- |
| MVFL compact 215/6W | 2-way valve, compact design, welded unions, DN 15, KVs 0,4 | 4211 6320 | C | 70,- |
| MVFL compact 215/5W | 2-way valve, compact design, welded unions, DN 15, KVs 0,63 | 4211 6330 | C | 70,- |
| MVFL compact 215/4W | 2-way valve, compact design, welded unions, DN 15, KVs 1,0 | 4211 6340 | C | 70,- |
| MVFL compact 215/3W | 2-way valve, compact design, welded unions, DN 15, KVs 1,6 | 4211 6350 | C | 70,- |
| MVFL compact 215/2W | 2-way valve, compact design, welded unions, DN 15, KVs 2,5 | 4211 6360 | C | 70,- |
| MVFL compact 215/1W | 2-way valve, compact design, welded unions, DN 15, KVs 4,0 | 4211 6370 | C | 70,- |
| MVFL compact 220/W | 2-way valve, compact design, welded unions, DN 20, KVs 6,3 | 4211 6380 | C | 76,- |
| MVFL compact 225/W | 2-way valve, compact design, welded unions, DN 25, KVs 10,0 | 4211 6390 | C | 85,- |
| MVFL compact 232/W | 2-way valve, compact design, welded unions, DN 32, KVs 16,0 | 4211 6400 | C | 107,- |
| MVFL compact 240/W | 2-way valve, compact design, welded unions, DN 40, KVs 25,0 | 4211 6410 | C | 118,- |

4.2.1.1.6.3 2-way valves, GG PN 16, 150°C, MVFL compact, with flange

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------------|--|-----------|----|-----------|
| MVFL compact 215/8F | 2-way valve, compact design, flange, DN 15, KVs 0,16 | 4211 6500 | C | 87,- |
| MVFL compact 215/7F | 2-way valve, compact design, flange, DN 15, KVs 0,25 | 4211 6510 | C | 87,- |
| MVFL compact 215/6F | 2-way valve, compact design, flange, DN 15, KVs 0,4 | 4211 6520 | C | 87,- |
| MVFL compact 215/5F | 2-way valve, compact design, flange, DN 15, KVs 0,63 | 4211 6530 | C | 87,- |
| MVFL compact 215/4F | 2-way valve, compact design, flange, DN 15, KVs 1,0 | 4211 6540 | C | 87,- |
| MVFL compact 215/3F | 2-way valve, compact design, flange, DN 15, KVs 1,6 | 4211 6550 | C | 87,- |
| MVFL compact 215/2F | 2-way valve, compact design, flange, DN 15, KVs 2,5 | 4211 6560 | C | 87,- |
| MVFL compact 215/1F | 2-way valve, compact design, flange, DN 15, KVs 4,0 | 4211 6570 | C | 87,- |
| MVFL compact 220/F | 2-way valve, compact design, flange, DN 20, KVs 6,3 | 4211 6580 | C | 101,- |
| MVFL compact 225/F | 2-way valve, compact design, flange, DN 25, KVs 10,0 | 4211 6590 | C | 117,- |
| MVFL compact 232/F | 2-way valve, compact design, flange, DN 32, KVs 16,0 | 4211 6600 | C | 158,- |
| MVFL compact 240/F | 2-way valve, compact design, flange, DN 40, KVs 25,0 | 4211 6610 | C | 175,- |

4.2.12 3-way valves

4.2.12.1 3-way valves, GG, PN 6, 130°C, watertight closure

The 3-way valves are used as mixing valves in water operated heating-, ventilation- and air conditioning- plants with temperature control. Features: Cast-iron casing with flanges, gasket, with double-O-ring. Additional O-ring gasket allows exchange of the bushing without emptying of the plant. Characteristic curve between ways A → AB constant in percent, B → AB linear. All kinds of Kvs values of standard flow and reduced flow. Optimized coupling of R+S lift actuator between valve and actuator.



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|--|-----------|----|-----------|
| HMVF 315/4-6 | 3-way valve, flange, DN 15, Kvs 4 | 4212 0000 | C | 155,- |
| HMVF 320/6,3-6 | 3-way valve, flange, DN 20, Kvs 6,3 | 4212 0100 | C | 165,- |
| HMVF 325/10-6 | 3-way valve, flange, DN 25, Kvs 10 | 4212 0200 | C | 175,- |
| HMVF 332/16-6 | 3-way valve, flange, DN 32, Kvs 16 | 4212 0300 | C | 205,- |
| HMVF 340/25-6 | 3-way valve, flange, DN 40, Kvs 25 | 4212 0400 | C | 220,- |
| HMVF 350/40-6 | 3-way valve, flange, DN 50, Kvs 40 | 4212 0500 | C | 240,- |
| HMVF 365/63-6 | 3-way valve, flange, DN 65, Kvs 63 | 4212 0600 | C | 450,- |
| HMVF 380/100-6 | 3-way valve, flange, DN 80, Kvs 100 | 4212 0700 | C | 588,- |
| HMVF 3100/160-6 | 3-way valve, flange, DN 100, Kvs 160 | 4212 0800 | C | 763,- |
| HMVF 315NR 0,63-6 | 3-way valve, reduced flow, flange, DN 15, Kvs 0,63 | 4212 0040 | C | 155,- |
| HMVF 315NR 1,25-6 | 3-way valve, reduced flow, flange, DN 15, Kvs 1,25 | 4212 0060 | C | 155,- |
| HMVF 315NR 1,6-6 | 3-way valve, reduced flow, flange, DN 15, Kvs 1,6 | 4212 0070 | C | 155,- |
| HMVF 315NR 2,5-6 | 3-way valve, reduced flow, flange, DN 15, Kvs 2,5 | 4212 0090 | C | 155,- |
| HMVF 320NR 5-6 | 3-way valve, reduced flow, flange, DN 20, Kvs 5 | 4212 0110 | C | 165,- |
| HMVF 325NR 8-6 | 3-way valve, reduced flow, flange, DN 25, Kvs 8 | 4212 0210 | C | 175,- |
| HMVF 332NR 12,5-6 | 3-way valve, reduced flow, flange, DN 32, Kvs 12,5 | 4212 0310 | C | 205,- |
| HMVF 340NR 20-6 | 3-way valve, reduced flow, flange, DN 40, Kvs 20 | 4212 0410 | C | 220,- |
| HMVF 350NR 31,5-6 | 3-way valve, reduced flow, flange, DN 50, Kvs 31,5 | 4212 0510 | C | 240,- |
| HMVF 365NR 50-6 | 3-way valve, reduced flow, flange, DN 65, Kvs 50 | 4212 0610 | C | 450,- |
| HMVF 380NR 80-6 | 3-way valve, reduced flow, flange, DN 80, Kvs 80 | 4212 0710 | C | 588,- |
| HMVF 3100NR125-6 | 3-way valve, reduced flow, flange, DN 100, Kvs 125 | 4212 0810 | C | 763,- |

Closing Pressure

| Size / Kvs-value | | | | actuator - max. closing pressure | | | | | |
|---------------------------------|------|---------------------|---------------------|----------------------------------|---------|----------|----------------------|----------|----------|
| DN | Lift | standard | reduced flow | HM 2025 | HM 2040 | HM 2060X | HM 1090X HM 2090X | HM 1150X | HM 2250X |
| [mm] | [mm] | [m ³ /h] | [m ³ /h] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] |
| 15 | 14 | 4 | 0,63 | 3,8 | 6 | 6 | 6 | - | - |
| 15 | 14 | - | 1,25 | 3,8 | 6 | 6 | 6 | - | - |
| 15 | 14 | - | 1,6 | 3,8 | 6 | 6 | 6 | - | - |
| 15 | 14 | - | 2,5 | 3,8 | 6 | 6 | 6 | - | - |
| 20 | 14 | 6,3 | 5 | 2,9 | 6 | 6 | 6 | - | - |
| 25 | 14 | 10 | 8 | 1,4 | 3,5 | 6 | 6 | - | - |
| 32 | 14 | 16 | 12,5 | 0,5 | 1,9 | 4,2 | 6 | - | - |
| 40 | 14 | 25 | 20 | - | 0,9 | 2,5 | 4,6 | 8,5 | - |
| 50 | 14 | 40 | 31,5 | - | 0,4 | 1,4 | 2,7 | 5,5 | - |
| 65 | 30 | 63 | 50 | - | - | - | 1,4 | 3,0 | 5,8 |
| 80 | 30 | 100 | 80 | - | - | - | - | 1,9 | 3,6 |
| 100 | 30 | 160 | 125 | - | - | - | - | 1,1 | 2,3 |
| running time for 10 mm Lift [s] | | | | 80 | 80 | 80 | 40; 80 | 40; 80 | 80 |
| max Lift [mm] | | | | 21 | 21 | 21 | 30* | 30* | 30* |
| max lift [N] | | | | 250 | 400 | 600 | 900 | 1500 | 2500 |
| Consumption [VA] | | | | 5,5 | 5,5 | 5,5 | 10,4; 4,8 | 10,4 | 10,4 |
| Protection level | | | | IP54 | IP54 | IP54 | IP54 | IP54 | IP54 |

*On this Type with feed-back potentiometer or continuous setting signal the lift can be limited to 15 • 1 mm or 20 • 1 mm.

4.2.12.2 3-way valves, GG, PN 16, 130°C, watertight closure

The 3-way valves are used as mixing valves in water operated heating-, ventilation- and air conditioning- plants with temperature control.

Features: Cast-iron casing with flanges, gasket, with double-O-ring. Additional O-ring gasket allows exchange of the bushing without emptying of the plant. Characteristic curve between ways A → AB constant in percent, B → AB linear. All kinds of Kvs values of standard flow and reduced flow. Optimized coupling of R+S lift actuator between valve and actuator.



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| HMVF 315/4 | 3-way valve, flange, DN 15, Kvs 4 | 4212 2000 | C | 178,- |
| HMVF 320/6,3 | 3-way valve, flange, DN 20, Kvs 6,3 | 4212 2100 | C | 185,- |
| HMVF 325/10 | 3-way valve, flange, DN 25, Kvs 10 | 4212 2200 | C | 195,- |
| HMVF 332/16 | 3-way valve, flange, DN 32, Kvs 16 | 4212 2300 | C | 235,- |
| HMVF 340/25 | 3-way valve, flange, DN 40, Kvs 25 | 4212 2400 | C | 255,- |
| HMVF 350/40 | 3-way valve, flange, DN 50, Kvs 40 | 4212 2500 | C | 285,- |
| HMVF 365/63 | 3-way valve, flange, DN 65, Kvs 63 | 4212 2600 | C | 495,- |
| HMVF 380/100 | 3-way valve, flange, DN 80, Kvs 100 | 4212 2700 | C | 690,- |
| HMVF 3100/160 | 3-way valve, flange, DN 100, Kvs 160 | 4212 2800 | C | 855,- |
| HMVF 315NR 0,63 | 3-way valve, reduced flow, flange, DN 15, Kvs 0,63 | 4212 2040 | C | 178,- |
| HMVF 315NR 1,25 | 3-way valve, reduced flow, flange, DN 15, Kvs 1,25 | 4212 2060 | C | 178,- |
| HMVF 315NR 1,6 | 3-way valve, reduced flow, flange, DN 15, Kvs 1,6 | 4212 2070 | C | 178,- |
| HMVF 315NR 2,5 | 3-way valve, reduced flow, flange, DN 15, Kvs 2,5 | 4212 2090 | C | 178,- |
| HMVF 320NR 5 | 3-way valve, reduced flow, flange, DN 20, Kvs 5 | 4212 2110 | C | 185,- |
| HMVF 325NR 8 | 3-way valve, reduced flow, flange, DN 25, Kvs 8 | 4212 2210 | C | 195,- |
| HMVF 332NR 12,5 | 3-way valve, reduced flow, flange, DN 32, Kvs 12,5 | 4212 2310 | C | 235,- |
| HMVF 340NR 20 | 3-way valve, reduced flow, flange, DN 40, Kvs 20 | 4212 2410 | C | 255,- |
| HMVF 350NR 31,5 | 3-way valve, reduced flow, flange, DN 50, Kvs 31,5 | 4212 2510 | C | 285,- |
| HMVF 365NR 50 | 3-way valve, reduced flow, flange, DN 65, Kvs 50 | 4212 2610 | C | 495,- |
| HMVF 380NR 80 | 3-way valve, reduced flow, flange, DN 80, Kvs 80 | 4212 2710 | C | 690,- |
| HMVF 3100NR 125 | 3-way valve, reduced flow, flange, DN 100, Kvs 125 | 4212 2810 | C | 855,- |
| HMVF 3125/250 | 3-way valve, reduced flow, flange, DN 125, Kvs 250 | 4212 2910 | C | 2.158,- |
| HMVF 3150/315 | 3-way valve, reduced flow, flange, DN 150, Kvs 315 | 4212 3010 | C | 2.523,- |



Closing Pressure

| nominal size / Kvs-Value | | | | actuator - max. closing pressure | | | | | |
|---------------------------------|------|---------------------|---------------------|----------------------------------|---------|----------|----------------------|----------|----------|
| DN | Lift | standard | reduced flow | HM 2025 | HM 2040 | HM 2060X | HM 1090X HM 2090X | HM 1150X | HM 2250X |
| [mm] | [mm] | [m ³ /h] | [m ³ /h] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] | Δp[bar] |
| 15 | 14 | 4 | 0,63 | 3,8 | 7,9 | 15 | 16 | - | - |
| 15 | 14 | - | 1,25 | 3,8 | 7,9 | 15 | 16 | - | - |
| 15 | 14 | - | 1,6 | 3,8 | 7,9 | 15 | 16 | - | - |
| 15 | 14 | - | 2,5 | 3,8 | 7,9 | 15 | 16 | - | - |
| 20 | 14 | 6,3 | 5 | 2,9 | 6,3 | 12 | 16 | - | - |
| 25 | 14 | 10 | 8 | 1,4 | 3,5 | 7,3 | 12,3 | 16 | - |
| 32 | 14 | 16 | 12,5 | 0,5 | 1,9 | 4,2 | 7,4 | 13,5 | - |
| 40 | 14 | 25 | 20 | - | 0,9 | 2,5 | 4,6 | 8,5 | - |
| 50 | 14 | 40 | 31,5 | - | 0,4 | 1,4 | 2,7 | 5,5 | - |
| 65 | 30 | 63 | 50 | - | - | - | 1,4 | 2,5 | 5,0 |
| 80 | 30 | 100 | 80 | - | - | - | - | 1,5 | 3,5 |
| 100 | 30 | 160 | 125 | - | - | - | - | 1,0 | 2,0 |
| running time for 10 mm Lift [s] | | | | 80 | 80 | 80 | 40; 80 | 40 | 80 |
| max Lift [mm] | | | | 21 | 21 | 21 | 30* | 30* | 30* |
| max lift [N] | | | | 250 | 400 | 600 | 900 | 1500 | 2500 |
| Consumption [VA] | | | | 5,5 | 5,5 | 5,5 | 10,4; 4,8 | 10,4 | 10,4 |
| Protection level | | | | IP54 | IP54 | IP54 | IP54 | IP54 | IP54 |

*On this Type with feed-back potentiometer or continuous setting signal, the lift can be limited to 15 • 1 mm or 20 • 1 mm.

4.2.12.3 3-way valves, GG, PN 16, Spindelabdichtung PTFE-Lippendichtg. up to 200°C

The 3-way valves are used as mixing valves in water operated heating-, ventilation- and air conditioning- plants with temperature control. The valves are suitable for mixing or distribution of water.

Features: Cast-iron casing with flanges, PTFE-gasket, with double-O-ring. Additional O-ring gasket allows exchange of the bushing without emptying of the plant. Characteristic curve between ways A → AB constant in percent, B → AB linear. All kinds of Kvs values of standard flow and reduced flow.



4

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|--|-----------|----|-----------|
| MVF 315/4 | 3-way valve, flange, DN 15, Kvs 4 | 4212 4000 | C | 699,- |
| MVF 320/6,3 | 3-way valve, flange, DN 20, Kvs 6,3 | 4212 4100 | C | 771,- |
| MVF 325/10 | 3-way valve, flange, DN 25, Kvs 10 | 4212 4200 | C | 816,- |
| MVF 332/16 | 3-way valve, flange, DN 32, Kvs 16 | 4212 4300 | C | 855,- |
| MVF 340/25 | 3-way valve, flange, DN 40, Kvs 25 | 4212 4400 | C | 889,- |
| MVF 350/40 | 3-way valve, flange, DN 50, Kvs 40 | 4212 4500 | C | 917,- |
| MVF 365/63 | 3-way valve, flange, DN 65, Kvs 63 | 4212 4600 | C | 1.302,- |
| MVF 380/100 | 3-way valve, flange, DN 80, Kvs 100 | 4212 4700 | C | 1.636,- |
| MVF 3100/160 | 3-way valve, flange, DN 100, Kvs 160 | 4212 4800 | C | 2.291,- |
| MVF 3125/250 | 3-way valve, flange, DN 125, Kvs 250 | 4212 4900 | C | 3.144,- |
| MVF 3150/400 | 3-way valve, flange, DN 150, Kvs 400 | 4212 5000 | C | 4.261,- |
| MVF 315NR 2,5 | 3-way valve, reduced flow, flange, DN 15, Kvs 2,5 | 4212 4090 | C | 699,- |
| MVF 320NR 2,5 | 3-way valve, reduced flow, flange, DN 20, Kvs 2,5 | 4212 4110 | C | 771,- |
| MVF 320NR 4,0 | 3-way valve, reduced flow, flange, DN 20, Kvs 4 | 4212 4120 | C | 873,- |
| MVF 320NR 5,0 | 3-way valve, reduced flow, flange, DN 20, Kvs 5 | 4212 4130 | C | 873,- |
| MVF 325NR 5,0 | 3-way valve, reduced flow, flange, DN 25, Kvs 5 | 4212 4210 | C | 918,- |
| MVF 325NR 6,3 | 3-way valve, reduced flow, flange, DN 25, Kvs 6,3 | 4212 4220 | C | 918,- |
| MVF 325NR 8,0 | 3-way valve, reduced flow, flange, DN 25, Kvs 8 | 4212 4230 | C | 816,- |
| MVF 332NR 8,0 | 3-way valve, reduced flow, flange, DN 32, Kvs 8 | 4212 4310 | C | 966,- |
| MVF 332NR 10 | 3-way valve, reduced flow, flange, DN 32, Kvs 10 | 4212 4320 | C | 966,- |
| MVF 332NR 12,5 | 3-way valve, reduced flow, flange, DN 32, Kvs 12,5 | 4212 4330 | C | 855,- |
| MVF 340NR 12,5 | 3-way valve, reduced flow, flange, DN 40, Kvs 12,5 | 4212 4410 | C | 1.006,- |
| MVF 340NR 16 | 3-way valve, reduced flow, flange, DN 40, Kvs 16 | 4212 4420 | C | 1.006,- |
| MVF 340NR 20 | 3-way valve, reduced flow, flange, DN 40, Kvs 20 | 4212 4430 | C | 889,- |
| MVF 350NR 20 | 3-way valve, reduced flow, flange, DN 50, Kvs 20 | 4212 4510 | C | 1.043,- |
| MVF 350NR 25 | 3-way valve, reduced flow, flange, DN 50, Kvs 25 | 4212 4520 | C | 1.043,- |
| MVF 350NR 31,5 | 3-way valve, reduced flow, flange, DN 50, Kvs 31,5 | 4212 4530 | C | 917,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|--|-----------|----|-----------|
| MVF 365NR 31,5 | 3-way valve, reduced flow, flange, DN 65, Kvs 31,5 | 4212 4610 | C | 1.445,- |
| MVF 365NR 40 | 3-way valve, reduced flow, flange, DN 65, Kvs 40 | 4212 4620 | C | 1.445,- |
| MVF 365NR 50 | 3-way valve, reduced flow, flange, DN 65, Kvs 50 | 4212 4630 | C | 1.302,- |
| MVF 380NR 50 | 3-way valve, reduced flow, flange, DN 80, Kvs 50 | 4212 4710 | C | 1.793,- |
| MVF 380NR 63 | 3-way valve, reduced flow, flange, DN 80, Kvs 63 | 4212 4720 | C | 1.793,- |
| MVF 380NR 80 | 3-way valve, reduced flow, flange, DN 80, Kvs 80 | 4212 4730 | C | 1.636,- |
| MVF 3100NR 80 | 3-way valve, reduced flow, flange, DN 100, Kvs 80 | 4212 4810 | C | 2.447,- |
| MVF 3100NR 100 | 3-way valve, reduced flow, flange, DN 100, Kvs 100 | 4212 4820 | C | 2.447,- |
| MVF 3100NR 125 | 3-way valve, reduced flow, flange, DN 100, Kvs 125 | 4212 4830 | C | 2.291,- |
| MVF 3125NR 125 | 3-way valve, reduced flow, flange, DN 125, Kvs 125 | 4212 4910 | C | 3.317,- |
| MVF 3125NR 160 | 3-way valve, reduced flow, flange, DN 125, Kvs 160 | 4212 4920 | C | 3.317,- |
| MVF 3125NR 200 | 3-way valve, reduced flow, flange, DN 125, Kvs 200 | 4212 4930 | C | 3.144,- |
| MVF 3150NR 200 | 3-way valve, reduced flow, flange, DN 150, Kvs 200 | 4212 5010 | C | 4.434,- |
| MVF 3150NR 250 | 3-way valve, reduced flow, flange, DN 150, Kvs 250 | 4212 5020 | C | 4.434,- |
| MVF 3150NR 315 | 3-way valve, reduced flow, flange, DN 150, Kvs 315 | 4212 5030 | C | 4.261,- |

nominal sizen DN 200/250/300 on req.

Closing Pressure

| Size / Kvs-value | | | | actuator - max. closing pressure | | | | | |
|---------------------------------|------|---------------------|---------------------|----------------------------------|---------------------|------------------|------------------|------------------|------------------|
| DN | Lift | standard | reduced flow | HM 2060X / 2060X SR | HM 1090X / HM 2090X | HM 1150X | HM 2250X | HM 2500 | HM 2100 |
| [mm] | [mm] | [m ³ /h] | [m ³ /h] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] |
| 15 | 20 | 4 | 0,16-1,6 | 16 | 16 | 16 | 16 | - | - |
| 15 | 20 | 4 | 2,5-5 | 5 | 9,5 | 16 | 16 | - | - |
| 20 | 20 | 6,3 | 2,5-5 | 5 | 9,5 | 16 | 16 | - | - |
| 25 | 20 | 10 | 5-8 | 4 | 7,5 | 16 | 16 | - | - |
| 32 | 20 | 16 | 8-12,5 | 2,5 | 4,5 | 11 | 16 | - | - |
| 40 | 20 | 25 | 12,5-20 | 1 | 2,5 | 6,5 | 14 | - | - |
| 50 | 30 | 40 | 20-31,5 | - | - | 3,8 | 8,6 | - | - |
| 65 | 30 | 63 | 31,5-50 | - | - | 2 | 5,4 | - | - |
| 80 | 50 | 100 | 50-80 | - | - | - | - | 7,5 | 14 |
| 100 | 50 | 160 | 80-125 | - | - | - | - | 4,5 | 9 |
| 125 | 60 | 250 | 125-200 | - | - | - | - | 2,5 | 4,5 |
| 150 | 60 | 400 | 200-315 | - | - | - | - | 1,5 | 3 |
| running time for 10 mm Lift [s] | | | | 80 | 40 / 80 | 40 | 80 | 25 | 10 |
| maximaler Lift [mm] | | | | 21*/15 | 30* | 30* | 30* | 60 | 80 |
| max lift [N] | | | | 600 | 900 | 1500 | 2500 | 5000 | 10000 |
| Consumption [VA] | | | | 5,5 / 9,5 | 10,4 / 4,8 | 10,4 | 10,4 | 47 | 70 |
| Protection level | | | | IP 54 | IP 54 | IP54 | IP 54 | IP 54 | IP 54 |

*On this Type with feed-back potentiometer or continuous setting signal, the lift can be limited to 15 • 1 mm or 20 • 1 mm



4.2.12.6 3-way valves, GG PN 16, 150°C, MVFL compact

The valve series **MVFL** compact... are control valves of a compact construction with external threaded coupling connection. The valves excel with minimum dimensions and weight, quality control function and a high tightness in closed position. Thanks to an unique flow characteristic which has been optimized for thermodynamic processes control, the valves are ideal for applications in heating and airconditioning. In regard of a sophisticated design of internal parts and long service life of packing the valves fulfill every demand for a long-time service without necessary



maintenance. The valves are optionally manufactured either two-way or three-way. The part of the delivery is a screw joint enabling a quick and easy installation to an appliance. Assembled with electromechanic actuators, the valve can be controlled with 3-point or continuous signal. The part of the delivery is also a hand wheel which can be used for the valve control until assembling with an actuator. Used materials for throttling trim which consist of plug made of high-quality stainless steel and soft sealing elements, ensure a hermetic tightness in both ports and enable the valves to be used not only in common warm-water and hot-water regulation circuits in heating but also in applications with special characteristic features of process medium such as in refrigerating industry and air-conditioning. The valves series RV 111 are suitable for applications where process medium is water or air. Further they can be used for refrigerating media and other non-aggressive liquids or gases with temperature ranging from +2 C to +150 C. The valves are not applicable to conditions with cavitation. Sealing surfaces of control trim are resistant to common sludge or water impurities. Yet it is recommended to pipe a strainer in front of valve to ensure a reliable function and tightness in case there are abrasive particles present. **You can find the suitable actuator HM 2030 in chapter 4.1.1.**

4.2.12.6.1 3-way valves, GG PN 16, 150°C, MVFL compact, with thread

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------------|--|-----------|----|-----------|
| MVFL compact 315/7T | 3-way valve, compact design, thread, DN 15, KVs 0,25 | 4212 6110 | C | 68,- |
| MVFL compact 315/6T | 3-way valve, compact design, thread, DN 15, KVs 0,4 | 4212 6120 | C | 68,- |
| MVFL compact 315/5T | 3-way valve, compact design, thread, DN 15, KVs 0,63 | 4212 6130 | C | 68,- |
| MVFL compact 315/4T | 3-way valve, compact design, thread, DN 15, KVs 1,0 | 4212 6140 | C | 68,- |
| MVFL compact 315/3T | 3-way valve, compact design, thread, DN 15, KVs 1,6 | 4212 6150 | C | 68,- |
| MVFL compact 315/2T | 3-way valve, compact design, thread, DN 15, KVs 2,5 | 4212 6160 | C | 68,- |
| MVFL compact 315/1T | 3-way valve, compact design, thread, DN 15, KVs 4,0 | 4212 6170 | C | 68,- |
| MVFL compact 320/T | 3-way valve, compact design, thread, DN 20, KVs 6,3 | 4212 6180 | C | 76,- |
| MVFL compact 325/T | 3-way valve, compact design, thread, DN 25, KVs 10,0 | 4212 6190 | C | 84,- |
| MVFL compact 332/T | 3-way valve, compact design, thread, DN 32, KVs 16,0 | 4212 6200 | C | 104,- |
| MVFL compact 340/T | 3-way valve, compact design, thread, DN 40, KVs 25,0 | 4212 6210 | C | 117,- |

4.2.12.6.2 3-way valves, GG PN 16, 150°C, MVFL compact, with welded unions

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------------|---|-----------|----|-----------|
| MVFL compact 315/7W | 3-way valve, compact design, welded unions, DN 15, KVs 0,25 | 4212 6310 | C | 71,- |
| MVFL compact 315/6W | 3-way valve, compact design, welded unions, DN 15, KVs 0,4 | 4212 6320 | C | 71,- |
| MVFL compact 315/5W | 3-way valve, compact design, welded unions, DN 15, KVs 0,63 | 4212 6330 | C | 71,- |
| MVFL compact 315/4W | 3-way valve, compact design, welded unions, DN 15, KVs 1,0 | 4212 6340 | C | 71,- |
| MVFL compact 315/3W | 3-way valve, compact design, welded unions, DN 15, KVs 1,6 | 4212 6350 | C | 71,- |
| MVFL compact 315/2W | 3-way valve, compact design, welded unions, DN 15, KVs 2,5 | 4212 6360 | C | 71,- |
| MVFL compact 315/1W | 3-way valve, compact design, welded unions, DN 15, KVs 4,0 | 4212 6370 | C | 71,- |
| MVFL compact 320/W | 3-way valve, compact design, welded unions, DN 20, KVs 6,3 | 4212 6380 | C | 81,- |
| MVFL compact 325/W | 3-way valve, compact design, welded unions, DN 25, KVs 10,0 | 4212 6390 | C | 90,- |
| MVFL compact 332/W | 3-way valve, compact design, welded unions, DN 32, KVs 16,0 | 4212 6400 | C | 114,- |
| MVFL compact 340/W | 3-way valve, compact design, welded unions, DN 40, KVs 25,0 | 4212 6410 | C | 128,- |

4.2.12.6.3 3-way valves, GG PN 16, 150°C, MVFL compact, with flange

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------------|--|-----------|----|-----------|
| MVFL compact 315/7F | 3-way valve, compact design, flange, DN 15, KVs 0,25 | 4212 6510 | C | 100,- |
| MVFL compact 315/6F | 3-way valve, compact design, flange, DN 15, KVs 0,4 | 4212 6520 | C | 100,- |
| MVFL compact 315/5F | 3-way valve, compact design, flange, DN 15, KVs 0,63 | 4212 6530 | C | 100,- |
| MVFL compact 315/4F | 3-way valve, compact design, flange, DN 15, KVs 1,0 | 4212 6540 | C | 100,- |
| MVFL compact 315/3F | 3-way valve, compact design, flange, DN 15, KVs 1,6 | 4212 6550 | C | 100,- |
| MVFL compact 315/2F | 3-way valve, compact design, flange, DN 15, KVs 2,5 | 4212 6560 | C | 100,- |
| MVFL compact 315/1F | 3-way valve, compact design, flange, DN 15, KVs 4,0 | 4212 6570 | C | 100,- |
| MVFL compact 320/F | 3-way valve, compact design, flange, DN 20, KVs 6,3 | 4212 6580 | C | 118,- |
| MVFL compact 325/F | 3-way valve, compact design, flange, DN 25, KVs 10,0 | 4212 6590 | C | 138,- |
| MVFL compact 332/F | 3-way valve, compact design, flange, DN 32, KVs 16,0 | 4212 6600 | C | 191,- |
| MVFL compact 340/F | 3-way valve, compact design, flange, DN 40, KVs 25,0 | 4212 6610 | C | 215,- |

4.2.2

Cast Steel

4.2.2.1

2-way valves, GS, PN 25/40, Spindelabdichtung PTFE-Gasket up to 200°C

The 2-way valves are used in heating, ventilation- and air conditioning- plants with temperature control
Features: Cast-steel casing with flanges, gasket, with double-O-ring. Additional O-ring gasket allows the exchange of the bushing without emptying of the plant. Characteristic curve between ways A → to AB constant in percent, all kinds of Kvs values. Optimized coupling of R+S lift actuator between valve and actuator. Special Types: -40 C up to 400 C on request



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| MVFS 215/4 | 2-way valve, flange, DN 15, Kvs 4 | 4221 2000 | C | 599,- |
| MVFS 220/6,3 | 2-way valve, flange, DN 20, Kvs 6,3 | 4221 2100 | C | 665,- |
| MVFS 225/10 | 2-way valve, flange, DN 25, Kvs 10 | 4221 2200 | C | 726,- |
| MVFS 232/16 | 2-way valve, flange, DN 32, Kvs 16 | 4221 2300 | C | 905,- |
| MVFS 240/25 | 2-way valve, flange, DN 40, Kvs 25 | 4221 2400 | C | 984,- |
| MVFS 250/40 | 2-way valve, flange, DN 50, Kvs 40 | 4221 2500 | C | 1.062,- |
| MVFS 265/63 | 2-way valve, flange, DN 65, Kvs 63 | 4221 2600 | C | 1.564,- |
| MVFS 280/100 | 2-way valve, flange, DN 80, Kvs 100 | 4221 2700 | C | 2.073,- |
| MVFS 2100/160 | 2-way valve, flange, DN 100, Kvs 160 | 4221 2800 | C | 2.810,- |
| MVFS 2125/250 | 2-way valve, flange, DN 125, Kvs 250 | 4221 2900 | C | 3.886,- |
| MVFS 2150/400 | 2-way valve, flange, DN 150, Kvs 400 | 4221 3000 | C | 5.399,- |
| MVFS 215NR 0,16 | 2-way valve, reduced flow, flange, DN 15, Kvs 0,16 | 4221 2010 | C | 679,- |
| MVFS 215NR 0,25 | 2-way valve, reduced flow, flange, DN 15, Kvs 0,25 | 4221 2020 | C | 679,- |
| MVFS 215NR 0,4 | 2-way valve, reduced flow, flange, DN 15, Kvs 0,4 | 4221 2030 | C | 679,- |
| MVFS 215NR 0,63 | 2-way valve, reduced flow, flange, DN 15, Kvs 0,63 | 4221 2040 | C | 679,- |
| MVFS 215NR 1,0 | 2-way valve, reduced flow, flange, DN 15, Kvs 1 | 4221 2050 | C | 679,- |
| MVFS 215NR 1,25 | 2-way valve, reduced flow, flange, DN 15, Kvs 1,25 | 4221 2060 | C | 679,- |
| MVFS 215NR 1,6 | 2-way valve, reduced flow, flange, DN 15, Kvs 1,6 | 4221 2070 | C | 679,- |
| MVFS 215NR 2,5 | 2-way valve, reduced flow, flange, DN 15, Kvs 2,5 | 4221 2090 | C | 679,- |
| MVFS 220NR 2,5 | 2-way valve, reduced flow, flange, DN 20, Kvs 2,5 | 4221 2110 | C | 768,- |
| MVFS 220NR 4,0 | 2-way valve, reduced flow, flange, DN 20, Kvs 4 | 4221 2120 | C | 665,- |
| MVFS 220 NR 5,0 | 2-way valve, reduced flow, flange, DN 20, Kvs 5 | 4221 2130 | C | 768,- |
| MVFS 225NR 5,0 | 2-way valve, reduced flow, flange, DN 25, Kvs 5 | 4221 2210 | C | 828,- |
| MVFS 225NR 6,3 | 2-way valve, reduced flow, flange, DN 25, Kvs 6,3 | 4221 2220 | C | 726,- |
| MVFS 225NR 8,0 | 2-way valve, reduced flow, flange, DN 25, Kvs 8 | 4221 2230 | C | 828,- |
| MVFS 232NR 8,0 | 2-way valve, reduced flow, flange, DN 32, Kvs 8 | 4221 2310 | C | 1.015,- |
| MVFS 232NR 10 | 2-way valve, reduced flow, flange, DN 32, Kvs 10 | 4221 2320 | C | 905,- |
| MVFS 232NR 12,5 | 2-way valve, reduced flow, flange, DN 32, Kvs 12,5 | 4221 2330 | C | 1.015,- |
| MVFS 240NR 12,5 | 2-way valve, reduced flow, flange, DN 40, Kvs 12,5 | 4221 2410 | C | 1.101,- |
| MVFS 240NR 16 | 2-way valve, reduced flow, flange, DN 40, Kvs 16 | 4221 2420 | C | 984,- |
| MVFS 240NR 20 | 2-way valve, reduced flow, flange, DN 40, Kvs 20 | 4221 2430 | C | 1.101,- |
| MVFS 250NR 20 | 2-way valve, reduced flow, flange, DN 50, Kvs 20 | 4221 2510 | C | 1.188,- |
| MVFS 250NR 25 | 2-way valve, reduced flow, flange, DN 50, Kvs 25 | 4221 2520 | C | 1.062,- |
| MVFS 250NR 31,5 | 2-way valve, reduced flow, flange, DN 50, Kvs 31,5 | 4221 2530 | C | 1.188,- |
| MVFS 265NR 31,5 | 2-way valve, reduced flow, flange, DN 65, Kvs 31,5 | 4221 2610 | C | 1.707,- |
| MVFS 265NR 40 | 2-way valve, reduced flow, flange, DN 65, Kvs 40 | 4221 2620 | C | 1.564,- |
| MVFS 265NR 50 | 2-way valve, reduced flow, flange, DN 65, Kvs 50 | 4221 2630 | C | 1.707,- |
| MVFS 280NR 50 | 2-way valve, reduced flow, flange, DN 80, Kvs 50 | 4221 2710 | C | 2.229,- |
| MVFS 280NR 63 | 2-way valve, reduced flow, flange, DN 80, Kvs 63 | 4221 2720 | C | 2.073,- |
| MVFS 280NR 80 | 2-way valve, reduced flow, flange, DN 80, Kvs 80 | 4221 2730 | C | 2.229,- |
| MVFS 2100NR 80 | 2-way valve, reduced flow, flange, DN 100, Kvs 80 | 4221 2810 | C | 2.966,- |
| MVFS 2100NR 100 | 2-way valve, reduced flow, flange, DN 100, Kvs 100 | 4221 2820 | C | 2.819,- |
| MVFS 2100NR 125 | 2-way valve, reduced flow, flange, DN 100, Kvs 125 | 4221 2830 | C | 2.966,- |
| MVFS 2125NR 125 | 2-way valve, reduced flow, flange, DN 125, Kvs 125 | 4221 2910 | C | 4.059,- |
| MVFS 2125NR 160 | 2-way valve, reduced flow, flange, DN 125, Kvs 160 | 4221 2920 | C | 3.886,- |
| MVFS 2125NR 200 | 2-way valve, reduced flow, flange, DN 125, Kvs 200 | 4221 2930 | C | 4.059,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| MVFS 2150NR 200 | 2-way valve, reduced flow, flange, DN 150, Kvs 200 | 4221 3010 | C | 5.573,- |
| MVFS 2150NR 250 | 2-way valve, reduced flow, flange, DN 150, Kvs 250 | 4221 3020 | C | 5.399,- |
| MVFS 2150NR 315 | 2-way valve, reduced flow, flange, DN 150, Kvs 315 | 4221 3030 | C | 5.573,- |

nominal sizes DN 200/250/300 on req

Closing Pressure

| Size / Kvs-value | | | | actuator - max. closing pressure | | | | |
|---------------------------------|------|---------------------|---------------------|----------------------------------|----------------------|----------|----------|----------|
| DN | Lift | standard | reduced flow | HM 2060X | HM 1090X HM 2090X | HM 1150X | HM 2250X | HM 2500 |
| [mm] | [mm] | [m ³ /h] | [m ³ /h] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] |
| 15 | 20 | 4 | 0,16 - 2,5 | 26 | 40 | 40 | 35 | - |
| 20 | 20 | 6,3 | 2,5 - 5 | 5 | 9,5 | 23 | 35 | - |
| 25 | 20 | 10 | 5 - 8 | 4 | 7,5 | 19 | 30 | - |
| 32 | 20 | 16 | 8 - 12,5 | 2,5 | 4,4 | 11 | 22 | - |
| 40 | 20 | 25 | 12,5 - 20 | 1 | 2,5 | 6,5 | 14 | - |
| 50 | 30 | 40 | 20 - 31,5 | - | - | 3,8 | 8,6 | - |
| 65 | 30 | 63 | 31,5 - 50 | - | - | 2 | 5,4 | - |
| 80 | 50 | 100 | 50 - 80 | - | - | - | - | 7,5 |
| 100 | 50 | 160 | 80 - 125 | - | - | - | - | 4,5 |
| 125 | 60 | 250 | 125 - 200 | - | - | - | - | 2,5 |
| 150 | 60 | 400 | 200 - 315 | - | - | - | - | 1,5 |
| running time for 10 mm Lift [s] | | | | 80 | 40; 80 | 40 | 80 | 25 |
| maximaler Lift [mm] | | | | 21* / 15 | 30* | 30* | 30* | 60 |
| max lift [N] | | | | 600 | 900 | 1500 | 2500 | 5000 |
| Consumption [VA] | | | | 5,5 / 9,5 | 10,4; 4,8 | 10,4 | 10,4 | 47 |
| Protection level | | | | IP 54 | IP 54 | IP54 | IP 54 | IP 54 |

*On this Type with feed-back potentiometer or continuous setting signal, the lift can be limited to 15 • 1 mm or 20 • 1 mm

4.2.22 3-way valves, GS, PN 25/40, spindel gasket PTFE-PTFE-Gasket up to 200°C

The 2-way valves are used in heating-, ventilation- and air conditioning- plants with temperature control
 Features: Cast-steel casing with flanges, gasket, with double-O-ring. Additional O-ring gasket allows the exchange of the bushing without emptying of the plant. Characteristic curve between ways A → to AB constant in percent, all kinds of Kvs values. Optimized coupling of R+S lift actuator between valve and actuator.

Special Types: -40 C up to 400 C on request.



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| MVFS 315/4 | 3-way valve, flange, DN 15, Kvs 4 | 4222 2000 | C | 777,- |
| MVFS 320/6,3 | 3-way valve, flange, DN 20, Kvs 6,3 | 4222 2100 | C | 866,- |
| MVFS 325/10 | 3-way valve, flange, DN 25, Kvs 10 | 4222 2200 | C | 944,- |
| MVFS 332/16 | 3-way valve, flange, DN 32, Kvs 16 | 4222 2300 | C | 1.179,- |
| MVFS 340/25 | 3-way valve, flange, DN 40, Kvs 25 | 4222 2400 | C | 1.280,- |
| MVFS 350/40 | 3-way valve, flange, DN 50, Kvs 40 | 4222 2500 | C | 1.380,- |
| MVFS 365/63 | 3-way valve, flange, DN 65, Kvs 63 | 4222 2600 | C | 2.033,- |
| MVFS 380/100 | 3-way valve, flange, DN 80, Kvs 100 | 4222 2700 | C | 2.691,- |
| MVFS 3100/160 | 3-way valve, flange, DN 100, Kvs 160 | 4222 2800 | C | 3.651,- |
| MVFS 3125/250 | 3-way valve, flange, DN 125, Kvs 250 | 4222 2900 | C | 5.053,- |
| MVFS 3150/400 | 3-way valve, flange, DN 150, Kvs 400 | 4222 3000 | C | 7.018,- |
| MVFS 315NR 2,5 | 3-way valve, reduced flow, flange, DN 15, Kvs 2,5 | 4222 2090 | C | 777,- |
| MVFS 320NR 2,5 | 3-way valve, reduced flow, flange, DN 20, Kvs 2,5 | 4222 2110 | C | 968,- |
| MVFS 320NR 4,0 | 3-way valve, reduced flow, flange, DN 20, Kvs 4 | 4222 2120 | C | 968,- |
| MVFS 320NR 5,0 | 3-way valve, reduced flow, flange, DN 20, Kvs 5 | 4222 2130 | C | 866,- |
| MVFS 325NR 5,0 | 3-way valve, reduced flow, flange, DN 25, Kvs 5 | 4222 2210 | C | 1.047,- |
| MVFS 325NR 6,3 | 3-way valve, reduced flow, flange, DN 25, Kvs 6,3 | 4222 2220 | C | 1.047,- |
| MVFS 325NR 8,0 | 3-way valve, reduced flow, flange, DN 25, Kvs 8 | 4222 2230 | C | 944,- |
| MVFS 332NR 8,0 | 3-way valve, reduced flow, flange, DN 32, Kvs 8 | 4222 2310 | C | 1.290,- |
| MVFS 332NR 10 | 3-way valve, reduced flow, flange, DN 32, Kvs 10 | 4222 2320 | C | 1.290,- |
| MVFS 332NR 12,5 | 3-way valve, reduced flow, flange, DN 32, Kvs 12,5 | 4222 2330 | C | 1.179,- |
| MVFS 340NR 12,5 | 3-way valve, reduced flow, flange, DN 40, Kvs 12,5 | 4222 2410 | C | 1.397,- |
| MVFS 340NR 16 | 3-way valve, reduced flow, flange, DN 40, Kvs 16 | 4222 2420 | C | 1.397,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| MVFS 340 NR 20 | 3-way valve, reduced flow, flange, DN 40, Kvs 20 | 4222 2430 | C | 1.280,- |
| MVFS 350NR 20 | 3-way valve, reduced flow, flange, DN 50, Kvs 20 | 4222 2510 | C | 1.506,- |
| MVFS 350NR 25 | 3-way valve, reduced flow, flange, DN 50, Kvs 25 | 4222 2520 | C | 1.506,- |
| MVFS 350NR 31,5 | 3-way valve, reduced flow, flange, DN 50, Kvs 31,5 | 4222 2530 | C | 1.380,- |
| MVFS 365NR 31,5 | 3-way valve, reduced flow, flange, DN 65, Kvs 31,5 | 4222 2610 | C | 2.176,- |
| MVFS 365NR 40 | 3-way valve, reduced flow, flange, DN 65, Kvs 40 | 4222 2620 | C | 2.176,- |
| MVFS 365NR 50 | 3-way valve, reduced flow, flange, DN 65, Kvs 50 | 4222 2630 | C | 2.033,- |
| MVFS 380NR 50 | 3-way valve, reduced flow, flange, DN 80, Kvs 50 | 4222 2710 | C | 2.848,- |
| MVFS 380NR 63 | 3-way valve, reduced flow, flange, DN 80, Kvs 63 | 4222 2720 | C | 2.848,- |
| MVFS 380NR 80 | 3-way valve, reduced flow, flange, DN 80, Kvs 80 | 4222 2730 | C | 2.691,- |
| MVFS 3100NR 80 | 3-way valve, reduced flow, flange, DN 100, Kvs 80 | 4222 2810 | C | 3.807,- |
| MVFS 3100NR 100 | 3-way valve, reduced flow, flange, DN 100, Kvs 100 | 4222 2820 | C | 3.807,- |
| MVFS 3100NR 125 | 3-way valve, reduced flow, flange, DN 100, Kvs 125 | 4222 2830 | C | 3.651,- |
| MVFS 3125NR 125 | 3-way valve, reduced flow, flange, DN 125, Kvs 125 | 4222 2910 | C | 5.226,- |
| MVFS 3125NR 160 | 3-way valve, reduced flow, flange, DN 125, Kvs 160 | 4222 2920 | C | 5.226,- |
| MVFS 3125NR 200 | 3-way valve, reduced flow, flange, DN 125, Kvs 200 | 4222 2930 | C | 5.053,- |
| MVFS 3150NR 200 | 3-way valve, reduced flow, flange, DN 150, Kvs 200 | 4222 3010 | C | 7.191,- |
| MVFS 3150NR 250 | 3-way valve, reduced flow, flange, DN 150, Kvs 250 | 4222 3020 | C | 7.191,- |
| MVFS 3150NR 315 | 3-way valve, reduced flow, flange, DN 150, Kvs 315 | 4222 3030 | C | 7.018,- |

nominal sizes DN 200/250/300 on req

Closing Pressure

| Size / Kvs-value | | | | actuator - max. closing pressure | | | | |
|---------------------------------|------|---------------------|---------------------|----------------------------------|----------------------|----------|----------|----------|
| DN | Lift | standard | reduced flow | HM 2060X | HM 1090X HM 2090X | HM 1150X | HM 2250X | HM 2500 |
| [mm] | [mm] | [m ³ /h] | [m ³ /h] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] |
| 15 | 20 | 4 | 0,16 - 2,5 | 26 | 40 | 40 | 35 | - |
| 20 | 20 | 6,3 | 2,5 - 5 | 5 | 9,5 | 23 | 35 | - |
| 25 | 20 | 10 | 5 - 8 | 4 | 7,5 | 19 | 30 | - |
| 32 | 20 | 16 | 8 - 12,5 | 2,5 | 4,4 | 11 | 22 | - |
| 40 | 20 | 25 | 12,5 - 20 | 1 | 2,5 | 6,5 | 14 | - |
| 50 | 30 | 40 | 20 - 31,5 | - | - | 3,8 | 8,6 | - |
| 65 | 30 | 63 | 31,5 - 50 | - | - | 2 | 5,4 | - |
| 80 | 50 | 100 | 50 - 80 | - | - | - | - | 7,5 |
| 100 | 50 | 160 | 80 - 125 | - | - | - | - | 4,5 |
| 125 | 60 | 250 | 125 - 200 | - | - | - | - | 2,5 |
| 150 | 60 | 400 | 200 - 315 | - | - | - | - | 1,5 |
| running time for 10 mm Lift [s] | | | | 80 | 40; 80 | 40 | 80 | 25 |
| maximaler Lift [mm] | | | | 21* / 15 | 30* | 30* | 30* | 60 |
| max lift [N] | | | | 600 | 900 | 1500 | 2500 | 5000 |
| Consumption [VA] | | | | 5,5 / 9,5 | 10,4; 4,8 | 10,4 | 10,4 | 47 |
| Protection level | | | | IP 54 | IP 54 | IP54 | IP 54 | IP 54 |

*On this Type with feed-back potentiometer or continuous setting signal the lift can be limited to 15 • 1 mm or 20 • 1 mm.

4

4.2.3 Red Brass

4.2.3.1 2-way valves

4.2.3.1.1 2-way valves, RG, PN 16, up to 130°C, Outer Thread with Fittings, Watertight Closure

The 2-way valves are used in water operated heating-, ventilation- and air conditioning- plants with temperature control

Features: Red brass casing with threaded fittings. Valve closes watertight in both end-positions. Additional O-ring gasket allows the exchange of the bushing without emptying of the plant. Characteristic curve between ways A → AB constant in percent, all kinds of Kvs values of standard and reduced flow. Optimized coupling of R+S lift actuator between valve and actuator.



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|---|-----------|----|-----------|
| RGV 215/4 | 2-way valve, standard flow, outer thread with fitting, DN 15, Kvs 4 | 4231 2000 | C | 108,- |
| RGV 220/6,3 | 2-way valve, standard flow, outer thread with fitting, DN 20, Kvs 6,3 | 4231 2100 | C | 110,- |
| RGV 225/10 | 2-way valve, standard flow, outer thread with fitting, DN 25, Kvs 10 | 4231 2200 | C | 125,- |
| RGV 232/16 | 2-way valve, standard flow, outer thread with fitting, DN 32, Kvs 16 | 4231 2300 | C | 150,- |
| RGV 240/25 | 2-way valve, standard flow, outer thread with fitting, DN 40, Kvs 25 | 4231 2400 | C | 185,- |
| RGV 250/40 | 2-way valve, standard flow, outer thread with fitting, DN 50, Kvs 40 | 4231 2500 | C | 235,- |
| RGV 215NR 0,63 | 2-way valve, reduced flow, outer thread with fitting, DN 15, Verschraub, Kvs 0,63 | 4231 2040 | C | 108,- |
| RGV 215NR 1,25 | 2-way valve, reduced flow, outer thread with fitting, DN 15, Verschraub, Kvs 1,25 | 4231 2060 | C | 108,- |
| RGV 215NR 1,6 | 2-way valve, reduced flow, outer thread with fitting, DN 15, Verschraub, Kvs 1,6 | 4231 2070 | C | 108,- |
| RGV 215NR 2,5 | 2-way valve, reduced flow, outer thread with fitting, DN 15, Verschraub, Kvs 2,5 | 4231 2090 | C | 108,- |
| RGV 220NR 5 | 2-way valve, reduced flow, outer thread with fitting, DN 20, Verschraub, Kvs 5 | 4231 2110 | C | 110,- |
| RGV 225NR 8 | 2-way valve, reduced flow, outer thread with fitting, DN 25, Verschraub, Kvs 8 | 4231 2210 | C | 125,- |
| RGV 232NR 12,5 | 2-way valve, reduced flow, outer thread with fitting, DN 32, Verschraub, Kvs 12,5 | 4231 2310 | C | 150,- |
| RGV 240NR 20 | 2-way valve, reduced flow, outer thread with fitting, DN 40, Verschraub, Kvs 20 | 4231 2410 | C | 185,- |
| RGV 250NR 31,5 | 2-way valve, reduced flow, outer thread with fitting, DN 50, Verschraub, Kvs 31,5 | 4231 2510 | C | 235,- |

Closing Pressure

| nominal size, Kvs-Value | | | | | actuator - max. closing pressure | | | | |
|---------------------------------|--------|------|--------------------|--------------------|----------------------------------|----------|----------|----------------------|----------|
| DN | G | Lift | standard | Nebenreihe | HM 2025 | HM 2040 | HM 2060X | HM 1090X HM 2090X | HM 1150X |
| [mm] | | [mm] | [m ^{3h}] | [m ^{3h}] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] |
| 15 | 1/2" | 14 | 4 | 0,63 | 3,8 | 7,9 | 15 | 16 | - |
| 15 | 1/2" | 14 | - | 1,25 | 3,8 | 7,9 | 15 | 16 | - |
| 15 | 1/2" | 14 | - | 1,6 | 3,8 | 7,9 | 15 | 16 | - |
| 15 | 1/2" | 14 | - | 2,5 | 3,8 | 7,9 | 15 | 16 | - |
| 20 | 3/4" | 14 | 6,3 | 5 | 2,9 | 6,3 | 12 | 16 | - |
| 25 | 1" | 14 | 10 | 8 | 1,4 | 3,5 | 7,3 | 12,3 | 16 |
| 32 | 1 1/4" | 14 | 16 | 12,5 | 0,5 | 1,9 | 4,2 | 7,4 | 13,5 |
| 40 | 1 1/2" | 14 | 25 | 20 | - | 0,9 | 2,5 | 4,6 | 8,5 |
| 50 | 2" | 14 | 40 | 31,5 | - | 0,4 | 1,4 | 2,7 | 5,5 |
| running time for 10 mm Lift [s] | | | | | 80 | 80 | 80 | 40; 80 | 40 |
| max Lift [mm] | | | | | 21 | 21 | 21 | 30* | 30* |
| max lift [N] | | | | | 250 | 400 | 600 | 900 | 1500 |
| Consumption [VA] | | | | | 5,5 | 5,5 | 5,5 | 10,4; 4,8 | 10,4 |
| Protection level | | | | | IP54 | IP54 | IP 54 | IP54 | IP54 |

*On this Type with feed-back potentiometer or continuous setting signal, the lift can be limited to 15 • 1 mm or 20 • 1 mm.

4.2.32 3-way valves

4.2.32.1 3-way valves, RG, PN16, up to 130°C, outer thread and Fittingsen, watertight dosure

The 3-way valves are used in water operated heating-, ventilation- and air conditioning- plants with temperature control. Features: Brass casing with threaded fittings. Valve closes watertight in both end-positions. Additional O-ring gasket allows the exchange of the bushing without emptying of the plant. Characteristic curve between ways A → AB constant in percent, B → AB linear, all kinds of Kvs values of standard and reduced flow. Optimized coupling of R+S lift actuator between valve and actuator.



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|---|-----------|----|-----------|
| RGV 315/4 | 3-way valve, standard flow, outer thread with fitting, DN 15, Kvs 4 | 4232 2000 | C | 108,- |
| RGV 320/6,3 | 3-way valve, standard flow, outer thread with fitting, DN 20, Kvs 6,3 | 4232 2100 | C | 110,- |
| RGV 325/10 | 3-way valve, standard flow, outer thread with fitting, DN 25, Kvs 10 | 4232 2200 | C | 125,- |
| RGV 332/16 | 3-way valve, standard flow, outer thread with fitting, DN 32, Kvs 16 | 4232 2300 | C | 150,- |
| RGV 340/25 | 3-way valve, standard flow, outer thread with fitting, DN 40, Kvs 25 | 4232 2400 | C | 185,- |
| RGV 350/40 | 3-way valve, standard flow, outer thread with fitting, DN 50, Kvs 40 | 4232 2500 | C | 235,- |
| RGV 315NR 0,63 | 3-way valve, reduced flow, outer thread with fitting, DN 15, Kvs 0,63 | 4232 2040 | C | 108,- |
| RGV 315NR 1,25 | 3-way valve, reduced flow, outer thread with fitting, DN 15, Kvs 1,25 | 4232 2060 | C | 108,- |
| RGV 315NR 1,6 | 3-way valve, reduced flow, outer thread with fitting, DN 15, Kvs 1,6 | 4232 2070 | C | 108,- |
| RGV 315NR 2,5 | 3-way valve, reduced flow, outer thread with fitting, DN 15, Kvs 2,5 | 4232 2090 | C | 108,- |
| RGV 320NR 5 | 3-way valve, reduced flow, outer thread with fitting, DN 20, Kvs 5 | 4232 2110 | C | 110,- |
| RGV 325NR 8 | 3-way valve, reduced flow, outer thread with fitting, DN 25, Kvs 8 | 4232 2210 | C | 125,- |
| RGV 332NR 12,5 | 3-way valve, reduced flow, outer thread with fitting, DN 32, Kvs 12,5 | 4232 2310 | C | 150,- |
| RGV 340NR 20 | 3-way valve, reduced flow, outer thread with fitting, DN 40, Kvs 20 | 4232 2410 | C | 185,- |
| RGV 350NR 31,5 | 3-way valve, reduced flow, outer thread with fitting, DN 50, Kvs 31,5 | 4232 2510 | C | 235,- |

Closing Pressure

| nominal size, Kvs-Value | | | | | actuator - max. closing pressure | | | | |
|---------------------------------|--------|------|---------------------|---------------------|----------------------------------|----------|----------|----------------------|----------|
| DN | G | Lift | standard | Nebenreihe | HM 2025 | HM 2040 | HM 2060X | HM 1090X HM 2090X | HM 1150X |
| [mm] | | [mm] | [m ^{3/h}] | [m ^{3/h}] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] |
| 15 | 1/2" | 14 | 4 | 0,63 | 3,8 | 7,9 | 15 | 16 | - |
| 15 | 1/2" | 14 | - | 1,25 | 3,8 | 7,9 | 15 | 16 | - |
| 15 | 1/2" | 14 | - | 1,6 | 3,8 | 7,9 | 15 | 16 | - |
| 15 | 1/2" | 14 | - | 2,5 | 3,8 | 7,9 | 15 | 16 | - |
| 20 | 3/4" | 14 | 6,3 | 5 | 2,9 | 6,3 | 12 | 16 | - |
| 25 | 1" | 14 | 10 | 8 | 1,4 | 3,5 | 7,3 | 12,3 | 16 |
| 32 | 1 1/4" | 14 | 16 | 12,5 | 0,5 | 1,9 | 4,2 | 7,4 | 13,5 |
| 40 | 1 1/2" | 14 | 25 | 20 | - | 0,9 | 2,5 | 4,6 | 8,5 |
| 50 | 2" | 14 | 40 | 31,5 | - | 0,4 | 1,4 | 2,7 | 5,5 |
| running time for 10 mm Lift [s] | | | | | 80 | 80 | 80 | 40; 80 | 40 |
| max Lift [mm] | | | | | 21 | 21 | 21 | 30* | 30* |
| max lift [N] | | | | | 250 | 400 | 600 | 900 | 1500 |
| Consumption [VA] | | | | | 5,5 | 5,5 | 5,5 | 10,4; 4,8 | 10,4 |
| Protection level | | | | | IP54 | IP54 | IP54 | IP54 | IP54 |

*On this Type with feed-back potentiometer or continuous setting signal, the lift can be limited to 15 • 1 mm or 20 • 1 mm.



4.2.4

Brass

4.2.4.2

3-way valves, Ms, inner thread, PN 16, up to 130°C, for actuators up to 600N

The 3-way valves are used in water operated heating-, ventilation- and air conditioning- plants with temperature control. When third way is blocked, this valve can also be used as a 2-way valve.

Features: Brass casing with inner thread, maintenance-free double-O-ring gasket. Additional O-ring gasket allows the exchange of the bushing without emptying of the plant. Characteristic curve between ways A → AB constant in percent, all kinds of Kvs values. Optimized coupling of R+S lift actuator between valve and actuator.



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|--|-----------|----|-----------|
| MVGX 315/3 | 3-way valve, inner thread, DN 15, Kvs 3 | 4242 3000 | C | 97,- |
| MVGX 320/6 | 3-way valve, inner thread, DN 20, Kvs 6 | 4242 3100 | C | 104,- |
| MVGX 325/9 | 3-way valve, inner thread, DN 25, Kvs 9 | 4242 3200 | C | 106,- |
| MVGX 332/14 | 3-way valve, inner thread, DN 32, Kvs 14 | 4242 3300 | C | 130,- |
| MVGX 315NR 1,5 | 3-way valve, reduced flow, inner thread, DN15, Kvs 1,5 | 4242 3070 | C | 112,- |

Closing Pressure

| nominal size, Kvs-Value | | | | | actuator - max. closing pressure | | |
|-------------------------|--------|------|----------|--------------|----------------------------------|----------|----------|
| DN | G | Lift | standard | reduced flow | HM 2025 | HM 2040 | HM 2060X |
| [mm] | | [mm] | [m³/h] | [m³/h] | Δp [bar] | Δp [bar] | Δp [bar] |
| 15 | 1/2" | 15 | 3 | 1,5 | 3,8 | 7,9 | 15 |
| 20 | 3/4" | 15 | 6 | - | 2,9 | 6,3 | 12,1 |
| 25 | 1" | 15 | 9 | - | 1,4 | 3,5 | 7,3 |
| 32 | 1 1/4" | 15 | 14 | - | 0,5 | 1,9 | 4,2 |
| running time [s/mm] | | | | | 8 | 8 | 8 |
| max Lift [mm] | | | | | 21 | 21 | 21 |
| max lift [N] | | | | | 250 | 400 | 600 |
| Consumption [VA] | | | | | 5,5 | 5,5 | 5,5 |
| Protection level | | | | | IP54 | IP54 | IP54 |

4

4.2.5

Nodular Cast Iron

4.2.5.1

2-way valves, GGG,PN25, PTFE-Gasket up to 200°C

The 2-way valves are used in water or steam operated heating-, ventilation- and air conditioning- plants with temperature control. Features: Nodular cast iron casing with flanges. Characteristic curve is constant in percent or in percent modified, linear on request. All kinds of Kvs values. Optimized coupling of R+S lift actuator between valve and actuator.

Special Types: -40 C up to 300 C, sizes DN 15 to 150.



| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|--|-----------|----|-----------|
| MVFSP 215/4 | 2-way valve, flange, DN 15, Kvs 4 | 4251 2000 | C | 558,- |
| MVFSP 220/6,3 | 2-way valve, flange, DN 20, Kvs 6,3 | 4251 2100 | C | 639,- |
| MVFSP 225/10 | 2-way valve, flange, DN 25, Kvs 10 | 4251 2200 | C | 653,- |
| MVFSP 232/16 | 2-way valve, flange, DN 32, Kvs 16 | 4251 2300 | C | 682,- |
| MVFSP 240/25 | 2-way valve, flange, DN 40, Kvs 25 | 4251 2400 | C | 709,- |
| MVFSP 250/40 | 2-way valve, flange, DN 50, Kvs 40 | 4251 2500 | C | 733,- |
| MVFSP 265/63 | 2-way valve, flange, DN 65, Kvs 63 | 4251 2600 | C | 1.228,- |
| MVFSP 280/100 | 2-way valve, flange, DN 80, Kvs 100 | 4251 2700 | C | 1.537,- |
| MVFSP 2100/160 | 2-way valve, flange, DN 100, Kvs 160 | 4251 2800 | C | 2.000,- |
| MVFSP 2125/250 | 2-way valve, flange, DN 125, Kvs 250 | 4251 2900 | C | 2.752,- |
| MVFSP 2150/400 | 2-way valve, flange, DN 150, Kvs 400 | 4251 3000 | C | 3.721,- |
| MVFSP 215NR 0,16 | 2-way valve, reduced flow, flange, DN 15, Kvs 0,16 | 4251 2010 | C | 639,- |
| MVFSP 215NR 0,25 | 2-way valve, reduced flow, flange, DN 15, Kvs 0,25 | 4251 2020 | C | 639,- |
| MVFSP 215NR 0,4 | 2-way valve, reduced flow, flange, DN 15, Kvs 0,4 | 4251 2030 | C | 639,- |
| MVFSP 215NR 0,63 | 2-way valve, reduced flow, flange, DN 15, Kvs 0,63 | 4251 2040 | C | 639,- |
| MVFSP 215NR 1,0 | 2-way valve, reduced flow, flange, DN 15, Kvs 1 | 4251 2050 | C | 639,- |
| MVFSP 215NR 1,25 | 2-way valve, reduced flow, flange, DN 15, Kvs 1,25 | 4251 2060 | C | 639,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|--|-----------|----|-----------|
| MVFSP 215NR 1,6 | 2-way valve, reduced flow, flange, DN 15, Kvs 1,6 | 4251 2070 | C | 639,- |
| MVFSP 215NR 2,5 | 2-way valve, reduced flow, flange, DN 15, Kvs 2,5 | 4251 2090 | C | 639,- |
| MVFSP 220NR 2,5 | 2-way valve, reduced flow, flange, DN 20, Kvs 2,5 | 4251 2110 | C | 742,- |
| MVFSP 220NR 4,0 | 2-way valve, reduced flow, flange, DN 20, Kvs 4 | 4251 2120 | C | 639,- |
| MVFSP 220NR 5,0 | 2-way valve, reduced flow, flange, DN 20, Kvs 5 | 4251 2130 | C | 742,- |
| MVFSP 225NR 5,0 | 2-way valve, reduced flow, flange, DN 25, Kvs 5 | 4251 2210 | C | 755,- |
| MVFSP 225NR 6,3 | 2-way valve, reduced flow, flange, DN 25, Kvs 6,3 | 4251 2220 | C | 653,- |
| MVFSP 225NR 8,0 | 2-way valve, reduced flow, flange, DN 25, Kvs 8 | 4251 2230 | C | 755,- |
| MVFSP 232NR 8,0 | 2-way valve, reduced flow, flange, DN 32, Kvs 8 | 4251 2310 | C | 792,- |
| MVFSP 232NR 10 | 2-way valve, reduced flow, flange, DN 32, Kvs 10 | 4251 2320 | C | 682,- |
| MVFSP 232NR 12,5 | 2-way valve, reduced flow, flange, DN 32, Kvs 12,5 | 4251 2330 | C | 792,- |
| MVFSP 240NR 12,5 | 2-way valve, reduced flow, flange, DN 40, Kvs 12,5 | 4251 2410 | C | 826,- |
| MVFSP 240NR 16 | 2-way valve, reduced flow, flange, DN 40, Kvs 16 | 4251 2420 | C | 709,- |
| MVFSP 240NR 20 | 2-way valve, reduced flow, flange, DN 40, Kvs 20 | 4251 2430 | C | 826,- |
| MVFSP 250NR 20 | 2-way valve, reduced flow, flange, DN 50, Kvs 20 | 4251 2510 | C | 859,- |
| MVFSP 250NR 25 | 2-way valve, reduced flow, flange, DN 50, Kvs 25 | 4251 2520 | C | 733,- |
| MVFSP 250NR 31,5 | 2-way valve, reduced flow, flange, DN 50, Kvs 31,5 | 4251 2530 | C | 859,- |
| MVFSP 265NR 31,5 | 2-way valve, reduced flow, flange, DN 65, Kvs 31,5 | 4251 2610 | C | 1.371,- |
| MVFSP 265NR 40 | 2-way valve, reduced flow, flange, DN 65, Kvs 40 | 4251 2620 | C | 1.228,- |
| MVFSP 265NR 50 | 2-way valve, reduced flow, flange, DN 65, Kvs 50 | 4251 2630 | C | 1.371,- |
| MVFSP 280NR 50 | 2-way valve, reduced flow, flange, DN 80, Kvs 50 | 4251 2710 | C | 1.694,- |
| MVFSP 280NR 63 | 2-way valve, reduced flow, flange, DN 80, Kvs 63 | 4251 2720 | C | 1.537,- |
| MVFSP 280NR 80 | 2-way valve, reduced flow, flange, DN 80, Kvs 80 | 4251 2730 | C | 1.694,- |
| MVFSP 2100NR 80 | 2-way valve, reduced flow, flange, DN 100, Kvs 80 | 4251 2810 | C | 2.156,- |
| MVFSP 2100NR 100 | 2-way valve, reduced flow, flange, DN 100, Kvs 100 | 4251 2820 | C | 2.000,- |
| MVFSP 2100NR 125 | 2-way valve, reduced flow, flange, DN 100, Kvs 125 | 4251 2830 | C | 2.156,- |
| MVFSP 2125NR 125 | 2-way valve, reduced flow, flange, DN 125, Kvs 125 | 4251 2910 | C | 2.925,- |
| MVFSP 2125NR 160 | 2-way valve, reduced flow, flange, DN 125, Kvs 160 | 4251 2920 | C | 2.752,- |
| MVFSP 2125NR 200 | 2-way valve, reduced flow, flange, DN 125, Kvs 200 | 4251 2930 | C | 2.925,- |
| MVFSP 2150NR 200 | 2-way valve, reduced flow, flange, DN 150, Kvs 200 | 4251 3010 | C | 3.894,- |
| MVFSP 2150NR 250 | 2-way valve, reduced flow, flange, DN 150, Kvs 250 | 4251 3020 | C | 3.721,- |
| MVFSP 2150NR 315 | 2-way valve, reduced flow, flange, DN 150, Kvs 315 | 4251 3030 | C | 3.894,- |

Nominal size DN 200/250/300 on request

Closing Pressure

| nominal size / Kvs-value | | | | actuator - max. closing pressure | | | | | |
|---------------------------------|------|--------------------|--------------|----------------------------------|----------------------|----------|----------|----------|----------|
| DN | Lift | Standard- reihe | reduced flow | HM 2060X | HM 1090X HM 2090X | HM 1150X | HM 2250X | HM 2500 | HM 2100 |
| [mm] | [mm] | [m³/h] | [m³/h] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] |
| 15 | 20 | 4 | 0,16 -2,5 | 5 | 9,5 | 23 | 25 | - | - |
| 20 | 20 | 6,3 | 2,5 - 5 | 5 | 9,5 | 23 | 25 | - | - |
| 25 | 20 | 10 | 5 - 8 | 4 | 7,5 | 19 | 25 | - | - |
| 32 | 20 | 16 | 8 - 12,5 | 2,5 | 4,5 | 11 | 22 | - | - |
| 40 | 20 | 25 | 12,5 - 20 | 1 | 2,5 | 6,5 | 14 | - | - |
| 50 | 30 | 40 | 20 -31,5 | - | - | 3,8 | 8,6 | - | - |
| 65 | 30 | 6,3 | 31,5 - 50 | - | - | 2 | 5,4 | - | - |
| 80 | 50 | 100 | 50 - 80 | - | - | - | - | 7,5 | 14 |
| 100 | 50 | 160 | 80 - 125 | - | - | - | - | 4,5 | 9 |
| 125 | 60 | 250 | 125 -200 | - | - | - | - | 2,5 | 4,5 |
| 150 | 60 | 400 | 200 -315 | - | - | - | - | 1,5 | 3 |
| running time for 10 mm Lift [s] | | | | 80 | 40; 80 | 40 | 80 | 25 | 10 |
| maximaler Lift [mm] | | | | 21 | 30* | 30* | 30* | 60 | 80 |
| max lift [N] | | | | 600 | 900 | 1500 | 2500 | 5000 | 10000 |
| Consumption [VA] | | | | 5,5 | 10,4; 4,8 | 10,4 | 10,4 | 4,7 | 70 |
| Protection level | | | | IP 54 | IP 54 | IP54 | IP 54 | IP 54 | IP 54 |

*On this Type with feed-back potentiometer or continuous setting signal, the lift can be limited to 15 • 1 mm or 20 • 1 mm.



4.2.52 3-way valves, GG, PN 25, PTFE-Gasket, up to 200°C

The 3-Way valves are used in water operated heating, district-heating- and air conditioning plants up to PN 25 with continuous temperature control. They have 3 ways, and can be used for mixing or distribution.

Features: Nodular cast iron casing, and all kinds of Kvs values, characteristic curve constant in percent or in percent modified, linear on request. Special Types -40 C up to 300 C. Optimized coupling of R+S lift actuator between valve and actuator.



| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|--|-----------|----|-----------|
| MVFSP 315/4 | 3-way valve, flange, DN 15, Kvs 4 | 4252 2000 | C | 699,- |
| MVFSP 320/6,3 | 3-way valve, flange, DN 20, Kvs 6,3 | 4252 2100 | C | 771,- |
| MVFSP 325/10 | 3-way valve, flange, DN 25, Kvs 10 | 4252 2200 | C | 816,- |
| MVFSP 332/16 | 3-way valve, flange, DN 32, Kvs 16 | 4252 2300 | C | 855,- |
| MVFSP 340/25 | 3-way valve, flange, DN 40, Kvs 25 | 4252 2400 | C | 889,- |
| MVFSP 350/40 | 3-way valve, flange, DN 50, Kvs 40 | 4252 2500 | C | 917,- |
| MVFSP 365/63 | 3-way valve, flange, DN 65, Kvs 63 | 4252 2600 | C | 1.302,- |
| MVFSP 380/100 | 3-way valve, flange, DN 80, Kvs 100 | 4252 2700 | C | 1.636,- |
| MVFSP 3100/160 | 3-way valve, flange, DN 100, Kvs 160 | 4252 2800 | C | 2.291,- |
| MVFSP 3125/250 | 3-way valve, flange, DN 125, Kvs 250 | 4252 2900 | C | 3.441,- |
| MVFSP 3150/400 | 3-way valve, flange, DN 150, Kvs 400 | 4252 3000 | C | 4.650,- |
| MVFSP 315NR 2,5 | 3-way valve, reduced flow, flange, DN 15, Kvs 2,5 | 4252 2090 | C | 699,- |
| MVFSP 320NR 2,5 | 3-way valve, reduced flow, flange, DN 20, Kvs 2,5 | 4252 2110 | C | 873,- |
| MVFSP 320NR 4,0 | 3-way valve, reduced flow, flange, DN 20, Kvs 4 | 4252 2120 | C | 873,- |
| MVFSP 320NR 5,0 | 3-way valve, reduced flow, flange, DN 20, Kvs 5 | 4252 2130 | C | 771,- |
| MVFSP 325NR 5,0 | 3-way valve, reduced flow, flange, DN 25, Kvs 5 | 4252 2210 | C | 918,- |
| MVFSP 325NR 6,3 | 3-way valve, reduced flow, flange, DN 25, Kvs 6,3 | 4252 2220 | C | 918,- |
| MVFSP 325NR 8,0 | 3-way valve, reduced flow, flange, DN 25, Kvs 8 | 4252 2230 | C | 816,- |
| MVFSP 332NR 8 | 3-way valve, reduced flow, flange, DN 32, Kvs 8 | 4252 2310 | C | 966,- |
| MVFSP 332NR 10 | 3-way valve, reduced flow, flange, DN 32, Kvs 10 | 4252 2320 | C | 966,- |
| MVFSP 332NR 12,5 | 3-way valve, reduced flow, flange, DN 32, Kvs 12,5 | 4252 2330 | C | 855,- |
| MVFSP 340NR 12,5 | 3-way valve, reduced flow, flange, DN 40, Kvs 12,5 | 4252 2410 | C | 1.006,- |
| MVFSP 340NR 16 | 3-way valve, reduced flow, flange, DN 40, Kvs 16 | 4252 2420 | C | 1.006,- |
| MVFSP 340NR 20 | 3-way valve, reduced flow, flange, DN 40, Kvs 20 | 4252 2430 | C | 889,- |
| MVFSP 350NR 20 | 3-way valve, reduced flow, flange, DN 50, Kvs 20 | 4252 2510 | C | 1.043,- |
| MVFSP 350NR 25 | 3-way valve, reduced flow, flange, DN 50, Kvs 25 | 4252 2520 | C | 1.043,- |
| MVFSP 350NR 31,5 | 3-way valve, reduced flow, flange, DN 50, Kvs 31,5 | 4252 2530 | C | 917,- |
| MVFSP 365NR 31,5 | 3-way valve, reduced flow, flange, DN 65, Kvs 31,5 | 4252 2610 | C | 1.445,- |
| MVFSP 365NR 40 | 3-way valve, reduced flow, flange, DN 65, Kvs 40 | 4252 2620 | C | 1.445,- |
| MVFSP 365NR 50 | 3-way valve, reduced flow, flange, DN 65, Kvs 50 | 4252 2630 | C | 1.302,- |
| MVFSP 380NR 50 | 3-way valve, reduced flow, flange, DN 80, Kvs 50 | 4252 2710 | C | 1.793,- |
| MVFSP 380NR 63 | 3-way valve, reduced flow, flange, DN 80, Kvs 63 | 4252 2720 | C | 1.793,- |
| MVFSP 380NR 80 | 3-way valve, reduced flow, flange, DN 80, Kvs 80 | 4252 2730 | C | 1.636,- |
| MVFSP 3100NR 80 | 3-way valve, reduced flow, flange, DN 100, Kvs 80 | 4252 2810 | C | 2.447,- |
| MVFSP 3100NR 100 | 3-way valve, reduced flow, flange, DN 100, Kvs 100 | 4252 2820 | C | 2.447,- |
| MVFSP 3100NR 125 | 3-way valve, reduced flow, flange, DN 100, Kvs 125 | 4252 2830 | C | 2.291,- |
| MVFSP 3125NR 125 | 3-way valve, reduced flow, flange, DN 125, Kvs 125 | 4252 2910 | C | 3.614,- |
| MVFSP 3125NR 160 | 3-way valve, reduced flow, flange, DN 125, Kvs 160 | 4252 2920 | C | 3.614,- |
| MVFSP 3125NR 200 | 3-way valve, reduced flow, flange, DN 125, Kvs 200 | 4252 2930 | C | 3.441,- |
| MVFSP 3150NR 200 | 3-way valve, reduced flow, flange, DN 150, Kvs 200 | 4252 3010 | C | 4.823,- |
| MVFSP 3150NR 250 | 3-way valve, reduced flow, flange, DN 150, Kvs 250 | 4252 3020 | C | 4.823,- |
| MVFSP 3150NR 315 | 3-way valve, reduced flow, flange, DN 150, Kvs 315 | 4252 3030 | C | 4.650,- |

Nominal size DN 200/250/300 on request

4

Closing Pressure

| nominal size / Kvs-value | | | | actuator - max. closing pressure | | | | | |
|---------------------------------|------|---------------------|---------------------|----------------------------------|----------------------|----------|----------|----------|----------|
| DN | Lift | Standard-reihe | reduced flow | HM 2060X | HM 1090X HM 2090X | HM 1150X | HM 2250X | HM 2500 | HM 2100 |
| [mm] | [mm] | [m ³ /h] | [m ³ /h] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] | Δp [bar] |
| 15 | 20 | 4 | 0,16 - 2,5 | 5 | 9,5 | 23 | 25 | - | - |
| 20 | 20 | 63 | 2,5 - 5 | 5 | 9,5 | 23 | 25 | - | - |
| 25 | 20 | 10 | 5 - 8 | 4 | 7,5 | 19 | 25 | - | - |
| 32 | 20 | 16 | 8 - 12,5 | 2,5 | 4,5 | 11 | 22 | - | - |
| 40 | 20 | 25 | 12,5 - 20 | 1 | 2,5 | 6,5 | 14 | - | - |
| 50 | 30 | 40 | 20 - 31,5 | - | - | 3,8 | 8,6 | - | - |
| 65 | 30 | 63 | 31,5 - 50 | - | - | 2 | 5,4 | - | - |
| 80 | 50 | 100 | 50 - 80 | - | - | - | - | 7,5 | 14 |
| 100 | 50 | 160 | 80 - 125 | - | - | - | - | 4,5 | 9 |
| 125 | 60 | 250 | 125 - 200 | - | - | - | - | 2,5 | 4,5 |
| 150 | 60 | 400 | 200 - 315 | - | - | - | - | 1,5 | 3 |
| running time for 10 mm Lift [s] | | | | 80 | 40; 80 | 40 | 80 | 25 | 10 |
| maximaler Lift [mm] | | | | 21 | 30* | 30* | 30* | 60 | 80 |
| max lift [N] | | | | 600 | 900 | 1500 | 2500 | 5000 | 10000 |
| Consumption [VA] | | | | 5,5 | 10,4; 4,8 | 10,4 | 10,4 | 47 | 70 |
| Protection level | | | | IP 54 | IP 54 | IP54 | IP 54 | IP 54 | IP 54 |

*On this Type with feed-back potentiometer or continuous setting signal, the lift can be limited to 15 • 1 mm or 20 • 1 mm.

4.2.10 Accessories

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|--|-----------|----|-----------|
| SPH24-0 | Spindle heating 24V AC, for RGV-, RGD- and valve HMVF- up to DN 50 | 4210 1000 | C | 174,- |
| SPH24-1 | Spindle heating 24V AC, for HMVF valves, DN 65 up to DN 100 | 4210 1100 | C | 263,- |

4.2.20 Special Types

4.2.20.1 Special Types for MVF...-Valves (add to price)

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|-----------|
| KD32 | Valve cone for 2-Way valve with pressure relieve DN 32 | 4220 1030 | C | 533,- |
| KD40 | Valve cone for 2-Way valve with pressure relieve DN 40 | 4220 1040 | C | 704,- |
| KD50 | Valve cone for 2-Way valve with pressure relieve DN 50 | 4220 1050 | C | 866,- |
| KD65 | Valve cone for 2-Way valve with pressure relieve DN 65 | 4220 1060 | C | 1.191,- |
| KD80 | Valve cone for 2-Way valve with pressure relieve DN 80 | 4220 1070 | C | 1.727,- |
| KD100 | Valve cone for 2-Way valve with pressure relieve DN 100 | 4220 1080 | C | 2.108,- |
| KD125 | Valve cone for 2-Way valve with pressure relieve DN 125 | 4220 1090 | C | 2.644,- |
| KD150 | Valve cone for 2-Way valve with pressure relieve DN 150 | 4220 1100 | C | 3.452,- |
| SS15-25 | Screwed-seat for 2-way valve DN 15-25 | 4220 1200 | C | 211,- |
| SS32 | Screwed-seat for 2-way valve DN 32 | 4220 1230 | C | 234,- |
| SS40 | Screwed-seat for 2-way valve DN 40 | 4220 1240 | C | 234,- |
| SS50 | Screwed-seat for 2-way valve DN 50 | 4220 1250 | C | 260,- |
| SS65 | Screwed-seat for 2-way valve DN 65 | 4220 1260 | C | 356,- |
| SS80 | Screwed-seat for 2-way valve DN 80 | 4220 1270 | C | 447,- |
| SS100 | Screwed-seat for 2-way valve DN 100 | 4220 1280 | C | 625,- |
| SS125 | Screwed-seat for 2-way valve DN 125 | 4220 1290 | C | 884,- |
| SS150 | Screwed-seat for 2-way valve DN 150 | 4220 1300 | C | 1.197,- |
| GSE-DG15-25 | watertight closure, upper and lower seat, for 2-way valve DN 15-25 | 4220 1400 | C | 162,- |
| GSE-DG32 | watertight closure, upper and lower seat, for 2-way valve DN 32 | 4220 1430 | C | 183,- |
| GSE-DG40 | watertight closure, upper and lower seat, for 2-way valve DN 40 | 4220 1440 | C | 203,- |
| GSE-DG50 | watertight closure, upper and lower seat, for 2-way valve DN 50 | 4220 1450 | C | 229,- |
| GSE-DG65 | watertight closure, upper and lower seat, for 2-way valve DN 65 | 4220 1460 | C | 287,- |
| GSE-DG80 | watertight closure, upper and lower seat, for 2-way valve DN 80 | 4220 1470 | C | 321,- |
| GSE-DG100 | watertight closure, upper and lower seat, for 2-way valve DN 100 | 4220 1480 | C | 365,- |

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| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|-----------|
| GSE-DG125 | watertight closure, upper and lower seat, for 2-way valve DN 125 | 4220 1490 | C | 481,- |
| GSE-DG150 | watertight closure, upper and lower seat, for 2-way valve DN 150 | 4220 1500 | C | 739,- |
| GSE-DW15-25 | watertight closure, upper and lower seat, for 3-way valve DN 15-25 | 4220 1600 | C | 272,- |
| GSE-DW32 | watertight closure, upper and lower seat, for 3-way valve DN 32 | 4220 1630 | C | 293,- |
| GSE-DW40 | watertight closure, upper and lower seat, for 3-way valve DN 40 | 4220 1640 | C | 313,- |
| GSE-DW50 | watertight closure, upper and lower seat, for 3-way valve DN 50 | 4220 1650 | C | 356,- |
| GSE-DW65 | watertight closure, upper and lower seat, for 3-way valve DN 65 | 4220 1660 | C | 438,- |
| GSE-DW80 | watertight closure, upper and lower seat, for 3-way valve DN 80 | 4220 1670 | C | 501,- |
| GSE-DW100 | watertight closure, upper and lower seat, for 3-way valve DN 100 | 4220 1680 | C | 585,- |
| GSE-DW125 | watertight closure, upper and lower seat, for 3-way valve DN 125 | 4220 1690 | C | 786,- |
| GSE-DW150 | watertight closure, upper and lower seat, for 3-way valve DN 150 | 4220 1700 | C | 1.151,- |
| LK15-25 | Perforated control cone for 2-way valve DN 15-25 | 4220 1810 | C | 116,- |
| LK32 | Perforated control cone for 2-way valve DN 32 | 4220 1830 | C | 133,- |
| LK40 | Perforated control cone for 2-way valve DN 40 | 4220 1840 | C | 133,- |
| LK50 | Perforated control cone for 2-way valve DN 50 | 4220 1850 | C | 150,- |
| LK65 | Perforated control cone for 2-way valve DN 65 | 4220 1860 | C | 290,- |
| LK80 | Perforated control cone for 2-way valve DN 80 | 4220 1870 | C | 356,- |
| LK100 | Perforated control cone for 2-way valve DN 100 | 4220 1880 | C | 533,- |
| LK125 | Perforated control cone for 2-way valve DN 125 | 4220 1890 | C | 710,- |
| LK150 | Perforated control cone for 2-way valve DN 150 | 4220 1900 | C | 861,- |
| SBT100-0 | Bushing gasket with 100 mm extension, DN 15-100 | 4220 0100 | C | 379,- |
| SBT100-1 | Bushing gasket with 100 mm extension, DN 125-150 | 4220 0110 | C | 519,- |
| SBT200-0 | Bushing gasket with 200 mm extension, DN 15-100 | 4220 0200 | C | 557,- |
| SBT200-1 | Bushing gasket with 200 mm extension, DN 125-150 | 4220 0210 | C | 762,- |

4.2.20.2

Special Accessories for RGV- and HMVF-Valves (add to price)

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|--|-----------|----|-----------|
| KK15-25 | Control cone of CrNi-steel, for RGV- and HMVF-Valves, DN 15-25 | 4220 2000 | C | 78,- |
| KK32-50 | Control cone of CrNi-steel, for RGV- and HMVF-Valves, DN 32-50 | 4220 2200 | C | 87,- |
| KK65 | Control cone of CrNi-steel, for HMVF-Valves, DN 65 | 4220 2600 | C | 101,- |
| KK80 | Control cone of CrNi-steel, for HMVF-Valves, DN 80 | 4220 2700 | C | 116,- |
| KK100 | Control cone of CrNi-steel, for HMVF-Valves, DN 100 | 4220 2800 | C | 139,- |

4.2.20.3

Domestic Hot Water Series, RGV-Valves (add to price)

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| BA-RGV15 | Domestic hot water series for RGV-Valve DN 15 | 4220 3000 | C | 241,- |
| BA-RGV20 | Domestic hot water series for RGV-Valve DN 20 | 4220 3100 | C | 258,- |
| BA-RGV25 | Domestic hot water series for RGV-Valve DN 25 | 4220 3200 | C | 278,- |
| BA-RGV32 | Domestic hot water series for RGV-Valve DN 32 | 4220 3300 | C | 344,- |
| BA-RGV40 | Domestic hot water series for RGV-Valve DN 40 | 4220 3400 | C | 374,- |
| BA-RGV50 | Domestic hot water series for RGV-Valve DN 50 | 4220 3500 | C | 421,- |

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4.3 Flipper valves93

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4.3.1 Flipper valves with flange connection

4.3.1.1 3-way flipper valves, flange connection, PN 6

3-Way flipper valves are used for temperature control in hot-water central heating plants by mixing hot flow water with colder return water. Hand- and motor-operation is possible. They are used with differential pressure of a maximum of 0,5 bar. Features: Solid cast iron casing, flange connection, linear characteristic curve, maintenance free O-ring gasket.



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|---|-----------|----|-----------|
| FM 332 | 3-way flipper valves, cast iron, flange, DN 32 | 4361 1100 | C | 115,- |
| FM 340 | 3-way flipper valves, cast iron, flange, DN 40 | 4361 1200 | C | 117,- |
| FM 350 | 3-way flipper valves, cast iron, flange, DN 50 | 4361 1300 | C | 147,- |
| FM 365 | 3-way flipper valves, cast iron, flange, DN 65 | 4361 1400 | C | 171,- |
| FM 380 | 3-way flipper valves, cast iron, flange, DN 80 | 4361 1500 | C | 232,- |
| FM 3100 | 3-way flipper valves, cast iron, flange, DN 100 | 4361 1600 | C | 281,- |
| FM 3125 | 3-way flipper valves, cast iron, flange, DN 125 | 4361 1700 | C | 415,- |

You can find suitable actuators SM 4018 or SM 4020 in chapter 4.1.2

4.3.1.2 4-way flipper valves, flange connection, PN 6

4-Way flipper valves are used for mixing hot water in central controlled heating systems. The 4-way-flipper valve enables the control of the flow temperature and simultaneously the control of the return temperature to the boiler (preventing the return temperature to get below the dew point and therefore preventing corrosion inside the boiler). Hand- and motor-operation is possible. They are used with differential pressure of a maximum of 0,5 bar. **Merkmale** see 3-way flipper valves above.



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|---|-----------|----|-----------|
| FM 432 | 4-way flipper valves, cast iron, flange, DN 32 | 4261 2100 | C | 119,- |
| FM 440 | 4-way flipper valves, cast iron, flange, DN 40 | 4261 2200 | C | 121,- |
| FM 450 | 4-way flipper valves, cast iron, flange, DN 50 | 4261 2300 | C | 147,- |
| FM 465 | 4-way flipper valves, cast iron, flange, DN 65 | 4261 2400 | C | 183,- |
| FM 480 | 4-way flipper valves, cast iron, flange, DN 80 | 4261 2500 | C | 256,- |
| FM 4100 | 4-way flipper valves, cast iron, flange, DN 100 | 4261 2600 | C | 293,- |
| FM 4125 | 4-way flipper valves, cast iron, flange, DN 125 | 4261 2700 | C | 670,- |

You can find suitable actuators SM 4018 or SM 4020 in chapter 4.1.2

4

4.3.2 Flipper valves with inner thread

4.3.2.1 3-way flipper valves, Cast Iron, inner thread, PN 6

3-Way flipper valves are used for temperature control in hot-water central heating plants by mixing hot flow water with colder return water. Hand- and motor-operation is possible. They are used with differential pressure of a maximum of 0,5 bar. **Features:** Solid cast iron casing, linear characteristic heating curve, maintenance free O-ring gasket.



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|--|-----------|----|-----------|
| GM 320 | 3-way flipper valves, cast iron, inner thread, DN 20 | 4362 1100 | C | 87,- |
| GM 325 | 3-way flipper valves, cast iron, inner thread, DN 25 | 4362 1200 | C | 88,- |
| GM 332 | 3-way flipper valves, cast iron, inner thread, DN 32 | 4362 1300 | C | 91,- |
| GM 340 | 3-way flipper valves, cast iron, inner thread, DN 40 | 4362 1400 | C | 99,- |
| GM 350 | 3-way flipper valves, cast iron, inner thread, DN 50 | 4362 1500 | C | 120,- |
| GM 365 | 3-way flipper valves, cast iron, inner thread, DN 65 | 4362 1600 | C | 174,- |

You can find suitable actuators SM 4018 or SM 4020 in chapter 4.1.2

4.3.2.2 4-way flipper valves, Cast Iron with inner thread, PN 6

4-Way flipper valves are used for mixing hot water in central controlled heating systems. The 4-way-flipper valve enables the control of the flow temperature and simultaneously the control of the return temperature to the boiler (preventing the return temperature to get below the dew point and therefore preventing corrosion inside the boiler). Hand- and motor-operation is possible. They are used with differential pressure of a maximum of 0,5 bar. **Features:** see 3-way flipper valves with inner thread above.



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|--|-----------|----|-----------|
| GM 420 | 4-way flipper valves, cast iron, inner thread, DN 20 | 4362 2100 | C | 86,- |
| GM 425 | 4-way flipper valves, cast iron, inner thread, DN 25 | 4362 2200 | C | 87,- |
| GM 432 | 4-way flipper valves, cast iron, inner thread, DN 32 | 4362 2300 | C | 91,- |
| GM 440 | 4-way flipper valves, cast iron, inner thread, DN 40 | 4362 2400 | C | 98,- |
| GM 450 | 4-way flipper valves, cast iron, inner thread, DN 50 | 4362 2500 | C | 109,- |
| GM 465 | 4-way flipper valves, cast iron, inner thread, DN 65 | 4362 2600 | C | 185,- |

You can find suitable actuators SM 4018 or SM 4020 in chapter 4.1.2

4.3.4 compact flipper valves

4.3.4.1 3-way-compact flipper valves with inner thread, brass , PN 10

3-Way flipper valves are used for temperature control in hot-water central heating plants by mixing hot flow water with colder return water. Hand- and motor-operation is possible. They are used with differential pressure of a maximum of 0,5 bar. **Features:** Solid brass casing, inner thread acc. to ISO 7/1, Medium: Cold and/or hot water with max 50% corrosion protection fluid: Glykole, Ethyleneglykole, Propylenglykole, Monoäthylene, Ethanole, Methanole, Glycerine, Antifrogene N+L, leakage rate: EN 1349, seat I (<= 2% of kvs-value), linear characteristic curve, casing and inner parts in brass CW617N, gasket with O-ring in EPDM, 0..+110°C



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|-----------|
| G 320/4 MS | 3-way-compact flipper valves, brass, inner thread, DN 20, Kvs 4 | 4341 0100 | C | 54,- |
| G 320/6 MS | 3-way-compact flipper valves, brass, inner thread, DN 20, Kvs 6 | 4341 0110 | C | 54,- |
| G 325/12 MS | 3-way-compact flipper valves, brass, inner thread, DN 25, Kvs 12 | 4341 0200 | C | 59,- |
| G 332/18 MS | 3-way-compact flipper valves, brass, inner thread, DN 32, Kvs 18 | 4341 0300 | C | 65,- |
| G 340/28 MS | 3-way-compact flipper valves, brass, inner thread, DN 40, Kvs 28 | 4341 0400 | C | 125,- |
| G 350/44 MS | 3-way-compact flipper valves, brass, inner thread, DN 50, Kvs 44 | 4341 0500 | C | 130,- |

You can find the suitable actuator SM 2010 or SM 4007 and the console in chapter 4.1.2

4

4.3.42 4-way-compact flipper valves with inner thread, brass , PN 10

4-Way flipper valves are used for mixing hot water in central controlled heating systems. The 4-way-flipper valve enables the control of the flow temperature and simultaneously the control of the return temperature to the boiler (preventing the return temperature to get below the dew point and therefore preventing corrosion inside the boiler). Hand- and motor-operation is possible. They are used with differential pressure of a maximum of 0,5 bar. **Features:** Solid brass casing, inner thread according to ISO 7/1, Medium: Cold and/or hot water with max 50% corrosion protection fluid: Glykole, Ethyleneglykole, Propylenglykole, Monoäthylene, Ethanole, Methanole, Glycerine, Antifrogene N+L, leakage rate: EN 1349, seat I ($\leq 2\%$ of kvs-value), linear characteristic curve, casing and inner parts in brass CW617N, gasket with O-ring in EPDM 0..+110°C



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|-----------|
| G 420/4 MS | 4-way-compact flipper valves, brass, inner thread, DN 20, Kvs 4 | 4342 0100 | C | 58,- |
| G 420/6 MS | 4-way-compact flipper valves, brass, inner thread, DN 20, Kvs 6 | 4342 0110 | C | 58,- |
| G 425/12 MS | 4-way-compact flipper valves, brass, inner thread, DN 25. Kvs 12 | 4342 0200 | C | 65,- |
| G 432/18 MS | 4-way-compact flipper valves, brass, inner thread, DN 32, Kvs 18 | 4342 0300 | C | 70,- |
| G 440/28 MS | 4-way-compact flipper valves, brass, inner thread, DN 40, Kvs 28 | 4342 0400 | C | 130,- |
| G 450/44 MS | 4-way-compact flipper valves, brass, inner thread, DN 50, Kvs 44 | 4342 0500 | C | 138,- |

You can find the suitable actuator SM 2010 or SM 4007 and the console in chapter 4.12

4.3.43 3-way-compact flipper valves, Cast Iron , PN 6

3-Way flipper valves are used for temperature control in hot-water central heating plants by mixing hot flow water with colder return water. Hand- and motor-operation is possible. They are used with differential pressure of a maximum of 0,5 bar. **Features:** Solid cast iron casing, inner thread according to ISO 7/1, Medium: cold- and warm water



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|-----------|
| GM 320/K | 3-way-compact flipper valves, cast iron, inner thread, DN 20, Kvs 20 | 4363 1100 | C | 66,- |
| GM 325/K | 3-way-compact flipper valves, cast iron, inner thread, DN 25. Kvs 22 | 4363 1200 | C | 67,- |
| GM 332/K | 3-way-compact flipper valves, cast iron, inner thread, DN 32, Kvs 25 | 4363 1300 | C | 70,- |
| GM 340/K | 3-way-compact flipper valves, cast iron, inner thread, DN 40, Kvs 25 | 4363 1400 | C | 76,- |

You can find the suitable actuator SM 4007 and the console in chapter 4.12

4.3.44 4-way-compact flipper valves, Cast Iron , PN 6

4-Way flipper valves are used for mixing hot water in central controlled heating systems. The 4-way-flipper valve enables the control of the flow temperature and simultaneously the control of the return temperature to the boiler (preventing the return temperature to get below the dew point and therefore preventing corrosion inside the boiler). Hand- and motor-operation is possible. They are used with differential pressure of a maximum of 0,5 bar. **Features:** Solid cast iron casing, inner thread according to ISO 7/1, Medium: cold- and warm water



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|-----------|
| GM 420/K | 4-way-compact flipper valves, cast iron, inner thread, DN 20, Kvs 20 | 4363 2100 | C | 65,- |
| GM 425/K | 4-way-compact flipper valves, cast iron, inner thread, DN 25. Kvs 22 | 4363 2200 | C | 66,- |
| GM 432/K | 4-way-compact flipper valves, cast iron, inner thread, DN 32, Kvs 25 | 4363 2300 | C | 70,- |
| GM 440/K | 4-way-compact flipper valves, cast iron, inner thread, DN 40, Kvs 25 | 4363 2400 | C | 75,- |

You can find the suitable actuator SM 4007 and the console in chapter 4.12

4

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4.4.2 Throttle-/shut-off valves, Cast Iron, watertight closure, PN 6 / 16



The throttle valve is used in heating-, ventilation- and air conditioning plants as shut-off or throttle valve in multi-boiler plants and in water supply lines of all kinds in the industries: Absolute watertight shut-off through elastic gaskets. It needs very little space, low on weight, low on torque, very reliable through simple construction, maintenance-free operation. Almost constant control characteristic between 20 - 70 opening angle, little pressure loss. Simple mounting between flanges PN 6, PN 10 or PN 16

4.4.2.1 Throttle-/shut-off valves, Cast Iron, watertight closure PN 6/16 up to 10 bar

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|---|-----------|----|-----------|
| MAK 220/10 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 20, inclusive mounting set MAS MAK 20-65, up to 10 bar | 4421 2100 | C | 206,- |
| MAK 225/10 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 25, inclusive mounting set MAS MAK 20-65, up to 10 bar | 4421 2200 | C | 206,- |
| MAK 232/10 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 32, inclusive mounting set MAS MAK 20-65, up to 10 bar | 4421 2300 | C | 213,- |
| MAK 240/10 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 40, inclusive mounting set MAS MAK 20-65, up to 10 bar | 4421 2400 | C | 238,- |
| MAK 250/10 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 50, inclusive mounting set MAS MAK 20-65, up to 10 bar | 4421 2500 | C | 254,- |
| MAK 265/10 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 65, inclusive mounting set MAS MAK 20-65, up to 10 bar | 4421 2600 | C | 266,- |
| MAK 280/10 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 80, inclusive mounting set MAS MAK 80-150, up to 10 bar | 4421 2700 | C | 313,- |
| MAK 2100/10 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 100, inclusive mounting set MAS MAK 80-150, up to 10 bar | 4421 2800 | C | 345,- |
| MAK 2125/10 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 125, up to 10 bar | 4421 2900 | C | 405,- |
| MAK 2150/10 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 150, up to 10 bar | 4421 3000 | C | 520,- |
| MAK 2125/6 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 125, up to 6 bar | 4421 2080 | C | 480,- |
| MAK 2150/3 | Throttle-/shut-off valve, Cast Iron, watertight closure, PN 6/16, DN 150, up to 3 bar | 4421 2090 | C | 499,- |

Throttle-/shut-off valves and actuators

| DN | Kvs-value [m ³ /h] | SM 500 Δp [bar] | SM 1500 Δp [bar] | SM 6025 Δp [bar] | SM 6000 Δp [bar] | SM E60 Δp [bar] |
|------------------|----------------------------------|--------------------|---------------------|---------------------|---------------------|--------------------|
| 20 | 32 | 10 | 10 | 10 | 10 | - |
| 25 | 36 | 10 | 10 | 10 | 10 | - |
| 32 | 40 | 10 | 10 | 10 | 10 | - |
| 40 | 50 | - | 10 | 10 | 10 | - |
| 50 | 85 | - | 10 | 10 | 10 | - |
| 65 | 215 | - | - | 10 | 10 | - |
| 80 | 420 | - | - | - | 10 | - |
| 100 | 800 | - | - | - | 10 | - |
| 125 | 1010 | - | - | - | 6 | 10 |
| 150 | 2100 | - | - | - | 3 | 10 |
| running time | [min / 90°] | 0,5 | 1,5 | 6 | 6 | 0,1 |
| Setting angle | max | 270° | 270° | 270° | 270° | 90 |
| max torque | [Nm] | 7,8 | 20 | 25 | 40 | 100 |
| Consumption | [VA] | 3,9 | 3,9 | 3,9 | 3,9 | 160 |
| Protection level | | IP 44 | IP 44 | IP 44 | IP 44 | IP 65 |

* Larger Δp on request

| | | |
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4.5.1 Red Brass 2-way valves for actuator with safety function, approved by „TÜV“, up to 150°C

These valves with safety functions operate with water or steam according DIN 4751 and /or DIN 4752. They are admitted with an electric actuator according DIN 32730. The unit is used for temperature control in district heating heat-exchange stations or steam humidifier. The actuator is provided with a sudden shut-off function when power supply fails.

Features: Valve brass casing, DN 15 up to DN 50, permissible pressure PN 25, fittings with welding possibility, control characteristic constant in percent, large temperature range, use in systems with cold or hot water, condensed liquids with frost and corrosion additives, glycol, ethylene glycol, propylene glycol, mono-ethylene, ethanol, methanol, glycerol, antifrogen N+L, neutral liquids, gases, steam or oils



4.5.1.5.1 RG PN 25, 2-way valves for actuator 500N, approved by „TÜV“

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|--|-----------|----|-----------|
| RG 215/4,0 | 2-way valve DN 15, Kvs 4,0; for electric actuator with safety function | 4501 5000 | C | 132,- |
| RG 220/6,3 | 2-way valve DN 20, Kvs 6,3; for electric actuator with safety function | 4501 5100 | C | 236,- |
| RG 225/8,0 | 2-way valve DN 25, Kvs 8,0; for electric actuator with safety function | 4501 5200 | C | 241,- |
| RG 232/16 | 2-way valve DN 32, Kvs 16; for electric actuator with safety function | 4501 5300 | C | 361,- |
| RG 240/20 | 2-way valve DN 40, Kvs 20; for electric actuator with safety function | 4501 5400 | C | 409,- |
| RG 250/25 | 2-way valve DN 50, Kvs 25; for electric actuator with safety function | 4501 5500 | C | 445,- |
| RG 215NR 0,1 | 2-way valve, reduced flow, DN 15, Kvs 0,1; for electric actuator with safety function | 4501 5010 | C | 132,- |
| RG 215NR 0,16 | 2-way valve, reduced flow, DN 15, Kvs 0,16; for electric actuator with safety function | 4501 5020 | C | 132,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|--|-----------|----|-----------|
| RG 215NR 0,25 | 2-way valve, reduced flow, DN 15, Kvs 0,25; for electric actuator with safety function | 4501 5030 | C | 132,- |
| RG 215NR 0,4 | 2-way valve, reduced flow, DN 15, Kvs 0,4; for electric actuator with safety function | 4501 5040 | C | 132,- |
| RG 215NR 0,63 | 2-way valve, reduced flow, DN 15, Kvs 0,63; for electric actuator with safety function | 4501 5050 | C | 132,- |
| RG 215NR 1,0 | 2-way valve, reduced flow, DN 15, Kvs 1,0; for electric actuator with safety function | 4501 5060 | C | 132,- |
| RG 215NR 1,6 | 2-way valve, reduced flow, DN 15, Kvs 1,6; for electric actuator with safety function | 4501 5070 | C | 132,- |
| RG 215NR 2,5 | 2-way valve, reduced flow, DN 15, Kvs 2,5; for electric actuator with safety function | 4501 5080 | C | 132,- |
| RG 220NR 1,0 | 2-way valve, reduced flow, DN 20, Kvs 1,0; for electric actuator with safety function | 4501 5110 | C | 236,- |
| RG 220NR 1,6 | 2-way valve, reduced flow, DN 20, Kvs 1,6; for electric actuator with safety function | 4501 5120 | C | 236,- |
| RG 220NR 2,5 | 2-way valve, reduced flow, DN 20, Kvs 2,5; for electric actuator with safety function | 4501 5130 | C | 236,- |
| RG 220NR 4,0 | 2-way valve, reduced flow, DN 20, Kvs 4,0; for electric actuator with safety function | 4501 5140 | C | 236,- |
| RG 225NR 1,0 | 2-way valve, reduced flow, DN 25, Kvs 1,0; for electric actuator with safety function | 4501 5210 | C | 241,- |
| RG 225NR 1,6 | 2-way valve, reduced flow, DN 25, Kvs 1,6; for electric actuator with safety function | 4501 5220 | C | 241,- |
| RG 225NR 2,5 | 2-way valve, reduced flow, DN 25, Kvs 2,5; for electric actuator with safety function | 4501 5230 | C | 241,- |
| RG 225NR 4,0 | 2-way valve, reduced flow, DN 25, Kvs 4,0; for electric actuator with safety function | 4501 5250 | C | 241,- |



4.5.15.2 Actuator for RG... Valves TÜV 500N

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|---|-----------|----|-----------|
| MFR 50-7,5 | Lifting actuator with safety function for RG... Valves DN 15 – 25, 500N | 4105 4000 | C | 323,- |
| MFR 50-12 | Lifting actuator with safety function for RG... Valves DN 32 – 50, 500N | 4105 4100 | C | 367,- |
| MFR 50-7,5 SR 24 | Lifting actuator with safety function for RG... Valves DN 15 – 25, 500N positioning controller, 0-10V | 4105 4010 | C | 500,- |
| MFR 50-12 SR 24 | Lifting actuator with safety function for RG... Valves DN 32 – 50, 500N positioning controller, 0-10V | 4105 4110 | C | 544,- |

4.5.15.3 Threaded fittings, fittings for welding, flange for RG... Valves

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|-----------|
| RG-AG 15 | threaded fittings DN 15 for RG... Valves (complete set) | 4501 6000 | C | 19,- |
| RG-AG 20 | threaded fittings DN 20 for RG... Valves (complete set) | 4501 6010 | C | 33,- |
| RG-AG 25 | threaded fittings DN 25 for RG... Valves (complete set) | 4501 6020 | C | 41,- |
| RG-AG 32 | threaded fittings DN 32 for RG... Valves (complete set) | 4501 6030 | C | 64,- |
| RG-AG 40 | threaded fittings DN 40 for RG... Valves (complete set) | 4501 6040 | C | 86,- |
| RG-AG 50 | threaded fittings DN 50 for RG... Valves (complete set) | 4501 6050 | C | 121,- |
| RG-A 15 | fittings for welding DN 15 for RG... Valves (complete set) | 4501 6100 | C | 19,- |
| RG-A 20 | fittings for welding DN 20 for RG... Valves (complete set) | 4501 6110 | C | 33,- |
| RG-A 25 | fittings for welding DN 25 for RG... Valves (complete set) | 4501 6120 | C | 41,- |
| RG-A 32 | fittings for welding DN 32 for RG... Valves (complete set) | 4501 6130 | C | 64,- |
| RG-A 40 | fittings for welding DN 40 for RG... Valves (complete set) | 4501 6140 | C | 86,- |
| RG-A 50 | fittings for welding DN 50 for RG... Valves (complete set) | 4501 6150 | C | 121,- |
| RG-F 15 | flange DN 15 for RG... Valves (complete set) | 4501 6200 | C | 129,- |
| RG-F 20 | flange DN 20 for RG... Valves (complete set) | 4501 6210 | C | 152,- |
| RG-F 25 | flange DN 25 for RG... Valves (complete set) | 4501 6220 | C | 170,- |
| RG-F 32 | flange DN 32 for RG... Valves (complete set) | 4501 6230 | C | 190,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|--|-----------|----|-----------|
| RG-F 40 | flange DN 40 for RG... Valves (complete set) | 4501 6240 | C | 194,- |
| RG-F 50 | flange DN 50 for RG... Valves (complete set) | 4501 6250 | C | 227,- |

Please consider when you order:

One unit consists of RG...-Valve + Motor (MFR...) + set of fittings (threaded fittings, fittings for welding or flange)

Further Types with electro-hydraulic actuators on request. Selection according to the following summary.

4.5.18 Red Brass, 2-way valves with actuator 800N, approved by „TÜV“, up to 150°C

4.5.2 Cast Iron, 2-way valves with actuator, approved by „TÜV“, up to 200°C

- 4.5.2.1 2-way valves with actuator 800N
- 4.5.2.2 2-way valves with actuator 2000N
- 4.5.2.3 2-way valves with actuator 2000N, pressure relief

4.5.3 Nodular Cast Iron, 2-way valves with actuator, approved by „TÜV“, up to 200°C

- 4.5.3.1 2-way valves with actuator 800N
- 4.5.3.2 2-way valves with actuator 2000N
- 4.5.3.3 2-way valves with actuator 2000N, pressure relief

4.5.4 Cast Steel, 2-way valves with actuator, approved by „TÜV“, up to 200°C

- 4.5.4.1 2-way valves with actuator 800N
- 4.5.4.2 2-way valves with actuator 2000N
- 4.5.4.3 2-way valves with actuator 2000N, pressure relief

4.5.6 Ball Valve with actuator with safety function

4.5.6.1 Ball Valve with inner thread, actuator with safety function



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|-----------|----|-----------|
| KHSF I215 | 2-Way Ball Valve, DN 15, with actuator 4NM with spring return, closed without power supply | 4506 1000 | C | 251,- |
| KHSF I220 | 2-Way Ball Valve, DN 20, with actuator 4NM with spring return, closed without power supply | 4506 0200 | C | 256,- |
| KHSF I225 | 2-Way Ball Valve, DN 25, with actuator 4NM with spring return, closed without power supply | 4506 0300 | C | 272,- |
| KHSF I232 | 2-Way Ball Valve, DN 32, with actuator 4NM with spring return, closed without power supply | 4506 0400 | C | 287,- |



| | | | |
|------------|---|-------|-----|
| 4.6 | Zone valves | | 100 |
| 4.6.1 | Brass | | 100 |
| 4.6.1.1 | 2-way-zone valves, PN 20, up to 95°C | | 100 |
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4.6.1 Brass

4.6.1.1 2-way-zone valve, PN 20, up to 95°C



The 2-way zone valve operates with a room thermostat in order to control space temperatures.

The zone valves have a spring-loaded return and regulate with a 2-point controller. Without power supply the valves are closed, but can be set manually into to "open" position and locked there. This locked position will be neutralized, when the valve will be completely opened by the actuator. The marking "A" and "B" are foand on the anderside of the valve casing.

Features: Watertight closure, low running noise, maintenance-free shaft gaskets, easy service, manual operation possible.

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|---|-----------|----|-----------|
| ZVM 215 | 2-way-zone valve, inner thread, DN 15, Kvs 2,2 | 4611 2000 | C | 26,- |
| ZVM 220 | 2-way-zone valve, inner thread, DN 20, Kvs 2,2 | 4611 2100 | C | 33,- |
| ZVM 225 | 2-way-zone valve, inner thread, DN 25, Kvs 6,9 | 4611 2200 | C | 53,- |

You will a suitable actuator in chapter 4.6.25

4.6.12 3-way-zone valves, PN 20, up to 95°C



The 3-way zone valve operates with a room thermostat in order to control space temperatures.

The zone valves have a spring-loaded return and regulate with a 2-point controller. Without power supply the val but can be set manually into "open" position and locked there. The inner control plug will be set in the middle position and "AB-A" and "AB-B" are open. This locked position will be neutralized, when the valve will be completely opened by the actuator. The marking "A" and "B" are foand on the anderside of the valve casing.

Features: Watertight closure, low running noise, maintenance-free shaft gaskets, easy service, manual operation possible.

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|--|-----------|----|-----------|
| ZVM 315 | 3-way-zone valve, inner thread, DN 15, Kvs 3,4 | 4612 2000 | C | 39,- |
| ZVM 320 | 3-way-zone valve , inner thread, DN 20, Kvs 4,3 | 4612 2100 | C | 40,- |
| ZVM 325 | 3-way-zone valve, inner thread, DN 25, Kvs 6,5 | 4612 2200 | C | 52,- |

You will a suitable actuator in chapter 4.6.25

4.6.13 Actuators for zone valves ZVM



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|--|-----------|----|-----------|
| RAH 24 | actuator for zone valve ZVM, 24 V / 50 Hz | 4611 2400 | C | 69,- |
| RAH 230 | actuator for zone valve ZVM, 230 V / 50 Hz | 4611 2300 | C | 69,- |

4.6.2 Red Brass

4.6.2.1.1 2-way-zone valves, PN 10, 100°C

2-Way zone valves ZV 2 .. are used in 2-line pump heating circuits. With normal temperature range. The valve Types ZV 2.../V allow the presetting of the Kvs value with readable settings and can therefore be used in 2-line pump-heating circuits with higher temperature ranges.. As actuators the Types ZHM... and ZHMT... can be used. Features: Low price brass valve for space zone control and single room control. Also thermal or electric actuators for 3-point or continuous control can be used. Maintenance-free shaft gasket. Gasket-change without emptying the plant is possible.



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|-----------------------------------|-----------|----|-----------|
| ZV 210 | 2-way-zone valve, DN 10, Kvs 1,25 | 4621 1900 | C | 15,- |
| ZV 215 | 2-way-zone valve, DN 15, Kvs 1,35 | 4621 2000 | C | 16,- |
| ZV 220 | 2-way-zone valve, DN 20, Kvs 2,5 | 4621 2100 | C | 21,- |
| ZV 225 | 2-way-zone valve, DN 25, Kvs 4,2 | 4621 2200 | C | 34,- |
| ZV 232 | 2-way-zone valve, DN 32, Kvs 5,8 | 4621 2300 | C | 55,- |

4.6.2.1.2 2-way-zone valves with Voreinstellung, PN 10, 100°C

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|-----------|
| ZV 210/V | 2-way-zone valve with presetting, DN 10, Kvs 0,054 .. 0,73 | 4621 1910 | C | 12,- |
| ZV 215/V | 2-way-zone valve with presetting, DN 15, Kvs 0,054 .. 0,73 | 4621 2010 | C | 14,- |
| ZV 220/V | 2-way-zone valve with presetting, DN 20, Kvs 0,054 .. 0,73 | 4621 2110 | C | 18,- |
| ESZV | Setting key for zone valves with presetting | 4621 0000 | C | 5,- |

4.6.2.2 3-way Switch-Over Zone Valves, PN 10, 100°C

The 3-Way change-over valve is used for the distribution of volume metric flow in heating and cooling circuits. Furthermore it is used in change-over circuits between heating and hot water circuits or between boiler, heat-pump or solar circuits. The valve controls the volume metric flow within the primary circuit to achieve constant pressures within the net, or controls the performance of heat-changer by volume metric control for air-heater, cooler or heat-exchanger. As actuators the Types ZHM... and ZHMT... can be used.



Features: Low price brass valve for space zone control and single room control. Also thermal or electric actuators for 3-point or continuous control can be used. Maintenance-free shaft gasket. Gasket-change without emptying the plant is possible.

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|--|-----------|----|-----------|
| ZV 315 | 3-way change-over zone valve, DN 15, Kvs 2,5 | 4622 3000 | C | 50,- |
| ZV 320 | 3-way change-over zone valve, DN 20, Kvs 4,2 | 4622 3100 | C | 55,- |
| ZV 325 | 3-way change-over zone valve, DN 25, Kvs 7,3 | 4622 3200 | C | 68,- |

Please, look at the necessary Accessories for 3-Way change-over valves in chapter **4.6.10.3** and the suitable actuators in chapter **4.6.2.5**

4.6.25 Actuator for Red Brass Zone Valves

The actuators **ZHM/24** and **ZHM SR/24** are used for 2-way- or 3-way zone valves. They operate with corresponding controllers in heating-, ventilation- and air-condition plants. Due to their low power consumption the actuators operate on widely branched nets with cables with small cross-sections. The actuator-valve combination are suitable for radiators, convectors, heat-circuit distribution, floor-heating, ceiling cooling systems and ceiling radiator heating as well as fan convectors and induction units in 2- and 4-line systems.



The thermal actuators **ZHMTU** and **ZHMTU/24** are used in combination with R+S zone-valves ZV 2... and ZV 3.. for 2-point control in heating ventilation and air-condition plants, especially when high differential pressures prevail.

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|-----------|----|-----------|
| ZHM/24 | Lifting actuator for zone valve 24V / 50 Hz, white | 4106 1030 | C | 122,- |
| ZHM SR/24 | Lifting actuator for zone valve 24V / 50 Hz, control signal 0..10V, white | 4106 1060 | C | 159,- |
| ZHMTU | Lifting actuator for zone valve 230V / 50 Hz, elektro thermal actuator, powerless closed / open adjustable, white | 4106 2010 | C | 26,- |
| ZHMTU/24 | Lifting actuator for zone valve 24V / 50 Hz, elektro thermal actuator, powerless closed / open adjustable, white | 4106 2040 | C | 26,- |
| KZHMTU | Protective cover for electro-thermal actuators for Type ZHMTU(/24), (Especially for buildings for local authorities) | 4106 2210 | C | 26,- |

4.6.10 Accessories

4.6.10.3 Accessories for 3-way change-over zone valves

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|---|-----------|----|-----------|
| ZV3SN15 | Fitting R 1/2", 3 pieces, brass, length 27,5 mm | 4601 3000 | C | 1,- |
| ZV3SN20 | Fitting R 3/4", 3 pieces, brass, length 30,5 mm | 4601 3100 | C | 3,- |
| ZV3SN25 | Fitting R 1", 3 pieces, brass, length 33 mm | 4601 3200 | C | 4,- |

4.7 Actuator Consoles

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4.7.1 Actuator Consoles for Valves

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------|---------------------------------|-----------|----|-----------|
| MVGX HAND* | Manual control for MVGX valves. | 4701 0060 | C | 38,- |

4.7.2 Actuator Consoles for Flipper Valves

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------------|--|-----------|----|-----------|
| MAS Centra 15-65* | SM mounting set for Centra flipper valves DN 15 .. 65 | 4702 0110 | C | 49,- |
| MAS Centra 80-100* | SM mounting set for Centra flipper valves DN 80 .. 100 | 4702 0120 | C | 65,- |
| MAS Centra Komp.* | SM mounting set for Centra compact flipper valves | 4702 0130 | C | 65,- |
| MAS Centra/A* | SM mounting set for Centra-A-flipper valves DN 15 .. 65 | 4702 0140 | C | 53,- |
| MAS ESBE/Elesta* | SM mounting set for ESBE / Elesta flipper valves | 4702 0180 | C | 63,- |
| MAS R+S N* | SM mounting set for R+S flipper valves | 4702 0270 | C | 47,- |
| MAS SM2010/3 | SM2010 mounting set for R+S 3-way-compact flipper valves G3xx MS | 4702 0420 | C | 4,20 |
| MAS SM2010/4 | SM2010 mounting set for R+S 4-way-compact flipper valves G4xx MS | 4702 0440 | C | 4,20 |
| MAS SM2010 C-DRU | SM2010 mounting set for Centra-flipper valves DRU | 4702 0430 | C | 37,- |
| MAS SM2010 C-DRZR | SM2010 mounting set for Centra-flipper valves DR and ZR | 4702 0450 | C | 8,50 |
| MAS SM2010 ESBE | SM2010 mounting set for ESBE-flipper valves | 4702 0460 | C | 7,30 |
| MAS SM2010 Siem | SM2010 mounting set for Siemens-flipper valves | 4702 0470 | C | 4,20 |
| MAS SM2010 Cent | SM2010 mounting set for Oventrop-flipper valves | 4702 0480 | C | 4,20 |
| MAS SM2010 xxx-C | SM2010 mounting set for Flipper valves other manufacturers | 4702 04xx | C | on req. |

4.7.3 Actuator Consoles for Thottle-/Shut-off Valves

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|--|-----------|----|-----------|
| MAS MAK 20-65 | SM mounting set for Throttle-/shut-off valve MAK 220 .. 265 | 4703 0030 | C | 40,- |
| MAS MAK 80-100 | SM mounting set for Throttle-/shut-off valve MAK 280 .. 2100 | 4703 0040 | C | 40,- |

4.7.4 Actuator Consoles for Duct Flaps

| Type | Description | Art.-Nr. | PG | Price EUR |
|------|---------------------------|-----------|----|-----------|
| Kla | SM mounting set for flaps | 4704 0010 | C | 49,- |
| Klb | Flap extension | 4704 0020 | C | 18,- |

4.10 Accessories

4.103 Bushing gasket

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| STN/HMVF 15-50 | Bushing gasket (one-piece) for HMVF- and RGV-valves, DN 15..50, temperature range 0 to 130 C | 4003 1100 | C | 22,- |
| STN/HMVF 65-100 | Bushing gasket (one-piece) for HMVF-valves DN 65 .. 100, temperature range, 0 to 130 C | 4003 1200 | C | 50,- |
| ST/MVG(X) | Bushing gasket for MVG(X), PN 16, DN 15 .. 32 | 4003 2010 | C | 19,- |
| ST/MVF 15-100 | Bushing gasket for MVF-, MVFSP- and MVFS-Valves DN 15-100, up to 200°C | 4003 3010 | C | 100,- |
| ST/MVF-O/15-100 | Bushing gasket for MVF valves DN 15-100, temperature range 0 to 130 C | 4003 3030 | C | 100,- |
| ST/MVF 125-150 | Bushing gasket for MVF-, MVFSP- and MVFS-Valves DN 125-150, up to 200°C | 4003 3020 | C | 140,- |

*soon out of production

5. Times Switches and Operation Hour Meter.....104

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5.1 Times Switches

| Type | Description | Art.-Nr. | PG | Price EUR |
|------|--|-----------|----|-----------|
| RT 1 | Analog timer, daily program , power reserve, quartz synchronized, plug-in type for R+S compact controller | 5101 2000 | A | 138,- |



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|---|-----------|----|-----------|
| RT 5 | Analog timer, daily program , power reserve, quartz synchronized, plug-in type for R+S compact controller | 5102 2000 | A | 82,- |
| RW 5 | Analog timer, weekly program , power reserve, quartz synchronized, plug-in type for R+S compact controller | 5102 3000 | A | 111,- |



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|-----------|
| RW 8* | Digital timer, weekly program, power reserve, quartz synchronized, plug-in type for R+S compact controller | 5103 4010 | A | 146,- |
| RW 9-E PLUS | Digital timer, weekly program, power reserve, quartz synchronized, front panel mounting, colour anthrazit | 5103 6020 | C | 146,- |



| Type | Description | Art.-Nr. | PG | Price EUR |
|------|---|-----------|----|-----------|
| UW 6 | Digital timer, weekly program, power reserve, crystal synchronized, in plug-in form, for compact automatic controller R+S | 5105 1000 | A | 146,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|------|---|-----------|----|-----------|
| UDO | Snap-in cover for front panel timer-cut-out | 5120 1000 | A | 6,- |



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|-----------|----|-----------|
| roomMOD T | Timer-/Clockmodul for roomBASE xx.24 or roomBASE xx.230, 2 weekly programs (C1/C2) 42 parameters in memory, automatic summer-/winter change-over, power reserve 120h | 1503 3310 | C | 157,- |

* soon out of production

5.2 Operation Hour Meter On request

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6.1 Temperature (Thermostat)

6.1.1 room thermostat without timer



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------|--|-----------|----|-----------|
| ZTA.1 | Room thermostat with thermal feedback, set-point range 5..30 C | 6101 1000 | C | 33,- |

6.1.2 room thermostat with timer



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------------|---|-----------|----|-----------|
| thermoCLOCK A1 | Clock thermostat, electronic, wall mounting for a time dependend control of temperatures in closed rooms. 230V, switching power: 13(2)A / 230V, for valves powerless closed, setting range: 5.30 C, reduced temperature 5.29 C, summer-winter change-over, party switch childen safety feature, valve protection, power reserve 4 days, holiday setting, Quarz base, min. switching time 15 minuts, max. switching power 250V AC / 10(4)A | 6102 2120 | C | 156,- |

| | | | | |
|------------------------|---|-----------|---|-------|
| thermoCLOCK AH1 | Clock thermostat with backlit display , electronic, wall mounting, for a time dependend control of temperatures in closed rooms. 230V, switching power: 13(2)A / 230V, for valves powerless closed, setting range: 5..30 C, reduced temperature 5.29 C, summer-winter change-over, party switch, childen safety feature, valve protection, power reserve 4 days, holiday setting, Quarz base, min. switching time 15 minuts, max. switching power 250V AC / 10(4)A | 6102 2220 | C | 182,- |
|------------------------|---|-----------|---|-------|

For electronic room thermostats see 1.5.2

6.1.3 Frost protection thermostat (TW)

relay 250V AC / 15(8)A, IP 40, TÜV acc to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|---|-----------|----|-----------|
| FST 600 | 1 switching-range -10..+12 C; 6,0 m capillary tube length | 6103 1000 | C | 82,- |
| MS/FST | 6 mounting clamps for capillary tube | 6103 1100 | C | 6,- |
| DF/FST | 1 passing collar for capillary tube | 6103 1200 | C | 3,- |
| MB/FST | 1 mounting hold for frost protection thermostat | 6103 1300 | C | 5,- |

6.1.5 Immersion thermostat- and guard with spiral sensor for air duct

6.1.5.1 Immersion thermostat (TR), external setting

Relay, IP 43, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| LR 80003 | 0..35°C external setting, 0,5..1 K, 250V AC / 15A, 120 mm other temperature ranges on req. | 6105 1010 | C | 88,- |

6.1.5.2 Immersion temperature guard (TW), internal setting

Relay, IP43, TÜV acc to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| LR 80108 | 0..35°C internal setting, 0,5..1 K, 250V AC / 10A, 120 mm | 6105 2010 | C | 88,- |
| LR 80116 | 0..70°C internal setting, 1..2 K, 250V AC / 10A, 120 mm | 6105 2030 | C | 69,- |

6.1.6 Immersion thermostat-, guard and Begrenzer with protective pocket

6.1.6.1 Immersion thermostat (TR)

6.1.6.1.1 Immersion thermostat (TR), external setting

Relay, IP 43, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| KR 80003 | 0..35°C external setting, 0,5..1K, 250VAC /15(8)A, 120 mm/ø10mm | 6106 1010 | C | 88,- |
| KR 80011 | 10..45°C external setting, 0,5..1K, 250VAC/15(8)A, 120mm/ø10mm | 6106 1020 | C | 118,- |
| KR 80028 | 0..70°C external setting, 1..2 K, 250VAC /15(8)A, 200 mm/ø10mm | 6106 1050 | C | 91,- |
| KR 80029 | 0..70°C external setting, 1..2 K, 250V AC /15(8)A, 280 mm/ø10mm | 6106 1060 | C | 92,- |

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|-----------|
| KR 80000 | 35..95°C external setting, 3..5 K, 250VAC/15(8)A, 120 mm/ø10mm | 6106 1070 | C | 72,- |
| KR 80001 | 35..95°C external setting, 3..5 K, 250VAC/15(8)A, 200 mm/ø10mm | 6106 1080 | C | 91,- |

6.1.6.1.2 Immersion thermostat (TR), external setting

Relay 250V AC / 10(2)A, IP 54, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|--|-----------|----|-----------|
| TR 20/90-100 | 20..90°C, switching diff. 6..8%, protective pocket 100 mm / ø 15 mm | 6106 1210 | C | 84,- |
| TR 20/90-300 | 20..90°C, switching diff. 3..4%, protective pocket 300 mm / ø 8 mm | 6106 1220 | C | 88,- |
| TR 30/110-100 | 30..110°C, switching diff. 3..4%, protective pocket 100 mm / ø 15 mm | 6106 1230 | C | on req. |
| TR 30/110-150 | 30..110°C, switching diff. 3..4%, protective pocket 150 mm / ø 8 mm | 6106 1240 | C | on req. |
| TR 50/150-150 | 50..150°C, switching diff. 3..4%, protective pocket 150 mm / ø 8 mm | 6106 1260 | C | on req. |

6.1.6.2 Immersion temperature guard (TW)

6.1.6.2.1 Immersion temperature guard (TW), internal setting

Relay, IP 43, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|-----------|
| KR 80108 | 0..35°C internal setting, 0.5..1 K, 250V AC / 10A, 120mm/ø10mm | 6106 2010 | C | 88,- |
| KR 80116 | 0..70°C internal setting, 1..2 K, 250V AC / 10A, 120 mm/ø10mm | 6106 2030 | C | 69,- |
| KR 80100 | 35..95°C internal setting 3..5 K, 250V AC / 15A, 120 mm/ø10mm | 6106 2050 | C | 76,- |
| KR 80101 | 35..95°C internal setting 3..5 K, 250V AC / 15A, 200 mm/ø10mm | 6106 2060 | C | 91,- |
| KR 80124 | 35..95°C internal setting 3..5 K, 250V AC / 15A, 280 mm/ø10mm | 6106 2070 | C | 92,- |

6.1.6.2.2 Immersion temperature guard (TW), internal setting

Relay 250V AC / 10(2)A, IP 54, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|--|-----------|----|-----------|
| TW 0/50-100 | 0..50°C, switching diff. 1,5 ± 0,5%, protective pocket 100 mm / ø 15 mm, switching power 250V AC / 6(1,2)A | 6106 2210 | C | 81,- |
| TW 20/90-100 | 20..90°C, switching diff. 6..8%, protective pocket 100 mm / ø 15 mm | 6106 2220 | C | 81,- |
| TW 30/110-100 | 30..110°C, switching diff. 3..4%, protective pocket 100 mm / ø 15 mm | 6106 2230 | C | 81,- |
| TW 30/110-200 | 30..110°C, switching diff. 3..4%, protective pocket 200 mm / ø 8 mm | 6106 2240 | C | 83,- |
| TW 50/150-150 | 50..150°C, switching diff. 3..4%, protective pocket 150 mm / ø 8 mm | 6106 2250 | C | on req. |
| TW 50/150-200 | 50..150°C, switching diff. 3..4%, protective pocket 200 mm / ø 8 mm | 6106 2260 | C | on req. |

6.1.6.3 Immersion safety temperature guard (STW), internal setting

Relay 250V AC / 10(2)A, IP 54, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|--|-----------|----|-----------|
| STW 60/130-150 | 60..130°C, switching diff. 4..6 %, protective pocket 150 mm / ø 8 mm | 6106 3010 | C | 95,- |
| STW 20/150-150 | 20..150°C, switching diff. 4..6 %, protective pocket 150 mm / ø 8 mm | 6106 3030 | C | 95,- |
| STW 20/90-100V4A | 20..90°C, switching diff. 4..6 %, protective pocket V4A 100mm / ø 8 mm | 6106 3040 | C | 112,- |

6.1.6.5 Immersion safety temperature limiter (STB), internal setting, internal reset

Öffner 250V AC / 10(2)A, IP 54, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|--|-----------|----|-----------|
| STB 30/110-150 | 30..110°C, protective pocket 150 mm / ø 8 mm | 6106 5210 | C | 101,- |
| STB 30/110-200 | 30..110°C, protective pocket 200 mm / ø 8 mm | 6106 5220 | C | on req. |
| STB 60/130-150 | 60..130°C, protective pocket 150 mm / ø 8 mm | 6106 5230 | C | on req. |
| STB 20/150-150 | 20..150°C, protective pocket 150 mm / ø 8 mm | 6106 5240 | C | on req. |
| STB 20/150-200 | 20..150°C, protective pocket 200 mm / ø 8 mm | 6106 5250 | C | on req. |



6.1.7 Immersion twin thermostat, -guard, -limiter with protective pocket

6.1.7.3 Immersion thermostat / Immersion safety temperature limiter (TR / STB)

6.1.7.3.2 Immersion thermostat/Immersion safety temperature limiter (TR/STB), TR external setting, STB internal reset fixed shwitch-off point, 2 individual switches, 250V AC / 10(2)A, IP 40, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------------|---|-----------|----|-----------|
| TR/STB 30-90/100-120 | TR 30..90°C, switching diff. 6 K, STB 100°C fest, protective pocket 120 / ø 15mm | 6107 3210 | C | on req. |
| TR/STB 30-100/110-120 | TR 30..100°C, switching diff. 6 K, STB 110°C fest, protective pocket 120 / ø 15mm | 6107 3220 | C | on req. |
| TR/STB 40-110/120-120 | TR 40..110°C, switching diff. 6 K, STB 120°C fest, protective pocket 120 / ø 15mm | 6107 3230 | C | on req. |

6.1.7.3.3 Immersion thermostat / Immersion safety temperature limiter (TR / STB), TR external setting STB Innenein- and rückstellung

2 individual switches, 250V AC / 10(2)A, IP 54, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|--|-----------|----|-----------|
| TR/STB 0/70-150 | TR / STB 0..70°C, TR switching diff. 3..4%, protective pocket 150 / ø 15 mm | 6107 3310 | C | on req. |
| TR/STB 0/70-250 | TR / STB 0..70°C, TR switching diff. 3..4%, protective pocket 250 / ø 15 mm | 6107 3320 | C | on req. |
| TR/STB 30/110-150 | TR / STB 30..110°C, TR switching diff. 3..4%, protective pocket 150 / ø 15 mm | 6107 3330 | C | 147,- |
| TR/STB 20/120-150 | TR 20..120°C, STB 60..130°C, TR switching diff. 3..4%, protective pocket 150 / ø 15 mm | 6107 3340 | C | 147,- |
| TR/STB 20/150-150 | TR / STB 20..150°C, TR switching diff. 3..4%, protective pocket 150 / ø 15 mm | 6107 3350 | C | 147,- |

6.1.7.5 Immersion thermostat / Immersion safety temperature guard (TR / STW), TR external setting, STW internal setting

2 individual switches, 250V AC / 10(2)A, IP 54, TÜV acc to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------------|---|-----------|----|-----------|
| TR/STW 0/70-150 | TR / STW 0..70°C, switching diff. TR 3..4% / STW 4..6%, 150 mm / ø 15 mm | 6107 5010 | C | 136,- |
| TR/STW 0/70-250 | TR / STW 0..70°C, switching diff. TR 3..4% / STW 4..6%, 250 mm / ø 15 mm | 6107 5020 | C | on req. |
| TR/STW 30/110-150 | TR / STW 30..110°C, switching diff. TR 3..4% / STW 4..6%, 150 mm / ø 15mm | 6107 5030 | C | 136,- |
| TR/STW 60/130-150 | TR / STW 60..130°C, switching diff. TR 3..4% / STW 4..6%, 150 mm / ø 15 mm | 6107 5040 | C | 136,- |
| TR/STW 20/150-150 | TR / STW 20..150°C, switching diff. TR 3..4% / STW 4..6%, 150 mm / ø 15 mm | 6107 5050 | C | 136,- |
| MTR/STW 30/110-150 | TR / STW 30..110°C, switching diff. TR 3..4% / STW 4..6%, 150 mm / ø 15 mm, in combination with an M-sensor with 2,5 m flexible cable | 6107 5200 | C | 191,- |

6.1.7.6 Immersion temperature guard / Immersion safety temperature limiter (TW / STB), TW internal setting, STB internal setting and reset

2 individual switches, 250V AC / 10(2)A, IP 54, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|---|-----------|----|-----------|
| TW/STB 30/110-150 | TW / STB 30..110°C, TW switching diff. 3..4%, protective pocket 150 / ø 15 mm | 6107 6010 | C | 151,- |
| TW/STB 30/110-250 | TW / STB 30..110°C, TW switching diff. 3..4%, protective pocket 250 / ø 15 mm | 6107 6020 | C | 150,- |

6.1.7.7 Immersion temperature guard / Immersion safety temperature guard (TW / STW), TW internal setting, STW internal setting

2 individual switches, 250V AC / 10(2)A, IP 54, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|--|----------|-------------|-----------|
| TW/STW 30/110-150 | TW / STW 30..110°C, switching diff. TW 3..4% / STW 4..6%, 150 mm / ø 15mm | | 6107 7030 C | on req. |

6.1.8 Clamp-on thermostat and -guard

6.1.8.1 Clamp-on thermostat



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|-----------|----|-----------|
| ATR 83001 | 0..60°C external setting, max. sensor temperature 80°C | 6108 1010 | C | 34,- |
| ATR 83000 | 30..90°C external setting, max. sensor temperature 115°C | 6108 1020 | C | 34,- |

6.1.8.2 Clamp-on temperature guard

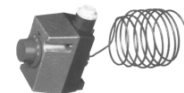


| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|--|-----------|----|-----------|
| ATR 83101 | 0..60°C internal setting, max. sensor temperature 80°C | 6108 2010 | C | 24,- |
| ATR 83100 | 30..90°C internal setting, max. sensor temperature 115°C | 6108 2030 | C | 30,- |

6.1.9 Immersion thermostat- and guard with capillary tube for refrigeration plants

6.1.9.1 Immersion thermostat (TR)

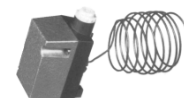
Relay 250V AC / 10(3)A, IP 43



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|--|-----------|----|-----------|
| WR 81029 | 0..35°C, external setting, 0,5..1 K, capillary length 500 mm, Fühler 7 x 135 mm | 6109 1020 | C | 96,- |
| WR 81009 | 0..70°C, external setting, 1..2 K, capillary length 1500 mm, Fühler 7 x 90 mm | 6109 1030 | C | 115,- |

6.1.9.2 Immersion temperature guard (TW)

relay 250V AC / 10(3)A, IP 43



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| WR 81101 | 0..35°C, internal setting, 0,5..1 K, capillary length 2000 mm, Fühler 7 x 135 mm | 6109 2010 | C | 110,- |
| WR 81109 | 0..70°C, internal setting, 1..2 K, capillary length 1500 mm, Fühler 7 x 90 mm | 6109 2020 | C | 110,- |

6.1.10 Exhaust temperature guard (ATW), internal setting

Relay 250V AC / 10(2)A, IP 54, TÜV acc. to DIN 3440



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------|--|-----------|----|-----------|
| ATW 80/120-150 | 40..120°C, switching diff. 10..18 K, immersion pocket 150 mm / ø 15 mm | 6110 1010 | C | 129,- |
| ATW 20/400-150 | 20..400°C, switching diff. 10..18 K, immersion pocket 150 mm / ø 15 mm | 6110 1020 | C | 129,- |



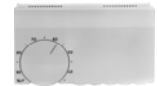
6.2

Humidity (Hygrostat)

6.2.1

Room humidity controller

Relay; dehumidifying 250V AC / 5(0,2)A, humidifying 250V AC / 2(0,2)A, IP 20



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------|---|-----------|----|-----------|
| HyRRx | Room humidity controller, external setting, wall mounting 30..100% r.h. | 6201 2000 | C | 72,- |
| HyRWx | Room humidity guard, internal setting wall mounting, 30..100% r.h. | 6201 2100 | C | 74,- |

6.2.2

Duct humidity controller

Relay 250V AC / 15(8)A, IP 65



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------|---|-----------|----|-----------|
| HyK | Duct humidity controller, external setting, 30..100% r.h. | 6202 1000 | C | 207,- |
| HWyK | Duct humidity guard, internal setting, 30..100% r.h. | 6202 2000 | C | 213,- |
| GA/HyK | Gauze | 6202 1200 | C | 17,- |
| FL/HyK | Wall mounting console | 6202 1300 | C | 23,- |

6.3

Pressure (Pressure-stat)

6.3.1

Differential pressure guard, Medium Luft

Relay 250V AC / 5(3)A, IP 54



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------|---|-----------|----|-----------|
| DDW-1,5 | Differential pressure guard, range 0,2..1,5 mbar, with mounting Accessories | 6301 1010 | C | 64,- |
| DDW-3 | Differential pressure guard, range 0,4..3 mbar, with mounting Accessories | 6301 1020 | C | 60,- |
| DDW-6 | Differential pressure guard, range 0,7..6 mbar, with mounting Accessories | 6301 1030 | C | 60,- |
| DDW-10 | Differential pressure guard, range 1..10 mbar, with mounting Accessories | 6301 1040 | C | 60,- |
| DDW-30 | Differential pressure guard, range 2,5..30 mbar, with mounting Accessories | 6301 1050 | C | 60,- |

6.3.2

Safety pressure limiter

Relay 250V AC / 10(5)A, IP 54, TÜV acc. to DIN 4751



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------|---|-----------|----|-----------|
| SDBAM 6 | Pressure switch for max. pressure guard, setting range 1,2 .. 6 bar | 6302 1010 | C | 370,- |
| SDBAM 16 | Pressure switch for max. pressure guard, setting range 3 .. 16 bar | 6302 1020 | C | 328,- |
| DWR 1-206 | Pressure switch for max. pressure guard, setting range 0,2 .. 1,6 bar | 6302 2010 | C | 332,- |
| DWR 6-206 | Pressure switch for max. pressure guard, setting range 0,5 .. 6 bar | 6302 2020 | C | 294,- |

6.10

Accessories

6.10.1.1

Protective pockets, brass

6.10.1.2.2

Protective pockets for thermostat TR., TW., STB., TR/STB., TR/STW., TW/STB..



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| TH 8/150 MS | Protective pocket 1/2", ø 8 mm, Brass, PN 35, length 150mm | 6001 0140 | C | on req. |
| TH 15/150 MS | Protective pocket 1/2", ø 15mm, Brass, PN18, length 150mm | 6001 2140 | C | on req. |

6.10.1.2 Protective pockets, V4A

6.10.1.2.1 Protective pockets for thermostate KR ...



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|--|-----------|----|-----------|
| NTHK 100 | Protective pocket 1/2", ø 10 mm, V4A, PN 40, length 100 mm | 6001 1220 | C | 56,- |
| NTHK 200 | Protective pocket 1/2", ø 10 mm, V4A, PN 40, length 200 mm | 6001 1250 | C | 49,- |
| NTHK 280 | Protective pocket 1/2", ø 10 mm, V4A, PN 40, length 280 mm | 6001 1270 | C | 51,- |
| NTHK 100 x 17 | Protective pocket 1/2", ø 17 mm, V4A, PN 40, length 100 mm | 6001 3220 | C | 55,- |
| NTHK 200 x 17 | Protective pocket 1/2", ø 17 mm, V4A, PN 40, length 200 mm | 6001 3250 | C | 60,- |

6.10.1.2.2 Protective pockets for Thermostate TR., TW., STB., TR/STB., TR/STW., TW/STB.



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|--|-----------|----|-----------|
| TH 8/150 V4A | Protective pocket 1/2", ø 8 mm, V4A, PN 45, length 150 mm | 6001 0240 | C | on req. |
| TH 8/200 V4A | Protective pocket 1/2", ø 8 mm, V4A, PN 45, length 200 mm | 6001 0250 | C | on req. |
| TH 8/300 V4A | Protective pocket 1/2", ø 8 mm, V4A, PN 45, length 300 mm | 6001 0280 | C | on req. |
| TH 15/100 V4A | Protective pocket 1/2", ø 15 mm, V4A, PN 45, length 100 mm | 6001 2220 | C | 32,- |
| TH 15/120 V4A | Protective pocket 1/2", ø 15 mm, V4A, PN 45, length 120 mm | 6001 2230 | C | on req. |
| TH 15/150 V4A | Protective pocket 1/2", ø 15 mm, V4A, PN 45, length 150 mm | 6001 2240 | C | 34,- |
| TH 15/200 V4A | Protective pocket 1/2", ø 15 mm, V4A, PN 45, length 200 mm | 6001 2250 | C | on req. |
| TH 15/250 V4A | Protective pocket 1/2", ø 15 mm, V4A, PN 45, length 250 mm | 6001 2260 | C | on req. |

7. Pumps112

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SMART VARIABLE SPEED CIRCULATION PUMPS



Advantage of SMART pumps

- Quick and optimal adaptability to the heating system
- Save up to 30% of electrical energy
- Operation via proportional pressure
- Impedance protected motor
- Parts in top quality materials
- Silent pump and system operation

| Technical Data | | | | | | | | | | | |
|-----------------|--------|-------|----------------------|----------------------|----------|---|------------------|------------------|----------------------|--------|-----------------|
| Pump Type | L (mm) | DN | Q _u (mVh) | H _{max} (m) | PN (bar) | temperature of the Medium T _{max} -T _{min} (°C) | hydraulic casing | Protection level | P _{MAX} (W) | In (V) | Isolation class |
| SMART 15/60-130 | 130 | DN 15 | 3,5 | 6 | PN 10 | 5-95 | GG/CI | 44 | 84 | 230 V | H |
| SMART 20/60-130 | 130 | DN20 | 3,5 | 6 | PN 10 | 5-95 | GG/CI | 44 | 84 | 230 V | H |
| SMART 25/60-130 | 130 | DN 25 | 3,5 | 6 | PN 10 | 5-95 | GG/CI | 44 | 84 | 230 V | H |
| SMART 20/60-180 | 180 | DN 20 | 3,5 | 6 | PN 10 | 5-95 | GG/CI | 44 | 84 | 230 V | H |
| SMART 25/60-180 | 180 | DN 25 | 3,5 | 6 | PN 10 | 5-95 | GG/CI | 44 | 84 | 230 V | H |
| SMART 32/60-180 | 180 | DN30 | 3,5 | 6 | PN 10 | 5-95 | GG/CI | 44 | 84 | 230 V | H |

GHN THREE SPEED CIRCULATION PUMPS

Usage of GHN pumps

- Usage in heating-, air conditioning- or solar systems
- 3 speed manual switch
- Easy installation in heating systems
- Extremely durable in all kinds of situations
- Parts in top quality materials



| Technical Data | | | | | | | | | | | | |
|----------------|--------|-------|------------------------|----------------------|----------|--|------------------|-------------|------------------|----------------------|-----------------|-----------------|
| Pump Type | L (mm) | DN | Q _{MAX} (m/h) | H _{MAX} (m) | PN (bar) | temperature of the medium /T _{min} -T _{max} (°C) | hydraulic casing | weight (Kg) | Protection level | P _{MAX} (W) | I _{EL} | isolation class |
| GHN 15/40-130 | 130 | DN 15 | 3,5 | 4,0 | PN 10 | -10 - +110 | GG/CI | 2,2 | 44 | 50 | 230V | H |
| GHN 15/60-130 | 130 | DN15 | 3,5 | 6,0 | PN 10 | -10 - +110 | GG/CI | 2,2 | 44 | 90 | 230V | H |
| GHN 15/65-130 | 130 | DN15 | 4,0 | 6,5 | PN 10 | -10 - +110 | GG/CI | 2,2 | 44 | 95 | 230V | H |
| GHN 20/40-130 | 130 | DN20 | 3,5 | 4,0 | PN 10 | -10 - +110 | GG/CI | 2,4 | 44 | 50 | 230V | H |
| GHN 25/40-130 | 130 | DN25 | 3,5 | 4,0 | PN 10 | -10 - +110 | GG/CI | 2,4 | 44 | 50 | 230V | H |
| GHN 20/60-130 | 130 | DN20 | 3,5 | 6,0 | PN 10 | -10 - +110 | GG/CI | 2,4 | 44 | 90 | 230V | H |
| GHN 25/60-130 | 130 | DN25 | 3,5 | 6,0 | PN 10 | -10 - +110 | GG/CI | 2,4 | 44 | 90 | 230V | H |
| GHN 25/65-180 | 180 | DN25 | 4,0 | 6,5 | PN 10 | -10 - +110 | GG/CI | 2,6 | 44 | 95 | 230V | H |
| GHN 32/65-180 | 180 | DN32 | 4,0 | 6,5 | PN 10 | -10 - +110 | GG/CI | 3,0 | 44 | 95 | 230V | H |
| GHN 20/65-130 | 130 | DN20 | 4,0 | 6,5 | PN 10 | -10 - +110 | GG/CI | 2,2 | 44 | 95 | 230V | H |
| GHN 25/65-130 | 130 | DN25 | 4,0 | 6,5 | PN 10 | -10 - +110 | GG/CI | 2,4 | 44 | 95 | 230V | H |
| GHN 20/40-180 | 180 | DN20 | 3,5 | 4,0 | PN 10 | -10 - +110 | GG/CI | 2,5 | 44 | 50 | 230V | H |
| GHN 25/40-180 | 180 | DN25 | 3,5 | 4,0 | PN 10 | -10 - +110 | GG/CI | 2,6 | 44 | 50 | 230V | H |
| GHN 32/40-180 | 180 | DN32 | 3,5 | 4,0 | PN 10 | -10 - +110 | GG/CI | 3,0 | 44 | 50 | 230V | H |
| GHN 20/60-180 | 180 | DN20 | 3,5 | 6,0 | PN 10 | -10 - +110 | GG/CI | 2,6 | 44 | 90 | 230V | H |
| GHN 25/60-180 | 180 | DN25 | 3,5 | 6,0 | PN 10 | -10 - +110 | GG/CI | 2,6 | 44 | 90 | 230V | H |
| GHN 32/60-180 | 180 | DN32 | 3,5 | 6,0 | PN 10 | -10 - +110 | GG/CI | 3,0 | 44 | 90 | 230V | H |
| GHN 32/70-180 | 180 | DN32 | 6,0 | 6,8 | PN 10 | -10 - +110 | GG/CI | 3,2 | 44 | 140 | 230V | H |
| GHN 32/80-180 | 180 | DN32 | 8,4 | 8,0 | PN 10 | -10 - +110 | GG/CI | 4,8 | 44 | 210 | 230V | H |
| GHN 32/120/180 | 180 | DN32 | 9,2 | 11,3 | PN 10 | -10 - +110 | GG/CI | 5,6 | 44 | 260 | 230V | H |



SAN

CIRCULATION PUMPS FOR DOMESTIC WATER WITH SPHERICAL ROTOR

Usage + Advantages

- Electric motor with magnetic rotor
- Useful for domestic water applications
- High efficiency
- Integrated timer and thermostat (BT or BTR)
- Impedance protected motor
- Very quiet operation
- Quick and optimal installation
- Extrem durability in extreme conditions



| Technical Data | | | | | | | | | | | | | | |
|----------------|--------|-------|-------------------------|----------------------|----------|---|-----------------|--------|----------------|----------------------|---------------------|------------------|---------|-------------|
| pump Type | L [mm] | DN | Q _{MAX} (m3/h) | H _{MAX} (m) | PN (bor) | Media Temperature t _{min} -t _{max} (°C) | Hydralig casing | weight | IP protec-tion | P _{max} (W) | I _{EL} (V) | insulating class | Timer | Thermos-tat |
| SAN 15/15 B | 65 | DN 15 | 1,5 | 1,5 | PN 10 | 5-70 | bronze | 1,2 | 42 | 25 | 230 V | F | no/nein | no/nein |
| SAN 15/15 BT | 65 | DN 15 | 1,5 | 1,5 | PN 10 | 5-70 | bronze | 1,4 | 42 | 25 | 230 V | F | yes/ja | yes/ja |
| SAN 15/15 BTR | 65 | DN 15 | 1,5 | 1,5 | PN 10 | 5-70 | bronze | 1,4 | 42 | 25 | 230 V | F | no/nein | yes/ja |

SAN

THREE SPEED CIRCULATION PUMPS FOR DOMESTIC WATER

Usage and Advantage

- Bronze hydraulic body
- Useful for domestic water applications
- 3-speed manual switch
- Impedance protected motor
- capsuled rotor and separate bushing
- balanced rotor



| Technical Data | | | | | | | | | | | | | |
|----------------|--------|-------|----------|----------------------|----------|--|------------------|--------|------------------|-------|---------------------|-----------------|--|
| Pump Type | L [mm] | DN | Q [m3/h] | H _{max} (m) | PN (bor) | Medium temperature t _{min} -t _{max} (°C) | hydraulic casing | weight | Protection level | P (W) | I _{EL} (V) | Isolation class | |
| SAN 15/40-130 | 130 | DN 15 | 2,8 | 3,9 | PM10 | 5-65 | bronze | 2,3 | 44 | 50 | 230 V | H | |
| SAN 20/40-130 | 130 | DN20 | 2,8 | 3,9 | PM10 | 5-65 | bronze | 2,4 | 44 | 50 | 230 V | H | |
| SAN 25/40-130 | 130 | DN25 | 2,6 | 3,9 | PM10 | 5-65 | bronze | 2,3 | 44 | 50 | 230 V | H | |
| SAN 15/60-130 | 130 | DN15 | 3,0 | 5,3 | PM10 | 5-65 | bronze | 2,5 | 44 | 90 | 230 V | H | |
| SAN 20/60-130 | 130 | DN20 | 3,0 | 5,3 | PM10 | 5-65 | bronze | 2,6 | 44 | 90 | 230 V | H | |
| SAN 25/60-130 | 130 | DN25 | 3,0 | 5,3 | PM10 | 5-65 | bronze | 2,6 | 44 | 90 | 230 V | H | |
| SAN 20/70-130 | 130 | DN20 | 4,2 | 6,7 | PM10 | 5-65 | bronze | 3,0 | 44 | 148 | 230 V | H | |
| SAN 25/70-130 | .30 | DN25 | 4,2 | 6,7 | PM10 | 5-65 | bronze | 3,0 | 44 | 148 | 230 V | H | |

Warning: When using desalinated Water the manufacturer should be informed. In this case special material could be used in the pump.

NMT 20-32

VARIABLE SPEED CIRCULATION PUMP

ADVANTAGE OF NMT 20 PUMPS

- Permanent magnet motor
- Pump performance adjusting to the actual system requirements
- Up to 78% of electric energy savings
- Overload protected motor
- Top quality materials
- Low-noise operation

OPERATION OF NMT 20 PUMPS

- Automatic operation
- Proportional pressure operation
- Three speed manual operation

NMT / NMTD 40-80

CIRCULATION PUMP WITH INOVATIVE MOTOR TECHNOLOGY

CHARACTERISTICS

The inovative technology of the **NMT** pump differs from other pumps. The **NMT** is equipped with an electronically self regulating motor with permanent magnet drive. These magnets create a rotational magnetic field, which use **60% less electrical energy** for the same amount of work..



The **NMT** pumps are manufactured according to the certificates BVQI (ISO 9001:1994) and SIQ. Nearly all of our pumps have the CE certificate confirming EU standards and the SVN certificate, confirming the IEC standards.

BENEFITS FOR THE INVESTOR

- Up to 60% less energy costs
- Low price and operating costs (TCO = Total costs of ownership)
- Reliable and safe
- Inovative drive technology for advanced building management
- Compiances with EU regulations

- Noiseless operation in systems with thermostatic controlled valves
- Advanved protection mechanism
- Optional moduls for LonWorks and BLUETOOTH communication
- Optinal IO-module for connecting external sensors

BENEFITS FOR THE ENVIRONMENT

- Economical and environmental friendly product

BENEFITS FOR THE INSTALLERS

- Quick and easy installation
- Parameter settings visible on LCD-display
- Easy adjustment via program menu

BENEFITS FOR ENGINEERS

- Easy planning
- Self-adapting to your hydraulic system for all conditions



TECHNICAL FEATURES

| Technical Features | | NMT Premium | NMTD Premium |
|---|--|---------------------------------|--------------|
| Connections DN | | 40 - 80 | |
| Connection type | | flange | |
| Max volumetric flow / Q (m ³ /h) | | 80 | 140 |
| Max lift H (m) | | 12 | |
| Operating pressure PN (bar) | | 6 / 10 | 6 |
| Max Consumption P (W) | | 440 - 1510 | |
| Power supply | | 1 x 230V AC | |
| Controlled | | Electronically commutated motor | |
| Temperature range T (°C) | | -10 / +110 | |
| Material of Casing | | GG | |
| Double pump / Twin Pump | | No | Yes |

| Application | | |
|--------------------------|---|---|
| Heating | √ | √ |
| Cold Water Systems | √ | √ |
| Domestic Hot Water | | |
| Air Conditioning Systems | √ | √ |
| Industrial Systems | √ | √ |
| Process Technic | | |

| Technical Data | | | | | | | | | | |
|------------------------------|------------|--|----------------|-----------------------------|------------------|------------------|----------|-------------|-------------------|---------------------|
| Pump Type | connection | Max. volumetric flow Q (m ³ /h) | Max lift H (m) | Operating pressure PN (bar) | Min Temp. T (°C) | Max Temp. T (°C) | Material | Weight (kg) | consumption P (W) | Speed range (min-1) |
| NMT 40 Premium | 40 | 18 | 11 | 6 / 10 | -10 | 110 | SL 25 | 25 | 440 | 500-2700 |
| NMT 50 Premium | 50 | 31 | 12 | 6 / 10 | -10 | 110 | SL 25 | 32 | 520 | 500-2800 |
| NMT 65 Premium | 65 | 49 | 12 | 6 / 10 | -10 | 110 | SL 25 | 37 | 1070 | 500-2800 |
| NMT 80 Premium PN 6 | 80 | 64 | 13 | 6 | -10 | 110 | SL 25 | 45 | 1510 | 500-3200 |
| NMT 80 Premium PN 10 | 80 | 64 | 13 | 10 | -10 | 110 | SL 25 | 45 | 1510 | 500-3200 |
| NMTD 40 Premium | 40 | 18 | 11 | 6 / 10 | -10 | 110 | SL 25 | 48 | 440 | 500-2700 |
| NMTD 50 Premium | 50 | 31 | 12 | 6 / 10 | -10 | 110 | SL 25 | 61 | 520 | 500-2800 |
| NMTD 65 Premium | 65 | 49 | 12 | 6 / 10 | -10 | 110 | SL 25 | 64 | 1070 | 500-2800 |
| NMTD 80 Premium PN 6 | 80 | 64 | 13 | 6 | -10 | 110 | SL 25 | 82 | 1510 | 500-3200 |
| NMTD 80 Premium PN 10 | 80 | 64 | 13 | 10 | -10 | 110 | SL 25 | 82 | 1510 | 500-3200 |

All measurements and other data in these diagrams apply to water at 18 °C

| RECOMMENDED SYSTEM PRESSURE | | | | | |
|------------------------------|---------------------|---------------------|----------------|-------|--------|
| | Nominal Cur. In (A) | Power supply In (V) | at temp. In °C | | |
| | | | 50 °C | 80 °C | 110 °C |
| NMT 40 Premium | 2,1 | 1 x 230 AC | 0,05 | 0,8 | 1,4 |
| NMT 50 Premium | 4 | 1 x 230 AC | 0,3 | 1 | 1,6 |
| NMT 65 Premium | 5,2 | 1 x 230 AC | 0,3 | 1 | 1,6 |
| NMT 80 Premium PN 6 | 7,3 | 1 x 230 AC | 0,3 | 1 | 1,6 |
| NMT 80 Premium PN 10 | 7,3 | 1 x 230 AC | 0,3 | 1 | 1,6 |
| NMTD 40 Premium | 2,1 | 1 x 230 AC | 0,05 | 0,8 | 1,4 |
| NMTD 50 Premium | 4 | 1 x 230 AC | 0,3 | 1 | 1,6 |
| NMTD 65 Premium | 5,2 | 1 x 230 AC | 0,3 | 1 | 1,6 |
| NMTD 80 Premium PN 6 | 7,3 | 1 x 230 AC | 0,3 | 1 | 1,6 |
| NMTD 80 Premium PN 10 | 7,3 | 1 x 230 AC | 0,3 | 1 | 1,6 |

7

7.1

Circulation pumps

7.1.1

3-Speed Circulation Pump for heating with outer thread, length 130



| Type | Hmax | Qmax | Art.-Nr. | PG | Price EUR |
|---------------|------|-----------------------|------------|----|-----------|
| GHN 15/40-130 | 4,1m | 3,0m ³ / h | P1001 1010 | C | 75,- |
| GHN 20/40-130 | 4,1m | 3,0m ³ / h | P1001 1020 | C | 75,- |
| GHN 25/40-130 | 4,1m | 3,0m ³ / h | P1001 1030 | C | 75,- |
| GHN 15/60-130 | 5,7m | 3,4m ³ / h | P1001 1040 | C | 75,- |
| GHN 20/60-130 | 5,7m | 3,4m ³ / h | P1001 1050 | C | 75,- |
| GHN 25/60-130 | 5,7m | 3,4m ³ / h | P1001 1060 | C | 75,- |
| GHN 15/65-130 | 6,3m | 3,5m ³ / h | P1001 1070 | C | 76,- |
| GHN 20/65-130 | 6,3m | 3,5m ³ / h | P1001 1080 | C | 76,- |
| GHN 25/65-130 | 6,3m | 3,5m ³ / h | P1001 1090 | C | 76,- |

7.1.2

3-Speed Circulation Pump for heating with outer thread, length 180



| Type | Hmax | Qmax | Art.-Nr. | PG | Price EUR |
|----------------|-------|----------------------|------------|----|-----------|
| GHN 20/40-180 | 4,1m | 3,0m ³ /h | P1001 2010 | C | 75,- |
| GHN 25/40-180 | 4,1m | 3,0m ³ /h | P1001 2020 | C | 75,- |
| GHN 32/40-180 | 4,1m | 3,0m ³ /h | P1001 2030 | C | 75,- |
| GHN 20/60-180 | 5,7m | 3,4m ³ /h | P1001 2040 | C | 74,- |
| GHN 25/60-180 | 5,7m | 3,4m ³ /h | P1001 2050 | C | 75,- |
| GHN 32/60-180 | 5,7m | 3,4m ³ /h | P1001 2060 | C | 75,- |
| GHN 25/65-180 | 6,3m | 3,5m ³ /h | P1001 2070 | C | 76,- |
| GHN 32/65-180 | 6,3m | 3,5m ³ /h | P1001 2080 | C | 76,- |
| GHN 25/70-180 | 6,8m | 6,0m ³ /h | P1001 2090 | C | 124,- |
| GHN 32/70-180 | 6,8m | 6,0m ³ /h | P1001 2100 | C | 124,- |
| GHN 32/80-180 | 7,8m | 8,4m ³ /h | P1001 2110 | C | 229,- |
| GHN 32/120-180 | 11,3m | 9,0m ³ /h | P1001 2120 | C | 364,- |

7.1.3

3-Speed Circulation Pump with flange

7.1.3.1

Single Pump, 3-speed with flange



| Type | pressure stage | Art.-Nr. | PG | Price EUR |
|-----------------|----------------|------------|----|-----------|
| GHN 40-120 F | PN 6/10 | P1001 3105 | C | 555,- |
| GHN 40-70 F | PN 6/10 | P1001 3110 | C | 517,- |
| GHN 40-40 F | PN 6/10 | P1001 3115 | C | 503,- |
| GHN 50-120 F | PN 6/10 | P1001 3120 | C | 696,- |
| GHN 50-70 F | PN 6/10 | P1001 3125 | C | 669,- |
| GHN 50-40 F | PN 6/10 | P1001 3130 | C | 646,- |
| GHN 65-120 F | PN 6/10 | P1001 3135 | C | 813,- |
| GHN 65-70 F | PN 6/10 | P1001 3140 | C | 796,- |
| GHN 65-40 F | PN 6/10 | P1001 3145 | C | 796,- |
| GHN 80-120 F/6 | PN 6 | P1001 3150 | C | 1.067,- |
| GHN 80-70 F/6 | PN 6 | P1001 3155 | C | 1.013,- |
| GHN 80-120 F/10 | PN 10 | P1001 3160 | C | 1.013,- |
| GHN 80-70 F/10 | PN 10 | P1001 3165 | C | 1.013,- |

7.1.3.2

Twin Pump, 3-speed with flange



| Type | pressure stage | Art.-Nr. | PG | Price EUR |
|------------------|----------------|------------|----|-----------|
| GHND 40-120 F | PN 6/10 | P1001 3205 | C | 1.080,- |
| GHND 40-70 F | PN 6/10 | P1001 3210 | C | 1.080,- |
| GHND 40-40 F | PN 6/10 | P1001 3215 | C | 981,- |
| GHND 50-120 F | PN 6/10 | P1001 3220 | C | 1.357,- |
| GHND 50-70 F | PN 6/10 | P1001 3225 | C | 1.357,- |
| GHND 50-40 F | PN 6/10 | P1001 3230 | C | 1.261,- |
| GHND 65-120 F | PN 6/10 | P1001 3235 | C | 1.585,- |
| GHND 65-70 F | PN 6/10 | P1001 3240 | C | 1.585,- |
| GHND 65-40 F | PN 6/10 | P1001 3245 | C | 1.545,- |
| GHND 80-120 F/6 | PN 6 | P1001 3250 | C | 2.079,- |
| GHND 80-70 F/6 | PN 6 | P1001 3255 | C | 2.079,- |
| GHND 80-120 F/10 | PN 10 | P1001 3260 | C | 2.079,- |
| GHND 80-70 F/10 | PN 10 | P1001 3265 | C | 1.976,- |

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7.1.4 Circulation Pump with flange

7.1.4.1 Single Pump with flange



| Type | pressure stage | Art.-Nr. | PG | Price EUR |
|---------------|----------------|------------|----|-----------|
| GHNM 40-120 F | PN 6/10 | P1001 4110 | C | 615,- |
| GHNM 40-70 F | PN 6/10 | P1001 4120 | C | 589,- |
| GHNM 50-120 F | PN 6/10 | P1001 4130 | C | 816,- |
| GHNM 50-70 F | PN 6/10 | P1001 4140 | C | 792,- |

7.1.4.2 Twin Pump with flange



| Type | pressure stage | Art.-Nr. | PG | Price EUR |
|----------------|----------------|------------|----|-----------|
| GHNMD 40-120 F | PN 6/10 | P1001 4210 | C | 1.199,- |
| GHNMD 40-70 F | PN 6/10 | P1001 4220 | C | 1.150,- |
| GHNMD 50-120 F | PN 6/10 | P1001 4230 | C | 1.594,- |
| GHNMD 50-70 F | PN 6/10 | P1001 4240 | C | 1.545,- |

7.1.10.1 Accessories - Fittings for Pumps with outer thread

| Type | Art.-Nr. | PG | Price EUR |
|-------------------|------------|----|-----------|
| GRAUGUSS R 3/4" | P1001 0110 | C | 6,- |
| GRAUGUSS R 1" | P1001 0120 | C | 6,- |
| GRAUGUSS R 1 1/4" | P1001 0130 | C | 10,- |

7.1.10.2 Flange-Adapter for Pumps with outer thread

| Type | Art.-Nr. | PG | Price EUR |
|----------------------------------|------------|----|-----------|
| GRAUGUSS R 5/4" > DN 32-50 (PN6) | P1001 0210 | C | 30,- |

7.2 Electronically controlled Circulation pumps



7.2.1 Electronically controlled Circulation Pump, with outer thread

7.2.1.1 Series EGHN SMART

| Type | Art.-Nr. | PG | Price EUR |
|--|------------|----|-----------|
| EGHN SMART 15/60-130 nominal size 15, Lift 6m, length 130, e nergy class B | P1002 1010 | C | 124,- |
| EGHN SMART 20/60-130 nominal size 20, Lift 6m, length 130, e nergy class B | P1002 1020 | C | 124,- |
| EGHN SMART 25/60-130 nominal size 25, Lift 6m, length 130, e nergy class B | P1002 1030 | C | 124,- |
| EGHN SMART 20/60-180 nominal size 20, Lift 6m, length 180, e nergy class B | P1002 1040 | C | 124,- |
| EGHN SMART 25/60-180 nominal size 25, Lift 6m, length 180, e nergy class B | P1002 1050 | C | 124,- |
| EGHN SMART 32/60-180 nominal size 32, Lift 6m, length 180, e nergy class B | P1002 1060 | C | 124,- |



7.2.1.2 Series NMT SMART

| Type | Art.-Nr. | PG | Price EUR |
|---|------------|----|-----------|
| NMT 20/40-130 nominal size 20, Lift 4m, length 130, e nergy class A | P1002 1110 | C | 260,- |
| NMT 25/40-130 nominal size 25, Lift 4m, length 130, e nergy class A | P1002 1120 | C | 260,- |
| NMT 32/40-130 nominal size 32, Lift 4m, length 130, e nergy class A | P1002 1130 | C | 260,- |
| NMT 20/60-130 nominal size 20, Lift 6m, length 130, e nergy class A | P1002 1140 | C | 286,- |
| NMT 25/60-130 nominal size 25, Lift 6m, length 130, e nergy class A | P1002 1150 | C | 286,- |
| NMT 32/60-130 nominal size 32, Lift 6m, length 130, e nergy class A | P1002 1160 | C | 286,- |

| Type | Art.-Nr. | PG | Price EUR |
|---|------------|----|-----------|
| NMT 20/40-180 nominal size 20, Lift 4m, length 180, e nergy class A | P1002 1210 | C | 262,- |
| NMT 25/40-180 nominal size 25, Lift 4m, length 180, e nergy class A | P1002 1220 | C | 262,- |
| NMT 32/40-180 nominal size 32, Lift 4m, length 180, e nergy class A | P1002 1230 | C | 262,- |
| NMT 20/60-180 nominal size 20, Lift 6m, length 180, e nergy class A | P1002 1240 | C | 287,- |
| NMT 25/60-180 nominal size 25, Lift 6m, length 180, e nergy class A | P1002 1250 | C | 287,- |
| NMT 32/60-180 nominal size 32, Lift 6m, length 180, e nergy class A | P1002 1260 | C | 287,- |

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7.2.2

Electronically controlled Circulation Pump with outer thread, series NMT



7.2.2.1

Single Pump, electronically controlled with outer thread, series NMT

| Type | pressure stage | Art:-Nr. | PG | Price EUR |
|--------------|----------------|-------------|----|-----------|
| NMT 40 | PN 6/10 | P1002 2 110 | C | 1.524,- |
| NMT 50 | PN 6/10 | P1002 2 120 | C | 1.817,- |
| NMT 65 * | PN 6/10 | P1002 2 130 | C | 2.055,- |
| NMT 80 /6 * | PN 6 | P1002 2 140 | C | 2.544,- |
| NMT 80 /10 * | PN 10 | P1002 2 150 | C | 2.544,- |

7.2.2.2

Twin Pump, electronically controlled, with outer thread, series NMT



| Type | pressure stage | Art:-Nr. | PG | Price EUR |
|---------------|----------------|-------------|----|-----------|
| NMTD 40 | PN 6/10 | P1002 2 210 | C | 3.006,- |
| NMTD 50 | PN 6/10 | P1002 2 220 | C | 3.565,- |
| NMTD 65 * | PN 6/10 | P1002 2 230 | C | 4.054,- |
| NMTD 80 /6 * | PN 6 | P1002 2 240 | C | 5.032,- |
| NMTD 80 /10 * | PN 10 | P1002 2 250 | C | 5.032,- |

7.2.3

Electronically controlled Circulation Pump with flange, series EGHN



7.2.3.1

Single Pump, electronically controlled, with flange, series EGHN

| Type | pressure stage | Art:-Nr. | PG | Price EUR |
|---------------|----------------|-------------|----|-----------|
| EGHN 40-100 F | PN6/10 | P1002 3 110 | C | 1.562,- |
| EGHN 40-60 F | PN6/10 | P1002 3 120 | C | 1.472,- |
| EGHN 50-100 F | PN6/10 | P1002 3 130 | C | 1.993,- |
| EGHN 50-60 F | PN 6/10 | P1002 3 140 | C | 1.901,- |
| EGHN 65-120 F | PN6/10 | P1002 3 150 | C | 2.117,- |
| EGHN 65-60 F | PN 6/10 | P1002 3 160 | C | 2.044,- |
| EGHN 80-60 F | PN6 | P1002 3 170 | C | 2.399,- |

7.2.3.2

Twin Pump, electronically controlled, with flange, series EGHN



| Type | pressure stage | Art:-Nr. | PG | Price EUR |
|----------------|----------------|-------------|----|-----------|
| EGHND 40-100 F | N 6/10 | P1002 3 210 | C | 3.050,- |
| EGHND 40-60 F | PN6/10 | P1002 3 220 | C | 2.865,- |
| EGHND 50-100 F | PN 6/10 | P1002 3 230 | C | 3.888,- |
| EGHND 50-60 F | PN 6/10 | P1002 3 240 | C | 3.729,- |
| EGHND 65-120 F | PN 6/10 | P1002 3 250 | C | 4.127,- |
| EGHND 65-60 F | PN 6/10 | P1002 3 260 | C | 3.988,- |
| EGHND 80-60 F | PN 6 | P1002 3 270 | C | 4.593,- |

7.2.4

Electronically controlled Circulation Pump with separate frequency converter, with flange, series EGHN



7.2.4.1

Single Pump, electronically controlled, with separate FC, with flange

| Type | pressure stage | Art:-Nr. | PG | Price EUR |
|-------------------|----------------|-------------|----|-----------|
| EGHN-L40-100 F | PN 6/10 | P1002 4 110 | C | 1.562,- |
| EGHN-L50-100 F | PN 6/10 | P1002 4 120 | C | 1.996,- |
| EGHN-L65-120 F | PN 6/10 | P1002 4 130 | C | 2.116,- |
| EGHN-L80-120 F/6 | PN 6 | P1002 4 140 | C | 2.592,- |
| EGHN-L80-120 F/10 | PN 10 | P1002 4 150 | C | 2.592,- |





7.2.4.2 Twin Pump, electronically controlled with separate FC, with flange, series EGHN

| Type | Art.-Nr. | PG | Price EUR |
|-------------------|------------|----|-----------|
| EGHND-L40-100 F | P1002 4210 | C | 2512,- |
| EGHND-L50-100 F | P1002 4220 | C | 3.199,- |
| EGHND-L65-120 F | P1002 4230 | C | 4.001,- |
| EGHND-L80-120 F/6 | P1002 4240 | C | 4.578,- |

7.2.10 Accessories, electronically controlled pumps

7.2.10.1 Frequency converter

| Type | Art.-Nr. | PG | Price EUR |
|---------------------|------------|----|-----------|
| P L 100-007 | P1002 0110 | C | 619,- |
| FP L 100-011 | P1002 0120 | C | 799,- |
| FP L 100-015 N | P1002 0130 | C | 806,- |
| FE FP L 100-022 NFE | P1002 0140 | C | 1.078,- |

7.2.10.2 Blank Flange

| Type | Art.-Nr. | PG | Price EUR |
|-----------------|------------|----|-----------|
| GHND40 | P1002 0210 | C | 56,- |
| GHND 50, 65, 80 | P1002 0220 | C | 89,- |

7.2.10.3 Distance Ring

| Type | Art.-Nr. | PG | Price EUR |
|-------|------------|----|-----------|
| DN40 | P1002 0310 | C | 21,- |
| DN 65 | P1002 0320 | C | 32,- |
| DN80 | P1002 0330 | C | 35,- |

7.3. Circulation Pump for domestic hot water

7.3.1 Circulation Pump for domestic hot water with spherical rotor, outer thread



| Type | Description | Hmax | Qmax | Art.-Nr. | PG | Price EUR |
|---------------|---------------------------|------|----------------------|------------|----|-----------|
| SAN 15/15 B | for continuous operation | 1,5m | 1,5m ³ /h | P1003 1010 | C | 143,- |
| SAN 15/15 BT | with timer | 1,5m | 1,5m ³ /h | P1003 1020 | C | 185,- |
| SAN 15/15 BTR | with timer and Thermostat | 1,5m | 1,5m ³ /h | P1003 1030 | C | 221,- |

7.3.2 Circulation Pump for domestic hot water, outer thread



| Type | Hmax | Qmax | Art.-Nr. | PG | Price EUR |
|----------------------------|------|-----------------------|------------|----|-----------|
| SAN 15/40-130 | 3,9m | 2,8m ³ /h | P1003 2010 | C | 135,- |
| SAN 20/40-130 | 3,9m | 2,8m ³ /h | P1003 2020 | C | 135,- |
| SAN 25/40-130 | 3,9m | 2,8m ³ /h | P1003 2030 | C | 135,- |
| SAN 15/60-130 | 5,3m | 3,0m ³ /h | P1003 2040 | C | 137,- |
| SAN 20/60-130 | 5,3m | 3,0m ³ /h | P1003 2050 | C | 137,- |
| SAN 25/60-130 | 5,3m | 3,0m ³ /h | P1003 2060 | C | 137,- |
| SAN 20/70-130 | 6,7m | 4,2m ³ /h | P1003 2070 | C | 165,- |
| SAN 25/70-130 | 6,7m | 4,2m ³ /h | P1003 2080 | C | 165,- |
| optionale Versionen | | | | | |
| Type | Hmax | Qmax | Art.-Nr. | PG | Price EUR |
| SAN 20/40-150 | 4,1m | 3,2m ³ /h | P1003 2110 | C | 154,- |
| SAN 25/40-150 | 4,1m | 3,2 m ³ /h | P1003 2120 | C | 157,- |
| SAN 20/60-150 | 5,7m | 3,4 m ³ /h | P1003 2130 | C | 155,- |
| SAN 25/60-ISO | 5,7m | 3,4 m ³ /h | P1003 2140 | C | 158,- |

7.3.3 3-stage Circulation Pump for domestic hot water with flange



| Type | pressure stage | Art.-Nr. | PG | Price EUR |
|--------------|----------------|------------|----|-----------|
| SAN 40-120 F | PN6/10 | P1003 3010 | C | 1.136,- |
| SAN 40-70 F | PN6/10 | P1003 3020 | C | 1.106,- |
| SAN 50-120 F | PN6/10 | P1003 3030 | C | 1.321,- |
| SAN 50-70 F | PN6/10 | P1003 3040 | C | 1.245,- |
| SAN 65-120 F | PN6/10 | P1003 3050 | C | 1.441,- |
| SAN 65-70 F | PN6/10 | P1003 3060 | C | 1.343,- |

7.3.10 Accessories

7.3.10.1 Thread fitting for circulation pumps

| Type | Art.-Nr. | PG | Price EUR |
|-----------------|------------|----|-----------|
| BRONZE R 3/4" | P1003 0110 | C | 15,- |
| BRONZE R 1" | P1003 0120 | C | 16,- |
| BRONZE R 1 1/4" | P1003 0130 | C | 17,- |

7.4. Inline Pumps

7.4.1 Inline heating pump, series CV

| Type | DN | Art.-Nr. | PG | Price EUR |
|------------|----|------------|----|-----------|
| CV-32-4/80 | 32 | P1004 1010 | C | 487,- |
| CV-32-4/70 | 32 | P1004 1020 | C | 487,- |
| CV-32-4/60 | 32 | P1004 1030 | C | 487,- |
| CV-32-2/80 | 32 | P1004 1040 | C | 487,- |
| CV-32-2/70 | 32 | P1004 1050 | C | 487,- |
| CV-32-2/60 | 32 | P1004 1060 | C | 487,- |



7.4.2 Inline Pump, series CL

7.4.2.1 Inline Pump, series CL with 4 - pole IEC Motor (n = 1450 min-1)

| Type | P(kW) | Art.-Nr. | PG | Price EUR |
|-----------|-------|------------|----|-----------|
| CL 401-4 | 1,1 | P1004 2105 | C | 945,- |
| CL 402-4 | 0,75 | P1004 2110 | C | 852,- |
| CL 403-4 | 0,55 | P1004 2115 | C | 729,- |
| CL 501-4 | 1,5 | P1004 2120 | C | 1.019,- |
| CL 502-4 | 1,1 | P1004 2125 | C | 931,- |
| CL 503-4 | 0,55 | P1004 2130 | C | 786,- |
| CL 651-4 | 2,2 | P1004 2135 | C | 1.183,- |
| CL 652-4 | 1,1 | P1004 2140 | C | 946,- |
| CL 653-4 | 0,75 | P1004 2145 | C | 845,- |
| CL 801-4 | 3 | P1004 2150 | C | 1.334,- |
| CL 802-4 | 2,2 | P1004 2155 | C | 1.204,- |
| CL 803-4 | 1,1 | P1004 2160 | C | 959,- |
| CL 1001-4 | 4 | P1004 2165 | C | 1.611,- |
| CL 1002-4 | 3 | P1004 2170 | C | 1.394,- |



7.4.2.2 Inline Pump, series CL with 2 - pole IEC Motor (n = 2900 min -1)

| Type | P(kW) | Art.-Nr. | PG | Price EUR |
|----------|-------|------------|----|-----------|
| CL 401-2 | 5,5 | P1004 2205 | C | 1.962,- |
| CL 402-2 | 4 | P1004 2210 | C | 1.723,- |
| CL 403-2 | 3 | P1004 2215 | C | 1.409,- |
| CL501-2 | 11 | P1004 2220 | C | 2.741,- |
| CL 502-2 | 5,5 | P1004 2225 | C | 2.087,- |
| CL 503-2 | 3 | P1004 2230 | C | 1.446,- |
| CL 651-2 | 15 | P1004 2235 | C | 3.195,- |
| CL 652-2 | 7,5 | P1004 2240 | C | 2.239,- |
| CL 653-2 | 5,5 | P1004 2245 | C | 2.050,- |
| CL 801-2 | 22 | P1004 2250 | C | 3.962,- |
| CL 802-2 | 18,5 | P1004 2255 | C | 3.333,- |
| CL 803-2 | 7,5 | P1004 2260 | C | 2.301,- |



7.4.3 Inline domestic hot water pump, series PV

| Type | DN | Art.-Nr. | PG | Price EUR |
|--------------|----|------------|----|-----------|
| PV - 32-4/80 | 32 | P1004 3010 | C | 769,- |
| PV - 32-4/70 | 32 | P1004 3020 | C | 769,- |
| PV - 32-4/60 | 32 | P1004 3030 | C | 769,- |
| PV - 32-2/80 | 32 | P1004 3040 | C | 727,- |
| PV - 32-2/70 | 32 | P1004 3050 | C | 727,- |
| PV - 32-2/60 | 32 | P1004 3060 | C | 727,- |



7.4.4 Inline domestic hot water pump, series CLP

7.4.4.1 Inline domestic hot water pump, series CLP with 4 - pole IEC



Motor (n = 1450 min-i)

| Type | P(kW) | Art.-Nr. | PG | Price EUR |
|-----------|-------|------------|----|-----------|
| CLP 401-4 | 1,1 | P1004 4105 | C | 1.710,- |
| CLP 402-4 | 0,75 | P1004 4110 | C | 1.581,- |
| CLP 403-4 | 0,55 | P1004 4115 | C | 1.399,- |
| CLP 501-4 | 1,5 | P1004 4120 | C | 1.892,- |
| CLP 502-4 | 1,1 | P1004 4125 | C | 1.736,- |
| CLP 503-4 | 0,55 | P1004 4130 | C | 1.601,- |
| CLP 651-4 | 2,2 | P1004 4135 | C | 2.125,- |
| CLP 652-4 | 1,1 | P1004 4140 | C | 1.808,- |
| CLP 653-4 | 0,75 | P1004 4145 | C | 1.672,- |
| CLP 801-4 | 3 | P1004 4150 | C | 2.397,- |
| CLP 802-4 | 2,2 | P1004 4155 | C | 2.164,- |
| CLP 803-4 | 1,1 | P1004 4160 | C | 1.775,- |



7.4.4.2

Inline domestic hot water pump, series CLP with 2 - pole IEC Motor (n = 2900 min -1)

| Type | P(kW) | Art.-Nr. | PG | Price EUR |
|-----------|-------|------------|----|-----------|
| CLP 401-2 | 5,5 | P1004 4205 | C | 3.395,- |
| CLP 402-2 | 4 | P1004 4210 | C | 3.110,- |
| CLP 403-2 | 3 | P1004 4215 | C | 2.501,- |
| CLP 501-2 | 11 | P1004 4220 | C | 4.665,- |
| CLP 502-2 | 5,5 | P1004 4225 | C | 3.544,- |
| CLP 503-2 | 3 | P1004 4230 | C | 2.689,- |
| CLP 651-2 | 15 | P1004 4235 | C | 5.805,- |
| CLP 652-2 | 7,5 | P1004 4240 | C | 3.965,- |
| CLP 653-2 | 5,5 | P1004 4245 | C | 3.680,- |
| CLP 801-2 | 22 | P1004 4250 | C | 6.933,- |
| CLP 803-2 | 18 | P1004 4255 | C | 6.013,- |
| CLP 803-2 | 7,5 | P1004 4260 | C | 4.186,- |



7.5

Monoblock End-Suction Pump

7.5.1

Monoblock End-Suction Pump with 4 - pole IEC Motor (n = 1450 min-1)

| Type | P(kW) | Art.-Nr. | PG | Price EUR |
|----------|-------|------------|----|-----------|
| CB 401-4 | 1,5 | P1005 1010 | C | 1.019,- |
| CB 402-4 | 1,1 | P1005 1020 | C | 931,- |
| CB 403-4 | 0,55 | P1005 1030 | C | 855,- |
| CB 501-4 | 2,2 | P1005 1040 | C | 1.184,- |
| CB 502-4 | 1,1 | P1005 1050 | C | 948,- |
| CB 503-4 | 0,75 | P1005 1060 | C | 880,- |
| CB 651-4 | 3 | P1005 1070 | C | 1.334,- |
| CB 652-4 | 2,2 | P1005 1080 | C | 1.207,- |
| CB 653-4 | 1,1 | P1005 1090 | C | 963,- |
| CB 801-4 | 4 | P1005 1100 | C | 1.610,- |
| CB 802-4 | 3 | P1005 1110 | C | 1.394,- |



7.5.2

Monoblock End-Suction Pump with 2 - pole IEC Motor (n = 2900 min -1)

| Type | P(kW) | Art.-Nr. | PG | Price EUR |
|----------|-------|------------|----|-----------|
| CB 401-2 | 11 | P1005 2010 | C | 2.730,- |
| CB 402-2 | 5,5 | P1005 2020 | C | 1.958,- |
| CB 403-2 | 3 | P1005 2030 | C | 1.486,- |
| CB 501-2 | 15 | P1005 2040 | C | 3.272,- |
| CB 502-2 | 7,5 | P1005 2050 | C | 2.177,- |
| CB 503-2 | 5,5 | P1005 2060 | C | 2.039,- |
| CB 651-2 | 22 | P1005 2070 | C | 3.939,- |
| CB 652-2 | 18,5 | P1005 2080 | C | 3.421,- |
| CB 653-2 | 7,5 | P1005 2090 | C | 2.327,- |

7

7.6

7.6.1

Frequency controlled In-Line Centrifugal Pump

Frequency controlled In-Line Centrifugal Pump with 4 - pole IEC Motor (n = 1450 min-1)



| Type | P(kW) | Art.-Nr. | PG | Price EUR |
|------------|-------|------------|----|-----------|
| ECL 401-4 | 1,1 | P1006 1010 | C | 3.029,- |
| ECL 402-4 | 0,75 | P1006 1020 | C | 2.594,- |
| ECL 501-4 | 1,5 | P1006 1030 | C | 3.184,- |
| ECL 502-4 | 1,1 | P1006 1040 | C | 2.893,- |
| ECL 651-4 | 2,2 | P1006 1050 | C | 3.471,- |
| ECL 652-4 | 1,1 | P1006 1060 | C | 3.233,- |
| ECL 801-4 | 3 | P1006 1070 | C | 3.799,- |
| ECL 802-4 | 2,2 | P1006 1080 | C | 3.523,- |
| ECL 1001-4 | 4 | P1006 1090 | C | 4.088,- |
| ECL 1002-4 | 3 | P1006 1100 | C | 3.937,- |

7.6.2

Frequency controlled In-Line Centrifugal Pump with 2 - pole IEC Motor (n = 2900 min -1)



| Type | P(kW) | Art.-Nr. | PG | Price EUR |
|-----------|-------|------------|----|-----------|
| ECL 402-2 | 4 | P1006 2010 | C | 4.082,- |
| ECL 403-2 | 3 | P1006 2020 | C | 3.585,- |
| ECL 502-2 | 5,5 | P1006 2030 | C | 3.914,- |
| ECL 503-2 | 3 | P1006 2040 | C | 3.724,- |
| ECL 652-2 | 7,5 | P1006 2050 | C | 5.256,- |
| ECL 653-2 | 5,5 | P1006 2060 | C | 4.919,- |
| ECL 803-2 | 7,5 | P1006 2070 | C | 5.560,- |

7.6.10

Accessories – Twin Pipe Connection

| Type | Art.-Nr. | PG | Price EUR |
|--------|------------|----|-----------|
| DN40 | P1006 0110 | C | 554,- |
| DN 50 | P1006 0120 | C | 682,- |
| DN 65 | P1006 0130 | C | 1.069,- |
| DN80 | P1006 0140 | C | 1.094,- |
| DN 100 | P1006 0150 | C | 1.133,- |

7.7

Selfpriming Jet Pumps



| Type | Hmax | Qmin-max | Material | Art.-Nr. | PG | Price EUR |
|---|-----------|-----------|----------|------------|----|-----------|
| SPG 40 | 38 - 10 m | 0,6 - 3,6 | C. Iron | P1007 1010 | C | 138,- |
| SPG 50 | 47 - 25 m | 0,6 - 3,6 | C. Iron | P1007 1020 | C | 201,- |
| SPN40 | 38 - 10 m | 0,6 - 3,6 | S. Steel | P1007 1030 | C | 157,- |
| SPN50 | 46 - 20 m | 0,6 - 4,8 | S. Steel | P1007 1040 | C | 254,- |
| SPN60 | 58 - 18 m | 0,6 - 4,8 | S. Steel | P1007 1050 | C | 332,- |
| EUROPRESS – Pressure (Pressure-stat)and flow controller (accessory) | | | | P1007 1060 | C | 98,- |

7.8

Automatic working Pressure Systems - Hidropak



| Type | Hmax | Qmin-max | Material | Art.-Nr. | PG | Price EUR |
|-----------|-----------|-----------|----------|------------|----|-----------|
| HPG 35/25 | 46 - 5 m | 0,6 - 3,6 | C. Iron | P1008 1010 | C | 263,- |
| HPN 35/25 | 46 - 5 m | 0,6 - 3,6 | S. Steel | P1008 1020 | C | 313,- |
| HPN 60/25 | 62 - 15 m | 0,6 - 5,4 | S. Steel | P1008 1030 | C | 352,- |

7.9

Submersible Pumps



| Type | Hmax | Qmin-max | Str.-ver. | Art.-Nr. | PG | Price EUR |
|----------|--------------|------------|-----------|------------|----|-----------|
| P32/8 | 7,5 - 1 m | 0,6 - 10,8 | Plastics | P1009 1010 | C | 153,- |
| P32/10 | 9,7 - 2 m | 0,6 - 14,4 | Plastics | P1009 1020 | C | 198,- |
| P40/10G | 10,0 - 3,5 m | 3,0 - 24,0 | C. Iron | P1009 1030 | C | 369,- |
| P50/10 N | 10,0 - 5,4 m | 0,6 - 18,0 | S. Steel | P1009 1040 | C | 368,- |

7.10

Multistage Submersible Deep Hole Pumps



| Type | P(kW) | Hmax | DN | SV / PS | Art.-Nr. | PG | Price EUR |
|----------------|-----------|------------|----|---------|------------|----|-----------|
| VPE 3 - 45 | 0,3-2,70 | 46-7m | 3" | 1~230V | P1010 1010 | C | 700,- |
| VPE 3 - 70 | 0,3-2,70 | 70-13 m | 3" | 1~230V | P1010 1020 | C | 788,- |
| VPE 3 - 90 | 0,3-2,70 | 92-17 m | 3" | 1~230V | P1010 1030 | C | 900,- |
| VPE 4 - 75/2 | 0,15-1,95 | 73-17 m | 4" | 1~230V | P1010 1040 | C | 500,- |
| VPE 4 - 150/2 | 0,15-1,95 | 151-36m | 4" | 1~230V | P1010 1050 | C | 688,- |
| VPE 4 - 230/2 | 0,15-1,95 | 233-55 m | 4" | 1~230V | P1010 1060 | C | 913,- |
| VPE 4 - 75/3 | 0,30-3,00 | 74-16 m | 4" | 1~230V | P1010 1070 | C | 475,- |
| VPE 4 - 150/3 | 0,30-3,00 | 147 - 33 m | 4" | 1~230V | P1010 1080 | C | 650,- |
| VPE 4 - 300/3 | 0,30-3,00 | 294 - 66 m | 4" | 1~230V | P1010 1090 | C | 1.050,- |
| VPE 4 - 60/5 | 0,90-5,40 | 58 - 15 m | 4" | 1~230V | P1010 1100 | C | 500,- |
| VPE 4 - 120/5 | 0,90-5,40 | 116 -32m | 4" | 1~230V | P1010 1110 | C | 713,- |
| VPE 4 - 175/5 | 0,90-5,40 | 175 - 48 m | 4" | 1~230V | P1010 1120 | C | 938,- |
| VPE 4 - 60/8 | 1,20-8,40 | 58 - 16 m | 4" | 1~230V | P1010 1130 | C | 600,- |
| VPE 4 - 125/8 | 1,20-8,40 | 124 - 33 m | 4" | 1~230V | P1010 1140 | C | 875,- |
| VPE 4 - 55/ 12 | 1,50-12,0 | 54 - 16 m | 4" | 1~230V | P1010 1150 | C | 638,- |
| VPE 4 -50/ 12 | 1,50-12,0 | 81 - 24 m | 4" | 1~230V | P1010 1160 | C | 800,- |
| VPE 4 - 50/20 | 3,0-21,0 | 50 - 12 m | 4" | 1~230V | P1010 1170 | C | 825,- |
| VPT 3 - 45 | 0,3-2,70 | 46-7 m | 3" | 3~400V | P1010 1180 | C | 688,- |
| VPT 3 - 70 | 0,3-2,70 | 70-13m | 3" | 3~400V | P1010 1190 | C | 775,- |
| VPT 3 - 90 | 0,3-2,70 | 92 - 17 m | 3" | 3~400V | P1010 1200 | C | 888,- |
| VPT 3 - 130 | 0,3-2,70 | 128 - 28 m | 3" | 3~400V | P1010 1210 | C | 1.038,- |
| VPT 4-75/2 | 0,15-1,95 | 73 - 17 m | 4" | 3~400V | P1010 1220 | C | 488,- |
| VPT 4 - 150/2 | 0,15-1,95 | 151 - 36 m | 4" | 3~400V | P1010 1230 | C | 688,- |
| VPT 4 - 230/2 | 0,15-1,95 | 233 - 55 m | 4" | 3~400V | P1010 1240 | C | 888,- |
| VPT 4 -75/3 | 0,30-3,00 | 74 - 16 m | 4" | 3~400V | P1010 1250 | C | 463,- |
| VPT 4 -ISO/ 3 | 0,30-3,00 | 147 - 33 m | 4" | 3~400V | P1010 1260 | C | 625,- |
| VPT 4 -300/3 | 0,30-3,00 | 294 - 66 m | 4" | 3~400V | P1010 1270 | C | 863,- |
| VPT 4 -60/5 | 0,90-5,40 | 58 - 15 m | 4" | 3~400V | P1010 1280 | C | 488,- |
| VPT 4 - 120/5 | 0,90-5,40 | 116 - 32 m | 4" | 3~400V | P1010 1290 | C | 663,- |
| VPT 4 - 175/5 | 0,90-5,40 | 175 - 48 m | 4" | 3~400V | P1010 1300 | C | 850,- |
| VPT 4 - 300/5 | 0,90-5,40 | 292 - 81 m | 4" | 3~400V | P1010 1310 | C | 1.375,- |
| VPT 4 - 60/8 | 1,20-8,40 | 58 - 16 m | 4" | 3~400V | P1010 1320 | C | 563,- |
| VPT 4 - 125/8 | 1,20-8,40 | 124 -33m | 4" | 3~400V | P1010 1330 | C | 788,- |
| VPT 4 -205/8 | 1,20-8,40 | 205 - 57 m | 4" | 3~400V | P1010 1340 | C | 1.338,- |
| VPT 4 -55/12 | 1,50-12,0 | 54 - 16 m | 4" | 3~400V | P1010 1350 | C | 588,- |
| VPT 4 - 80/12 | 1,50-12,0 | 81 - 24 m | 4" | 3~400V | P1010 1360 | C | 700,- |
| VPT 4 -145/12 | 1,50-12,0 | 149 - 44 m | 4" | 3~400V | P1010 1370 | C | 1.188,- |
| VPT 4 -205/12 | 1,50-12,0 | 203 - 61 m | 4" | 3~400V | P1010 1380 | C | 1.425,- |
| VPT 4 - 50/20 | 3,0-21,0 | 50 - 12 m | 4" | 3~400V | P1010 1390 | C | 763,- |
| VPT 4 - 70/20 | 3,0-21,0 | 67 - 16 m | 4" | 3~400V | P1010 1400 | C | 938,- |
| VPT 4 - 95/20 | 3,0-21,0 | 95 - 25 m | 4" | 3~400V | P1010 1410 | C | 1.275,- |
| VPT 4 -130/20 | 3,0-21,0 | 129 - 35 m | 4" | 3~400V | P1010 1420 | C | 1.575,- |
| VPT 4 -170/20 | 3,0-21,0 | 168 - 42 m | 4" | 3~400V | P1010 1430 | C | 1.950,- |



7.11

Horizontal Monoblock Multistage Pumps with crew connection



7.11.1

Horizontale Monoblock Pumpen, multi stage with crew connection, with 2-pole IEC Motor (n=2900 min-1)

| Type | P(kW) | Hmax | Qmin-max | DN | SV / PS | Art.-Nr. | PG | Price EUR |
|---------------|-------|------|----------|----|----------|------------|----|-----------|
| MVP-BM 25-203 | 0,75 | 44m | 1 -4,5 | 25 | 1~ 230V | P1011 1010 | C | 629,- |
| MVP-BM 25-204 | 0,75 | 44m | 1 -4,5 | 25 | 1~ 230V | P1011 1020 | C | 649,- |
| MVP-BM 25-205 | 0,75 | 56m | 1 -4,5 | 25 | 1~ 230V | P1011 1030 | C | 669,- |
| MVP-BM 25-206 | 1,1 | 68m | 1 -4,5 | 25 | 1~ 230V | P1011 1040 | C | 719,- |
| MVP-BM 25-207 | 1,1 | 80m | 1 -4,5 | 25 | 1~ 230V | P1011 1050 | C | 745,- |
| MVP-BM 25-208 | 1,5 | 91m | 1 -4,5 | 25 | 1~ 230V | P1011 1060 | C | 790,- |
| MVP-BM 25-210 | 1,5 | 114m | 1 -4,5 | 25 | 1~ 230V | P1011 1070 | C | 836,- |
| MVP-BM 32-403 | 1,1 | 45m | 2,5-8 | 32 | 1~ 230 V | P1011 1080 | C | 654,- |
| MVP-BM 32-404 | 1,1 | 45m | 2,5-8 | 32 | 1~ 230 V | P1011 1090 | C | 674,- |
| MVP-BM 32-405 | 1,1 | 56m | 2,5-8 | 32 | 1-230 V | P1011 1100 | C | 696,- |
| MVP-BM 32-406 | 1,5 | 68m | 2,5-8 | 32 | 1~ 230V | P1011 1110 | C | 731,- |
| MVP-BM 32-407 | 1,5 | 80m | 2,5-8 | 32 | 1~ 230V | P1011 1120 | C | 768,- |
| MVP-BM 40-803 | 1,5 | 47m | 5-13 | 40 | 1~ 230 V | P1011 1130 | C | 699,- |
| MVP-BM 40-804 | 1,5 | 47m | 5-13 | 40 | 1~ 230V | P1011 1140 | C | 719,- |
| MVP-B 25-203 | 0,75 | 44m | 1 -4,5 | 25 | 3~ 400 V | P1011 1150 | C | 613,- |
| MVP-B 25-204 | 0,75 | 44m | 1 -4,5 | 25 | 3~ 400 V | P1011 1160 | C | 633,- |
| MVP-B 25-205 | 0,75 | 56m | 1 -4,5 | 25 | 3~ 400 V | P1011 1170 | C | 651,- |
| MVP-B 25-206 | 1,1 | 68m | 1 -4,5 | 25 | 3~ 400 V | P1011 1180 | C | 699,- |
| MVP-B 25-207 | 1,1 | 80m | 1 -4,5 | 25 | 3~ 400 V | P1011 1190 | C | 726,- |
| MVP-B 25-208 | 1,5 | 91m | 1 -4,5 | 25 | 3~ 400 V | P1011 1200 | C | 766,- |
| MVP-B 25-210 | 1,5 | 114m | 1 -4,5 | 25 | 3~ 400 V | P1011 1210 | C | 810,- |
| MVP-B 32-404 | 1,1 | 45m | 2,5-8 | 32 | 3~ 400 V | P1011 1220 | C | 634,- |
| MVP-B 32-405 | 1,1 | 56m | 2,5-8 | 32 | 3~ 400 V | P1011 1230 | C | 654,- |
| MVP-B 32-406 | 1,5 | 68m | 2,5-8 | 32 | 3~ 400 V | P1011 1240 | C | 676,- |
| MVP-B 32-407 | 1,5 | 80m | 2,5-8 | 32 | 3~ 400 V | P1011 1250 | C | 705,- |
| MVP-B 32-408 | 2,2 | 91m | 2,5-8 | 32 | 3~ 400 V | P1011 1260 | C | 743,- |
| MVP-B 32-410 | 2,2 | 114m | 2,5-8 | 32 | 3~ 400 V | P1011 1270 | C | 783,- |
| MVP-B 40-804 | 1,5 | 47m | 5-13 | 40 | 3~ 400 V | P1011 1280 | C | 829,- |
| MVP-B 40-805 | 2,2 | 59m | 5-13 | 40 | 3~ 400 V | P1011 1290 | C | 673,- |
| MVP-B 40-806 | 2,2 | 71m | 5-13 | 40 | 3-400 V | P1011 1300 | C | 694,- |

7.12

Inline Pump, multi stage, with 2-pole IEC Motor (RPM=2900mm-1)

7.12.1

Inline Pump, multi stage, with 2-pole IEC Motor (RPM=2900mm-1), with thread connection



| Type | P(kW) | Hmax | Qmin-max | DN | SV / PS | Art.-Nr. | PG | Price EUR |
|--------------|-------|------|----------|----|----------|------------|----|-----------|
| MVP-M 25-204 | 0,75 | 44m | 1 -4,5 | 25 | 1~ 230 V | P1012 1010 | C | 799,- |
| MVP-M 25-205 | 0,75 | 56m | 1 -4,5 | 25 | 1~ 230 V | P1012 1020 | C | 816,- |
| MVP-M 25-206 | 1,1 | 68m | 1 -4,5 | 25 | 1~ 230 V | P1012 1030 | C | 891,- |
| MVP-M 25-207 | 1,1 | 80m | 1 -4,5 | 25 | 1~ 230 V | P1012 1040 | C | 913,- |
| MVP-M 25-208 | 1,5 | 91m | 1 -4,5 | 25 | 1~ 230 V | P1012 1050 | C | 1026,- |
| MVP-M 25-210 | 1,5 | 114m | 1 -4,5 | 25 | 1~ 230 V | P1012 1060 | C | 1070,- |
| MVP-M 25-212 | 2,2 | 136m | 1 -4,5 | 25 | 1~ 230 V | P1012 1070 | C | 1239,- |
| MVP-M 25-214 | 2,2 | 159m | 1 -4,5 | 25 | 1~ 230 V | P1012 1080 | C | 1301,- |
| MVP-M 32-404 | 1,1 | 45m | 2,5-8 | 32 | 1~ 230 V | P1012 1090 | C | 828,- |
| MVP-M 32-405 | 1,1 | 56m | 2,5-8 | 32 | 1~ 230 V | P1012 1100 | C | 844,- |
| MVP-M 32-406 | 1,5 | 68m | 2,5-8 | 32 | 1~ 230 V | P1012 1110 | C | 973,- |
| MVP-M 32-407 | 1,5 | 80m | 2,5-8 | 32 | 1~ 230 V | P1012 1120 | C | 996,- |
| MVP-M 32-408 | 2,2 | 91m | 2,5-8 | 32 | 1~ 230 V | P1012 1130 | C | 1094,- |
| MVP-M 32-410 | 2,2 | 114m | 2,5-8 | 32 | 1~ 230 V | P1012 1140 | C | 1138,- |
| MVP-M 40-804 | 1,5 | 47m | 5,0 - 13 | 40 | 1~ 230 V | P1012 1150 | C | 990,- |
| MVP-M 40-805 | 2,2 | 59m | 5,0 - 13 | 40 | 1~ 230 V | P1012 1160 | C | 1100,- |
| MVP-M 40-806 | 2,2 | 71m | 5,0 - 13 | 40 | 1~ 230V | P1012 1170 | C | 1178,- |
| MVP 25-204 | 0,75 | 44m | 1-4,5 | 25 | 3~ 400 V | P1012 1180 | C | 721,- |
| MVP 25-205 | 0,75 | 56m | 1-4,5 | 25 | 3~ 400 V | P1012 1190 | C | 739,- |
| MVP 25-206 | 1,1 | 68m | 1-4,5 | 25 | 3~ 400 V | P1012 1200 | C | 811,- |
| MVP 25-207 | 1,1 | 80m | 1-4,5 | 25 | 3~ 400 V | P1012 1210 | C | 833,- |
| MVP 25-208 | 1,5 | 91m | 1-4,5 | 25 | 3~ 400 V | P1012 1220 | C | 950,- |
| MVP 25-210 | 1,5 | 114m | 1-4,5 | 25 | 3~ 400 V | P1012 1230 | C | 994,- |
| MVP 25-212 | 2,2 | 136m | 1-4,5 | 25 | 3~ 400 V | P1012 1240 | C | 1156,- |
| MVP 25-214 | 2,2 | 159m | 1-4,5 | 25 | 3~ 400 V | P1012 1250 | C | 1219,- |
| MVP 25-216 | 3 | 182m | 1-4,5 | 25 | 3~ 400 V | P1012 1260 | C | 1370,- |
| MVP 25-218 | 3 | 205m | 1-4,5 | 25 | 3~ 400 V | P1012 1270 | C | 1414,- |
| MVP 25-220 | 3 | 228m | 1-4,5 | 25 | 3~ 400 V | P1012 1280 | C | 1501,- |
| MVP 32-404 | 1,1 | 45m | 2,5-8 | 32 | 3~ 400 V | P1012 1290 | C | 748,- |



| Type | P(kW) | Hmax | Qmin-max | DN | SV / PS | Art.-Nr. | PG | Price EUR |
|------------|-------|------|----------|----|---------|------------|----|-----------|
| MVP 32-405 | 1,1 | 56m | 2,5-8 | 32 | 3~400 V | P1012 1300 | C | 765,- |
| MVP 32-406 | 1,5 | 68m | 2,5-8 | 32 | 3~400 V | P1012 1310 | C | 896,- |
| MVP 32-407 | 1,5 | 80m | 2,5-8 | 32 | 3~400 V | P1012 1320 | C | 920,- |
| MVP 32-408 | 2,2 | 91m | 2,5-8 | 32 | 3~400 V | P1012 1330 | C | 1.010,- |
| MVP 32-410 | 2,2 | 114m | 2,5-8 | 32 | 3~400 V | P1012 1340 | C | 1.054,- |
| MVP 32 412 | 3 | 136m | 2,5-8 | 32 | 3~400 V | P1012 1350 | C | 1.269,- |
| MVP 32-414 | 3 | 159m | 2,5-8 | 32 | 3~400 V | P1012 1360 | C | 1.325,- |
| MVP 32-416 | 4 | 182m | 2,5-8 | 32 | 3~400 V | P1012 1370 | C | 1.516,- |
| MVP 32-418 | 4 | 205m | 2,5-8 | 32 | 3~400 V | P1012 1380 | C | 1.628,- |
| MVP 40-804 | 1,5 | 47m | 5-13 | 40 | 3~400 V | P1012 1390 | C | 914,- |
| MVP 40-805 | 2,2 | 59m | 5-13 | 40 | 3~400 V | P1012 1400 | C | 1.018,- |
| MVP 40-806 | 2,2 | 71m | 5-13 | 40 | 3~400 V | P1012 1410 | C | 1.094,- |
| MVP 40-807 | 3 | 83m | 5-13 | 40 | 3~400 V | P1012 1420 | C | 1.235,- |
| MVP 40-808 | 3 | 95m | 5-13 | 40 | 3~400 V | P1012 1430 | C | 1.266,- |
| MVP 40 810 | 4 | 119m | 5-13 | 40 | 3~400 V | P1012 1440 | C | 1.450,- |
| MVP 40-811 | 4 | 131m | 5-13 | 40 | 3~400 V | P1012 1450 | C | 1.556,- |
| MVP 40-813 | 5,5 | 155m | 5-13 | 40 | 3~400 V | P1012 1460 | C | 1.891,- |
| MVP 40-815 | 5,5 | 179m | 5-13 | 40 | 3~400 V | P1012 1470 | C | 2.004,- |
| MVP 40-817 | 7,5 | 202m | 5-13 | 40 | 3~400 V | P1012 1480 | C | 2.239,- |
| MVP 40-819 | 7,5 | 226m | 5-13 | 40 | 3~400 V | P1012 1490 | C | 2.364,- |



7.12.2

Inline Pump, multi stage, with 2-pole IEC Motor (RPM=2900mm-1) with flange connection

| Type | P(kW) | Hmax | Qmin-max | DN | SV / PS | Art.-Nr. | PG | Price EUR |
|---------------|-------|------|----------|----|---------|------------|----|-----------|
| MVP 50-1603 F | 3 | 51m | 8-24 | 50 | 3~400 V | P1012 2010 | C | 1.109,- |
| MVP 50-1604 F | 4 | 69m | 8-24 | 50 | 3~400 V | P1012 2020 | C | 1.353,- |
| MVP 50-1605 F | 5,5 | 86m | 8-24 | 50 | 3~400 V | P1012 2030 | C | 1.796,- |
| MVP 50-1606 F | 5,5 | 103m | 8-24 | 50 | 3~400 V | P1012 2040 | C | 1.961,- |
| MVP 50-1607 F | 7,5 | 120m | 8-24 | 50 | 3~400 V | P1012 2050 | C | 2.158,- |
| MVP 50-1608 F | 7,5 | 138m | 8-24 | 50 | 3~400 V | P1012 2060 | C | 2.198,- |
| MVP 50-1609 F | 11 | 155m | 8-24 | 50 | 3~400 V | P1012 2070 | C | 2.713,- |
| MVP 50-1610 F | 11 | 172m | 8-24 | 50 | 3~400 V | P1012 2080 | C | 2.779,- |
| MVP 50-1611 F | 11 | 189m | 8-24 | 50 | 3~400 V | P1012 2090 | C | 2.946,- |
| MVP 50-1612 F | 15 | 206m | 8-24 | 50 | 3~400 V | P1012 2100 | C | 3.255,- |
| MVP 50-1614 F | 15 | 240m | 8-24 | 50 | 3~400 V | P1012 2110 | C | 3.625,- |
| MVP 50-1616 F | 18,5 | 275m | 8-24 | 50 | 3~400 V | P1012 2120 | C | 3.945,- |
| MVP 65-3202 F | 4 | 37m | 15-44 | 65 | 3~400 V | P1012 2130 | C | 1.749,- |
| MVP 65-3203 F | 5,5 | 56m | 15-44 | 65 | 3~400 V | P1012 2140 | C | 2.281,- |
| MVP 65-3204 F | 7,5 | 75m | 15-44 | 65 | 3~400 V | P1012 2150 | C | 2.563,- |
| MVP 65-3205 F | 11 | 94m | 15-44 | 65 | 3~400 V | P1012 2160 | C | 3.190,- |
| MVP 65-3206 F | 11 | 112m | 15-44 | 65 | 3~400 V | P1012 2170 | C | 3.515,- |
| MVP 65-3207 F | 15 | 131m | 15-44 | 65 | 3~400 V | P1012 2180 | C | 4.430,- |
| MVP 65-3208 F | 15 | 150m | 15-44 | 65 | 3~400 V | P1012 2190 | C | 4.638,- |
| MVP 65-3209 F | 18,5 | 168m | 15-44 | 65 | 3~400 V | P1012 2200 | C | 5.026,- |
| MVP 65-3210 F | 18,5 | 187m | 15-44 | 65 | 3~400 V | P1012 2210 | C | 5.394,- |
| MVP 65-3212 F | 22 | 225m | 15-44 | 65 | 3~400 V | P1012 2220 | C | 5.949,- |
| MVP 80-4801 F | 4 | 20m | 21-60 | 80 | 3~400 V | P1012 2230 | C | 1.819,- |
| MVP 80-4802 F | 5,5 | 41m | 21-60 | 80 | 3~400 V | P1012 2240 | C | 2.231,- |
| MVP 80-4803 F | 7,5 | 61m | 21-60 | 80 | 3~400 V | P1012 2250 | C | 2.625,- |
| MVP 80-4804 F | 11 | 81m | 21-60 | 80 | 3~400 V | P1012 2260 | C | 3.300,- |
| MVP 80-4805 F | 15 | 101m | 21-60 | 80 | 3~400 V | P1012 2270 | C | 3.818,- |
| MVP 80-4806 F | 15 | 121m | 21-60 | 80 | 3~400 V | P1012 2280 | C | 4.209,- |
| MVP 80-4807 F | 18,5 | 142m | 21-60 | 80 | 3~400 V | P1012 2290 | C | 4.921,- |
| MVP 80-4808 F | 22 | 162m | 21-60 | 80 | 3~400 V | P1012 2300 | C | 5.625,- |

7.12.10

Accessories – counter flange

| Type | Art.-Nr. | PG | Price EUR |
|-------|------------|----|-----------|
| DN 50 | P1012 0110 | C | 38,- |
| DN 65 | P1012 0120 | C | 54,- |
| DN 80 | P1012 0130 | C | 73,- |

7.13

Inline Pump, horizontal, multi stage with 4 pole IEC Motor (RPM = 1450 min⁻¹)

7.13.1

Inline Pump, horizontal, multi stage with 4 pole IEC Motor
(RPM = 1450 min⁻¹) with thread connection

| Type | P(kW) | Hmax | Qmin-max | DN | SV / PS | Art.-Nr. | PG | Price EUR |
|--------------|-------|------|----------|----|---------|------------|----|-----------|
| MVP-4 25-204 | 0,55 | 11m | 0,6-2,2 | 25 | 3~400V | P1013 1010 | C | 716,- |
| MVP-4 25-205 | 0,55 | 14m | 0,6-2,2 | 25 | 3~400V | P1013 1020 | C | 733,- |
| MVP-4 25-206 | 0,55 | 17m | 0,6-2,2 | 25 | 3~400V | P1013 1030 | C | 788,- |
| MVP-4 25-207 | 0,55 | 20m | 0,6-2,2 | 25 | 3~400V | P1013 1040 | C | 809,- |
| MVP-4 25-208 | 0,55 | 23m | 0,6-2,2 | 25 | 3~400V | P1013 1050 | C | 903,- |
| MVP-4 25-210 | 0,55 | 29m | 0,6-2,2 | 25 | 3~400V | P1013 1060 | C | 948,- |
| MVP-4 25-212 | 0,55 | 35m | 0,6-2,2 | 25 | 3~400V | P1013 1070 | C | 1.058,- |
| MVP-4 25-214 | 0,55 | 40m | 0,6-2,2 | 25 | 3~400V | P1013 1080 | C | 1.120,- |
| MVP-4 25-216 | 0,55 | 46m | 0,6-2,2 | 25 | 3~400V | P1013 1090 | C | 1.208,- |
| MVP-4 25-218 | 0,55 | 52m | 0,6-2,2 | 25 | 3~400V | P1013 1100 | C | 1.251,- |
| MVP-4 25-220 | 0,55 | 58m | 0,6-2,2 | 25 | 3~400V | P1013 1110 | C | 1.339,- |
| MVP-4 32-404 | 0,55 | 11m | 0,9-3,6 | 32 | 3~400V | P1013 1120 | C | 724,- |
| MVP-4 32-405 | 0,55 | 14m | 0,9-3,6 | 32 | 3~400V | P1013 1130 | C | 740,- |
| MVP-4 32-406 | 0,55 | 17m | 0,9-3,6 | 32 | 3~400V | P1013 1140 | C | 849,- |
| MVP-4 32-407 | 0,55 | 20m | 0,9-3,6 | 32 | 3~400V | P1013 1150 | C | 873,- |
| MVP-4 32-408 | 0,55 | 23m | 0,9-3,6 | 32 | 3~400V | P1013 1160 | C | 911,- |
| MVP-4 32-410 | 0,55 | 28m | 0,9-3,6 | 32 | 3~400V | P1013 1170 | C | 956,- |
| MVP-4 32-412 | 0,55 | 34m | 0,9-3,6 | 32 | 3~400V | P1013 1180 | C | 1.105,- |
| MVP-4 32-414 | 0,55 | 39m | 0,9-3,6 | 32 | 3~400V | P1013 1190 | C | 1.163,- |
| MVP-4 32-416 | 0,55 | 45m | 0,9-3,6 | 32 | 3~400V | P1013 1200 | C | 1.304,- |
| MVP-4 32-418 | 0,75 | 51m | 0,9-3,6 | 32 | 3~400V | P1013 1210 | C | 1.423,- |
| MVP-4 40-804 | 0,55 | 11m | 2-6,9 | 40 | 3~400V | P1013 1220 | C | 866,- |
| MVP-4 40-805 | 0,55 | 14m | 2-6,9 | 40 | 3~400V | P1013 1230 | C | 919,- |
| MVP-4 40-806 | 0,55 | 17m | 2-6,9 | 40 | 3~400 V | P1013 1240 | C | 996,- |
| MVP-4 40-807 | 0,55 | 20m | 2-6,9 | 40 | 3~400V | P1013 1250 | C | 1.071,- |
| MVP-4 40-808 | 0,55 | 23m | 2-6,9 | 40 | 3~400 V | P1013 1260 | C | 1.104,- |
| MVP-4 40-810 | 0,75 | 29m | 2-6,9 | 40 | 3~400 V | P1013 1270 | C | 1.244,- |
| MVP-4 40-811 | 0,75 | 32m | 2-6,9 | 40 | 3~400V | P1013 1280 | C | 1.350,- |
| MVP-4 40-813 | 0,75 | 38m | 2-6,9 | 40 | 3~400V | P1013 1290 | C | 1.570,- |
| MVP-4 40-815 | 1,1 | 44m | 2-6,9 | 40 | 3~400V | P1013 1300 | C | 1.709,- |
| MVP-4 40-817 | 1,1 | 49m | 2-6,9 | 40 | 3~400 V | P1013 1310 | C | 1.823,- |
| MVP-4 40-819 | 1,1 | 55m | 2-6,9 | 40 | 3~400 V | P1013 1320 | C | 1.948,- |

7.13.2

Inline Pump, horizontal, multi stage with 4 pole IEC Motor (RPM = 1450 min⁻¹)
with flange connection

| Type | P(kW) | Hmax | Qmin-max | DN | SV / PS | Art.-Nr. | PG | Price EUR |
|-----------------|-------|------|-----------|----|---------|------------|----|-----------|
| MVP-4 50-1603 F | 2,2 | 12m | 3,6-12,9 | 50 | 3~400 V | P1013 2010 | C | 1.069,- |
| MVP-4 50-1604 F | 2,2 | 16m | 3,6-12,9 | 50 | 3~400 V | P1013 2020 | C | 1.263,- |
| MVP-4 50-1605 F | 2,2 | 20m | 3,6-12,9 | 50 | 3~400 V | P1013 2030 | C | 1.591,- |
| MVP-4 50-1606 F | 2,2 | 24m | 3,6-12,9 | 50 | 3~400 V | P1013 2040 | C | 1.756,- |
| MVP-4 50-1607 F | 2,2 | 29m | 3,6-12,9 | 50 | 3~400 V | P1013 2050 | C | 1.830,- |
| MVP-4 50-1608 F | 2,2 | 33m | 3,6-12,9 | 50 | 3~400 V | P1013 2060 | C | 1.870,- |
| MVP-4 50-1609 F | 2,2 | 37m | 3,6-12,9 | 50 | 3~400 V | P1013 2070 | C | 2.109,- |
| MVP-4 50-1610 F | 2,2 | 41m | 3,6- 12,9 | 50 | 3~400 V | P1013 2080 | C | 2.174,- |
| MVP-4 50-1611 F | 2,2 | 45m | 3,6- 12,9 | 50 | 3~400 V | P1013 2090 | C | 2.343,- |
| MVP-4 50-1612 F | 2,2 | 49m | 3,6- 12,9 | 50 | 3~400 V | P1013 2100 | C | 2.406,- |
| MVP-4 50-1614 F | 2,2 | 58m | 3,6- 12,9 | 50 | 3~400 V | P1013 2110 | C | 2.778,- |
| MVP-4 50-1616 F | 3 | 66m | 3,6- 12,9 | 50 | 3~400 V | P1013 2120 | C | 2.940,- |
| MVP-4 65-3202 F | 2,2 | 9m | 7 - 23,4 | 65 | 3~400 V | P1013 2130 | C | 1.659,- |
| MVP-4 65-3203 F | 2,2 | 13m | 7 - 23,4 | 65 | 3~400 V | P1013 2140 | C | 2.076,- |
| MVP-4 65-3204 F | 2,2 | 18m | 7 - 23,4 | 65 | 3~400 V | P1013 2150 | C | 2.235,- |
| MVP-4 65-3205 F | 2,2 | 22m | 7 - 23,4 | 65 | 3~400 V | P1013 2160 | C | 2.586,- |
| MVP-4 65-3206 F | 2,2 | 26m | 7 - 23,4 | 65 | 3~400 V | P1013 2170 | C | 2.911,- |
| MVP-4 65-3207 F | 2,2 | 31m | 7 - 23,4 | 65 | 3~400 V | P1013 2180 | C | 3.581,- |
| MVP-4 65-3208 F | 2,2 | 35m | 7 - 23,4 | 65 | 3~400 V | P1013 2190 | C | 3.790,- |
| MVP-4 65-3209 F | 3 | 39m | 7 - 23,4 | 65 | 3~400 V | P1013 2200 | C | 4.021,- |
| MVP-4 65-3210 F | 3 | 44m | 7 - 23,4 | 65 | 3~400 V | P1013 2210 | C | 4.389,- |
| MVP-4 65-3212 F | 4 | 53m | 7 - 23,4 | 65 | 3~400 V | P1013 2220 | C | 4.750,- |
| MVP-4 80-4803 F | 2,2 | 16m | 9-30 | 80 | 3~400 V | P1013 2230 | C | 2.298,- |
| MVP-4 80-4804 F | 2,2 | 21m | 9-30 | 80 | 3~400 V | P1013 2240 | C | 2.696,- |
| MVP-4 80-4805 F | 2,2 | 26m | 9-30 | 80 | 3~400 V | P1013 2250 | C | 2.969,- |
| MVP-4 80-4806 F | 2,2 | 31m | 9-30 | 80 | 3~400 V | P1013 2260 | C | 3.360,- |
| MVP-4 80-4807 F | 3 | 37m | 9-30 | 80 | 3~400 V | P1013 2270 | C | 3.916,- |
| MVP-4 80-4808 F | 3 | 42m | 9-30 | 80 | 3~400 V | P1013 2280 | C | 4.360,- |



7.13.10.1

Accessories flange

| Type | P(kW) | Hmax | Qmin-max | Art.-Nr. | PG | Price EUR |
|------|--------|--------|-----------|------------|----|-----------|
| DN25 | Screws | - Nuts | - Gaskets | P1013 0110 | C | 55,- |
| DN32 | Screws | - Nuts | - Gaskets | P1013 0120 | C | 60,- |
| DN40 | Screws | - Nuts | - Gaskets | P1013 0130 | C | 68,- |

7.13.10.2

Accessories Counter flange in AISI 304 / Accessory – Counter Flange in AISI 304

| Type | P(kW) | Hmax | Qmin-max | Art.-Nr. | PG | Price EUR |
|--------|--------|-------|-----------|------------|----|-----------|
| GI | Screws | -Nuts | - Gaskets | P1013 0210 | C | 55,- |
| GI 1/4 | Screws | -Nuts | - Gaskets | P1013 0220 | C | 60,- |
| GI1/2 | Screws | -Nuts | - Gaskets | P1013 0230 | C | 68,- |
| DM 50 | Screws | -Nuts | - Gaskets | P1013 0240 | C | 38,- |
| DN65 | Screws | -Nuts | - Gaskets | P1013 0250 | C | 54,- |
| DN80 | Screws | -Nuts | - Gaskets | P1013 0260 | C | 73,- |

7.14.

Pressure Boosting Systems

7.14.1

Pressure Boosting System with frequency converter VARIOMAT



7.14.1.1

Pressure Boosting System with frequency converter with multi stage pump MHP

| Type | P(kW) | SV / PS | Art.-Nr. | PG | Price EUR |
|---------------|-------|---------|------------|----|-----------|
| 1MHP 203E-VMT | 0,45 | 1-230 V | P1014 1102 | C | 1.175,- |
| 1MHP 204E-VMT | 0,55 | 1-230 V | P1014 1104 | C | 1.239,- |
| 1MHP 205E-VMT | 0,75 | 1-230 V | P1014 1106 | C | 1.278,- |
| 1MHP 206E-VMT | 1,1 | 1-230 V | P1014 1108 | C | 1.660,- |
| 1MHP 403E-VMT | 0,55 | 1-230 V | P1014 1110 | C | 1.285,- |
| 1MHP 404E-VMT | 0,75 | 1-230 V | P1014 1112 | C | 1.316,- |
| 1MHP 405E-VMT | 1,1 | 1-230 V | P1014 1114 | C | 1.644,- |
| 1MHP 406-VMT | 1,5 | 1-230 V | P1014 1116 | C | 1.736,- |
| 1MHP 803-VMT | 1,1 | 1-230 V | P1014 1118 | C | 1.716,- |
| 1MHP 804-VMT | 1,5 | 1-230 V | P1014 1120 | C | 1.750,- |
| 1MHP 805-VMT | 1,8 | 1-230 V | P1014 1122 | C | 1.843,- |
| 1MHP 1602-VMT | 1,5 | 1-230 V | P1014 1124 | C | 1.905,- |
| 1MHP 1603-VMT | 1,8 | 1-230 V | P1014 1126 | C | 1.965,- |
| 1MHP 203E-VTT | 0,45 | 3-400 V | P1014 1128 | C | 1.954,- |
| 1MHP 204E-VTT | 0,55 | 3-400 V | P1014 1130 | C | 2.018,- |
| 1MHP 205E-VTT | 0,75 | 3-400 V | P1014 1132 | C | 2.056,- |
| 1MHP 206E-VTT | 1,1 | 3-400 V | P1014 1134 | C | 2.183,- |
| 1MHP 403E-VTT | 0,55 | 3-400 V | P1014 1136 | C | 2.064,- |
| 1MHP 404E-VTT | 0,75 | 3-400 V | P1014 1138 | C | 2.094,- |
| 1MHP 405E-VTT | 1,1 | 3-400 V | P1014 1140 | C | 2.166,- |
| 1MHP 406-VTT | 1,5 | 3-400 V | P1014 1142 | C | 2.258,- |
| 1MHP 803-VTT | 1,1 | 3-400 V | P1014 1144 | C | 2.240,- |
| 1MHP 804-VTT | 1,5 | 3-400 V | P1014 1146 | C | 2.274,- |
| 1MHP 805-VTT | 1,8 | 3-400 V | P1014 1148 | C | 2.365,- |
| 1MHP 1602-VTT | 1,5 | 3-400 V | P1014 1150 | C | 2.428,- |
| 1MHP 1603-VTT | 1,8 | 3-400 V | P1014 1152 | C | 2.488,- |

7.14.1.2

Pressure Boosting System with frequency converter with two multi stage pumps

MHP

| Type | P(kW) | SV / PS | Art.-Nr. | PG | Price EUR |
|---------------|---------|---------|------------|----|-----------|
| 2MHP 203E-VMT | 0,45 x2 | 1-230 V | P1014 1202 | C | 3.029,- |
| 2MHP 204E-VMT | 0,55 x2 | 1-230 V | P1014 1204 | C | 3.156,- |
| 2MHP 205E-VMT | 0,75x2 | 1-230 V | P1014 1206 | C | 3.233,- |
| 2MHP 206E-VMT | 1,1x2 | 1-230 V | P1014 1208 | C | 3.484,- |
| 2MHP 403E-VMT | 0,55 x2 | 1-230 V | P1014 1210 | C | 3.248,- |
| 2MHP 404E-VMT | 0,75 x2 | 1-230 V | P1014 1212 | C | 3.308,- |
| 2MHP 405E-VMT | 1,1 x2 | 1-230 V | P1014 1214 | C | 3.450,- |
| 2MHP 406-VMT | 1,5 x2 | 1-230 V | P1014 1216 | C | 3.635,- |
| 2MHP 803-VMT | 1,1 x2 | 1-230 V | P1014 1218 | C | 3.633,- |
| 2MHP 804-VMT | 1,5 x2 | 1-230 V | P1014 1220 | C | 3.700,- |
| 2MHP 805-VMT | 1,8 x2 | 1-230 V | P1014 1222 | C | 3.881,- |
| 2MHP 1602-VMT | 1,5x2 | 1-230 V | P1014 1224 | C | 4.043,- |
| 2MHP 1603-VMT | 1,8 x2 | 1-230 V | P1014 1226 | C | 4.163,- |
| 2MHP 203E-VTT | 0,45 x2 | 3-400 V | P1014 1228 | C | 4.158,- |
| 2MHP 204E-VTT | 0,55 x2 | 3-400 V | P1014 1230 | C | 4.286,- |
| 2MHP 205E-VTT | 0,75x2 | 3-400 V | P1014 1232 | C | 4.361,- |
| 2MHP 206E-VTT | 1,1x2 | 3-400 V | P1014 1234 | C | 4.614,- |
| 2MHP 403E-VTT | 0,55x2 | 3-400 V | P1014 1236 | C | 4.378,- |
| 2MHP 404E-VTT | 0,75x2 | 3-400 V | P1014 1238 | C | 4.436,- |
| 2MHP 405E-VTT | 1,1x2 | 3-400 V | P1014 1240 | C | 4.581,- |
| 2MHP 406-VTT | 1,5 x2 | 3-400 V | P1014 1242 | C | 4.766,- |
| 2MHP 803-VTT | 1,1 x2 | 3-400 V | P1014 1244 | C | 4.761,- |
| 2MHP 804-VTT | 1,5 x2 | 3-400 V | P1014 1246 | C | 4.829,- |
| 2MHP 805-VTT | 1,8 x2 | 3-400 V | P1014 1248 | C | 5.010,- |
| 2MHP 1602-VTT | 1,5 x2 | 3-400 V | P1014 1250 | C | 5.173,- |
| 2MHP 1603-VTT | 1,8 x2 | 3-400 V | P1014 1252 | C | 5.293,- |

7.14.1.3

Pressure Boosting System with frequency converter with multi stage pump MVP-B

| Type | P(kW) | SV / PS | Art.-Nr. | PG | Price EUR |
|-------------------|-------|---------|------------|----|-----------|
| 1MVP-B 25-204-VMT | 0,75 | 1-230 V | P1014 1302 | C | 1.553,- |
| 1MVP-B 25-205-VMT | 0,75 | 1-230 V | P1014 1304 | C | 1.571,- |
| 1MVP-B 25-206-VMT | 1,1 | 1-230 V | P1014 1306 | C | 1.875,- |
| 1MVP-B 25-207-VMT | 1,1 | 1-230 V | P1014 1308 | C | 1.903,- |
| 1MVP-B 25-208-VMT | 1,5 | 1-230 V | P1014 1310 | C | 1.943,- |
| 1MVP-B 25-210-VMT | 1,5 | 1-230 V | P1014 1312 | C | 1.985,- |
| 1MVP-B 32-404-VMT | 1,1 | 1-230 V | P1014 1314 | C | 1.878,- |
| 1MVP-B 32-405-VMT | 1,1 | 1-230 V | P1014 1316 | C | 1.900,- |
| 1MVP-B 32-406-VMT | 1,5 | 1-230 V | P1014 1318 | C | 1.930,- |
| 1MVP-B 32-407-VMT | 1,5 | 1-230 V | P1014 1320 | C | 1.966,- |
| 1MVP-B 32-408-VMT | 2,2 | 1-230 V | P1014 1322 | C | 2.009,- |
| 1MVP-B 32-410-VMT | 2,2 | 1-230 V | P1014 1324 | C | 2.054,- |
| 1MVP-B 40-804-VMT | 1,5 | 1-230 V | P1014 1326 | C | 1.959,- |
| 1MVP-B 40-805-VMT | 2,2 | 1-230 V | P1014 1328 | C | 1.994,- |
| 1MVP-B 40-806-VMT | 2,2 | 1-230 V | P1014 1330 | C | 2.038,- |
| 1MVP-B 25-204-VTT | 0,75 | 3-400 V | P1014 1332 | C | 2.331,- |
| 1MVP-B 25-205-VTT | 0,75 | 3-400 V | P1014 1334 | C | 2.349,- |
| 1MVP-B 25-206-VTT | 1,1 | 3-400 V | P1014 1336 | C | 2.398,- |
| 1MVP-B 25-207-VTT | 1,1 | 3-400 V | P1014 1338 | C | 2.425,- |
| 1MVP-B 25-208-VTT | 1,5 | 3-400 V | P1014 1340 | C | 2.465,- |
| 1MVP-B 25-210-VTT | 1,5 | 3-400 V | P1014 1342 | C | 2.509,- |
| 1MVP-B 32-404-VTT | 1,1 | 3-400 V | P1014 1344 | C | 2.400,- |
| 1MVP-B 32-405-VTT | 1,1 | 3-400 V | P1014 1346 | C | 2.423,- |
| 1MVP-B 32-406-VTT | 1,5 | 3-400 V | P1014 1348 | C | 2.453,- |
| 1MVP-B 32-407-VTT | 1,5 | 3-400 V | P1014 1350 | C | 2.489,- |
| 1MVP-B 32-408-VTT | 2,2 | 3-400 V | P1014 1352 | C | 2.531,- |
| 1MVP-B 32-410-VTT | 2,2 | 3-400 V | P1014 1354 | C | 2.576,- |
| 1MVP-B 40-804-VTT | 1,5 | 3-400 V | P1014 1356 | C | 2.483,- |
| 1MVP-B 40-805-VTT | 2,2 | 3-400 V | P1014 1358 | C | 2.516,- |
| 1MVP-B 40-806-VTT | 2,2 | 3-400 V | P1014 1360 | C | 2.560,- |



7.14.1.4

Pressure Boosting System with frequency converter with two multi stage pumps

MVP

| Type | P(kW) | SV / PS | Art.-Nr. | PG | Price EUR |
|-------------------|---------|---------|------------|----|-----------|
| 2MVP-B 25-204-VMT | 0,75x2 | 1-230 V | P1014 1402 | C | 3.784,- |
| 2MVP-B 25-205-VMT | 0,75x2 | 1-230 V | P1014 1404 | C | 3.820,- |
| 2MVP-B 25-206-VMT | 1,1x2 | 1-230 V | P1014 1406 | C | 3.918,- |
| 2MVP-B 25-207-VMT | 1,1x2 | 1-230 V | P1014 1408 | C | 3.971,- |
| 2MVP-B 25-208-VMT | 1,5x2 | 1-230 V | P1014 1410 | C | 4.050,- |
| 2MVP-B 25-210-VMT | 1,5x2 | 1-230 V | P1014 1412 | C | 4.136,- |
| 2MVP-B 32-404-VMT | 1,1x2 | 1-230 V | P1014 1414 | C | 3.929,- |
| 2MVP-B 32-405-VMT | 1,1x2 | 1-230 V | P1014 1416 | C | 3.974,- |
| 2MVP-B 32-406-VMT | 1,5x2 | 1-230 V | P1014 1418 | C | 4.031,- |
| 2MVP-B 32-407-VMT | 1,5x2 | 1-230 V | P1014 1420 | C | 4.105,- |
| 2MVP-B 32-408-VMT | 2,2x2 | 1-230 V | P1014 1422 | C | 4.188,- |
| 2MVP-B 32-410-VMT | 2,2 x2 | 1-230 V | P1014 1424 | C | 4.279,- |
| 2MVP-B 40-804-VMT | 1,5 x2 | 1-230 V | P1014 1426 | C | 4.181,- |
| 2MVP-B 40-805-VMT | 2,2 x2 | 1-230 V | P1014 1428 | C | 4.253,- |
| 2MVP-B 40-806-VMT | 2,2 x2 | 1-230 V | P1014 1430 | C | 4.340,- |
| 2MVP-B 25-204-VTT | 0,75 x2 | 3-400 V | P1014 1432 | C | 4.914,- |
| 2MVP-B 25-205-VTT | 0,75 x2 | 3-400 V | P1014 1434 | C | 4.949,- |
| 2MVP-B 25-206-VTT | 1,1x2 | 3-400 V | P1014 1436 | C | 5.046,- |
| 2MVP-B 25-207-VTT | 1,1x2 | 3-400 V | P1014 1438 | C | 5.101,- |
| 2MVP-B 25-208-VTT | 1,5 x2 | 3-400 V | P1014 1440 | C | 5.179,- |
| 2MVP-B 25-210-VTT | 1,5x2 | 3-400 V | P1014 1442 | C | 5.269,- |
| 2MVP-B 32-404-VTT | 1,1x2 | 3-400 V | P1014 1444 | C | 5.059,- |
| 2MVP-B 32-405-VTT | 1,1 x2 | 3-400 V | P1014 1446 | C | 5.104,- |
| 2MVP-B 32-406-VTT | 1,5x2 | 3-400 V | P1014 1448 | C | 5.161,- |
| 2MVP-B 32-407-VTT | 1,5x2 | 3-400 V | P1014 1450 | C | 5.235,- |
| 2MVP-B 32-408-VTT | 2,2x2 | 3-400 V | P1014 1452 | C | 5.318,- |
| 2MVP-B 32-410-VTT | 2,2x2 | 3-400 V | P1014 1454 | C | 5.408,- |
| 2MVP-B 40-804-VTT | 1,5x2 | 3-400 V | P1014 1456 | C | 5.311,- |
| 2MVP-B 40-805-VTT | 2,2x2 | 3-400 V | P1014 1458 | C | 5.381,- |
| 2MVP-B 40-806-VTT | 2,2x2 | 3-400 V | P1014 1460 | C | 5.470,- |

7.14.2

Pressure Boosting System without frequency converter

7.14.2.1

Pressure Boosting System with two multi stage pumps MHP

| Type | P(kW) | SV / PS | Art.-Nr. | PG | Price EUR |
|-------------|---------|---------|------------|----|-----------|
| 2MHP-M 203E | 0,45 x2 | 1-230 V | P1014 2102 | C | 1.560,- |
| 2MHP-M 204E | 0,55 x2 | 1-230 V | P1014 2104 | C | 1.614,- |
| 2MHP-M 205E | 0,75 x2 | 1-230 V | P1014 2106 | C | 1.695,- |
| 2MHP-M 206 | 1,1x2 | 1-230 V | P1014 2108 | C | 2.070,- |
| 2MHP-M 403E | 0,55 x2 | 1-230 V | P1014 2110 | C | 1.571,- |
| 2MHP-M 404E | 0,75 x2 | 1-230 V | P1014 2112 | C | 1.626,- |
| 2MHP-M 405 | 1,1x2 | 1-230 V | P1014 2114 | C | 1.856,- |
| 2MHP-M 406 | 1,5x2 | 1-230 V | P1014 2116 | C | 2.183,- |
| 2MHP-M 803 | 1,1x2 | 1-230 V | P1014 2118 | C | 1.885,- |
| 2MHP-M 804 | 1,5x2 | 1-230 V | P1014 2120 | C | 1.968,- |
| 2MHP 203E | 0,45 x2 | 3-400 V | P1014 2122 | C | 1.758,- |
| 2MHP 204E | 0,55 x2 | 3-400 V | P1014 2124 | C | 1.808,- |
| 2MHP 205E | 0,75 x2 | 3-400 V | P1014 2126 | C | 1.881,- |
| 2MHP 206E | 1,1x2 | 3-400 V | P1014 2128 | C | 2.131,- |
| 2MHP 403E | 0,55 x2 | 3-400 V | P1014 2130 | C | 1.765,- |
| 2MHP 404E | 0,75 x2 | 3-400 V | P1014 2132 | C | 1.811,- |
| 2MHP 405E | 1,1x2 | 3-400 V | P1014 2134 | C | 1.906,- |
| 2MHP 406 | 1,5x2 | 3-400 V | P1014 2136 | C | 2.284,- |
| 2MHP 803 | 1,1x2 | 3-400 V | P1014 2138 | C | 2.045,- |
| 2MHP 804 | 1,5x2 | 3-400 V | P1014 2140 | C | 2.111,- |
| 2MHP 805 | 1,8x2 | 3-400 V | P1014 2142 | C | 2.273,- |
| 2MHP 1602 | 1,5x2 | 3-400 V | P1014 2144 | C | 2.674,- |
| 2MHP 1603 | 1,8x2 | 3-400 V | P1014 2146 | C | 2.794,- |

7.14.2.2

Pressure Boosting System with two centrifugal-pumps MVP-B

| Type | P(kW) | SV / PS | Art.-Nr. | PG | Price EUR |
|----------------|---------|---------|------------|----|-----------|
| 2MVP-BM 25-204 | 0,75 x2 | 1-230 V | P1014 2202 | C | 2324,- |
| 2MVP-BM 25-205 | 0,75 x2 | 1-230 V | P1014 2204 | C | 2385,- |
| 2MVP-BM 25-206 | 1,1x2 | 1-230 V | P1014 2206 | C | 2486,- |
| 2MVP-BM 25-207 | 1,1x2 | 1-230 V | P1014 2208 | C | 2536,- |
| 2MVP-BM 25-208 | 1,5x2 | 1-230 V | P1014 2210 | C | 2638,- |
| 2MVP-BM 32-404 | 1,1x2 | 1-230 V | P1014 2212 | C | 2463,- |
| 2MVP-BM 32-405 | 1,1x2 | 1-230 V | P1014 2214 | C | 2530,- |
| 2MVP-BM 32-406 | 1,5x2 | 1-230 V | P1014 2216 | C | 2601,- |
| 2MVP-BM 32-407 | 1,5x2 | 1-230 V | P1014 2218 | C | 2674,- |
| 2MVP-BM 40-804 | 1,5x2 | 1-230 V | P1014 2220 | C | 2730,- |
| 2MVP-B 25-204 | 0,75 x2 | 3-400 V | P1014 2222 | C | 2484,- |
| 2MVP-B 25-205 | 0,75 x2 | 3-400 V | P1014 2224 | C | 2541,- |
| 2MVP-B 25-206 | 1,1x2 | 3-400 V | P1014 2226 | C | 2639,- |
| 2MVP-B 25-207 | 1,1 x2 | 3-400 V | P1014 2228 | C | 2693,- |
| 2MVP-B 25-208 | 1,5x2 | 3-400 V | P1014 2230 | C | 2781,- |
| 2MVP-B 32-404 | 1,1x2 | 3-400 V | P1014 2232 | C | 2615,- |
| 2MVP-B 32-405 | 1,1x2 | 3-400 V | P1014 2234 | C | 2683,- |
| 2MVP-B 32-406 | 1,5x2 | 3-400 V | P1014 2236 | C | 2743,- |
| 2MVP-B 32-407 | 1,5x2 | 3-400 V | P1014 2238 | C | 2815,- |
| 2MVP-B 32-408 | 2,2x2 | 3-400 V | P1014 2240 | C | 2904,- |
| 2MVP-B 40-804 | 1,5x2 | 3-400 V | P1014 2242 | C | 2871,- |
| 2MVP-B 40-805 | 2,2x2 | 3-400 V | P1014 2244 | C | 2961,- |
| 2MVP-B 40-806 | 2,2x2 | 3-400 V | P1014 2246 | C | 3049,- |

7.14.2.3

Pressure Boosting System with three centrifugal-Pumps MVP-B

| Type | P(kW) | SV / PS | Art.-Nr. | PG | Price EUR |
|---------------|---------|---------|------------|----|-----------|
| 3MVP-B 25-204 | 0,75 x3 | 3-400 V | P1014 2302 | C | 4298,- |
| 3MVP-B 25-205 | 0,75 x3 | 3-400 V | P1014 2304 | C | 4385,- |
| 3MVP-B 25-206 | 1,1x3 | 3-400 V | P1014 2306 | C | 4530,- |
| 3MVP-B 25-207 | 1,1x3 | 3-400 V | P1014 2308 | C | 4611,- |
| 3MVP-B 25-208 | 1,5x3 | 3-400 V | P1014 2310 | C | 4744,- |
| 3MVP-B 32-404 | 1,1x3 | 3-400 V | P1014 2312 | C | 4553,- |
| 3MVP-B 32-405 | 1,1x3 | 3-400 V | P1014 2314 | C | 4651,- |
| 3MVP-B 32-406 | 1,5x3 | 3-400 V | P1014 2316 | C | 4741,- |
| 3MVP-B 32-407 | 1,5x3 | 3-400 V | P1014 2318 | C | 4849,- |
| 3MVP-B 32-408 | 2,2x3 | 3-400 V | P1014 2320 | C | 4984,- |
| 3MVP-B 40-804 | 1,5x3 | 3-400 V | P1014 2322 | C | 4973,- |
| 3MVP-B 40-805 | 2,2x3 | 3-400 V | P1014 2324 | C | 5.109,- |
| 3MVP-B 40-806 | 2,2x3 | 3-400 V | P1014 2326 | C | 5240,- |

7.14.2.4

Pressure Boosting System with two centrifugal-Pumps MVP

| Type | P(kW) | Art.-Nr. | PG | Price EUR |
|---------------|---------|------------|----|-----------|
| 2MVP-M 25-204 | 0,75 x2 | P1014 2402 | C | 2623,- |
| 2MVP-M 25-205 | 0,75 x2 | P1014 2404 | C | 2679,- |
| 2MVP-M 25-206 | 1,1x2 | P1014 2406 | C | 2830,- |
| 2MVP-M 25-207 | 1,1x2 | P1014 2408 | C | 2871,- |
| 2MVP-M 25-208 | 1,5x2 | P1014 2410 | C | 3.109,- |
| 2MVP-M 32-404 | 1,1x2 | P1014 2412 | C | 2771,- |
| 2MVP-M 32-405 | 1,1x2 | P1014 2414 | C | 2826,- |
| 2MVP-M 32-406 | 1,5x2 | P1014 2416 | C | 3.084,- |
| 2MVP-M 32-407 | 1,5x2 | P1014 2418 | C | 3.133,- |
| 2MVP-M 40-804 | 1,5x2 | P1014 2420 | C | 3.271,- |
| 2MVP 25-204 | 0,75 x2 | P1014 2422 | C | 2661,- |
| 2MVP 25-205 | 0,75 x2 | P1014 2424 | C | 2716,- |
| 2MVP 25-206 | 1,1x2 | P1014 2426 | C | 2863,- |
| 2MVP 25-207 | 1,1x2 | P1014 2428 | C | 2905,- |
| 2MVP 25-208 | 1,5x2 | P1014 2430 | C | 3.149,- |
| 2MVP 32-404 | 1,1x2 | P1014 2432 | C | 2804,- |
| 2MVP 32-405 | 1,1x2 | P1014 2434 | C | 2859,- |
| 2MVP 32-406 | 1,5x2 | P1014 2436 | C | 3.124,- |
| 2MVP 32-407 | 1,5x2 | P1014 2438 | C | 3.170,- |
| 2MVP 32-408 | 2,2x2 | P1014 2440 | C | 3.359,- |
| 2MVP 40-804 | 1,5x2 | P1014 2442 | C | 3.311,- |
| 2MVP 40-805 | 2,2x2 | P1014 2444 | C | 3.539,- |
| 2MVP 40-806 | 2,2x2 | P1014 2446 | C | 3.691,- |
| 2MVP 40-807 | 3x2 | P1014 2448 | C | 3.973,- |
| 2MVP 40-808 | 3x2 | P1014 2450 | C | 4.045,- |
| 2MVP 50-1603 | 3x2 | P1014 2452 | C | 4.733,- |
| 2MVP 50-1604 | 4x2 | P1014 2454 | C | 5.244,- |
| 2MVP 50-1605 | 5,5x2 | P1014 2456 | C | 6.139,- |
| 2MVP 50-1606 | 5,5x2 | P1014 2458 | C | 6.468,- |



| Type | P(kW) | Art.-Nr. | PG | Price EUR |
|--------------|-------|------------|----|-----------|
| 2MVP 65-3202 | 4x2 | P1014 2460 | C | 7258,- |
| 2MVP 65-3203 | 5,5x2 | P1014 2462 | C | 8345,- |
| 2MVP 65-3204 | 7,5x2 | P1014 2464 | C | 9844,- |
| 2MVP 65-3205 | 11x2 | P1014 2466 | C | 11.195,- |
| 2MVP 80-4802 | 5,5x2 | P1014 2468 | C | 11.831,- |
| 2MVP 80-4803 | 7,5x2 | P1014 2470 | C | 13.443,- |
| 2MVP 80-4804 | 11x2 | P1014 2472 | C | 14.869,- |
| 2MVP 80-4805 | 15x2 | P1014 2474 | C | 16.113,- |

7.14.2.5 Pressure Boosting System with three centrifugal-Pumps MVP

| Type | P(kW) | SV / PS | Art.-Nr. | PG | Price EUR |
|--------------|---------|---------|------------|----|-----------|
| 3MVP 25-204 | 0,75 x3 | 3-400 V | P1014 2502 | C | 4564,- |
| 3MVP 25-205 | 0,75 x3 | 3-400 V | P1014 2504 | C | 4648,- |
| 3MVP 25-206 | 1,1x3 | 3-400 V | P1014 2506 | C | 4868,- |
| 3MVP 25-207 | 1,1x3 | 3-400 V | P1014 2508 | C | 4929,- |
| 3MVP 25-208 | 1,5x3 | 3-400 V | P1014 2510 | C | 5294,- |
| 3MVP 32-404 | 1,1x3 | 3-400 V | P1014 2512 | C | 4835,- |
| 3MVP 32-405 | 1,1x3 | 3-400 V | P1014 2514 | C | 4916,- |
| 3MVP 32-406 | 1,5x3 | 3-400 V | P1014 2516 | C | 5314,- |
| 3MVP 32-407 | 1,5x3 | 3-400 V | P1014 2518 | C | 5383,- |
| 3MVP 32-408 | 2,2x3 | 3-400 V | P1014 2520 | C | 5665,- |
| 3MVP 40-804 | 1,5x3 | 3-400 V | P1014 2522 | C | 5634,- |
| 3MVP 40-805 | 2,2x3 | 3-400 V | P1014 2524 | C | 5975,- |
| 3MVP 40-806 | 2,2x3 | 3-400 V | P1014 2526 | C | 6205,- |
| 3MVP 40-807 | 3x3 | 3-400 V | P1014 2528 | C | 6625,- |
| 3MVP 40-808 | 3x3 | 3-400 V | P1014 2530 | C | 6734,- |
| 3MVP 50-1603 | 3x3 | 3-400 V | P1014 2532 | C | 8024,- |
| 3MVP 50-1604 | 4x3 | 3-400 V | P1014 2534 | C | 8859,- |
| 3MVP 50-1605 | 5,5x3 | 3-400 V | P1014 2536 | C | 10200,- |
| 3MVP 50-1606 | 5,5x3 | 3-400 V | P1014 2538 | C | 10694,- |
| 3MVP 65-3202 | 4x3 | 3-400 V | P1014 2540 | C | 13384,- |
| 3MVP 65-3203 | 5,5x3 | 3-400 V | P1014 2542 | C | 15015,- |
| 3MVP 65-3204 | 7,5x3 | 3-400 V | P1014 2544 | C | 16938,- |
| 3MVP 65-3205 | 11x3 | 3-400 V | P1014 2546 | C | 18970,- |
| 3MVP 80-4802 | 5,5x3 | 3-400 V | P1014 2548 | C | 18053,- |
| 3MVP 80-4803 | 7,5x3 | 3-400 V | P1014 2550 | C | 20100,- |
| 3MVP 80-4804 | 11x3 | 3-400 V | P1014 2552 | C | 22255,- |
| 3MVP 80-4805 | 15x3 | 3-400 V | P1014 2554 | C | 24185,- |

7.14.2.6 Pressure Boosting System with two centrifugal-Pumps NMP

| Type | P(kW) | SV / PS | Art.-Nr. | PG | Price EUR |
|----------------|---------|---------|------------|----|-----------|
| 2NBP 32/16BE | 1,5x2 | 3-400 V | P1014 2602 | C | 2596,- |
| 2NBP 32/16AE | 2,2x2 | 3-400 V | P1014 2604 | C | 2735,- |
| 2NBP 32/20CE | 3x2 | 3-400 V | P1014 2606 | C | 2994,- |
| 2NBP 32/20AE | 4x2 | 3-400 V | P1014 2608 | C | 3.173,- |
| 2NBPD 32/210DE | 4x2 | 3-400 V | P1014 2610 | C | 3.791,- |
| 2NBPD 32/210CE | 5,5x2 | 3-400 V | P1014 2612 | C | 4.135,- |
| 2NBPD 32/210BE | 7,5x2 | 3-400 V | P1014 2614 | C | 5368,- |
| 2NBPD 32/210AE | 9,2x2 | 3-400 V | P1014 2616 | C | 5934,- |
| 2NBPD 40/180DE | 4x2 | 3-400 V | P1014 2618 | C | 3935,- |
| 2NBPD 40/180CE | 5,5x2 | 3-400 V | P1014 2620 | C | 4283,- |
| 2NBPD 40/180BE | 7,5x2 | 3-400 V | P1014 2622 | C | 5408,- |
| 2NBPD 40/180AE | 9,2x2 | 3-400 V | P1014 2624 | C | 5913,- |
| 2NBP 40/16BE | 3x2 | 3-400 V | P1014 2626 | C | 4633,- |
| 2NBP 40/16AE | 4x2 | 3-400 V | P1014 2628 | C | 4844,- |
| 2NBP 40/20BE | 5,5x2 | 3-400 V | P1014 2630 | C | 5568,- |
| 2NBP 40/20AE | 7,5x2 | 3-400 V | P1014 2632 | C | 6684,- |
| 2NBP 40/25BE | 11x2 | 3-400 V | P1014 2634 | C | 8373,- |
| 2NBP 40/25AE | 15x2 | 3-400 V | P1014 2636 | C | 9004,- |
| 2NBP 50/16BE | 5,5x2 | 3-400 V | P1014 2638 | C | 5951,- |
| 2NBP 50/16AE | 7,5x2 | 3-400 V | P1014 2640 | C | 6950,- |
| 2NBP 50/20BE | 9,2x2 | 3-400 V | P1014 2642 | C | 7846,- |
| 2NBP 50/20AE | 11x2 | 3-400 V | P1014 2644 | C | 8205,- |
| 2NBP 50/25CE | 11x2 | 3-400 V | P1014 2646 | C | 8551,- |
| 2NBP 50/25BE | 15x2 | 3-400 V | P1014 2648 | C | 9.168,- |
| 2NBP 50/25AE | 18,5 x2 | 3-400 V | P1014 2650 | C | 10.411,- |
| 2NBP 50M/EE | 11x2 | 3-400 V | P1014 2652 | C | 9.899,- |
| 2NBP 50M/DE | 15x2 | 3-400 V | P1014 2654 | C | 10.519,- |
| 2NBP 50M/CE | 18,5 x2 | 3-400 V | P1014 2656 | C | 11.823,- |
| 2NBP 65/16BE | 11x2 | 3-400 V | P1014 2658 | C | 9.146,- |
| 2NBP 65/16AE | 15x2 | 3-400 V | P1014 2660 | C | 9.765,- |
| 2NBP 65/20CE | 15x2 | 3-400 V | P1014 2662 | C | 9.920,- |
| 2NBP 65/20BE | 18,5 x2 | 3-400 V | P1014 2664 | C | 11.174,- |

| Type | P(kW) | SV / PS | Art.-Nr. | PG | Price EUR |
|----------------|---------|---------|------------|----|-----------|
| 2NBP 65/ 200AE | 22x2 | 3-400 V | P1014 2666 | C | 13840,- |
| 2NBP 65/ 250CE | 22x2 | 3-400 V | P1014 2668 | C | 14340,- |
| 2NBP 65/ 250BE | 30x2 | 3-400 V | P1014 2670 | C | 17908,- |
| 2NBP 65/ 250AE | 37x2 | 3-400 V | P1014 2672 | C | 22494,- |
| 2NBP 80/ 16BE | 15x2 | 3-400 V | P1014 2674 | C | 11.443,- |
| 2NBP 80/ 16AE | 18,5 x2 | 3-400 V | P1014 2676 | C | 12.679,- |
| 2NBP 80/ 200BE | 22x2 | 3-400 V | P1014 2678 | C | 15.611,- |
| 2NBP 80/ 200AE | 30x2 | 3-400 V | P1014 2680 | C | 19.103,- |
| 2NBP 80/ 250EE | 22x2 | 3-400 V | P1014 2682 | C | 15.875,- |
| 2NBP 80/ 250DE | 30x2 | 3-400 V | P1014 2684 | C | 19.486,- |
| 2NBP 80/ 250CE | 37x2 | 3-400 V | P1014 2686 | C | 23.959,- |
| 2NBP 80/ 250BE | 45x2 | 3-400 V | P1014 2688 | C | 25.615,- |
| 2NBP 80/ 250AE | 55x2 | 3-400 V | P1014 2690 | C | 31.428,- |

7.14.2.7

Pressure Boosting System with three centrifugal-Pumps NBP

| Type | P(kW) | SV / PS | Art.-Nr. | PG | Price EUR |
|----------------|---------|---------|------------|----|-----------|
| 3NBP 40/ 16BE | 3x3 | 3-400 V | P1014 2702 | C | 7.700,- |
| 3NBP 40/ 16AE | 4x3 | 3-400 V | P1014 2704 | C | 8.120,- |
| 3NBP 40/ 20BE | 5,5x3 | 3-400 V | P1014 2706 | C | 9.040,- |
| 3NBP 40/ 20AE | 7,5x3 | 3-400 V | P1014 2708 | C | 10.279,- |
| 3NBP 40/ 25BE | 11x3 | 3-400 V | P1014 2710 | C | 12.594,- |
| 3NBP 40/ 25AE | 15x3 | 3-400 V | P1014 2712 | C | 13.595,- |
| 3NBP 50/ 16BE | 5,5x3 | 3-400 V | P1014 2714 | C | 9.326,- |
| 3NBP 50/ 16AE | 7,5x3 | 3-400 V | P1014 2716 | C | 10.553,- |
| 3NBP 50/ 20BE | 9,2x3 | 3-400 V | P1014 2718 | C | 11.910,- |
| 3NBP 50/ 20AE | 11x3 | 3-400 V | P1014 2720 | C | 12.449,- |
| 3NBP 50/ 25CE | 11x3 | 3-400 V | P1014 2722 | C | 13.081,- |
| 3NBP 50/ 25BE | 15x3 | 3-400 V | P1014 2724 | C | 14.070,- |
| 3NBP 50/ 25AE | 18,5 x3 | 3-400 V | P1014 2726 | C | 15.728,- |
| 3NBP 50M/EE | 11x3 | 3-400 V | P1014 2728 | C | 15.738,- |
| 3NBP 50M/DE | 15x3 | 3-400 V | P1014 2730 | C | 16.733,- |
| 3NBP 50M/CE | 18,5 x3 | 3-400 V | P1014 2732 | C | 18.479,- |
| 3NBP 65/ 16BE | 11x3 | 3-400 V | P1014 2734 | C | 13.921,- |
| 3NBP 65/ 16AE | 15x3 | 3-400 V | P1014 2736 | C | 14.918,- |
| 3NBP 65/ 20CE | 15x3 | 3-400 V | P1014 2738 | C | 15.149,- |
| 3NBP 65/ 20BE | 18,5 x3 | 3-400 V | P1014 2740 | C | 16.825,- |
| 3NBP 65/ 200AE | 22x3 | 3-400 V | P1014 2742 | C | 21.103,- |
| 3NBP 65/ 250CE | 22x3 | 3-400 V | P1014 2744 | C | 21.918,- |
| 3NBP 65/ 250BE | 30x3 | 3-400 V | P1014 2746 | C | 27.276,- |
| 3NBP 65/ 250AE | 37x3 | 3-400 V | P1014 2748 | C | 34.469,- |
| 3NBP 80/ 16BE | 15x3 | 3-400 V | P1014 2750 | C | 17.308,- |
| 3NBP 80/ 16AE | 18,5 x3 | 3-400 V | P1014 2752 | C | 18.626,- |
| 3NBP 80/ 200BE | 22x3 | 3-400 V | P1014 2754 | C | 22.984,- |
| 3NBP 80/ 200AE | 30x3 | 3-400 V | P1014 2756 | C | 28.475,- |
| 3NBP 80/ 250EE | 22x3 | 3-400 V | P1014 2758 | C | 23.564,- |
| 3NBP 80/ 250DE | 30x3 | 3-400 V | P1014 2760 | C | 29.073,- |
| 3NBP 80/ 250CE | 37x3 | 3-400 V | P1014 2762 | C | 36.225,- |
| 3NBP 80/ 250BE | 45x3 | 3-400 V | P1014 2764 | C | 38.623,- |
| 3NBP 80/ 250AE | 55x3 | 3-400 V | P1014 2766 | C | 46.606,- |

7.15
7.15.1

End-Suction Centrifugal Pumps
End-Suction Centrifugal Pumps with 2-pole IEC
Motor (n=2900 min-1)



| Type | P(kW) | Hmax | Qmin-max | DN | Art.-Nr. | PG | Price EUR |
|--------------|-------|------|-----------|--------|------------|----|-----------|
| NP 32-125F | 0,55 | 12,5 | 5 - 16,8 | DN 32 | P1015 1010 | C | 1526,- |
| NP 32-125D | 0,75 | 18 | 5 - 21,0 | DN 32 | P1015 1020 | C | 1543,- |
| NP 32-125A | 1,1 | 23 | 5 - 24,0 | DN 32 | P1015 1030 | C | 1563,- |
| NP 32-125S | 1,5 | 23,5 | 5 - 24,0 | DN 32 | P1015 1040 | C | 1615,- |
| NP 32-160B | 1,5 | 29,5 | 5 - 24,0 | DN32 | P1015 1050 | C | 1629,- |
| NP 32-160A | 2,2 | 35,5 | 5 - 27,0 | DN 32 | P1015 1060 | C | 1705,- |
| NP 32-200D | 2,2 | 37,5 | 5 - 18,9 | DN32 | P1015 1070 | C | 1784,- |
| NP 32-3200C | 3 | 44,5 | 5 - 18,9 | DN 32 | P1015 1080 | C | 1924,- |
| NP 32-200A | 4 | 57 | 5 - 18,9 | DN 32 | P1015 1090 | C | 2056,- |
| NP 40-125F | 1,1 | 14,5 | 15 - 30,0 | DN40 | P1015 1100 | C | 1576,- |
| NP 40-125C | 1,5 | 18 | 15 - 33,0 | DN 40 | P1015 1110 | C | 1629,- |
| NP 40-125A | 2,2 | 22,5 | 15 - 37,8 | DN40 | P1015 1120 | C | 1704,- |
| NP 40-160C | 2,2 | 26 | 15 - 33,0 | DN 40 | P1015 1130 | C | 1738,- |
| NP 40-160B | 3 | 31,5 | 15 - 37,8 | DN40 | P1015 1140 | C | 1876,- |
| NP 40-160A | 4 | 37 | 15 - 37,8 | DN 40 | P1015 1150 | C | 2010,- |
| NP 40-200C | 4 | 44 | 15 - 30,0 | DN40 | P1015 1160 | C | 2109,- |
| NP 40-200B | 5,5 | 51,5 | 15 - 33,0 | DN 40 | P1015 1170 | C | 2249,- |
| NP 40-200 AR | 5,5 | 55 | 15 - 27,0 | DN 40 | P1015 1180 | C | 2249,- |
| NP 40-200A | 7,5 | 59 | 15 - 42,0 | DN40 | P1015 1190 | C | 2380,- |
| NP 40-250C | 9,2 | 63,5 | 15 - 33,0 | DN 40 | P1015 1200 | C | 2793,- |
| NP 40-250B | 11 | 71,5 | 15 - 33,0 | DN40 | P1015 1210 | C | 3000,- |
| NP 40-250 A | 15 | 88 | 15 - 33,0 | DN40 | P1015 1220 | C | 3261,- |
| NP 50-125F | 2,2 | 15,5 | 30-66 | DN 50 | P1015 1230 | C | 1751,- |
| NP 50-125D | 3 | 18,5 | 30-66 | DN 50 | P1015 1240 | C | 1890,- |
| NP 50-125A | 4 | 23,5 | 30-75 | DN 50 | P1015 1250 | C | 2024,- |
| NP 50-160B | 5,5 | 31 | 30-75 | DN 50 | P1015 1260 | C | 2219,- |
| NP 50-160A | 7,5 | 36,5 | 30-75 | DN 50 | P1015 1270 | C | 2350,- |
| NP 50-200B | 9,2 | 48 | 24-60 | DN 50 | P1015 1280 | C | 2678,- |
| NP 50-200A | 11 | 55 | 24-60 | DN50 | P1015 1290 | C | 2885,- |
| NP 50-250C | 11 | 60,5 | 24-54 | DN50 | P1015 1300 | C | 3059,- |
| NP 50-250B | 15 | 71 | 24-54 | DN 50 | P1015 1310 | C | 3321,- |
| NP 50-250 A | 18,5 | 86 | 24- 54 | DN 50 | P1015 1320 | C | 3625,- |
| NP 50M/E | 11 | 48 | 27-75 | DN50 | P1015 1330 | C | 3213,- |
| NP 50M/D | 15 | 57 | 30-84 | DN50 | P1015 1340 | C | 3474,- |
| NP 50M/C | 18,5 | 68 | 30-84 | DN50 | P1015 1350 | C | 3779,- |
| NP 65-125E | 4 | 18 | 37,8 - 96 | DN65 | P1015 1360 | C | 2128,- |
| NP 65-125C | 5,5 | 22 | 37,8 - 96 | DN65 | P1015 1370 | C | 2268,- |
| NP 65-125A | 7,5 | 26 | 37,8 - 96 | DN65 | P1015 1380 | C | 2399,- |
| NP 65-160E | 5,5 | 20 | 48 - 108 | DN65 | P1015 1390 | C | 2276,- |
| NP 65-160D | 7,5 | 26 | 48 - 120 | DN65 | P1015 1400 | C | 2408,- |
| NP 65-160C | 9,2 | 30 | 48 - 120 | DN65 | P1015 1410 | C | 2668,- |
| NP 65-160B | 11 | 33,5 | 48 - 120 | DN65 | P1015 1420 | C | 2874,- |
| NP 65-160A | 15 | 38 | 48 - 120 | DN 65 | P1015 1430 | C | 3136,- |
| NP 65-200C | 15 | 44 | 48 - 132 | DN 65 | P1015 1440 | C | 3209,- |
| NP 65-200B | 18,5 | 50 | 48 - 132 | DN 65 | P1015 1450 | C | 3513,- |
| NP 65-200A | 22 | 56,5 | 48 - 132 | DN65 | P1015 1460 | C | 4029,- |
| NP 65-250C | 22 | 64 | 48 - 108 | DN 65 | P1015 1470 | C | 4590,- |
| NP 65-250B | 30 | 79,5 | 48 - 108 | DN65 | P1015 1480 | C | 5638,- |
| NP 65-250A | 37 | 90 | 48 - 108 | DN65 | P1015 1490 | C | 7049,- |
| NP 80-160E | 7,5 | 20 | 75 - 150 | DN80 | P1015 1500 | C | 2529,- |
| NP 80-160D | 9,2 | 23 | 75 - 150 | DN80 | P1015 1510 | C | 2789,- |
| NP 80-160C | 11 | 27,5 | 75 - 168 | DN80 | P1015 1520 | C | 2996,- |
| NP 80-160B | 15 | 34 | 75 - 180 | DN80 | P1015 1530 | C | 3258,- |
| NP 80-1 60 A | 18,5 | 38,5 | 75 - 180 | DN80 | P1015 1540 | C | 3563,- |
| NP 80-200B | 22 | 46,5 | 75 - 180 | DN80 | P1015 1550 | C | 4549,- |
| NP 80-200A | 30 | 56 | 75 - 180 | DN80 | P1015 1560 | C | 5598,- |
| NP 80-250E | 22 | 51 | 75 - 180 | DN 80 | P1015 1570 | C | 4688,- |
| NP 80-250D | 30 | 65 | 75 - 192 | DN80 | P1015 1580 | C | 5735,- |
| NP 80-250C | 37 | 73,5 | 75 - 192 | DN80 | P1015 1590 | C | 7145,- |
| NP 80-250B | 45 | 84 | 75 - 192 | DN80 | P1015 1600 | C | 8193,- |
| NP 80-250A | 55 | 95 | 75 - 192 | DN80 | P1015 1610 | C | 10298,- |
| NP 100-200E | 18,5 | 30 | 108 - 240 | DN 100 | P1015 1620 | C | 4121,- |
| NP 100-200D | 22 | 36 | 108 - 270 | DN 100 | P1015 1630 | C | 4638,- |
| NP 100-200C | 30 | 45 | 108 - 300 | DN 100 | P1015 1640 | C | 5686,- |
| NP 100-200B | 37 | 54 | 108 - 300 | DN 100 | P1015 1650 | C | 7096,- |
| NP 100-200A | 45 | 61,5 | 108 - 300 | DN 100 | P1015 1660 | C | 8144,- |
| NP 100-250B | 55 | 73,5 | 108 - 300 | DN 100 | P1015 1670 | C | 10379,- |
| NP 100-250A | 75 | 91 | 108 - 300 | DN 100 | P1015 1680 | C | 13789,- |





7.15.2

End-Suction Centrifugal Pumps with 4-pole IEC Motor (n=1450 min⁻¹)

| Type | P(kW) | Hmax | Qmin-max | DN | Art.-Nr. | PG | Price EUR |
|---------------|-------|------|-------------|--------|------------|----|-----------|
| NP-4 32-125F | 0,25 | 3 | 2,4 - 8,4 | DN32 | P1015 2010 | C | 1525,- |
| NP-4 32-125D | 0,25 | 4,6 | 2,4 - 10,8 | DN32 | P1015 2020 | C | 1525,- |
| NP-4 32-125A | 0,25 | 5,7 | 2,4 - 10,8 | DN32 | P1015 2030 | C | 1525,- |
| NP-4 32-160B | 0,37 | 7,6 | 2,4 - 10,8 | DN32 | P1015 2040 | C | 1540,- |
| NP-4 32-160A | 0,37 | 9 | 2,4 - 12 | DN 32 | P1015 2050 | C | 1540,- |
| NP-4 32-200B | 0,55 | 12,5 | 2,4 - 13,2 | DN32 | P1015 2060 | C | 1633,- |
| NP-4 32-200A | 0,75 | 14,3 | 2,4 - 13,2 | DN 32 | P1015 2070 | C | 1695,- |
| NP-4 40-125F | 0,25 | 3,7 | 5,4 - 15 | DN40 | P1015 2080 | C | 1539,- |
| NP-4 40-125C | 0,37 | 4,5 | 5,4 - 16,8 | DN40 | P1015 2090 | C | 1539,- |
| NP-4 40-125A | 0,37 | 5,7 | 5,4 - 16,8 | DN40 | P1015 2100 | C | 1539,- |
| NP-4 40-160C | 0,37 | 6,9 | 5,4 - 18,9 | DN40 | P1015 2110 | C | 1571,- |
| NP-4 40-160B | 0,55 | 7,9 | 5,4 - 21 | DN40 | P1015 2120 | C | 1586,- |
| NP-4 40-160A | 0,75 | 9,3 | 5,4 - 21 | DN40 | P1015 2130 | C | 1649,- |
| NP-4 40-200B | 1,1 | 13 | 5,4 - 21 | DN40 | P1015 2140 | C | 1776,- |
| NP-4 40-200A | 1,1 | 14,8 | 5,4 - 21 | DN40 | P1015 2150 | C | 1776,- |
| NP-4 40-250C | 1,5 | 16,4 | 5,4 - 24 | DN40 | P1015 2160 | C | 1960,- |
| NP-4 40-250B | 2,2 | 21,3 | 5,4 - 27 | DN40 | P1015 2170 | C | 2096,- |
| NP-4 40-250A | 3 | 23,1 | 5,4 - 27 | DN40 | P1015 2180 | C | 2330,- |
| NP-4 50-125F | 0,37 | 4 | 10,8 - 30 | DN50 | P1015 2190 | C | 1586,- |
| NP-4 50-125D | 0,55 | 4,8 | 10,8 - 30 | DN 50 | P1015 2200 | C | 1600,- |
| NP-4 50-125A | 0,75 | 5,9 | 10,8 - 33 | DN50 | P1015 2210 | C | 1663,- |
| NP-4 50-160B | 1,1 | 7,6 | 10,8 - 37,8 | DN50 | P1015 2220 | C | 1746,- |
| NP-4 50-160A | 1,1 | 9,1 | 10,8 - 42 | DN50 | P1015 2230 | C | 1746,- |
| NP-4 50-200C | 1,1 | 10,1 | 10,8 - 42 | DN50 | P1015 2240 | C | 1814,- |
| NP-4 50-200B | 1,5 | 12 | 10,8 - 42 | DN50 | P1015 2250 | C | 1845,- |
| NP-4 50-200A | 2,2 | 14,4 | 10,8 - 48 | DN 50 | P1015 2260 | C | 1980,- |
| NP-4 50-250C | 2,2 | 17,9 | 10,8 - 37,8 | DN50 | P1015 2270 | C | 2155,- |
| NP-4 50-250B | 3 | 21,4 | 10,8 - 42 | DN50 | P1015 2280 | C | 2390,- |
| NP-4 50-250A | 4 | 22,3 | 10,8 - 42 | DN 50 | P1015 2290 | C | 2546,- |
| NP-4 65-125E | 0,75 | 4,4 | 21-42 | DN65 | P1015 2300 | C | 1766,- |
| NP-4 65-125C | 0,75 | 5,4 | 21 -48 | DN65 | P1015 2310 | C | 1766,- |
| NP-4 65-125A | X,10 | 6,3 | 21-54 | DN65 | P1015 2320 | C | 1795,- |
| NP-4 65-160C | 1,1 | 6,3 | 21-60 | DN65 | P1015 2330 | C | 1804,- |
| NP-4 65-160B | 1,1 | 7,5 | 21-66 | DN65 | P1015 2340 | C | 1804,- |
| NP-4 65-160A | 1,5 | 9 | 21-75 | DN65 | P1015 2350 | C | 1835,- |
| NP-4 65-200B | 2,2 | 11,9 | 21-84 | DN65 | P1015 2360 | C | 2043,- |
| NP-4 65-200A | 3 | 14,1 | 21-84 | DN65 | P1015 2370 | C | 2276,- |
| NP-4 65-250B | 4 | 18 | 21-84 | DN65 | P1015 2380 | C | 2995,- |
| NP-4 65-250A | 5,5 | 21,9 | 21-84 | DN65 | P1015 2390 | C | 3138,- |
| NP-4 65-315C | 5,5 | 25,8 | 21 -84 | DN65 | P1015 2400 | C | 3461,- |
| NP-4 65-315B | 7,5 | 31 | 21-84 | DN65 | P1015 2410 | C | 3668,- |
| NP-4 65-315A | 9,2 | 35,9 | 21-84 | DN65 | P1015 2420 | C | 3998,- |
| NP-4 80-160C | 1,1 | 5,4 | 30-75 | DN80 | P1015 2430 | C | 1925,- |
| NP-4 80-160B | 1,5 | 6,7 | 30-84 | DN80 | P1015 2440 | C | 1956,- |
| NP-4 80-160A | 2,2 | 9,6 | 30-96 | DN80 | P1015 2450 | C | 2091,- |
| NP-4 80-200C | 2,2 | 10,3 | 30-96 | DN80 | P1015 2460 | C | 2563,- |
| NP-4 80-200B | 3 | 12,1 | 30 - 108 | DN80 | P1015 2470 | C | 2796,- |
| NP-4 80-200A | 4 | 13,9 | 30 - 120 | DN80 | P1015 2480 | C | 2954,- |
| NP-4 80-250C | 4 | 16,9 | 30 - 120 | DN80 | P1015 2490 | C | 3091,- |
| NP-4 80-250B | 5,5 | 20,7 | 30 - 132 | DN80 | P1015 2500 | C | 3235,- |
| NP-4 80-250A | 7,5 | 23,7 | 30 - 132 | DN80 | P1015 2510 | C | 3441,- |
| NP-4 80-315C | 9,2 | 28,8 | 30 - 132 | DN80 | P1015 2520 | C | 4014,- |
| NP-4 80315-B | 11 | 32,3 | 30 - 132 | DN80 | P1015 2530 | C | 4014,- |
| NP-4 80-315A | 15 | 37,4 | 30 - 132 | DN80 | P1015 2540 | C | 4600,- |
| NP-4 80-400C | 18,5 | 46,5 | 30 - 120 | DN80 | P1015 2550 | C | 5970,- |
| NP-4 80-400B | 22 | 54 | 30 - 132 | DN80 | P1015 2560 | C | 6269,- |
| NP-4 80-400A | 30 | 61,5 | 30 - 132 | DN80 | P1015 2570 | C | 7645,- |
| NP-4 100-200C | 3 | 9,6 | 48 - 150 | DN 100 | P1015 2580 | C | 2885,- |
| NP-4 100-200B | 4 | 12 | 48 - 168 | DN 100 | P1015 2590 | C | 3043,- |
| NP-4 100-200A | 5,5 | 15,2 | 48 - 192 | DN 100 | P1015 2600 | C | 3185,- |
| NP-4 100-250B | 7,5 | 19,5 | 48 - 210 | DN 100 | P1015 2610 | C | 3521,- |
| NP-4 100-250A | 9,2 | 22,3 | 48 - 210 | DN 100 | P1015 2620 | C | 3851,- |
| NP-4 100-315C | 11 | 26,9 | 48 - 192 | DN 100 | P1015 2630 | C | 4111,- |
| NP-4 100-315B | 15 | 31,5 | 48 - 210 | DN 100 | P1015 2640 | C | 4698,- |
| NP-4 100-315A | 18,5 | 36,9 | 48 - 210 | DN100 | P1015 2650 | C | 5175,- |
| NP-4 100-400C | 22 | 41,3 | 48 -192 | DN 100 | P1015 2660 | C | 6516,- |
| NP-4 100-400B | 30 | 50,2 | 48 - 210 | DN100 | P1015 2670 | C | 7894,- |
| NP-4 100-400A | 37 | 58,2 | 48 - 210 | DN 100 | P1015 2680 | C | 9373,- |
| NP-4 125-250E | 5,5 | 11 | 84 - 240 | DN 125 | P1015 2690 | C | 3471,- |
| NP-4 125,250D | 7,5 | 14 | 84 - 270 | DN125 | P1015 2700 | C | 3678,- |
| NP-4 125,250C | 9,2 | 16,7 | 84 - 300 | DN 125 | P1015 2710 | C | 4006,- |
| NP-4 125-250B | 11 | 19,3 | 84 - 300 | DN 125 | P1015 2720 | C | 4006,- |



| Type | P(kW) | Hmax | DN | Str.-ver. | Art.-Nr. | PG | Price EUR |
|---------------|-------|------|----------|-----------|------------|----|-----------|
| NP-4 125-250A | 15 | 22,7 | 84 - 330 | DN125 | P1015 2730 | C | 4593,- |
| NP-4 125-315C | 18,5 | 27,9 | 84 - 330 | DN125 | P1015 2740 | C | 6065,- |
| NP-4 125-315B | 22 | 31,8 | 84 - 330 | DN125 | P1015 2750 | C | 6365,- |
| NP-4 125-315A | 30 | 36,8 | 84 - 330 | DN 125 | P1015 2760 | C | 7741,- |
| NP-4 125-400C | 37 | 45,4 | 84 - 330 | DN125 | P1015 2770 | C | 9539,- |
| NP-4 125-400B | 45 | 51,4 | 84 - 330 | DN 125 | P1015 2780 | C | 10465,- |
| NP-4 125-400A | 55 | 59,2 | 84 - 330 | DN 125 | P1015 2790 | C | 12078,- |
| NP-4 150-315D | 18,5 | 22,8 | 132-420 | DN 150 | P1015 2800 | C | 6289,- |
| NP-4 150-315C | 22 | 25,6 | 132-450 | DN 150 | P1015 2810 | C | 6588,- |
| NP-4 150-315B | 30 | 30,6 | 132-450 | DN 150 | P1015 2820 | C | 7964,- |
| NP-4 150-315A | 37 | 35,6 | 132-480 | DN 150 | P1015 2830 | C | 9443,- |
| NP-4 150-400C | 45 | 45 | 132-480 | DN 150 | P1015 2840 | C | 11.159,- |
| NP-4 150-400B | 55 | 50,8 | 132-480 | DN 150 | P1015 2850 | C | 12771,- |
| NP-4 150-400A | 75 | 58,8 | 132-480 | DN 150 | P1015 2860 | C | 15270,- |

7.15.10

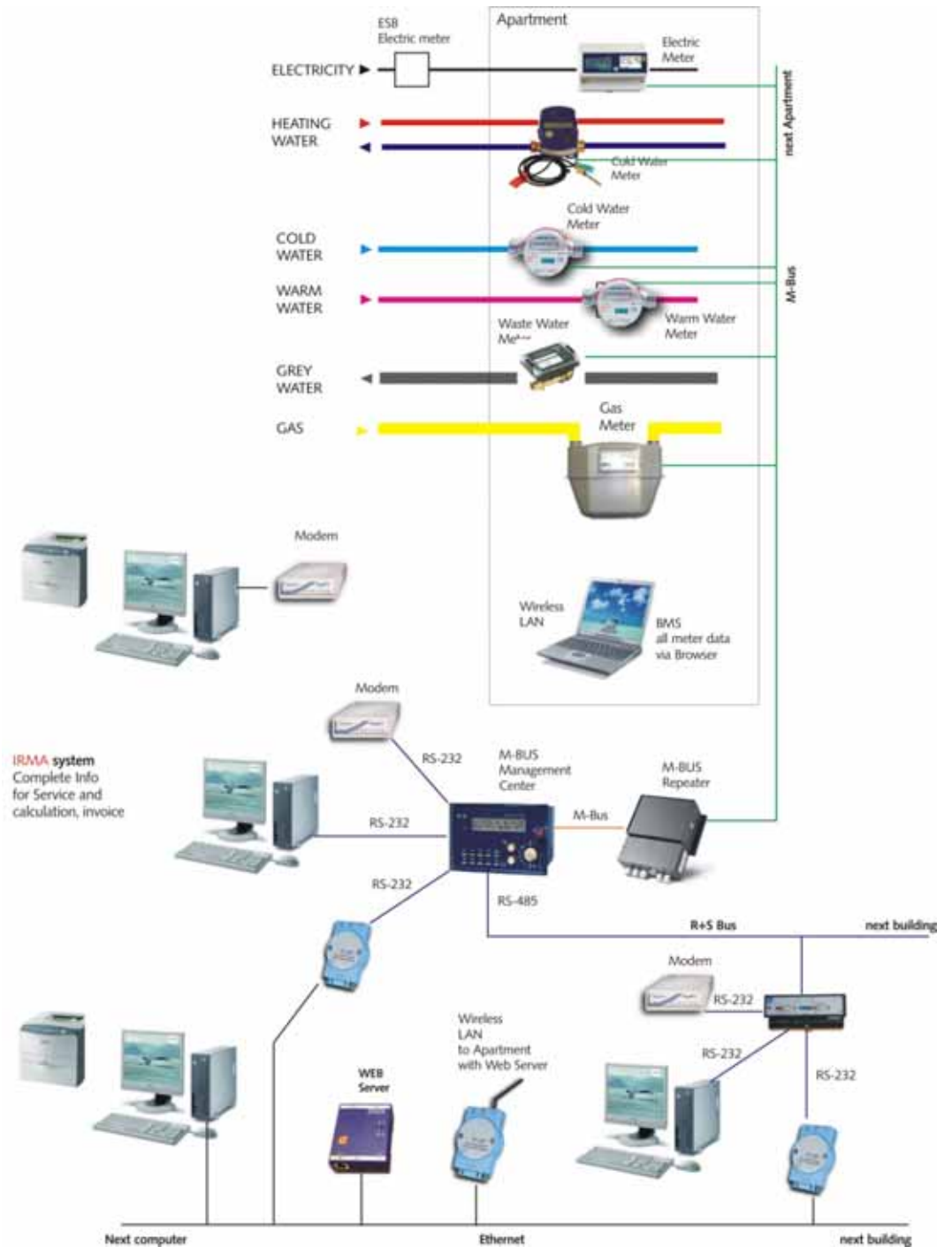
Accessories - Counter flange-Sets

| Type | P(kW) | Hmax | Qmin-max | DN | Str.-ver. | Art.-Nr. | PG | Price EUR |
|-----------------|--------|------|----------|----|-----------|------------|----|-----------|
| G11/4-G2 | Screws | Nuts | Gaskets | | | P1015 0110 | C | 30,- |
| G1 1/2-G2 1/2 | Screws | Nuts | Gaskets | | | P1015 0120 | C | 34,- |
| G2 - G2 1/2 | Screws | Nuts | Gaskets | | | P1015 0130 | C | 36,- |
| DN 65 - DN 80 | Screws | Nuts | Gaskets | | | P1015 0140 | C | 43,- |
| DN 80 - DN 100 | Screws | Nuts | Gaskets | | | P1015 0150 | C | 54,- |
| DN 80 - DN 125 | Screws | Nuts | Gaskets | | | P1015 0160 | C | 61,- |
| DN 100 - DN 125 | Screws | Nuts | Gaskets | | | P1015 0170 | C | 68,- |
| DN 125 - DN 150 | Screws | Nuts | Gaskets | | | P1015 0180 | C | 103,- |
| DN 150 - DN 200 | Screws | Nuts | Gaskets | | | P1015 0190 | C | 153,- |

8. Water Meter, Heat-, Volumetric-, Electricity- and Gas Meter

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R+S is specialized in monitoring recording and invoicing consumption values. To do this, R+S offers all kinds of meters with or without M-Bus or puls interfaces like water meters, heat meters, volumetric flow meters, electricity meters and gas meters. R+S also offers the complete components necessary to record the data via a Building Management System (IRMA control) like **M-Bus Repeater**, **M-Bus Controller** and the **Network Components** (see chapter 1.9) like interface converter, Web server etc. The central part of this system is the BMS Software IRMA **system**, (see Chap. 1.9), which enables you to record and store the data, monitor data, send alarms or write invoices for each tenant



8.1 Water Meter

8.1.1 Water Meter, Standard Version



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------------|---|-----------|----|-----------|
| KWZmess 1,5 | Cold water meter, 1/2", nominal volumetric flow QN 1,5, max. volumetric flow Qmax 3,0, max. pressure Pmax 10bar, pressure loss 0,25 bar, max. water temperature +30°C | 8110 1000 | C | 27,- |
| KWZmess 2,5 | Cold water meter, 3/4", nominal volumetric flow QN 2,5, max. volumetric flow Qmax 5,0, max. pressure Pmax 10bar, pressure loss 0,25 bar, max. water temperature +30°C | 8110 1010 | C | 30,- |
| VVWZmess 1,5 | Warm water meter, 1/2", nominal volumetric flow QN 1,5, max. volumetric flow Qmax 3,0, max. pressure Pmax 10bar, pressure loss 0,25 bar, max. water temperature +90°C | 8110 1100 | C | 27,- |
| VVWZmess 2,5 | Warm water meter, 3/4", nominal volumetric flow QN 2,5, max. volumetric flow Qmax 5,0, max. pressure Pmax 10bar, pressure loss 0,25 bar, max. water temperature +90°C | 8110 1110 | C | 35,- |

Other meters on request



8.1.10 Accessories for Water Meter

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|--|-----------|----|-----------|
| UWZradio | Radio Module for KWZmess and VVWZmess , 18 monthly values, value for the last year and the year before. Optical IR interface, optional: 6-digit LCD display, battery life 6 years plus reserve | 8110 2000 | C | on req. |
| UWZdate | Date Module for KWZmess and VVWZmess , 18 monthly values, value for the last year and the year before. Optical IR interface, optional: 6-digit LCD display, battery life 6 years plus reserve | 8110 2010 | C | 75,- |
| UWZpulse | Pulse Module for KWZmess and VVWZmess , potential free contact, 1,0l/Imp, max. switching power 200W, max. current 500mA, max. switching capacity 10W, min. pulse duration at Qmax 150ms | 8110 2020 | C | 34,- |
| UWZm-bus | M-Bus Module for KWZmess and VVWZmess , protocol EN 1434-3, transfer rate 300 or 2400 Baud. Primary address 1..250, secondary address programmable, 8-digits, numeric | 8110 2030 | C | on req. |



| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|---|-----------|----|-----------|
| RADIOmat | Data logger, records and stores consumption data and meter information for up to 200 meters in apartment blocks or office buildings via radio interface. Data is read via IR interface. | 8110 3010 | C | on req. |

8.2

Volumetric Flow Meter

8.2.1

Volumetric Flow Meter with pulse output

8.2.1.2

Ultra Sonic-Volumetric Flow Meter with pulse output

Static volumetric flow meter in Ultra Sonic-Technology, thread- or flange connection, is used to measure cold, warm or hot water in near or district heating plants or in cooling plants or combi plants (heating and cooling). Lithium-battery with 12 year life duration



8.2.1.2.1

Ultra Sonic-Volumetric Flow Meter with pulse output, cold or warm water

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------------|---|-----------|----|--------------------|
| VSultraG 0,6 | Static volumetric flow meter in Ultra Sonic-Technology, thread connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 110, Qp=0,6m ³ /h | 8210 1000 | C | 272,- |
| VSultraG 1,5 | Static volumetric flow meter in Ultra Sonic-Technology, thread connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 130, Qp=1,5m ³ /h | 8210 1010 | C | 281,- |
| VSultraG 2,5 | Static volumetric flow meter in Ultra Sonic-Technology, thread connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 190, Qp=2,5m ³ /h | 8210 1020 | C | 292,- |
| VSultraG 3,5 | Static volumetric flow meter in Ultra Sonic-Technology, thread connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 260, Qp=3,5m ³ /h | 8210 1030 | C | 526,- |
| VSultraG 6,0 | Static volumetric flow meter in Ultra Sonic-Technology, thread connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 260, Qp=6,0m ³ /h | 8210 1040 | C | 526,- |
| VSultraG 10,0 | Static volumetric flow meter in Ultra Sonic-Technology, thread connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 300, Qp=10,0m ³ /h | 8210 1050 | C | 701,- |
| VSultraF 0,6 | Static volumetric flow meter in Ultra Sonic-Technology, flange connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 190, Qp=0,6m ³ /h | 8210 2000 | C | 363,- |
| VSultraF 1,5 | Static volumetric flow meter in Ultra Sonic-Technology, flange connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 190, Qp=1,5m ³ /h | 8210 2010 | C | 363,- |
| VSultraF 2,5 | Static volumetric flow meter in Ultra Sonic-Technology, flange connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 190, Qp=2,5m ³ /h | 8210 2020 | C | 363,- |
| VSultraF 3,5 | Static volumetric flow meter in Ultra Sonic-Technology, flange connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 260, Qp=3,5m ³ /h | 8210 2030 | C | 631,- |
| VSultraF 6,0 | Static volumetric flow meter in Ultra Sonic-Technology, flange connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 260, Qp=6,0m ³ /h | 8210 2040 | C | 631,- |
| VSultraF 10,0 | Static volumetric flow meter in Ultra Sonic-Technology, flange connection, is used to measure cold or warm water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 15-90°C, length 260, Qp=6,0m ³ /h | 8210 2050 | C | 965,- |
| STROMultra 230 | Version for 230V external power supply instead of battery, temperature range up to 130°C | 8219 1050 | C | without add. price |
| STROMultra 24 | Version for 24V external power supply instead of battery, temperature range up to 130°C | 8219 1060 | C | without add. price |

8.2.1.2.2 Ultra Sonic-Volumetric Flow Meter with pulse output for cold, warm or hot water and for cooling systems

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------------|---|-----------|----|-----------|
| VSultra XG 0,6 | Static volumetric flow meter in Ultra Sonic-Technology, thread R3/4 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 110, Qp=0,6m ³ /h | 8210 3000 | C | 272,- |
| VSultra XG 1,5 | Static volumetric flow meter in Ultra Sonic-Technology, thread R3/4 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 130, Qp=1,5m ³ /h | 8210 3010 | C | 281,- |
| VSultra XG 2,5 | Static volumetric flow meter in Ultra Sonic-Technology, thread R3/4 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 190, Qp=2,5m ³ /h | 8210 3020 | C | 292,- |
| VSultra XG 3,5 | Static volumetric flow meter in Ultra Sonic-Technology, thread R5/4 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 260, Qp=3,5m ³ /h | 8210 3030 | C | 526,- |
| VSultra XG 6,0 | Static volumetric flow meter in Ultra Sonic-Technology, thread R5/4 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 260, Qp=6,0m ³ /h | 8210 3040 | C | 526,- |
| VSultra XG 10,0 | Static volumetric flow meter in Ultra Sonic-Technology, thread R3/2 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 300, Qp=10,0m ³ /h | 8210 3050 | C | 701,- |
| VSultra XF 0,6 | Static volumetric flow meter in Ultra Sonic-Technology, Flange DN20 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 190, Qp=0,6m ³ /h | 8210 4000 | C | 363,- |
| VSultra XF 1,5 | Static volumetric flow meter in Ultra Sonic-Technology, Flange DN20 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 190, Qp=1,5m ³ /h | 8210 4010 | C | 363,- |
| VSultra XF 2,5 | Static volumetric flow meter in Ultra Sonic-Technology, Flange DN20 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 190, Qp=2,5m ³ /h | 8210 4020 | C | 363,- |
| VSultra XF 3,5 | Static volumetric flow meter in Ultra Sonic-Technology, Flange DN25 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 260, Qp=3,5m ³ /h | 8210 4030 | C | 631,- |
| VSultra XF 6,0 | Static volumetric flow meter in Ultra Sonic-Technology, Flange DN32 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 260, Qp=6,0m ³ /h | 8210 4040 | C | 631,- |
| VSultra XF 10,0 | Static volumetric flow meter in Ultra Sonic-Technology, Flange DN40 connection, is used to measure cold, warm or hot water in heating cooling or combi plants, Lithium-battery with 12 year life duration, temperature range 5-130°C, length 260, Qp=6,0m ³ /h | 8210 4050 | C | 965,- |
| STROMultra X230 | Version for 230V external power supply instead of battery for VSultraXC, temperature range up to 130°C | 8219 1020 | C | 10,- add. |
| STROMultra X24 | Version for 24V external power supply instead of battery for VSultraXC, temperature range up to 130°C | 8219 1030 | C | 10,- add. |
| COOLultra | Version for cooling systems | 8219 1040 | C | 45,- add. |

8.2.1.2.2 Accessories for Ultra Sonic-Volumetric Flow Meter

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------------|---|-----------|----|-----------|
| IPultra 2,5 | Pulse cable for VSultraX Ultra Sonic-Volumetric Flow Meter 2,5m | 8219 1000 | C | on req. |
| IPultra 10 | Pulse cable for VSultraX Ultra Sonic-Volumetric Flow Meter 10m | 8219 1010 | C | on req. |

8.3

Heat Meter

8.3.1

Single Jet-Heat Meter



Employing the latest generation microprocessors and innovative measuring techniques R+S has the best measuring system **data PLUS** with accuracy, measurement stability and functionality unprecedented in the history of heat computer development. Volumetric measuring units for heat meters with both reed pulser outputs or high-frequency electronic outputs can be used together with either Pt-500 or Pt-100 temperature sensors. As one of the first heat computers, **data PLUS** has already been given **approval in compliance with European Standard EN 1434 (2.55/98.02)**. The multi-functional **data PLUS** can of course work together **with all sizes of volumetric measuring units**. Operating failures and faults are detected automatically and can be shown on the register with the date it occurred, its duration and the type of fault. A non-volatile memory **backs up** all determinative data **at regular intervals** in order to ensure that it cannot be lost. In addition, all devices have an optical interface for **on-site data acquisition** along with programming of the most essential parameters.

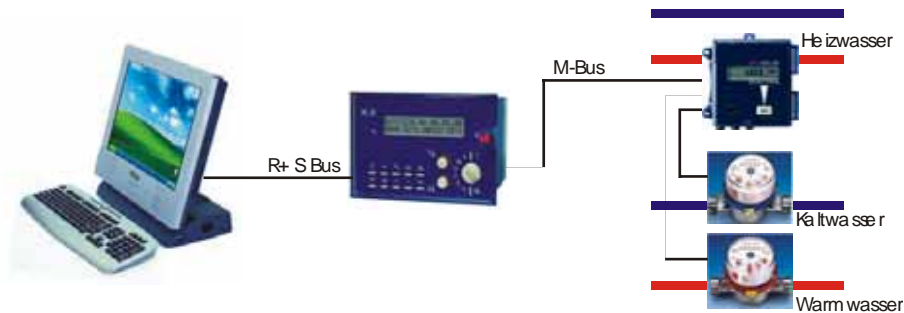
Apart from the volumetric measuring unit, with all standard devices it is possible to connect two additional pulse output meters, e.g. a cold and hot water meter, whose consumption both appears on the register and can also be determined via the remote read-out systems. The additional connections however have a multiple function, i.e. they can be programmed not only as inputs but also as outputs, so that they function as remote meter outputs for energy and volume, for instance.

8.3.1.1 Single Jet Heat Meter with measuring unit data PLUS

| Type | Description | Art.-Nr. | PG | Price EUR |
|-----------------|---|-----------|----|-----------|
| ETHI 0,6/15/110 | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 0,6 m/h, connection 15 mm, length 110 mm | 8301 1100 | C | on req. |
| ETHI 0,6/20/120 | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 0,6 m/h, connection 20 mm, length 110 mm | 8301 1200 | C | on req. |
| ETHI 0,6/20/130 | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 0,6 m/h, connection 20 mm, length 130 mm | 8301 1300 | C | on req. |
| ETHI 1,5/15/110 | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 1,5 m/h, connection 15 mm, length 110 mm | 8301 1400 | C | on req. |
| ETHI 1,5/20/110 | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 1,5 m/h, connection 20 mm, length 110 mm | 8301 1500 | C | on req. |
| ETHI 1,5/20/130 | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 1,5 m/h, connection 20 mm, length 130 mm | 8301 1600 | C | on req. |
| ETHI 2,5/20/130 | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 2,5 m/h, connection 20 mm, length 130 mm | 8301 1700 | C | on req. |

8.3.12

Single Jet Heat Meter with Zählerinheit data PLUS and with M-Bus and two zusätzlichen Pulseingängen



| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|---|-----------|----|-----------|
| ETHI 0,6/15/110/M | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 0,6 m/h, connection 15 mm, length 110 mm, with M-Bus | 8301 2100 | C | on req. |
| ETHI 0,6/20/120/M | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 0,6 m/h, connection 20 mm, length 110 mm, with M-Bus | 8301 2200 | C | on req. |
| ETHI 0,6/20/130/M | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 0,6 m/h, connection 20 mm, length 130 mm, with M-Bus | 8301 2300 | C | on req. |
| ETHI 1,5/15/110/M | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 1,5 m/h, connection 15 mm, length 110 mm, with M-Bus | 8301 2400 | C | on req. |
| ETHI 1,5/20/110/M | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 1,5 m/h, connection 20 mm, length 110 mm, with M-Bus | 8301 2500 | C | on req. |
| ETHI 1,5/20/130/M | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 1,5 m/h, connection 20 mm, length 130 mm, with M-Bus | 8301 2600 | C | on req. |
| ETHI 2,5/20/130/M | Battery powered Heat Meter with Single Jet volumetric flow meter for horizontal and vertical installation, with measuring unit data PLUS, 120°C, 2,5 m/h, connection 20 mm, length 130 mm, with M-Bus | 8301 2700 | C | on req. |

8.4

Multi Jet-Heat Meter

8.4.1

Compact-Multi Jet-Heat Meter with M-Bus

8.4.1.1

Compact-Multi Jet-Heat Meter heat STAR 2+/2 for heating/cooling

heat STAR 2+ is a compact heat meter with Koax-Multi Jet-flow sensors with a length of 110 and 130mm and M-Bus-interface. The meter can store up to 15 monthly values, which can be read on the LCD display. Menu driven operation. Installation in return. Return sensor is already installed in the volumetric flow meter. Flow sensor is connected via 1,5m silicone cable (5mm diameter). The temperature sensor is designed for direct installation or installation via a protective pocket. Incl Seal and wall mounting set.



| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------|--|-----------|----|-----------|
| heat STAR 2+/06M | Compact-Heat Meter with M-Bus interface, Qp 0,6, thread R1/2, with removable measuring unit, | 8401 1000 | C | 201,- |
| heat STAR 2+/15M | Compact-Heat Meter with M-Bus interface, Qp 1,5, thread R1/2, with removable measuring unit | 8401 1010 | C | 201,- |
| heat STAR 2+/25M | Compact-Heat Meter with M-Bus interface, Qp 2,5, thread R3/4, with removable measuring unit | 8401 1020 | C | 209,- |
| heat STAR 2/06M | Compact-Heat Meter with M-Bus interface, Qp 0,6, thread 15mm, measuring unit fixed | 8401 2000 | C | 186,- |
| heat STAR 2/15M | Compact-Heat Meter with M-Bus interface, Qp 1,5, thread 15mm, measuring unit fixed | 8401 2010 | C | 186,- |
| heat STAR 2/256M | Compact-Heat Meter with M-Bus interface, Qp 2,5, thread 20mm, measuring unit fixed | 8401 2020 | C | 193,- |

8.4.1.9

Accessories for Compact-Heat Meter heat STAR 2+/2

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------------|--|-----------|----|------------|
| Heat STAR 2 pulse | Pulse output for energy or volume (only without M-Bus) | 8401 9000 | C | 27,- |
| heat STAR 2 flow | Installation of the meter in the flow | 8401 9010 | C | 34,- |
| heat STAR 2 solar | Special edition for solar systems | 8401 9020 | C | 40,- |
| heat STAR 2 power | Power supply 230V for heat STAR 2+ | 8401 9030 | C | on req. |
| heat STAR 2 t5.2 | Temperature sensor with 5,2mm diameter | 8401 9040 | C | o. AuPrice |
| heat STAR 2 ta1 | Special length of sensor cable: VL=1,5m, RL=1,5m | 8401 9050 | C | 9,- |
| heat STAR 2 ta2 | Special length of sensor cable: VL=3,0m, RL=0,5m integr. | 8401 9060 | C | 12,- |
| heat STAR 2 ta3 | Special length of sensor cable: VL=3,0m, RL=3,0m | 8401 9070 | C | 24,- |
| heat STAR 2 mbusc | M-Bus cable | 8401 9080 | C | on req. |
| heat STAR 2 cold | Add. costs for version for cooling (sealed) | 8401 9090 | C | 39,- |
| heat STAR 2 hybrid | Add. Costs for hybrid version (heating and cooling function) | 8401 9100 | C | 45,- |

8.4.2 Multi Jet-Heat Meter heat STAR 1



heat STAR 1 is an electronic measuring unit, which can be combined with all kinds of different volumetric flow meters. Included in this package are 2 temperature sensors, UTF 6mm with 4 bushings to secure the sensors and 3m cable (already mounted), 2 Almess nuts, 2 PVC screws ¼". All meters can be used in heating or cooling systems.

8.4.2.0 Heat Meter measuring unit heat STAR 1

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------------|--|-----------|----|-----------|
| heat STAR 1 /1 | Heat Meter measuring unit heat STAR 1 incl. temperature sensor UTS- 8402 0000 6mm-5AH, Pt500, 3m cable, 2-wire technology, 1l/Imp | 8402 0000 | C | 276,- |
| heat STAR 1 /10 | Heat Meter measuring unit heat STAR 1 incl. temperature sensor UTS- 8402 0100 6mm-5AH, Pt500, 3m cable, 2-wire technology, 10l/Imp | 8402 0100 | C | 276,- |
| heat STAR 1 /100 | Heat Meter measuring unit heat STAR 1 incl. temperature sensor UTS- 8402 0200 6mm-5AH, Pt500, 3m cable, 2-wire technology, 100l/Imp | 8402 0200 | C | 276,- |
| heat STAR 1 /1000 | Heat Meter measuring unit heat STAR 1 incl. temperature sensor UTS- 8402 0300 6mm-5AH, Pt500, 3m cable, 2-wire technology, 1000l/Imp | 8402 0300 | C | 276,- |

other options are available (see chap. 8.4.2.9)



8.4.2.1 Multi Jet-Heat Meter heat STAR 1 WV for horizontal installation with thread

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------------|--|-----------|----|-----------|
| heat STAR 1 WV 1,5G | Multi Jet-Heat Meter, Qp=1,5, length 190mm, connection G1B, PN 16, horizontal installation | 8402 1000 | C | 488,- |
| heat STAR 1 WV 2,5G | Multi Jet-Heat Meter, Qp=2,5, length 190mm, connection G1B, PN 16, horizontal installation | 8402 1010 | C | 488,- |
| heat STAR 1 WV 3,5G | Multi Jet-Heat Meter, Qp=3,5, length 260mm, connection G5/4B, PN 16, horizontal installation | 8402 1020 | C | 525,- |
| heat STAR 1 WV 6,0-25G | Multi Jet-Heat Meter, Qp=6,0, length 260mm, connection G5/4B, PN 16, horizontal installation | 8402 1030 | C | 525,- |
| heat STAR 1 WV 6,0-32G | Multi Jet-Heat Meter, Qp=6,0, length 260mm, connection G3/2B, PN 16, horizontal installation | 8402 1040 | C | 535,- |
| heat STAR 1 WV 10G | Multi Jet-Heat Meter, Qp=10, length 300mm, connection G2B, PN 16, horizontal installation | 8402 1050 | C | 657,- |

8.4.2.2 Multi Jet-Heat Meter heat STAR 1 WV for horizontal installation with flange

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------------|---|-----------|----|-----------|
| heat STAR 1 WV 1,5F | Multi Jet-Heat Meter, Qp=1,5, length 190mm, connection DN20, PN 16, horizontal installation | 8402 2000 | C | 633,- |
| heat STAR 1 WV 2,5F | Multi Jet-Heat Meter, Qp=2,5, length 190mm, connection DN20, PN 16, horizontal installation | 8402 2010 | C | 633,- |
| heat STAR 1 WV 3,5F | Multi Jet-Heat Meter, Qp=3,5, length 260mm, connection DN25, PN 16, horizontal installation | 8402 2020 | C | 655,- |
| heat STAR 1 WV 6,0-25F | Multi Jet-Heat Meter, Qp=6,0, length 260mm, connection DN25, PN 16, horizontal installation | 8402 2030 | C | 655,- |
| heat STAR 1 WV 6,0-32F | Multi Jet-Heat Meter, Qp=6,0, length 260mm, connection DN32, PN 16, horizontal installation | 8402 2040 | C | 668,- |
| heat STAR 1 WV 10F | Multi Jet-Heat Meter, Qp=10, length 300mm, connection DN40, PN 16, horizontal installation | 8402 2050 | C | 827,- |



8.4.3.1 Multi Jet-Heat Meter heat STAR 1 WV for vertical installation in the riser with thread connection

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------------|--|-----------|----|-----------|
| heat STAR 1 SV 1,5G | Multi Jet-Heat Meter, Qp=1,5, length 105mm, connection G1B, PN16, vertical installation in riser | 8403 1000 | C | 533,- |
| heat STAR 1 SV 2,5G | Multi Jet-Heat Meter, Qp=2,5, length 105mm, connection G1B, PN16, vertical installation in riser | 8403 1010 | C | 533,- |
| heat STAR 1 SV 3,5G | Multi Jet-Heat Meter, Qp=3,5, length 150mm, connection G5/4B, PN16, vertical installation in riser | 8403 1020 | C | 554,- |
| heat STAR 1 SV 6,0-25G | Multi Jet-Heat Meter, Qp=6,0, length 150mm, connection G5/4B, PN16, vertical installation in riser | 8403 1030 | C | 554,- |
| heat STAR 1 SV 6,0-32G | Multi Jet-Heat Meter, Qp=6,0, length 150mm, connection G3/2B, PN16, vertical installation in riser | 8403 1040 | C | 594,- |
| heat STAR 1 SV 10G | Multi Jet-Heat Meter, Qp=10, length 150mm, connection G2B, PN16, vertical installation in riser | 8403 1050 | C | 753,- |
| heat STAR 1 SV 10GX | Multi Jet-Heat Meter, Qp=10, length 200mm, connection G2B, PN16, vertical installation in riser | 8403 1050 | C | 753,- |

8.4.3.2 Multi Jet-Heat Meter heatSTAR 1 WV for vertical installation in the down pipe with thread connection

| Type | Description | Art.-Nr. | PG | Price EUR |
|------------------------|---|-----------|----|-----------|
| heat STAR 1 FV 1,5G | Multi Jet-Heat Meter, Qp=1,5, length 105mm, connection G1B, PN 16, vertical installation in the pipe that goes down | 8403 2000 | C | 533,- |
| heat STAR 1 FV 2,5G | Multi Jet-Heat Meter, Qp=2,5, length 105mm, connection G1B, PN 16, vertical installation in the pipe that goes down | 8403 2010 | C | 533,- |
| heat STAR 1 FV 3,5G | Multi Jet-Heat Meter, Qp=3,5, length 150mm, connection G5/4B, PN 16, vertical installation in the pipe that goes down | 8403 2020 | C | 554,- |
| heat STAR 1 FV 6,0-25G | Multi Jet-Heat Meter, Qp=6,0, length 150mm, connection G5/4B, PN 16, vertical installation in the pipe that goes down | 8403 2030 | C | 554,- |
| heat STAR 1 FV 6,0-32G | Multi Jet-Heat Meter, Qp=6,0, length 150mm, connection G3/2B, PN 16, vertical installation in the pipe that goes down | 8403 2040 | C | 504,- |
| heat STAR 1 FV 10G | Multi Jet-Heat Meter, Qp=10, length 150mm, connection G2B, PN 16, vertical installation in the pipe that goes down | 8403 2050 | C | 753,- |
| heat STAR 1 FV 10GX | Multi Jet-Heat Meter, Qp=10, length 200mm, connection G2B, PN 16, vertical installation in the pipe that goes down | 8403 2060 | C | 753,- |

8.4.4.1 Combined Heat Meter heatSTAR 1 WV with Woltman-volumetric flow meter for horizontal installation with flange



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------------|---|-----------|----|-----------|
| heat STAR 1 WV 15F4 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=15, length 270mm, flange connection DN50, 4-Loch, horizontal installation | 8404 1000 | C | 1.251,- |
| heat STAR 1 WV 25F4 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=25, length 300mm, flange connection DN65, 4-Loch, horizontal installation | 8404 1010 | C | 1.314,- |
| heat STAR 1 WV 40F4 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=40, length 300mm, flange connection DN80, 4-Loch, horizontal installation | 8404 1020 | C | 1.357,- |
| heat STAR 1 WV 40F8 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=40, length 300mm, flange connection DN80, 8-Loch, horizontal installation | 8404 1030 | C | 1.357,- |
| heat STAR 1 WV 60F8 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=60, length 360mm, flange connection DN100, 8-Loch, horizontal installation | 8404 1040 | C | 1.585,- |
| heat STAR 1 WV 150F8 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=150, length 500mm, flange connection DN150, 8-Loch, horizontal installation | 8404 1050 | C | 2.602,- |



8.4.4.2 Combined Heat Meter heat STAR 1 WP with Woltman-volumetric flow meter for any kind of installation with flange

| Type | Description | Art.-Nr. | PG | Price EUR |
|----------------------|--|-----------|----|-----------|
| heat STAR 1 WP 15F4 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=15, length 200mm, flange connection DN50, 4-Loch , any kind of installation | 8405 1000 | C | 1.251,- |
| heat STAR 1 WP 25F4 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=25, length 225mm, flange connection DN65, 4-Loch , any kind of installation | 8405 1010 | C | 1.314,- |
| heat STAR 1 WP 40F4 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=40, length 225mm, flange connection DN80, 4-Loch , any kind of installation | 8405 1020 | C | 1.357,- |
| heat STAR 1 WP 40Fx4 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=40, length 200mm, flange connection DN80, 4-Loch , any kind of installation | 8405 1030 | C | 1.357,- |
| heat STAR 1 WP 40F8 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=15, length 225mm, flange connection DN80, 4-Loch , any kind of installation | 8405 2000 | C | 1.092,- |
| heat STAR 1 WP 40Fx8 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=15, length 200mm, flange connection DN80, 4-Loch , any kind of installation | 8405 2010 | C | 1.357,- |
| heat STAR 1 WP 60F8 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=15, length 250mm, flange connection DN100, 4-Loch , any kind of installation | 8405 2020 | C | 1.585,- |
| heat STAR 1 WP 100F8 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=15, length 250mm, flange connection DN125, 4-Loch , any kind of installation | 8405 2030 | C | 1.895,- |
| heat STAR 1 WP 150F8 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=15, length 300mm, flange connection DN150, 4-Loch , any kind of installation | 8405 2040 | C | 2.602,- |
| heat STAR 1 WP 250F8 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=15, length 350mm, flange connection DN200, 4-Loch , any kind of installation | 8405 2050 | C | 3.050,- |
| heat STAR 1 WP 400F8 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=15, length 450mm, flange connection DN250, 4-Loch , any kind of installation | 8405 2060 | C | on req. |
| heat STAR 1 WP 600F8 | Combined Heat Meter with Woltmann-volumetric flow meter, Qp=15, length 500mm, flange connection DN300, 4-Loch , any kind of installation | 8405 2070 | C | on req. |

8.4.2.9 Accessories for heat STAR 1 Heat Meter

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------------|---|-----------|----|-----------|
| heat STAR 1 mbus | M-Bus interface for heat STAR 1 | 8409 1000 | C | 37,- |
| heat STAR 1 pulseE | Pulse output for energy for heat STAR 1 | 8409 1010 | C | 77,- |
| heat STAR 1 pulseEV | Pulse output for energy and volumetric flow for heat STAR 1 | 8409 1020 | C | 111,- |
| heat STAR 1 flow | Installation in flow for heat STAR 1 | 8409 1030 | C | 34,- |
| heat STAR 1 R4 | measuring unit in 4-wire version for heat STAR 1 | 8409 1040 | C | 56,- |
| heat STAR 1 T10 | temperature sensor-cable 10m (only with R4) | 8409 1050 | C | 34,- |
| heat STAR 1 hybrid | measuring unit in hybrid-version (heating and cooling-function) | 8409 1090 | C | 45,- |

8.6

Ultra Sonic- Heat Meter

8.6.1.2

Compact-Ultra Sonic-Heat Meter

Static compact-energy meter in ultra sonic-technology, thread or flange connection, recording of all relevant Consumption data for near or district heating plants or cooling plants with extreme accuracy, Lithium-battery with 12 year duration, application also as a cooling meter, energy saving mode, remote read-out M-Bus, radio or RS-232 modules are optional History memory for more than 24 month, temperature sensor PT 100, 5,2mm diameter, 2m cable.



8.6.1.2.1

Ultra Sonic-Heat Meter, Standard Version with Lithium-Battery

| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------|---|-----------|----|-----------|
| WMultraG 0,6 | Static compact energy meter in Ultra Sonic-Technologie, thread R3/4, Lithium battery with 12 year duration, temperature range 5-130°C, length 110, Qp=0,6m3/h | 8601 1000 | C | 313,- |
| WMultraG 1,5 | Static compact energy meter in Ultra Sonic-Technologie, thread R1, Lithium battery with 12 year duration, temperature range 5-130°C, length 130, Qp=1,5m3/h | 8601 1010 | C | 323,- |
| WMultraG 2,5 | Static compact energy meter in Ultra Sonic-Technologie, thread R1, Lithium battery with 12 year duration, temperature range 5-130°C, length 190, Qp=2,5m3/h | 8601 1020 | C | 337,- |
| WMultraG 3,5 | Static compact energy meter in Ultra Sonic-Technologie, thread R5/4, Lithium battery with 12 year duration, temperature range 5-130°C, length 260, Qp=3,5m3/h | 8601 1030 | C | 510,- |
| WMultraG 6,0 | Static compact energy meter in Ultra Sonic-Technologie, thread R5/4, Lithium battery with 12 year duration, temperature range 5-130°C, length 260, Qp=6,0m3/h | 8601 1040 | C | 510,- |
| WMultraG 10,0 | Static compact energy meter in Ultra Sonic-Technologie, thread R5/4, Lithium battery with 12 year duration, temperature range 5-130°C, length 300, Qp=10,0m3/h | 8601 1050 | C | 699,- |
| WMultraF 0,6 | Static compact energy meter in Ultra Sonic-Technologie, flange DN 20, Lithium battery with 12 year duration, temperature range 5-130°C, length 190, Qp=0,6m3/h | 8601 2000 | C | 413,- |
| WMultraF 1,5 | Static compact energy meter in Ultra Sonic-Technologie, flange DN 20, Lithium battery with 12 year duration, temperature range 5-130°C, length 190, Qp=1,5m3/h | 8601 2010 | C | 413,- |
| WMultraF 2,5 | Static compact energy meter in Ultra Sonic-Technologie, flange DN 20, Lithium battery with 12 year duration, temperature range 5-130°C, length 190, Qp=2,5m3/h | 8601 2020 | C | 413,- |
| WMultraF 3,5 | Static compact energy meter in Ultra Sonic-Technologie, flange DN 25, Lithium battery with 12 year duration, temperature range 5-130°C, length 260, Qp=3,5m3/h | 8601 2030 | C | 610,- |
| WMultraF 6,0 | Static compact energy meter in Ultra Sonic-Technologie, flange DN 32, Lithium battery with 12 year duration, temperature range 5-130°C, length 260, Qp=6,0m3/h | 8601 2040 | C | 660,- |
| WMultraF 10,0 | Static compact energy meter in Ultra Sonic-Technologie, flange DN 40, Lithium battery with 12 year duration, temperature range 5-130°C, length 300, Qp=10,0m3/h | 8601 2050 | C | 933,- |

8.6.1.2.10

Accessories for Ultra Sonic-Heat Meter

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---|-----------|----|-----------|
| NTultraW 230 | Version with 230V AC power supply for WMultra Ultra Sonic-Heat Meter instead of Lithium battery | 8609 1000 | C | 74,- add |
| NTultraW 24 | Version with 24V power supply for WMultra Ultra Sonic-Heat Meter instead of Lithium battery | 8609 1000 | C | 72,- add |
| MBUSultraW | M-Bus Module for WMultra Ultra Sonic-Heat Meter | 8609 1000 | C | 48,- add |
| RS232ultraW | RS-232 Module for WMultraX Ultra Sonic-Heat meter | 8609 1000 | C | 29,- add |
| PULSEultraW | Pulse output for WMultra Ultra Sonic-Heat Meter | 8609 1000 | C | 35,- add |
| PULSEultraW | Pulse input for WMultra Ultra Sonic-Heat Meter | 8609 1000 | C | 35,- add |
| RADIOultraW | Radio Module for WMultra Ultra Sonic-Heat Meter | 8609 1000 | C | 93,- add |
| RADIOXultraW | External radio Module for WMultra Ultra Sonic-Heat Meter | 8609 1000 | C | 107,- add |
| COOLultraW | Version for cooling applications for WMultra Ultra Sonic-Heat Meter | 8609 1000 | C | 88,- add |
| AHultraW | Shut-off valve with integrated sensor pocket for WMultra Ultra Sonic-Heat Meter | 8609 1000 | C | on req. |

8.11

Electricity Meter with M-Bus



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------------|---|-----------|----|-----------|
| E-METER 200 | Electricity Meter with SO-interface, for 2-wire AC net, direct measuring, 65A, class 1, net frequency 50Hz, input 230V, can be calibrated, energy and capacity visible in display | 8801 1000 | C | on req. |
| E-METER 300 | Electricity Meter with SO-interface, for 3-wire AC net, direct measuring, 65A, class 1, net frequency 50Hz, input 230V, can be calibrated, energy and capacity visible in display | 8801 1010 | C | on req. |
| E-METER 400 | Electricity Meter with SO-interface, for 4-wire AC net, direct measuring, 65A, class 1, net frequency 50Hz, input 230V, can be calibrated, energy and capacity visible in display | 8800 1020 | C | on req. |

Weitere Typen auf Anfrage

8.12 Gas Meter with M-Bus



| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------------|---|-----------|----|-----------|
| G-METER Z4 | Balgen gas meter for industrial or private housing acc. to DIN EN 1359, HTB, can be used for gas acc. to DVGW-working paper G260, can be calibrated for flow between 0,04m ³ /h up to 6m ³ /h, max. operating pressure 0,5 bar, gas temp. -20 up to +50°C | 8900 1000 | C | on req. |
| G-METER Z25 | Balgen gas meter for industrial or private housing acc. to DIN EN 1359, HTB, can be used for gas acc. to DVGW-working paper G260, can be calibrated for flow between 0,25m ³ /h up to 40m ³ /h, max. operating pressure 0,5 bar, gas temp. -20 up to +50°C | 8900 1010 | C | on req. |
| G-METER Z40 | Balgen gas meter for industrial or private housing acc. to DIN EN 1359, HTB, can be used for gas acc. to DVGW-working paper G260, can be calibrated for flow between 0,40m ³ /h up to 160m ³ /h, max. operating pressure 0,5 bar, gas temp. -20 up to +50°C | 8900 1020 | C | on req. |

8.15 Network Components

8.15.1 M-Bus-Controller



| Type | Description | Art.-Nr. | PG | Price EUR |
|----------|---|-----------|----|-----------|
| RU 98.MB | DDC-RegelUNIT compact , M-Bus Controller to store and readout up to 100 M-Bus meters, C-DIND-rail or wall mounting, interface RU9S.M is needed additionally. If more than 2 meters are connected you will also need an M-Bus Repeater. | 1497 2100 | C | 530,- |
| RU 9S.M | M-Bus interface | 1459 3000 | C | 120,- |

8.15.2 M-Bus Repeater



| Type | Description | Art.-Nr. | PG | Price EUR |
|---------------------------|---|-----------|----|-----------|
| M-Bus Repeater-10 | unit PLUS M-Bus Repeater for max. 10 M-Bus meters, 24V DC/AC, C-DIN-rail or wall mounting, protection against short | 8010 1100 | C | 782,- |
| M-Bus Repeater-120 | unit PLUS M-Bus Repeater for max. 120 M- meters, incl power supplyl 230V AC, wall mounting protected against lightning and short | 8010 1200 | C | 1.257,- |
| M-Bus Repeater-250 | unit PLUS M-Bus Repeater for max. 250 M- meters, incl power supply 230V AC, wall mounting protected against lightning and short | 8010 1300 | C | 1.988,- |

8.20

Attestation Fee

8.20.1

Attestation Fee for impeller- and Woltman meter (cold water meter)

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---|-----------|----|-----------|
| BEGLwolt 6 | Attestation Fee for impeller- and Woltman meter (cold water meter) up to Qn 6,0 | 8002 1000 | - | 6,40 |
| BEGLwolt 10 | Attestation Fee for impeller- and Woltman meter (cold water meter) up to Qn 10 | 8002 1010 | - | 9,30 |
| BEGLwolt 50 | Attestation Fee for impeller- and Woltman meter (cold water meter) up to Qn 50 | 8002 1020 | - | 44,80 |
| BEGLwolt 100 | Attestation Fee for impeller- and Woltman meter (cold water meter) up to Qn 100 | 8002 1030 | - | 103,00 |
| BEGLwolt 150 | Attestation Fee for impeller- and Woltman meter (cold water meter) up to Qn 150 | 8002 1040 | - | 117,80 |
| BEGLwolt 250 | Attestation Fee for impeller- and Woltman meter (cold water meter) up to Qn 250 | 8002 1050 | - | 163,40 |
| BEGLwolt 600 | Attestation Fee for impeller- and Woltman meter (cold water meter) up to Qn 600 | 8002 1060 | - | 292,50 |

8.20.2

Attestation Fee for association water meter

| Type | Description | Art.-Nr. | PG | Price EUR |
|-------------|--|-----------|----|-----------|
| BEGLwas 50 | Attestation Fee for association water meter up to Qn 50 | 8002 2020 | - | 115,60 |
| BEGLwas 100 | Attestation Fee for association water meter up to Qn 100 | 8002 2030 | - | 173,80 |
| BEGLwas 150 | Attestation Fee for association water meter up to Qn 150 | 8002 2040 | - | 188,60 |
| BEGLwas 250 | Attestation Fee for association water meter up to Qn 250 | 8002 2050 | - | 252,81 |

8.20.3

Attestation Fee for warm- and hot water meter and volumetric flow meter, test with cold water

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|--|-----------|----|-----------|
| BEGLwhvK 6 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with cold water up to Qn 6,0 | 8002 3000 | - | 7,50 |
| BEGLwhvK 10 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with cold water up to Qn 10 | 8002 3010 | - | 10,90 |
| BEGLwhvK 50 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with cold water up to Qn 50 | 8002 3020 | - | 52,40 |
| BEGLwhvK 100 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with cold water up to Qn 100 | 8002 3030 | - | 120,50 |
| BEGLwhvK 150 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with cold water up to Qn 150 | 8002 3040 | - | 163,40 |
| BEGLwhvK 250 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with cold water up to Qn 250 | 8002 3050 | - | 209,90 |
| BEGLwhvK 600 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with cold water up to Qn 600 | 8002 3060 | - | 341,90 |

8.20.4

Attestation Fee for warm- and hot water meter and volumetric flow meter, test with warm and hot water

| Type | Description | Art.-Nr. | PG | Price EUR |
|--------------|---|-----------|----|-----------|
| BEGLwhvW 6 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with warm and hot water, up to Qn 6,0 | 8002 4000 | - | 30,30 |
| BEGLwhvW 10 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with warm and hot water, up to Qn 10 | 8002 4010 | - | 45,50 |
| BEGLwhvW 50 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with warm and hot water, up to Qn 50 | 8002 4020 | - | 103,00 |
| BEGLwhvW 100 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with warm and hot water, up to Qn 100 | 8002 4030 | - | 154,40 |
| BEGLwhvW 150 | Attestation Fee for warm- and hot water meter and volumetric flow meter, test with warm and hot water, up to Qn 150 | 8002 4040 | - | 234,40 |

| 8.20.5 Attestation Fee for compact heat meter, complete | | | | |
|--|---|-----------------|-----------|------------------|
| Type | Description | Art.-Nr. | PG | Price EUR |
| BEGLcomp 6 | Attestation Fee for compact heat meter up to Qn 60 | 8002 5000 | - | 31,70 |
| BEGLcomp 10 | Attestation Fee for compact heat meter up to Qn 10 | 8002 5010 | - | 35,08 |
| BEGLcomp 50 | Attestation Fee for compact heat meter up to Qn 50 | 8002 5020 | - | 76,61 |
| BEGLcomp 100 | Attestation Fee for compact heat meter up to Qn 100 | 8002 5030 | - | 144,70 |
| BEGLcomp 150 | Attestation Fee for compact heat meter up to Qn 150 | 8002 5040 | - | 187,55 |

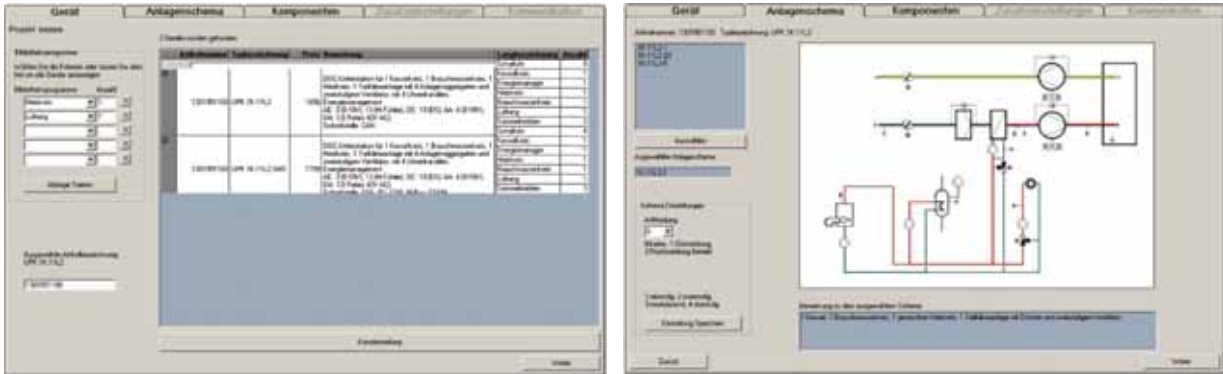
| 8.20.9 Attestation Fee miscelaneous | | | | |
|--|---|-----------------|-----------|------------------|
| Type | Description | Art.-Nr. | PG | Price EUR |
| BEGLcalc | Attestation Fee for measuring unit | 8002 9000 | - | 12,10 |
| BEGLsensor | Attestation Fee for temperature sensor (p. pcs) | 8002 9010 | - | 5,- |
| BEGLpair | Additional fee for temperature pair | 8002 9020 | - | 2,10 |
| BEGLcertificate | Fee for issuing the certificate (for all nominal sizes) | 8002 9030 | - | 10,50 |

9. R+S Tools to select the right components

9.1 UPK select and UPS select: How to select the right controller

9.1.1 UPK select

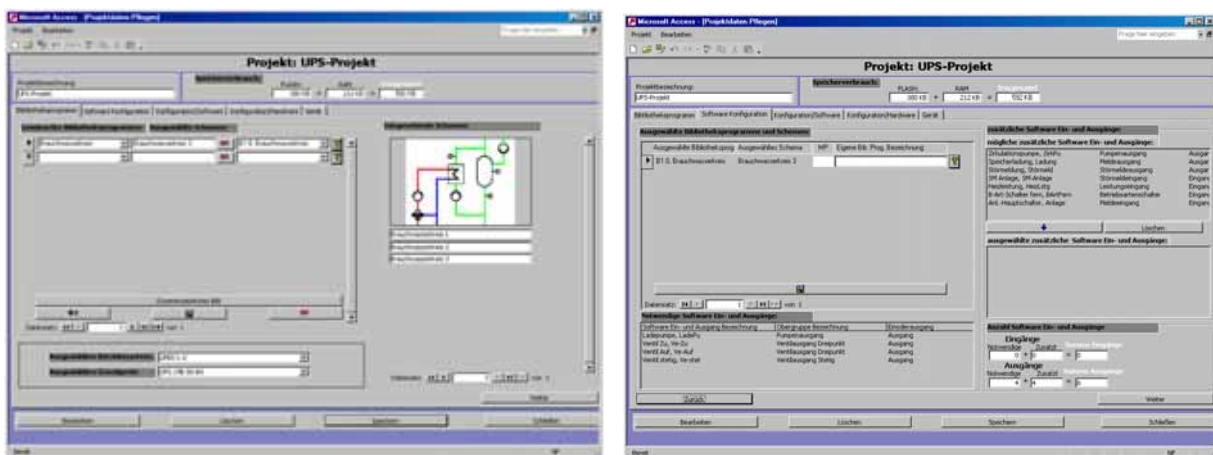
With UPK select you have an easy to operate tool to select the right compact controller from the controller system unit PLUS compact. The easy menu dialog will guide you through the process. At the end you will not only have the right controller but also a list of all the other components you need for your system like sensors, remote control units etc. In addition you have the possibility to choose the functions you want to activate and the program will give you a initialisation file, which, if downloaded into your controller, will automatically configure the controller. This will help you with the initial installation and reduce the time on the site.



9.1.2 UPS select

UPS select goes even further than UPK select. Here you have the possibility to choose single plant parts like a heating circuit, a boiler, a ventilation unit etc. This will lead to an individual controller, especially designed for your kind of plant.

In the end you not only have a specification for the controller, but also a list for the additional components, a configuration file for the selected Hardware and a configuration file for the functions of each part of your system.



Both Tools can be ordered from R+S (without any costs) or can be downloaded from our web site.

9.2 How to select the right valve

9.2.1 In General

The task of a control element is to transfer the control value into your system by manipulating the mass flow (volume flow) or energy flow. They form the interface between the controller and controlled system. In general the control element in the area of building services, energy and environmental engineering is displayed as a valve in connection with a motor. The unit, consisting of a valve and a motor is called actuator.

The motor receives his signal directly or indirectly from the controller and influences the entire controlled system directly through its runtime performance. The motor therefore is a component of the control equipment,. The valve although is a component of the control system, because it transforms the control value y into a mass flow or energy flow in the control circuit.

Because of the direct influence of the valve into the controlled system it influences directly the behaviour of the closed-loop control system. The transfer behaviour of the valve is determined by the "characteristic curve" of the valve. In order to receive a controlled system as simple as possible you have to transfer the complex reciprocal actions of individual parts of the control circuit in such a way, that you receive a linear relationship between the controlled value x and the manipulated variable y . Therefore the valve should never be looked at separately, but always in connection with the whole system and the components used in it.

In our experience most of the time an erroneous dimensioned valve is the reason for an insufficient working closed-loop control systems.

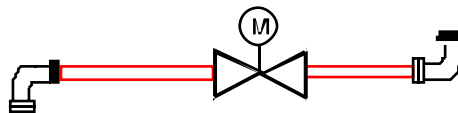
On the following pages you will find a description and explanation of the basic terms and parameters used to select/design the right valve for your control system.

9.2.2 Basic terms for the selection/design of the control valve (control element)

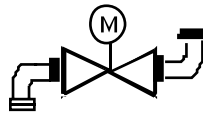
The width between the connecting pipes should correspond to the width of the connections of the control valve. In order to minimise arising noises you should make sure, that current-unfavourable components are not installed immediately in front of the control valve.

9.2.2.1 Connecting Pipe DN (diameter)

Example of current-favourable mounting (minimum 15 ... 20 x DN (pipe diameter) in front and after the valve).



Example of current-unfavourable mounting



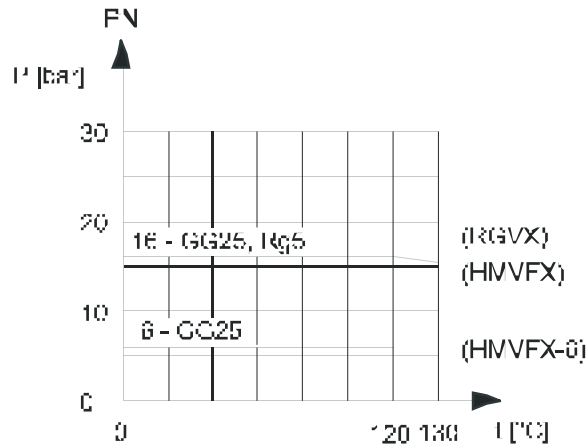
9.2.2.2 Nominal Pressure PN

PN is the maximum overpressure for which a valve is usable. For ferrous materials it corresponds with the maximum working pressure in the temperature range of -10 C. 120 C.

To standardize the calculation, we assume the same pressure for all the components (valves, pipes, fittings etc.) in the control circuit.

9.2.2.3 Operating Pressure P_B

The operating pressure is the maximum pressure that occurs in the valve during operation. According to DIN 2401 the operating pressure depends on the temperature of the medium in the valve (fluid, gas etc.) and the material of the valve.



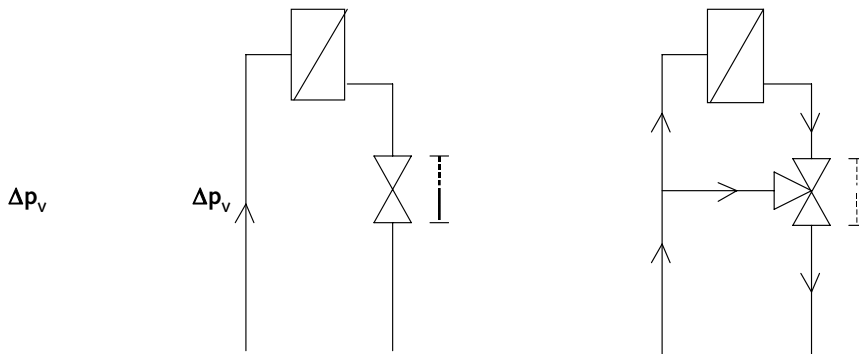
9.2.2.4 Pressure Difference Δp_v

The pressure difference Δp_v is the pressure drop occurring when the valve is completely open (lift=100%).

CAUTION: For reasons of noise prevention and to prevent damage to the valve it could be necessary to limit the lift.

2-way valve

3-way-valve



9.2.2.5 Closing Pressure p_s

The closing pressure is the biggest permissible pressure difference, were the actuator closes and opens the valve in consideration of the permissible leakage volumetric flow. The closing pressure is directly dependent on the flow diameter and the mechanical power in the valve body as well as the necessary clamping force. You can find the information for the maximum closing pressure for each R+S valve in the technical data sheets in the R+S catalog.

9.2.2.6 Leak Rate

The leak rate is the amount of the medium, that will flow through the valve, when the valve is completely closed with the necessary clamping force. The definition of the maximum leak rate is carried out according to two different procedures:

- DIN EN 1349 (IEC 534 T4)
- DIN 3230, T3

The indicated leak rate according to the technical data sheets are only valid if the necessary clamping force is applied.

The following table shows a summary of the organisation of the controlling valves in dependence of the maximally permissible leak rate.



| procedure | Class | max. leakage volumetric flow |
|--------------------------|----------------------------|---|
| DIN 3230, T3 | Leak Rate 1 (dosing tight) | 0 mm ³ /min. |
| | Leak Rate 2 (moist) | 100 mm ³ /min |
| | Leak Rate 3 (dripping) | 500-1000 mm ³ /min |
| DIN EN 1349 (IEC 534 T4) | II | 0,005 x kvs-value (= 0,5 % before kvs-value) |
| | III | 0,001 x kvs-value (= 0,1 % before kvs-value) |
| | IV | 0,0001 x kvs-value (= 0,01 % before kvs-value) |
| | IV-S1 | 5x10 ⁻⁶ x kvs-value (= 0,0005 % before kvs-value) |
| | IV-S2 | 0,001 x kvs-value (= 0,0001 % before kvs-value) |
| | VI | 0,3 x Dp [bar] x f _L * * leakage factor acc. DIN |

9.2.2.7 kv-Value

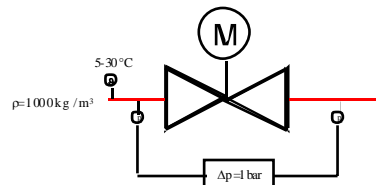
The kv-value is the volumetric flow [m³/h] of water* at 5 to 30 C and an arbitrary continuous lift H which can be measured above the valve with a pressure difference of $\Delta p_0 = 1$ bar (Δp_0). The graphical depiction of the kv-value over the entire range (lift) is the characteristic curve of the valve.

* generally formulated: ... a liquid with the density $\rho = 1000$ kg/m³ and the kinematic viscosity $\nu = 10^{-6}$ m²/s

9.2.2.8 kvs-Value

The kvs-value is the kv-value with a nominal lift H_{100} (= value for a certain valve type from the catalog). The virtually measured maximum flow rate kv_{100} of a specimen of the corresponding valve type may deviate not more than ± 10 % from the indicated kvs-value.

Parameter for the definition of kv/ kvs- value of a valve

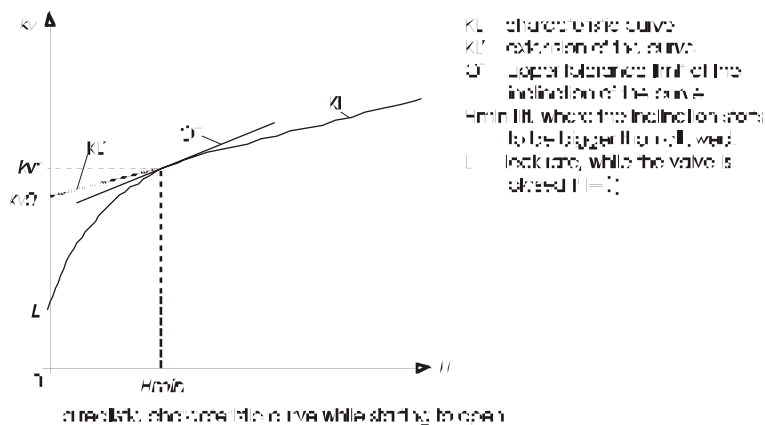


9.2.2.9 Inclination tolerance

The actual inclination of the characteristic curve may deviate over a big range (at least between H_{100} to H_{10}) not more than ± 30 % of the inclination given by producer and shown in the catalogue of the indicated basic form of the characteristic.

9.2.2.10 kvr-Value

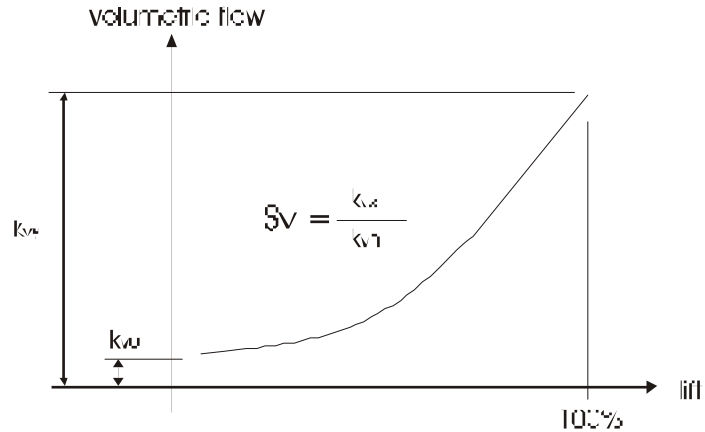
The kvr-value is the smallest kv-value at which the inclination tolerance of the characteristic curve is maintained.



9.2.2.11 Positioning Ratio Sv

The positioning ratio S_v is the maximal controllable range in comparison to the maximal flow of a valve. (The ratio between the k_{vs} -value and the k_{v1} -value)

The k_{v1} -value and the positioning ratio S_v are therefore the decisive characteristics for the evaluation of the controllable range of a valve.



9.2.2.12 Characteristic Curve

In general we assume, that the characteristic curve is the dependence between the k_v -value and the lift. To get a homogeneous representation of the parameters both are indicated as relative values [%]. There are two forms of the characteristic curve that nowadays are used as a standard:

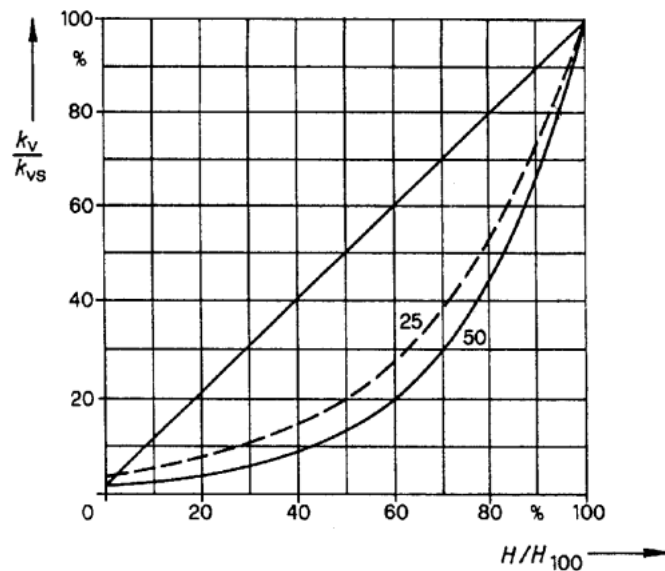
- Inverse equal percentage and
- Linear

The inclination tolerance has to be maintained according to the definition.

Linear characteristic curve - similar changes in the lift will lead to the same changes of the k_v -value.

Inverse equal percentage curve - similar changes in the lift will lead to similar percentage changes of the k_v -value

linear characteristic curve and inverse equal percentage curve with $S_v = 25$ and/or 50



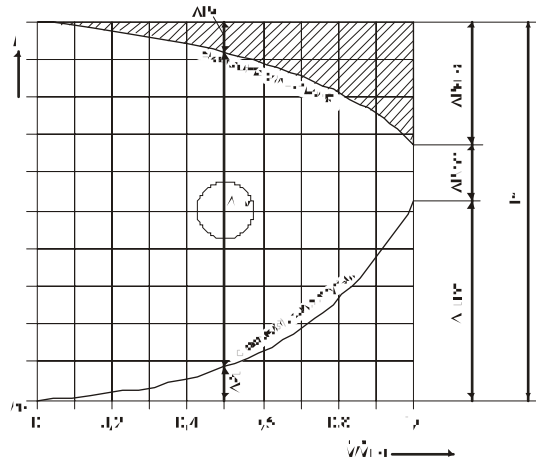
9.2.2.13 Basic Characteristic Curve

The basic characteristic curve shows the connection between lift and volumetric flow with a constant pressure drop of 1 bar (Δp) over the entire control range. It is assumed that the medium is water.

9.2.2.14 Operating Characteristic Curve

The operating characteristic curve shows the connection between lift and volumetric flow in operating conditions: valve installed in a system with medium flowing and all necessary components (pump, heat provider, pipes, heat consumer, valves, actuators etc). The pressure drop at the valve is only partially responsible for the pressure drop in the system. The pressure drop is therefore not constant.

Pressure in comparison to the change of flow



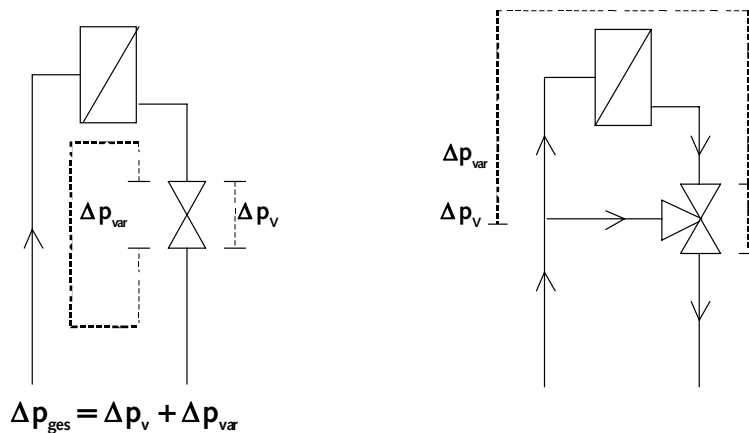
The system of measurement for the deviation between the operating characteristic curve and the basic characteristic curve is called valve authority P_v .

9.2.2.15 Valve authority P_v (or a_v)

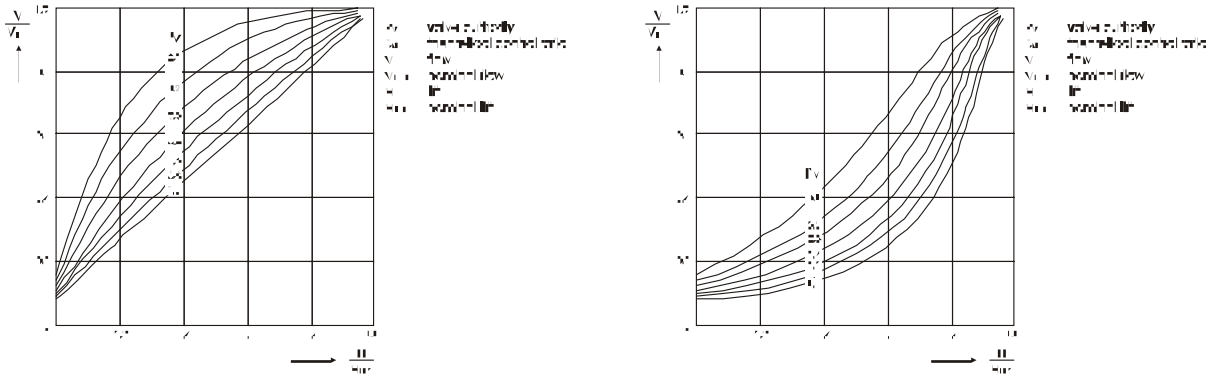
The pressure drop ΔP_{v100} at the open valve in comparison to the pressure drop of the system is called valve authority P_v or a_v . You can calculate the valve authority with the ratio between the pressure drop at the valve and the pressure drop in the whole system. The pressure on the system is the sum of the pressure drop at the completely opened valve (lift $H=100$) and the pressure drop at the pipe section with a design volumetric flow $V = 100\%$.

2-way-valve

3-way-valve

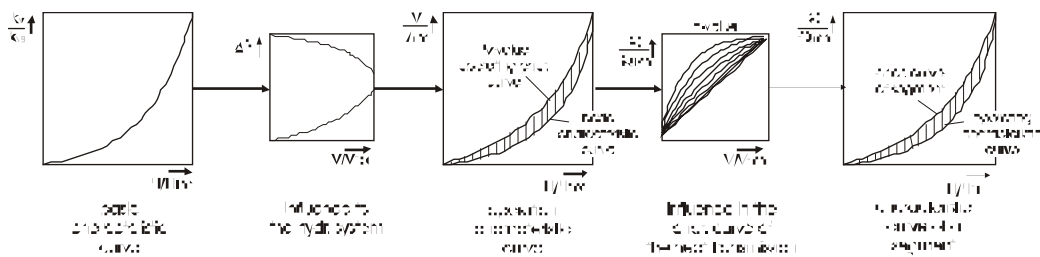


9.2.2.16 Influence on operating characteristic curves



Operating char. curve with a linear basic char. curve and $S_{v0}=25$ Operating char. curve with an inverse equal percentage basic char. curve and $S_{v0}=25$

9.2.2.17 Origin of a company and route characteristic



9.2.3 Formula Survey

9.2.3.1 Liquids

maximum volumetric flow maximum mass flow

$$\dot{V}_{100} = \frac{\dot{Q}_N}{c \times \Delta t \times \rho}$$

$$\dot{m}_{100} = \frac{\dot{Q}_N}{c \times \Delta t}$$

Determination of the pressure drop (\leftrightarrow valve authority)

$$\Delta p_V = \Delta p_{V,100}$$

$$P_V = \frac{\Delta p_{V,100}}{\Delta p_{V,Ges}} \geq 0,5$$

Calculation of the k_{vs} - value

In general

simplified for the medium water

$$k_{VS} = \dot{V}_{100} \times \sqrt{\frac{\Delta p_0 \times \rho}{\Delta p_{V,100} \times \rho_0}}$$

$$k_{VS} = \dot{V} \times \sqrt{\frac{1}{\Delta p_V}} = \frac{\dot{V}}{\sqrt{\Delta p_V}}$$

Calculation of an arbitrary K_V - value

$$k_V = \frac{\dot{V}}{31,6} \times \sqrt{\frac{\rho}{\Delta p_V}}$$

k_V - value parallel

k_V - value parallel

$$k_{VS,ges} = \frac{k_{V1} \times k_{V2}}{\sqrt{k_{V1}^2 + k_{V2}^2}}$$

$$k_{V,ges} = k_{V1} + k_{V2}$$



Pressure difference with the help of the kvs- value

In general

simplified for water medium

$$\Delta p_{V, crit} = \frac{\Delta p_0 \times p}{p_0} \times \left(\frac{\dot{V}}{k_{VS}} \right)^2 \qquad \Delta p_{V, crit} = \Delta p_0 \times \left(\frac{\dot{V}}{k_{VS}} \right)^2$$

9.2.3.2 Steam and Gases

$$\Delta p_{critical} = 0,5 \times p_1 \quad \{p_1 = \text{abs. pressure before the valve}\}$$

Calculation of the kvs- Worth

uncritical operation

critical/hypercritical operation

$$k_{VS} = \frac{\dot{m}}{22,4 \times \sqrt{\Delta p_V \times p_2}} \qquad k_{VS} = \frac{2 \times \dot{m}}{22,4 \times p_1}$$

- pressure p₂ = pressure after the valve - dependently on the system process, for example
- absolute pressure
- condensation pressure (mostly given by the temperature of a secondary medium)
- controlled pressure in a downstream distributor

maximum mass flow

$$\dot{m} = \frac{Q}{r} \quad \begin{matrix} r = \text{heat of evaporation (see VDI vapour table)} \\ r = h'' - h' \text{ (heat content steam - heat content condensate)} \end{matrix}$$

uncritical operation

critical/hypercritical operation

$$\dot{m} = 22,4 \times k_{VS} \times \sqrt{\Delta p_V \times p_2} \qquad \dot{m} = 22,4 \times k_{VS} \times \frac{p_1}{2}$$

To minimize noises and wear we recommend an advisory speed not higher than given in the following table and to keep the speed constant. Due to the expansion this will lead to an enlargement of the tube diameter after the valve.

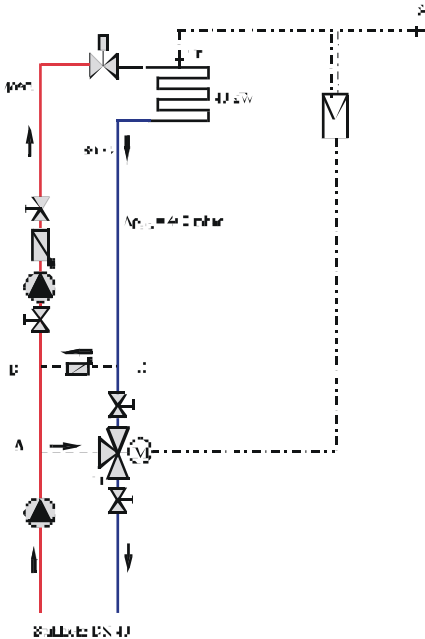
| medium | | speed [m/s] |
|-------------------|---------|-------------|
| saturated steam | | 20 - 40 m/s |
| superheated steam | ≤ PN 40 | 40 - 50 m/s |
| | > PN 40 | 50 - 80 m/s |

Continuing we refer to the supporting R+S dimension aids.



9.2.4 Dimensioning example

Hydraulic 3-way-valve in an underfloor heating circuit



$$\dot{V}_{100} = \frac{40 \text{ kW}}{4,18 \frac{\text{kJ}}{\text{kg} \times \text{K}} \times (40-30) \text{ K} \times 994 \frac{\text{kg}}{\text{m}^3}} \times 3600 \frac{\text{s}}{\text{h}} = 3,466 \frac{\text{m}^3}{\text{h}}$$

$$\rightarrow v \approx 0,8 \frac{\text{m}}{\text{s}}$$

selected: $P_V = \frac{\Delta p_{V100}}{\Delta p_{V Ges}} \geq 0,5$

$$\Delta p_{Ges} = \Delta p_V + \Delta p_{var} = \Delta p_V + \Delta p_{AB} + \Delta p_{CD}$$

$$\rightarrow \Delta p_V = \Delta p_{var}$$

$$R_{DN40} \approx 180 \frac{\text{Pa}}{\text{m}}$$

$$\Delta p_{var} = 2 \times 2 \text{ m} \times 180 \frac{\text{Pa}}{\text{m}} = 720 \text{ Pa} = 7,2 \text{ mbar}$$

kvs- value: $k_{VS} = 3,466 \frac{\text{m}^3}{\text{h}} \times \sqrt{\frac{1}{0,0072 \text{ bar}}} = 40,8 \frac{\text{m}^3}{\text{h}}$

→ kvs- value too large → selection is too big (oversized) (= DN 50)
Recommendation: choose biggest Kvs- value of the dimension of the pipe

Selected: DN 40; kvs - Value = 25

real pressure drop at the chosen valve

$$\Delta p_V = \left(\frac{3,466 \frac{\text{m}^3}{\text{h}}}{25 \frac{\text{m}^3}{\text{h}}} \right)^2 = 0,01922 \text{ bar}$$

Pressure drop in the system $\Delta p_{Ges} = \Delta p_V + \Delta p_{var} = 1922 \text{ Pa} + 720 \text{ Pa} = 2642 \text{ Pa}$

Valve authority

$$P_V = \frac{\Delta p_{V100}}{\Delta p_{V Ges}} \geq 0,5$$

→ $P_V = 0,73$; positive influence on the control characteristic of the underfloor heating
The suitable actuators can be found in the technical data sheets for the R+S valves or in the price list (24V or 230V, with or without return potentiometer, with or without additional switches).

Selected: HM 2090 X SR/24 (max. pressure 4,6 bar)

9.2.5 Dimensioning example with R+S valve slide ruler

Medium: Water

Volumetric flow and nominal size (inside diameter)

Set heat flow Q (scale 2, 3 or 4) to the corresponding temperature difference Δt (scale 1) and read V volumetric flow (Scale 5) at the arrow. In the same position of the ruler you can read the nominal size DN at (scale 7) in connection with the flow velocity (speed) v (scale 6). $Q = 70$ kilowatts

$$\Delta t = 20 \text{ K } V = 3 \text{ m}^3/\text{h}$$

$$v = \text{of } 1,7 \text{ m/s } DN = 25 \text{ chosen}$$

kv-value

Don't change the upper part of the ruler. Set the lower part of the ruler with the density ρ (scale 10) in the same position as the pressure drop at the valve Δp (scales 8 or 9). Now you can read the **kv-value** (scale 11) at the arrow.

Select valve (scales 12 to 15).

$$\Delta p = 0,090 \text{ bar}$$

$$\rho = 1 \text{ kg/dm}^3$$

$$V = 3 \text{ m}^3/\text{h } kvs = 10 \text{ m}^3/\text{h}$$

Advice: The calculation of the volumetric flow V from Q and Δt is valid only for water. The calculation of the **kv-value** and DN is valid for all liquids

Medium: Steam

Mass Flow for saturated steam

Set heat capacity Q (scales 15, 16, 17) on the arrow and read the mass flow (scale 14) at the scale for the saturated steam pressure (scale 13) or the scale for saturated steam temperature (scale 12).

$$Q = 132 \text{ kilowatts}$$

$$t_{\text{satd.}} = 135 \text{ C}$$

$$p_{\text{satd.}} = 3,2 \text{ bar, abs. } m = 0,22 \text{ t/h}$$

Nominal size for output

Saturated steam

Set mass flow m (Scale 8) to the position of the pressure after the valve $p_2 = p_1 \cdot \Delta p$ (scale 9). Read the nominal size for the output DN (Scale 10) at the position for the flow velocity v (scale 11).

$$p_{1=} 3,2 \text{ bar, abs. } \Delta p = 0,2 \text{ bar}$$

$$p_{\text{satd.}} = p_2 = 3 \text{ bar, abs}$$

$$m = 0,22 \text{ t/h}$$

$$v = \text{of } 30 \text{ m/s } DN = 40 \text{ chosen}$$

(for the nominal size for the input use the value used in the formular)

Superheated steam

Set the operating temperature t (scale 6) to the position of the pressure after the valve $p_2 = p_1 \cdot \Delta p$ (scale 9) and read the density ρ at scale 7. Set the mass flow m (Scale 8) to the position of the density ρ and read the nominal size DN (scale 10) at the position of the flow velocity v (Scale 11).

$$t = 300 \text{ C}$$

$$p_2 = 3 \text{ bar, abs. } \rho = \text{of } 1,12 \text{ kg/cubic m}^{\text{re}}$$

$$m = 0,26 \text{ t/h}$$

$$v = \text{of } 50 \text{ m/s } DN = 40 \text{ chosen}$$

(for the nominal size for the input use the value used in the formular)

kv-value

Saturated vapour

Set the mass flow m (Scale 4) onto the pressure after the valve $p_{\text{satd.}} = p_1 \cdot \Delta p$ (Scale 3) set. Read the **kv-value** at the position of Δp (Scale 1).

$$m = 0,22 \text{ t/h}$$

$$p_{1=} 3,2 \text{ bar, abs}$$

$$p_{2=} 3 \text{ bar, abs}$$

$$\Delta p = 0,2 \text{ bar } kv = 12 \text{ m}^3/\text{h}$$

$$kvs = 12,5 \text{ m}^3/\text{h selected}$$

Superheated steam

Use the diagram for superheated steam. Set the operating temperature t (scale 6) to the position of the pressure after the valve $p_2 = p_1 \cdot \Delta p$ and read the density ρ (scale 5). Set the mass flow m (scale 4) to the position of the density ρ (Scale 5) and read the **kv-value** (scale 2) at the position Δp (scale 1).

$$p_{1=} 3,25 \text{ bar, abs}$$

$$p_{2=} 3 \text{ bar, abs}$$

$$t = 300 \text{ C } \rho = \text{of } 1,12 \text{ kg/m}^3$$

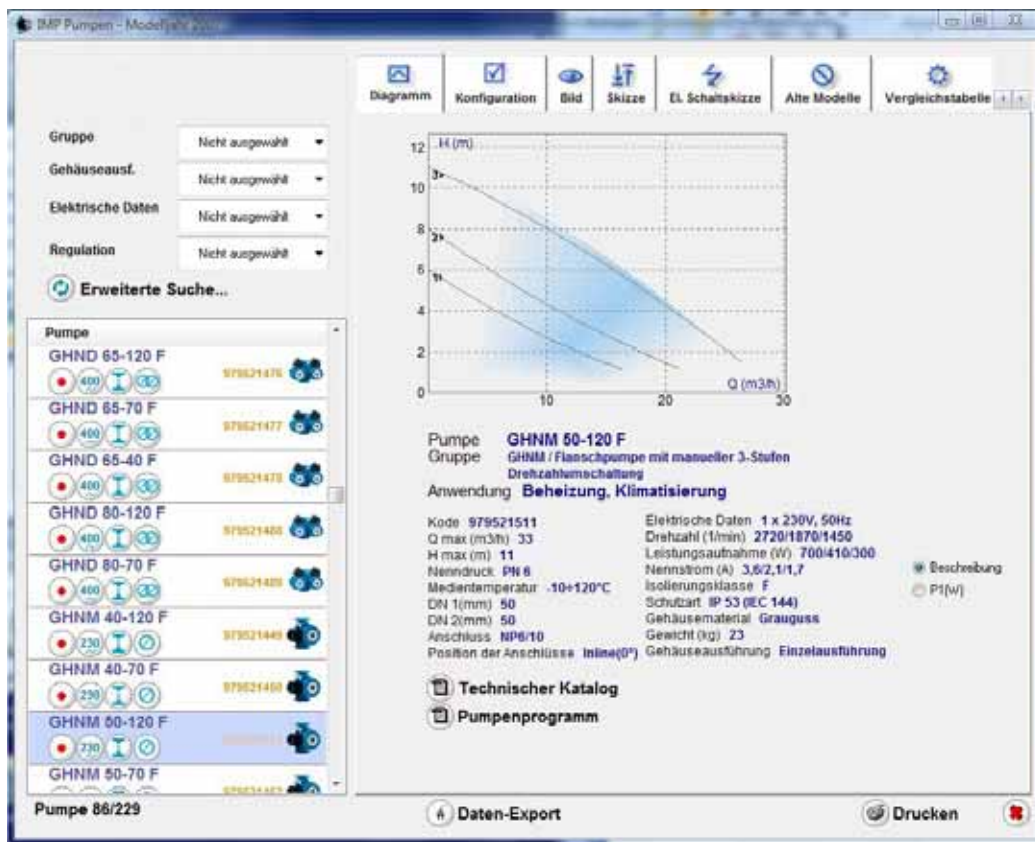
$$m = 0,26 \text{ t/h}$$

$$\Delta p = 0,25 \text{ kv} = 15,4 \text{ m}^3/\text{h} \quad kvs = 16 \text{ m}^3/\text{h selected}$$

Advice: You can find the Standard values for the flow velocity v (m/s) on the ruler.

9.3 How to select the right pump

R+S offers a program for the quick selection of the right pump. You can download the program or contact R+S to send the program **PUMP select**.



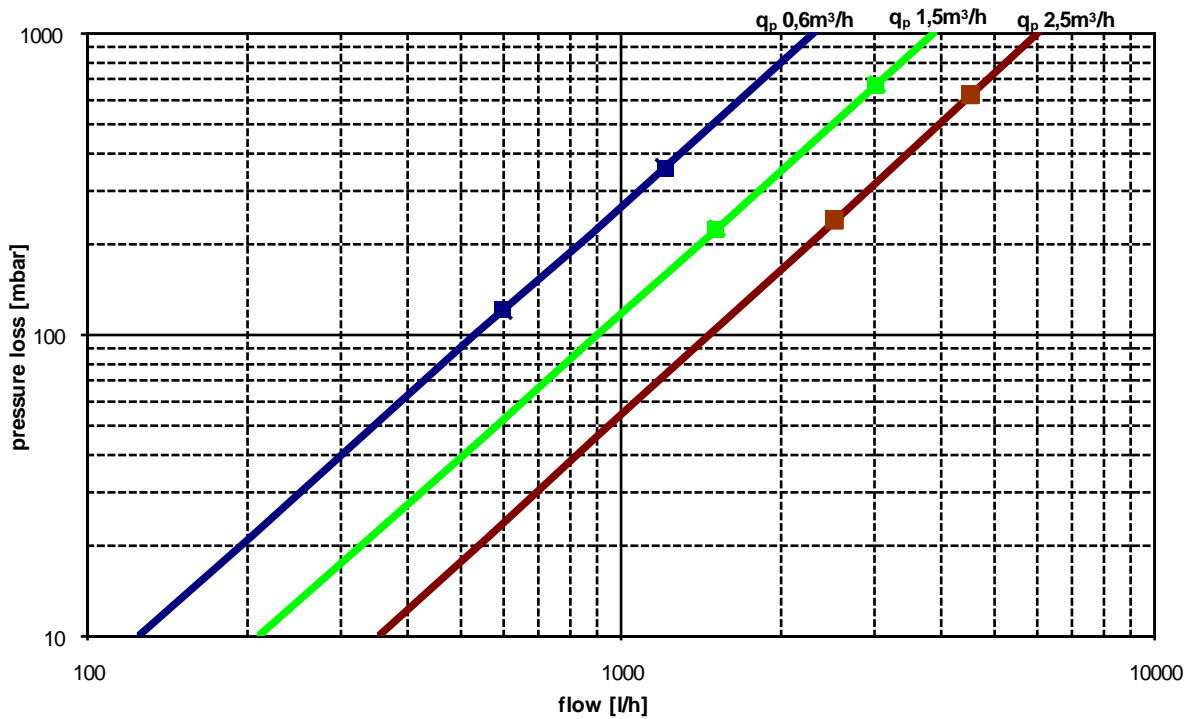
The program consists of a calculation program with diagrams and pictures for each pump. You will also find a quick comparing list with pumps of other manufacturers.

9.4 How to select the right heat meter

9.4.1 Selection table for Heat Meter, Compact-Heat Meter heat STAR 2/2+

| Clumetric flow at Q1 bar pressure loss | measuring unit | Meter Type | installation | Nominal value q_p [m ³ /h] | pressure stage | Connection thread | Pipe thread | nominal size | length [mm] | Smallest flow q_1 [l/h] | length of pocket |
|--|----------------|------------|--------------|---|----------------|-------------------|-------------|--------------|-------------|---------------------------|------------------|
| 0,50 m ³ /h | heat STAR 2+ | QS | H/V | 0,6 | PN16 | G3/4B | R1/2 | DN15 | 110 | 6 | 45 |
| 0,90 m ³ /h | heat STAR 2+ | QS | H/V | 1,5 | PN16 | G3/4B | R1/2 | DN15 | 110 | 15 | 45 |
| 1,50 m ³ /h | heat STAR 2+ | QS | H/V | 2,5 | PN16 | G1B | R3/4 | DN20 | 130 | 25 | 45 |

pressure loss curve QS

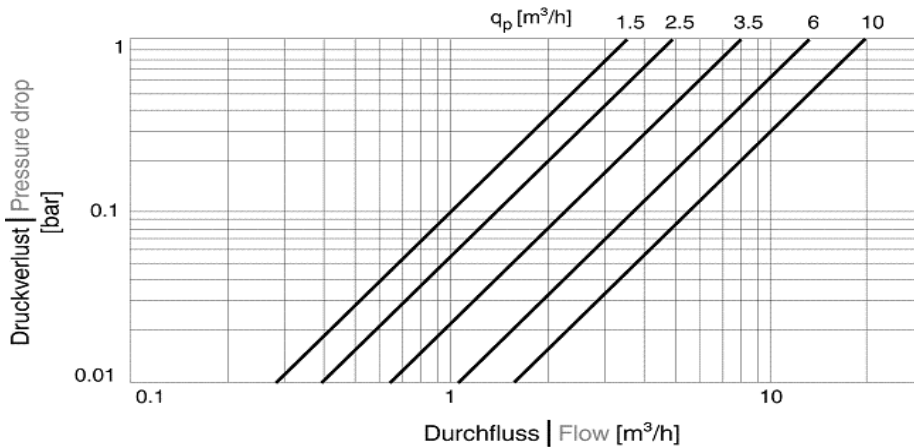


9.4.2

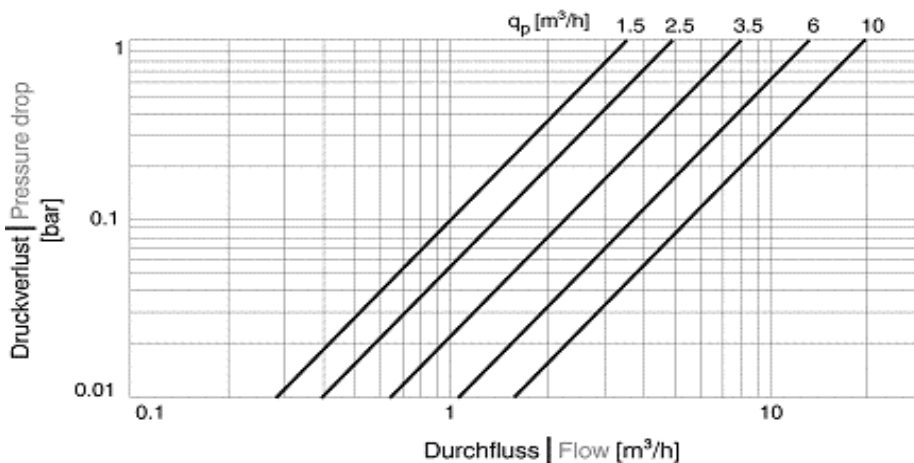
Table for Heat Meter heat STAR 1, q_p 3,5 up to 10 m³/h

| Flow at 0,1 bar pressure loss | measuring unit | Type Volumetric flow | installation | Nominal size q_p [m ³ /h] | pressure stage | connector | Pipe connector | nominal size | length [mm] | Minimal flow q_i [m ³ /h] | Value of pulse [l/imp] | length pocket [mm] |
|-------------------------------|----------------|----------------------|--------------|--|----------------|-----------|----------------|--------------|-------------|--|------------------------|--------------------|
| 2,2 m ³ /h | Heat STAR 1 | WV | H | 3,5 | PN16 | G5/4B | R1 | DN25 | 260 | 0,07 | 10 | 85 |
| 2,2 m ³ /h | Heat STAR 1 | WFL | H | 3,5 | PN16 | flange | - | DN25 | 260 | 0,07 | 10 | 85 |
| 2,2 m ³ /h | Heat STAR 1 | FV | Fallrohr | 3,5 | PN16 | G5/4B | R1 | DN25 | 150 | 0,07 | 10 | 85 |
| 2,2 m ³ /h | Heat STAR 1 | SV | Steigrohr | 3,5 | PN16 | G5/4B | R1 | DN25 | 150 | 0,07 | 10 | 85 |
| 3,8 m ³ /h | Heat STAR 1 | WV | H | 6 | PN16 | G5/4B | R1 | DN25 | 260 | 0,09 | 10 | 85 |
| 3,8 m ³ /h | Heat STAR 1 | WFL | H | 6 | PN16 | flange | - | DN25 | 260 | 0,09 | 10 | 85 |
| 3,8 m ³ /h | Heat STAR 1 | FV | Fallrohr | 6 | PN16 | G5/4B | R1 | DN25 | 150 | 0,09 | 10 | 85 |
| 3,8 m ³ /h | Heat STAR 1 | SV | Steigrohr | 6 | PN16 | G5/4B | R1 | DN25 | 150 | 0,09 | 10 | 85 |
| 6,3 m ³ /h | Heat STAR 1 | WV | H | 10 | PN16 | G2B | R1 1/2 | DN40 | 300 | 0,16 | 10 | 85 |
| 6,3 m ³ /h | Heat STAR 1 | WFL | H | 10 | PN16 | flange | - | DN40 | 300 | 0,16 | 10 | 85 |
| 6,3 m ³ /h | Heat STAR 1 | FV | Fallrohr | 10 | PN16 | G2B | R1 1/2 | DN40 | 200 | 0,16 | 10 | 85 |
| 6,3 m ³ /h | Heat STAR 1 | SV | Steigrohr | 10 | PN16 | G2B | R1 1/2 | DN40 | 200 | 0,16 | 10 | 85 |

Druckverlustkurve Mehrstrahlflügelradzähler für Steig- bzw. Fallrohrleitung MTH-SV/-FV



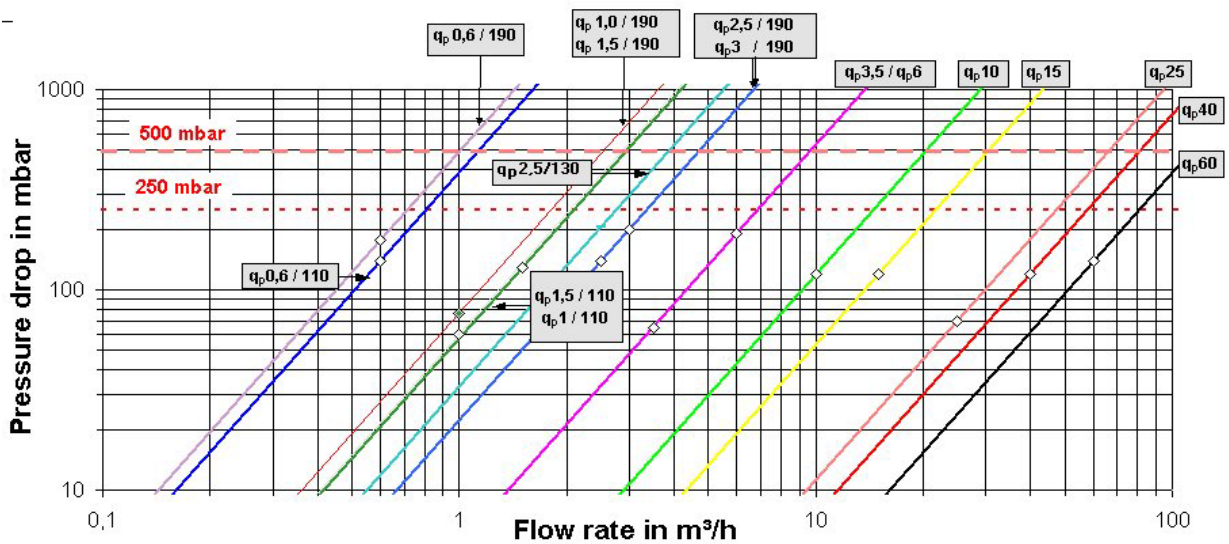
Druckverlustkurve Mehrstrahlflügelradzähler für wagerechte Rohrleitung MTH-WV/-WFL



9.4.3 Table for Heat Meter heat STAR 1, q_p 15 up to 150 m³/h

| Pressure loss [bar] at q_p | measuring unit | Type Volumetric flow unit | installation | Nominal size q_p [m ³ /h] | pressure stage | connection | Pipe connection | nominal size DN | length | Minimal flow q [m ³ /h] | value of pulse [l/Imp] | length pocket [mm] |
|------------------------------|----------------|---------------------------|--------------|--|----------------|------------|-----------------|-----------------|--------|--------------------------------------|------------------------|--------------------|
| 0,20 | Heat STAR 1 | Ultra Sonic | H/V | 0,6 | PN16 | G3/4B | R1/2 | 15 | 110 | 0,2 | 1 | 38 |
| 0,20 | Heat STAR 1 | Ultra Sonic | H/V | 1,5 | PN16 | G3/4B | R1/2 | 15 | 110 | 0,6 | 1 | 38 |
| 0,20 | Heat STAR 1 | Ultra Sonic | H/V | 2,5 | PN16 | G1B | R3/4 | 20 | 130 | 0,2 | 1 | 38 |
| 0,10 | Heat STAR 1 | Ultra Sonic | H/V | 3,5 | PN16 | G5/4B | R1 | 25 | 260 | 1,6 | 10 | 85 |
| 0,10 | Heat STAR 1 | Ultra Sonic | H/V | 6 | PN16 | G5/4B | R1 | 25 | 260 | 0,3 | 10 | 85 |
| 0,05 | Heat STAR 1 | Ultra Sonic | H/V | 10 | PN16 | G2B | R3/2 | 40 | 300 | 1,6 | 10 | 85 |
| 0,07 | Heat STAR 1 | Ultra Sonic | H/V | 15 | PN25 | flange | - | 50 | 270 | 0,4 | 100 | 120 |
| 0,07 | Heat STAR 1 | Ultra Sonic | H/V | 25 | PN25 | flange | - | 65 | 300 | 2 | 100 | 120 |
| 0,10 | Heat STAR 1 | Ultra Sonic | H/V | 40 | PN25 | flange | - | 80 | 300 | 3 | 100 | 120 |
| 0,15 | Heat STAR 1 | Ultra Sonic | H/V | 60 | PN25 | flange | - | 100 | 360 | 4,5 | 100 | 120 |

pressure losskurve



Sale, delivery and other rightful business are subject to the following terms. All agreements must be confirmed in writing by R+S (Seller). Also if no confirmation in writing has been given, it will not affect in any way the following conditions and terms listed below.

Buyer's purchase terms and conditions: Any purchase terms and conditions of the buyer are hereby not accepted. They are also not accepted by the Seller if these terms and conditions are not particularly refused by the Seller. At the latest with the acceptance of the merchandise and/or service the Buyer accepts terms and conditions of the Seller. Any alterations of single terms will not affect the validity of the others.

The non-acceptance of the conditions, especially the delay of payment by the Buyer, reserves the right of the Seller to withhold delivery or services until Buyer accepts terms and conditions to the full extent.

1. Offer, Orders, Quotations and other Agreements

Orders are only considered accepted after Seller has confirmed them in writing. With the confirmation of order by Seller only the terms and conditions by the Seller are valid.

All other agreements or terms and conditions must be confirmed in writing by Seller. With the acceptance of the confirmation of order by the Seller, the Buyer accepts terms and conditions by the Seller. Once orders have been received and confirmed by Seller, the orders are binding. After the Seller has received the order by the Buyer and confirmed the order, the Seller reserves the right of modifications of the products.

2. Right of withdrawal of Seller and claim of indemnification by Buyer.

Due to circumstances of *force majeure* the Seller has the right to partly or entirely reject the order. This can be war, strike, political unrest, national disasters, hindrance of transport, difficulty to obtain production-components, restrictions, prohibitions, priorities or allocations imposed or actions taken by a governmental authority, sabotage, fire theft and vandalism, etc.

Seller will only be liable in case of gross negligence on his part, and deliberate intent. In this case Buyer has the right of indemnification. If Seller rejects an order the Buyer has to be informed immediately. When after the confirmation of the order there should be negative changes in the economical situation of the Buyer, the Seller has the right to reject the order or request advanced payment. If Seller agrees to deliver an order of Buyer on call, Seller has the right to terminate the on-call order after 6 months and send the produced merchandise and invoice to Buyer.

3. Order Delivery Time and Delay.

Given dates of delivery by Seller are only approximate and not binding. Seller has the right to exceed given dates of delivery by 20% or a minimum of one week without being in default. Buyer has the right of indemnification in case of his own delivery difficulties only in case of gross negligence and deliberate intent on part of the Seller.

4. Prices

All prices are stated and payable in Euros (€) and are understood ex works Berlin, do not include packaging customs and insurance, and do not include VAT.

Prices are only valid if confirmed to each order by the Seller. The Seller reserves the right to change prices due to rising costs from salary or material increases. This is only valid when between order and delivery of merchandise and/or service there will be a time-difference of at least 4 months.

With on-call orders of Buyer, the Seller will invoice merchandise with prices valid the day of delivery.

All services, like adjusting control-systems, consultations etc. are subject to price agreements between Buyer and Seller.

All discount rates are negotiated by Buyer and Seller and will depend on quantity and group of merchandise. Seller reserves the right to change discount rates if market-situation calls for it.

All discount rates are calculated on the basis of prices listed in this brochure.

5. Packaging and Delivery

Seller guarantees proper packaging and shipping of merchandise. Seller will choose best way of transport, unless Buyer requests other ways of expedition. All deliveries are not free of charge. This also includes particular and more secure packaging.

Deliveries to other countries will be free up to the German border.

Any other agreement must be negotiated between Buyer and Seller.

6. Risks of delivery

After merchandise has left the factory all risk of mishandling and damaging the goods will be on the side of the Buyer. If insurance is requested by Buyer, insurance cost will be charged to the Buyer unless otherwise agreed.

7. Reclamation

If any delivery of merchandise and/or service does not comply with delivery note and invoice, such as quality and quantity of the delivered goods, Buyer must notify inside of 8 days after reception of the supplies in writing to the Seller.

Any reclamation after 8 days after reception of the goods cannot be taken into consideration by the Seller unless Buyer has ample reason for a delayed reclamation.

After 30 days all reclamations are ruled out, unless the reclamation of the Buyer is a matter of warranty.

8. Warranties

Seller expressly warrants and guarantees to Buyer, or to Buyer's successors, that all merchandise and all service delivered to Buyer will be merchantable and free of defect in design, materials and workmanship for up to 24 months. Within this time, Buyer will be entitled to have the merchandise repaired free of charge. Seller can decide to deliver new merchandise and/or service instead of repair. Seller will bear any costs like packing, handling, shipping and repair of any warranty cases.

Liability for faulty components or material can not be extended further than the liability of the supplier of the components or of the material.

Should the merchandise be improperly handled or manipulated through Buyer or third party, Seller will be relieved of any of its responsibilities or warranties. This concerns in particular faulty wiring, rough handling, chemical influences, force majeure etc.

Any liabilities for follow-up damages caused by merchandise and/or service from Seller are excluded.

If replacement parts under certain circumstances will be free of charge, Buyer is obliged to return damaged part to the Seller.

Seller has developed his software programs to the highest standards of heating-, ventilating- and air-condition-systems. Seller warrants any faulty reproducible software-errors. Should nevertheless reproducible software-errors not be correctable, Seller will try to develop a new program according to a written default-report of Buyer. Should the second software also not be applicable, Buyer has the right to return the DDC-Control-Units including the software free of charge.

Any liability for suitability of software programs except for the agreed technical application of any peripheral programs is excluded. Seller is only liable for programs and peripheral software as agreed and contracted with Buyer. Seller will not be liable for program used in connection with other, not approved programs, which have been changed without agreement from Seller.

Seller is also not liable for data-loss, unless the loss is caused by Seller.

Seller is not liable for free of charge consultations before or after contract confirmation.

9. Seller's Property Reservation

Seller reserves the right to claim property of his merchandise and/or service until Buyer has fulfilled all terms, obligations and conditions agreed upon and confirmed in writing by Seller. Merchandise will remain Seller's property also when Buyer's successor has taken possession of goods until Buyer's fulfillment of all obligations concerning his purchase order.

10. Payments

Payments are due with reception of invoice by Buyer. Payments can be carried out in cash or by bank transfer. All payments will be made in Euro (€) unless otherwise expressly stated in the order. All merchandise and/or service leaving Germany will be invoiced without VAT. VAT must be paid inside the country where goods are delivered. All invoices directed to a German address will include VAT. Payments can be made with a discount of 2 % within 10 days from date of invoice, or full payment within 30 days.

Services must be paid in full under all circumstances and should be paid without delay. If Buyer delays payment after 30 days, Seller has the right to add interest at the rate of 4 % over the current interest rate of the European Central Bank (ECB). All other payment-conditions must be agreed upon and confirmed in writing between Seller and Buyer.

Buyer will bear the cost of any other method of payment that will lead to additional cost to Seller.

11. Return of goods

All returns of goods from Buyer must be agreed upon and confirmed in advance by Seller. Returned goods of Buyer without agreement will not be accepted or shipped back by Seller. Any costs arising from packaging, handling and freight will be charged to the Buyer.

If returned supplies are accepted, Seller will deduct

- 10 % from the credit note of the invoice, if returned good is still in unopened condition and not older than 6 months of invoice-date,
- 15 % from the credit note of the invoice, if returned merchandise is unused but in opened packaging and not older than 6 months of invoice-date.
- Special editions of goods will only be accepted, if the merchandise can be changed into a standard edition and therefore be saleable to other Buyers.
- Goods that have become obsolete or have been replaced by a different Type cannot be accepted.

12. Proprietary rights of Seller

Seller has proprietary rights of all of his products and services, including any patent, trademark and copyright, moral or industrial design right, documentation or misappropriation of trade secret, etc.

Seller will contest any infringement or inducement to infringe of proprietary rights.

If Seller will produce any good according to Buyer's specification, Buyer will have proprietary right on this specification only.

Any Buyer's specification has to be confirmed and itemized by Seller in writing.

13. Jurisdiction and Arbitration

Any dispute regarding the supplies, the order, the validity of the order or any of these terms, or any other matter between the parties, will be resolved by binding arbitration, conducted in the German language and in the city of Berlin, Germany, using a single arbitrator selected by the parties. Arbitration will be under German Law with the Amtsgericht Berlin-Schöneberg being the court of jurisdiction.