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process control  
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# Valves

Catalog 0952



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**Warning, Offer of Sale**

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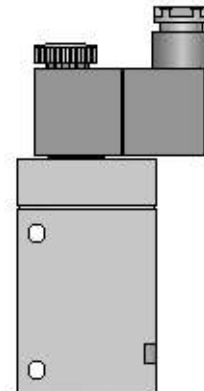
# 3/2-Way Valve 1/8

**Actuation: Solenoid**

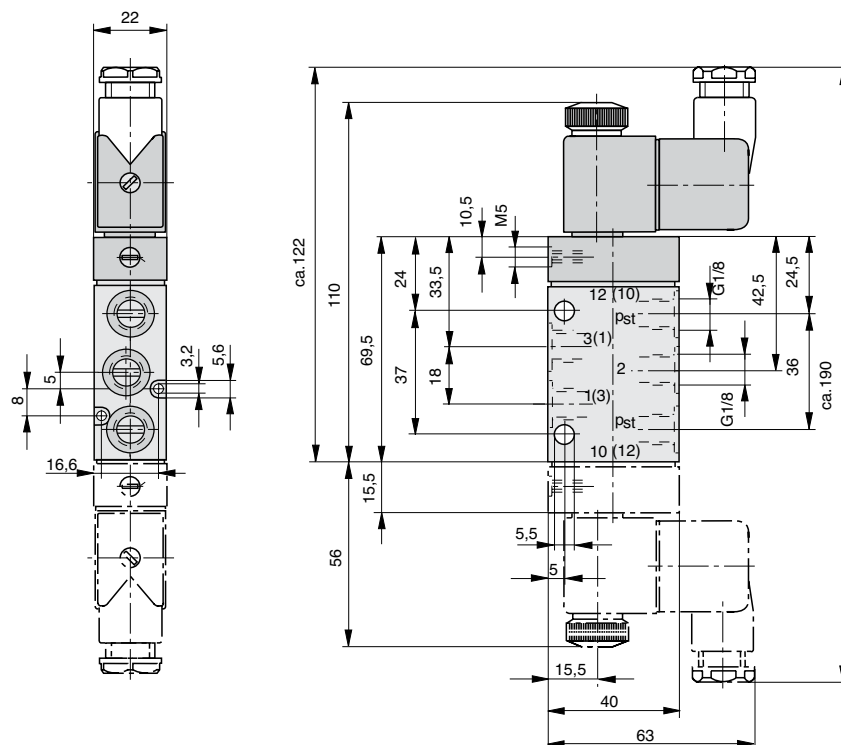
- Single Solenoid
- Double Solenoid

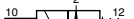
| Characteristics to VDI 3290                   |                                          |            | Pressures quoted as gauge pressure                         |                                                                              |
|-----------------------------------------------|------------------------------------------|------------|------------------------------------------------------------|------------------------------------------------------------------------------|
| Characteristics                               | Symbol                                   | Unit       | Description                                                |                                                                              |
| General Features                              |                                          |            |                                                            |                                                                              |
| Type                                          |                                          |            | Spool valve                                                |                                                                              |
| Mounting                                      |                                          |            | 2 screws M6 (M3)                                           |                                                                              |
| Tube connection                               |                                          |            | Thread                                                     |                                                                              |
| Port size                                     |                                          | NPT (G)    | 1/8                                                        |                                                                              |
| Weight (mass)                                 |                                          | lbs. (kg)  | .54 (0.247) Single solenoid<br>.84 (0.382) Double solenoid |                                                                              |
| Installation                                  |                                          |            | In any position                                            |                                                                              |
| Ambient temperature range                     | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                                      | Note:<br>When using below freezing point it is necessary to consult factory. |
| Medium temperature range                      | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                                      |                                                                              |
| Medium                                        |                                          |            | Filtered compressed air                                    |                                                                              |
| Lubrication                                   |                                          |            | With or without oil mist lubrication <sup>1)</sup>         |                                                                              |
| Pneumatic Characteristics                     |                                          |            |                                                            |                                                                              |
| Nominal pressure                              | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                                     |                                                                              |
| Operating pressure range                      | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | Single solenoid<br>29 (2)<br>145 (10)                      |                                                                              |
|                                               | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | Double solenoid<br>22 (1.5)<br>145 (10)                    |                                                                              |
| Nominal flow                                  | Q <sub>N</sub>                           | Cv (l/min) | .45 (450)                                                  |                                                                              |
| Actuation                                     |                                          |            |                                                            |                                                                              |
| Electrical                                    |                                          |            | Pilot operated                                             |                                                                              |
| Voltage                                       |                                          |            | AC                                                         | DC                                                                           |
| Nominal voltage*<br>Standard version          | U <sub>n</sub>                           | V          | 220                                                        | 24                                                                           |
| Initial power consumption<br>Standard version |                                          | VA (W)     | 8.5                                                        | 2.5                                                                          |
| Continuous consumption<br>Standard version    |                                          | VA (W)     | 6.0                                                        | 2.5                                                                          |
| Duty cycle                                    | ED                                       | %          | Continuous Duty                                            |                                                                              |
| Electrical protection                         |                                          |            | IP65 to DIN 40050 (with plug)                              |                                                                              |
| Insulating material                           |                                          |            | VDE 0580                                                   |                                                                              |
| Connection                                    |                                          |            | Plug to DIN 43650 form B                                   |                                                                              |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448



### Dimensions (mm)



| Version 1/8                       |                                                                                     | Metric Version     |               | NPT Version         |               |
|-----------------------------------|-------------------------------------------------------------------------------------|--------------------|---------------|---------------------|---------------|
| Actuation                         | Symbol                                                                              | Type Number        | Order Number  | Type Number         | Order Number  |
| 3/2 Single Solenoid/Spring Return |  | S9 381RF-1/8-NG-.. | PA 10297-..33 | S9 381RF-1/8U-NG-.. | PD 43295-..33 |
| 3/2 Single Solenoid/Spring Return |  | S9 381RF-1/8-NO-.. | PA 10298-..33 | S9 381RF-1/8U-NO-.. | PD 45459-..33 |
| 3/2 Double Solenoid               |  | S9 381-1/8-..      | PA 10299-..33 | S9 381-1/8U-..      | PD 45460-..33 |

| Voltage Range |            | Coil Number | Order Code |
|---------------|------------|-------------|------------|
| Nominal       | Secondary  |             |            |
| 12 vDC        | --         | KZ 3674     | <b>01</b>  |
| 24 vDC        | 60 50/60Hz | KZ 3673     | <b>02</b>  |
| 110 50/60Hz   | 48 vDC     | KZ 3669     | <b>57</b>  |
| 220 50/60Hz   | 110 vDC    | KZ 3672     | <b>61</b>  |
| 24 50/60Hz    | --         | KZ 3675     | <b>51</b>  |



- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

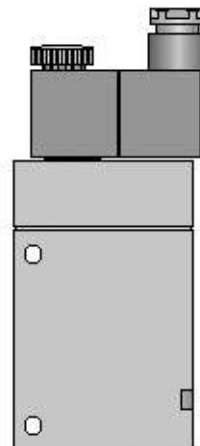
# 3/2-Way Valve 1/4

## Actuation: Solenoid

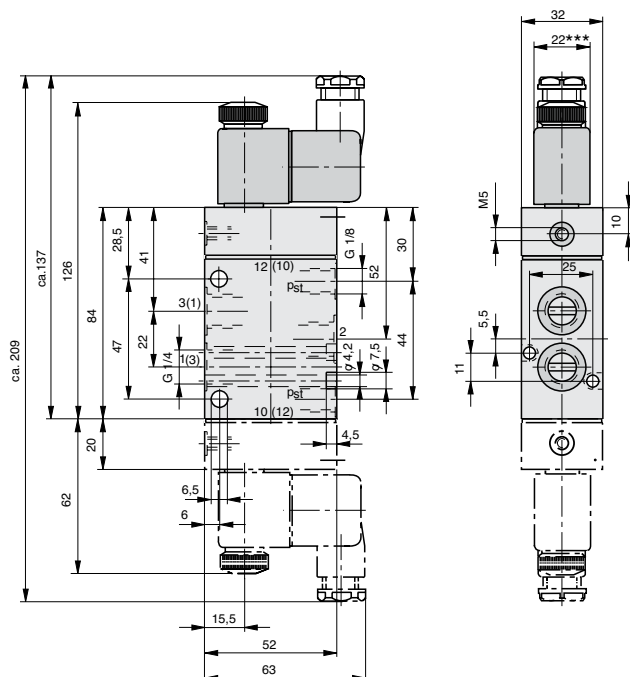
- Single Solenoid
- Double Solenoid

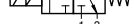
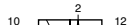
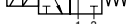
| Characteristics to VDI 3290                   |                                          | Pressures quoted as gauge pressure |                                                         |                                                                              |
|-----------------------------------------------|------------------------------------------|------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------|
| Characteristics                               | Symbol                                   | Unit                               | Description                                             |                                                                              |
| General Features                              |                                          |                                    |                                                         |                                                                              |
| Type                                          |                                          |                                    | Spool valve                                             |                                                                              |
| Mounting                                      |                                          |                                    | 2 screws M6 (M4)                                        |                                                                              |
| Tube connection                               |                                          |                                    | Thread                                                  |                                                                              |
| Port size                                     |                                          | NPT (G)                            | 1/4                                                     |                                                                              |
| Weight (mass)                                 |                                          | lbs. (kg)                          | 1.1 (0.5) Single solenoid<br>1.32 (0.6) Double solenoid |                                                                              |
| Installation                                  |                                          |                                    | In any position                                         |                                                                              |
| Ambient temperature range                     | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)                            | 14 (-10)<br>140 (+60)                                   | Note:<br>When using below freezing point it is necessary to consult factory. |
| Medium temperature range                      | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)                            | 14 (-10)<br>158 (+70)                                   |                                                                              |
| Medium                                        |                                          |                                    | Filtered compressed air                                 |                                                                              |
| Lubrication                                   |                                          |                                    | With or without oil mist lubrication <sup>1)</sup>      |                                                                              |
| Pneumatic Characteristics                     |                                          |                                    |                                                         |                                                                              |
| Nominal pressure                              | p <sub>n</sub>                           | psi (bar)                          | 87 (6)                                                  |                                                                              |
| Operating pressure range                      | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)                          | Single solenoid<br>29 (2)<br>145 (10)                   |                                                                              |
|                                               | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)                          | Double solenoid<br>22 (1.5)<br>145 (10)                 |                                                                              |
| Nominal flow                                  | Q <sub>N</sub>                           | Cv (l/min)                         | 1.3 (1300)                                              |                                                                              |
| Actuation                                     |                                          |                                    |                                                         |                                                                              |
| Electrical                                    |                                          |                                    | Pilot operated                                          |                                                                              |
| Voltage                                       |                                          |                                    | AC                                                      | DC                                                                           |
| Nominal voltage*<br>Standard version          | U <sub>n</sub>                           | V                                  | 220                                                     | 24                                                                           |
| Initial power consumption<br>Standard version |                                          | VA (W)                             | 8.5                                                     | 2.5                                                                          |
| Continuous consumption<br>Standard version    |                                          | VA (W)                             | 6.0                                                     | 2.5                                                                          |
| Duty cycle                                    | ED                                       | %                                  | Continuous Duty                                         |                                                                              |
| Electrical protection                         |                                          |                                    | IP65 to DIN 40050 (with plug)                           |                                                                              |
| Insulating material                           |                                          |                                    | VDE 0580                                                |                                                                              |
| Connection                                    |                                          |                                    | Plug to DIN 43650 form B                                |                                                                              |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448



### Dimensions (mm)



| Version 1/4                       |                                                                                     | Metric Version     |               | NPT Version         |               |
|-----------------------------------|-------------------------------------------------------------------------------------|--------------------|---------------|---------------------|---------------|
| Actuation                         | Symbol                                                                              | Type Number        | Order Number  | Type Number         | Order Number  |
| 3/2 Single Solenoid/Spring Return |  | S9 381RF-1/4-NG-.. | PA 12716-..33 | S9 381RF-1/4U-NG-.. | PD 45461-..33 |
| 3/2 Single Solenoid/Spring Return |  | S9 381RF-1/4-NO-.. | PA 12717-..33 | S9 381RF-1/4U-NO-.. | PD 45462-..33 |
| 3/2 Double Solenoid               |  | S9 381-1/4-..      | PA 12718-..33 | S9 381-1/4U-..      | PD 45463-..33 |

| Voltage Range |            | Coil Number | Order Code |
|---------------|------------|-------------|------------|
| Nominal       | Secondary  |             |            |
| 12 vDC        | --         | KZ 3674     | <b>01</b>  |
| 24 vDC        | 60 50/60Hz | KZ 3673     | <b>02</b>  |
| 110 50/60Hz   | 48 vDC     | KZ 3669     | <b>57</b>  |
| 220 50/60Hz   | 110 vDC    | KZ 3672     | <b>61</b>  |
| 24 50/60Hz    | --         | KZ 3675     | <b>51</b>  |



- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

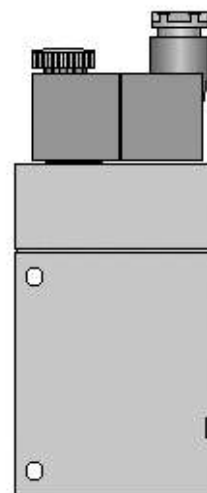
# 3/2-Way Valve 1/2

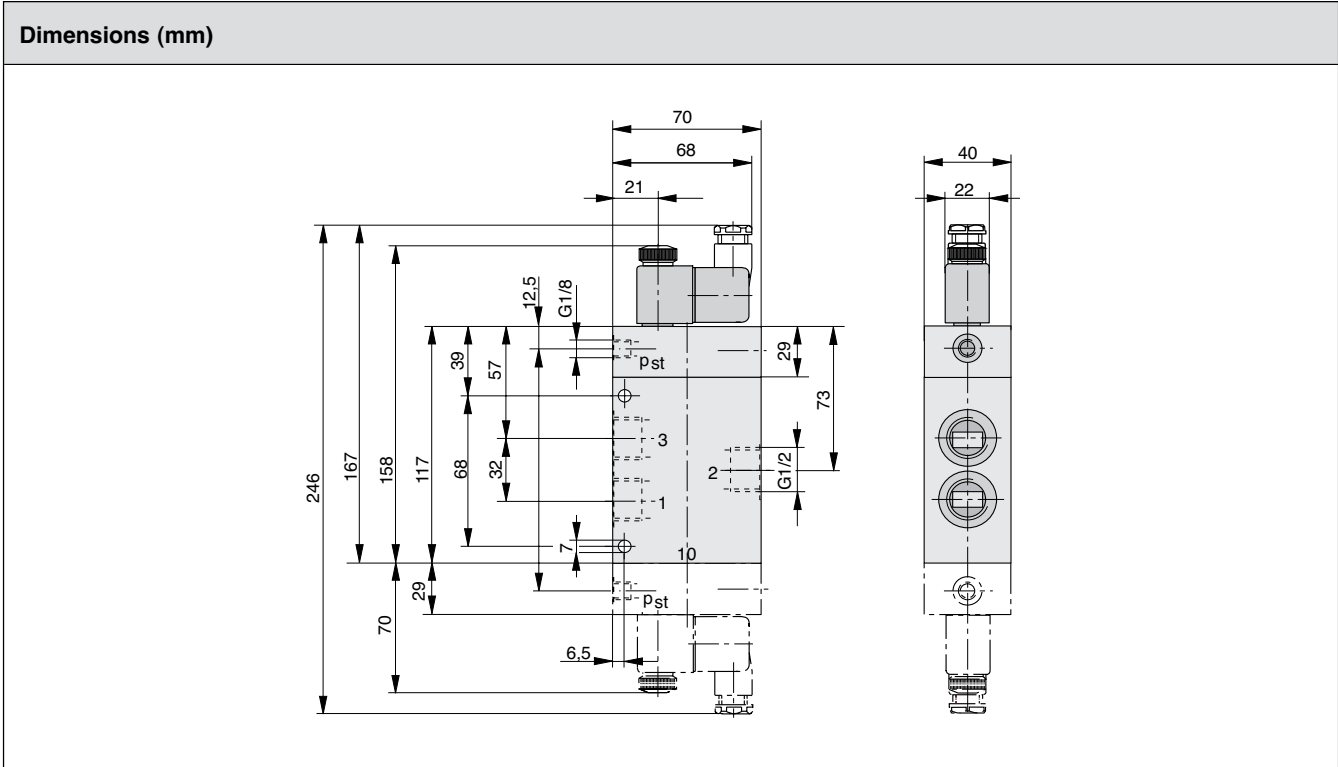
## Actuation: Solenoid

- Single Solenoid
- Double Solenoid

| Characteristics to VDI 3290                   |                                        | Pressures quoted as gauge pressure |                                                            |                                                                              |
|-----------------------------------------------|----------------------------------------|------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------|
| Characteristics                               | Symbol                                 | Unit                               | Description                                                |                                                                              |
| General Features                              |                                        |                                    |                                                            |                                                                              |
| Type                                          |                                        |                                    | Spool valve                                                |                                                                              |
| Mounting                                      |                                        |                                    | 2 screws M6                                                |                                                                              |
| Tube connection                               |                                        |                                    | Thread                                                     |                                                                              |
| Port size                                     |                                        | NPT (G)                            | 1/2                                                        |                                                                              |
| Weight (mass)                                 |                                        | lbs. (kg)                          | 1.69 (0.77) Single solenoid<br>1.32 (0.60) Double solenoid |                                                                              |
| Installation                                  |                                        |                                    | In any position                                            |                                                                              |
| Ambient temperature range                     | $\vartheta_{min}$<br>$\vartheta_{max}$ | °F (°C)                            | 14 (-10)<br>140 (+60)                                      | Note:<br>When using below freezing point it is necessary to consult factory. |
| Medium temperature range                      | $\vartheta_{min}$<br>$\vartheta_{max}$ | °F (°C)                            | 14 (-10)<br>158 (+70)                                      |                                                                              |
| Medium                                        |                                        |                                    | Filtered compressed air                                    |                                                                              |
| Lubrication                                   |                                        |                                    | With or without oil mist lubrication <sup>1)</sup>         |                                                                              |
| Pneumatic Characteristics                     |                                        |                                    |                                                            |                                                                              |
| Nominal pressure                              | p <sub>n</sub>                         | psi (bar)                          | 87 (6)                                                     |                                                                              |
| Operating pressure range                      | p <sub>min</sub><br>p <sub>max</sub>   | psi (bar)                          | Single solenoid<br>29 (2)<br>145 (10)                      |                                                                              |
|                                               |                                        | psi (bar)                          | Double solenoid<br>22 (1.5)<br>145 (10)                    |                                                                              |
| Nominal flow                                  | Q <sub>N</sub>                         | Cv (l/min)                         | 3.5 (3500)                                                 |                                                                              |
| Actuation                                     |                                        |                                    |                                                            |                                                                              |
| Electrical                                    |                                        |                                    | Pilot operated                                             |                                                                              |
| Voltage                                       |                                        |                                    | AC                                                         | DC                                                                           |
| Nominal voltage*<br>Standard version          | U <sub>n</sub>                         | V                                  | 220                                                        | 24                                                                           |
| Initial power consumption<br>Standard version |                                        | VA (W)                             | 11                                                         | 4.8                                                                          |
| Continuous consumption<br>Standard version    |                                        | VA (W)                             | 8.5                                                        | 4.8                                                                          |
| Duty cycle                                    | ED                                     | %                                  | Continuous Duty                                            |                                                                              |
| Electrical protection                         |                                        |                                    | IP65 to DIN 40050 (with plug)                              |                                                                              |
| Insulating material                           |                                        |                                    | VDE 0580                                                   |                                                                              |
| Connection                                    |                                        |                                    | Plug to DIN 43650 form B                                   |                                                                              |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448





| Version 1/2                       |        | Metric Version     |               | NPT Version         |               |
|-----------------------------------|--------|--------------------|---------------|---------------------|---------------|
| Actuation                         | Symbol | Type Number        | Order Number  | Type Number         | Order Number  |
| 3/2 Single Solenoid/Spring Return |        | S9 381RF-1/2-NG-.. | PA 16412-..33 | S9 381RF-1/2U-NG-.. | PD 45464-..33 |
| 3/2 Single Solenoid/Spring Return |        | S9 381RF-1/2-NO-.. | PA 16413-..33 | S9 381RF-1/2U-NO-.. | PD 45465-..33 |
| 3/2 Double Solenoid               |        | S9 381-1/2-..      | PA 16414-..33 | S9 381-1/2U-..      | PD 45466-..33 |

| Voltage Range |            | Coil Number | Order Code |
|---------------|------------|-------------|------------|
| Nominal       | Secondary  |             |            |
| 12 vDC        | --         | KZ 3518     | 01         |
| 24 vDC        | 60 50/60Hz | KZ 3519     | 02         |
| 110 50/60Hz   | 48 vDC     | KZ 3521     | 57         |
| 220 50/60Hz   | 110 vDC    | KZ 3522     | 61         |



- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.

## Characteristics

## 5/2-Way &amp; 5/3-Way Valve, 1/8, 1/4, 1/2 Inch

| Features                  |                                                                                                     |       |                                                     |                                                                              |                                                                                          |
|---------------------------|-----------------------------------------------------------------------------------------------------|-------|-----------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Type                      |                                                                                                     |       | Spool Valve                                         |                                                                              |                                                                                          |
| Mounting                  |                                                                                                     |       | 2 Screws                                            |                                                                              |                                                                                          |
| Port connection           |                                                                                                     |       | Threaded                                            |                                                                              |                                                                                          |
| Port size                 |                                                                                                     | G/NPT | 1/8 • 1/4 • 1/2                                     |                                                                              |                                                                                          |
| Installation              |                                                                                                     |       | In Any Position                                     |                                                                              |                                                                                          |
| Ambient temperature range | min<br>max                                                                                          |       | 14°F (-10°C)<br>140°F (+60°C)                       | Note:<br>When using below freezing point it is necessary to consult factory. |                                                                                          |
| Medium temperature range  | min<br>max                                                                                          |       | 14°F (-10°C)<br>158°F (+70°C)                       |                                                                              |                                                                                          |
| Medium                    |                                                                                                     |       | Filtered Compressed Air                             |                                                                              |                                                                                          |
| Lubrication               |                                                                                                     |       | With or Without Oil Mist Lubrication <sup>1)</sup>  |                                                                              |                                                                                          |
| Pneumatic Characteristics |                                                                                                     |       |                                                     |                                                                              |                                                                                          |
| Body Size                 |                                                                                                     |       | 5/2 Position<br>Single                      Double  |                                                                              | 5/3 Position<br>Double                                                                   |
| 1/8                       | Minimum Pressure psi (bar)<br>Maximum Pressure psi (bar)<br>Flow Cv (l/min)<br>Weight lbs. (kg)     |       | 29 (2)<br>145 (10)<br>0.5 (500)<br>0.62 (0.28)      | 22 (1.5)<br>145 (10)<br>0.5 (500)<br>0.91 (0.415)                            | 29 (2)<br>145 (10)<br>0.6 (600)<br>0.94 (0.425)                                          |
| 1/4                       | Minimum Pressure psi (bar)<br>Maximum Pressure psi (bar)<br>Flow Cv (l/min)<br><br>Weight lbs. (kg) |       | 29 (2)<br>145 (10)<br>1.3 (1300)<br><br>1.32 (0.6)  | 22 (1.5)<br>145 (10)<br>1.3 (1300)<br><br>1.54 (0.7)                         | 29 (2)<br>145 (10)<br>RFG,RFB:1.3(1300)<br>RFE:1.0 (1000)<br>1.54 (0.7)                  |
| 1/2                       | Minimum Pressure psi (bar)<br>Maximum Pressure psi (bar)<br>Flow Cv (l/min)<br><br>Weight lbs. (kg) |       | 32 (2.2)<br>145 (10)<br>3.5 (3500)<br><br>2.2 (1.0) | 22 (1.5)<br>145 (10)<br>3.5 (3500)<br><br>2.43 (1.1)                         | 36 (2.5)<br>145 (10)<br>RFE:3.3 (3300)<br>RFG:3.5 (3500)<br>RFB:3.6 (3600)<br>2.43 (1.1) |
| Voltage                   |                                                                                                     |       | AC                                                  |                                                                              | DC                                                                                       |
| Nominal Voltage           | Standard Version                                                                                    |       | V                                                   | 24, 110, 220                                                                 | 12, 24                                                                                   |
|                           |                                                                                                     |       |                                                     | Others Contact Factory                                                       |                                                                                          |
| Power Consumption         |                                                                                                     |       |                                                     |                                                                              |                                                                                          |
| Inrush                    | Body Size: 1/8 • 1/4                                                                                |       |                                                     | Body Size: 1/2                                                               |                                                                                          |
|                           | AC                                                                                                  |       | DC                                                  | AC                                                                           |                                                                                          |
|                           | 50 HZ                                                                                               | 60 HZ |                                                     | 50 HZ                                                                        | 60 HZ                                                                                    |
| 12                        | —                                                                                                   | —     | 2.8 W                                               | 10.4VA                                                                       | 10.4VA                                                                                   |
| 24                        | 8.5VA                                                                                               | 8.5VA | 2.5 W                                               | 10.4VA                                                                       | 10.4VA                                                                                   |
| 110                       | 8.5VA                                                                                               | 8.5VA | 2.7 W                                               | 10.4VA                                                                       | 10.4VA                                                                                   |
| 220                       | 8.5VA                                                                                               | 8.5VA | 3.5 W                                               | 10.4VA                                                                       | 10.4VA                                                                                   |
| Holding                   | Body Size: 1/8 • 1/4                                                                                |       |                                                     | Body Size: 1/2                                                               |                                                                                          |
|                           | AC                                                                                                  |       | DC                                                  | AC                                                                           |                                                                                          |
|                           | 50 HZ                                                                                               | 60 HZ |                                                     | 50 HZ                                                                        | 60 HZ                                                                                    |
| 12                        | —                                                                                                   | —     | 2.8 W                                               | 8.5VA                                                                        | 8.5VA                                                                                    |
| 24                        | 6.0VA                                                                                               | 6.0VA | 2.5 W                                               | 8.5VA                                                                        | 8.5VA                                                                                    |
| 110                       | 6.0VA                                                                                               | 4.9VA | 2.7 W                                               | 8.2VA                                                                        | 6.6VA                                                                                    |
| 220                       | 6.0VA                                                                                               | 4.9VA | 3.5 W                                               | 8.5VA                                                                        | 6.9VA                                                                                    |
| Duty cycle                |                                                                                                     | ED    | %                                                   | Continuous Duty                                                              |                                                                                          |
| Electrical protection     |                                                                                                     |       |                                                     | IP65 to DIN 40050 (with plug)                                                |                                                                                          |
| Installing material       |                                                                                                     |       |                                                     | VDE 0580                                                                     |                                                                                          |
| Connection                |                                                                                                     |       |                                                     | Plug to DIN 43650 Form B                                                     |                                                                                          |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

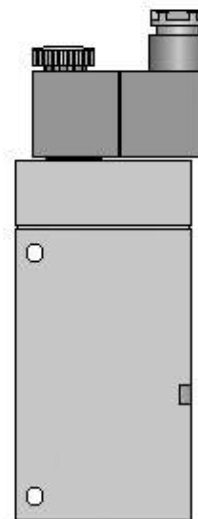
# 5/2-Way Valve

# 5/3-Way Valve

## 1/8 • 1/4 • 1/2

Actuation: Solenoid

- Single Solenoid
- Double Solenoid



## Dimensions &amp; Ordering Information

## Valves

## 5/2-Way &amp; 5/3-Way Valve, 1/8, 1/4, 1/2 Inch

| VERSION 1/8                        |        | Metric Version   |               | NPT Version        |               |
|------------------------------------|--------|------------------|---------------|--------------------|---------------|
| Actuation                          | Symbol | Type Number      | Order Number  | Type Number        | Order Number  |
| 5/2 Single Solenoid/Spring Return  |        | S9 581RF-1/8-..  | PA 10312-..33 | S9 581RF-1/8 U-..  | PD 40663-..33 |
| 5/2 Double Solenoid                |        | S9 581-1/8-..    | PA 10313-..33 | S9 581-1/8 U-..    | PD 40664-..33 |
| 5/3 Double Solenoid/Center Blocked |        | S9 581RFG-1/8-.. | PA 10333-..33 | S9 581RFG-1/8 U-.. | PD 40736-..33 |
| 5/3 Double Solenoid/Center Exhaust |        | S9 581RFE-1/8-.. | PA 10334-..33 | S9 581RFE-1/8 U-.. | PD 40737-..33 |
| 5/3 Double Solenoid/Dual Center    |        | S9 581RFB-1/8-.. | PA 10335-..33 | S9 581RFB-1/8 U-.. | PD 40738-..33 |
| VERSION 1/4                        |        | Metric Version   |               | NPT Version        |               |
| Actuation                          | Symbol | Type Number      | Order Number  | Type Number        | Order Number  |
| 5/2 Single Solenoid/Spring Return  |        | S9 581RF-1/4-..  | PA 12679-..33 | S9 581RF-1/4 U-..  | PD 40665-..33 |
| 5/2 Double Solenoid                |        | S9 581-1/4-..    | PA 12680-..33 | S9 581-1/4 U-..    | PD 40666-..33 |
| 5/3 Double Solenoid/Center Blocked |        | S9 581RFG-1/4-.. | PA 12705-..33 | S9 581RFG-1/4 U-.. | PD 40739-..33 |
| 5/3 Double Solenoid/Center Exhaust |        | S9 581RFE-1/4-.. | PA 12706-..33 | S9 581RFE-1/4 U-.. | PD 40740-..33 |
| 5/3 Double Solenoid/Dual Center    |        | S9 581RFB-1/4-.. | PA 12707-..33 | S9 581RFB-1/4 U-.. | PD 40741-..33 |

| Voltage Range |            | Coil Number | Order Code |
|---------------|------------|-------------|------------|
| Nominal       | Secondary  |             |            |
| 12 vDC        | --         | KZ 3674     | 01         |
| 24 vDC        | 60 50/60Hz | KZ 3673     | 02         |
| 110 50/60Hz   | 48 vDC     | KZ 3669     | 57         |
| 220 50/60Hz   | 110 vDC    | KZ 3672     | 61         |
| 24 50/60Hz    | --         | KZ 3675     | 51         |

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.



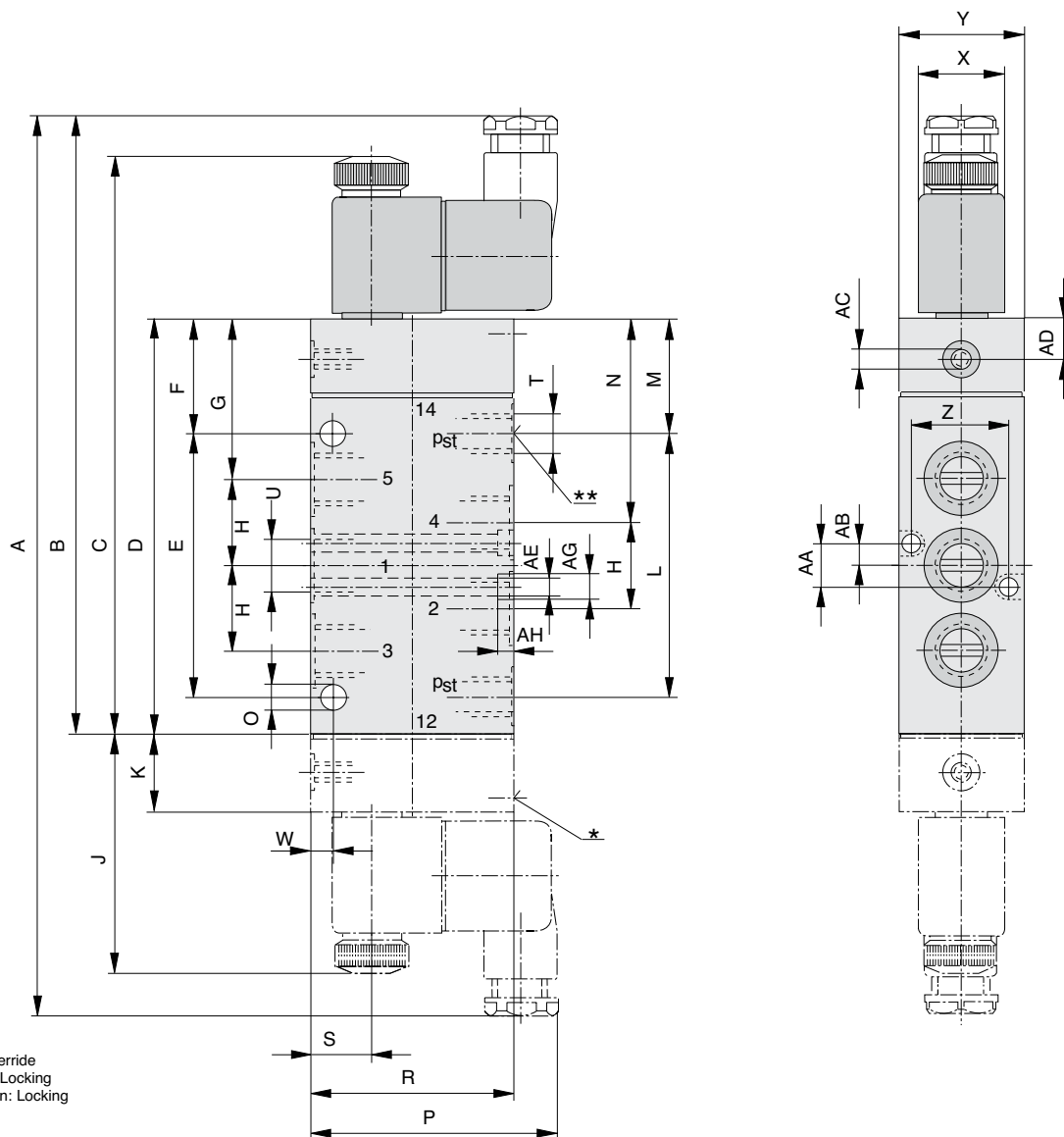
| VERSION 1/2                        |        | Metric Version   |               | NPT Version       |               |
|------------------------------------|--------|------------------|---------------|-------------------|---------------|
| Actuation                          | Symbol | Type Number      | Order Number  | Type Number       | Order Number  |
| 5/2 Single Solenoid/Spring Return  |        | S9 581RF-1/2-..  | PA 16171-..33 | S9 581RF-1/2U-..  | PD 37950-..33 |
| 5/2 Double Solenoid                |        | S9 581-1/2-..    | PA 16172-..33 | S9 581-1/2U-..    | PD 37951-..33 |
| 5/3 Double Solenoid/Center Blocked |        | S9 581RFG-1/2-.. | PA 16176-..33 | S9 581RFG-1/2U-.. | PD 37971-..33 |
| 5/3 Double Solenoid/Center Exhaust |        | S9 581RFE-1/2-.. | PA 16177-..33 | S9 581RFE-1/2U-.. | PD 37972-..33 |
| 5/3 Double Solenoid/Dual Center    |        | S9 581RFB-1/2-.. | PA 16178-..33 | S9 581RFB-1/2U-.. | PD 37973-..33 |

| Voltage Range |            | Coil Number | Order Code |
|---------------|------------|-------------|------------|
| Nominal       | Secondary  |             |            |
| 12 vDC        | --         | KZ 3518     | 01         |
| 24 vDC        | 60 50/60Hz | KZ 3519     | 02         |
| 110 50/60Hz   | 48 vDC     | KZ 3521     | 57         |
| 220 50/60Hz   | 110 vDC    | KZ 3522     | 61         |

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.



Sizes: 1/8 &amp; 1/4

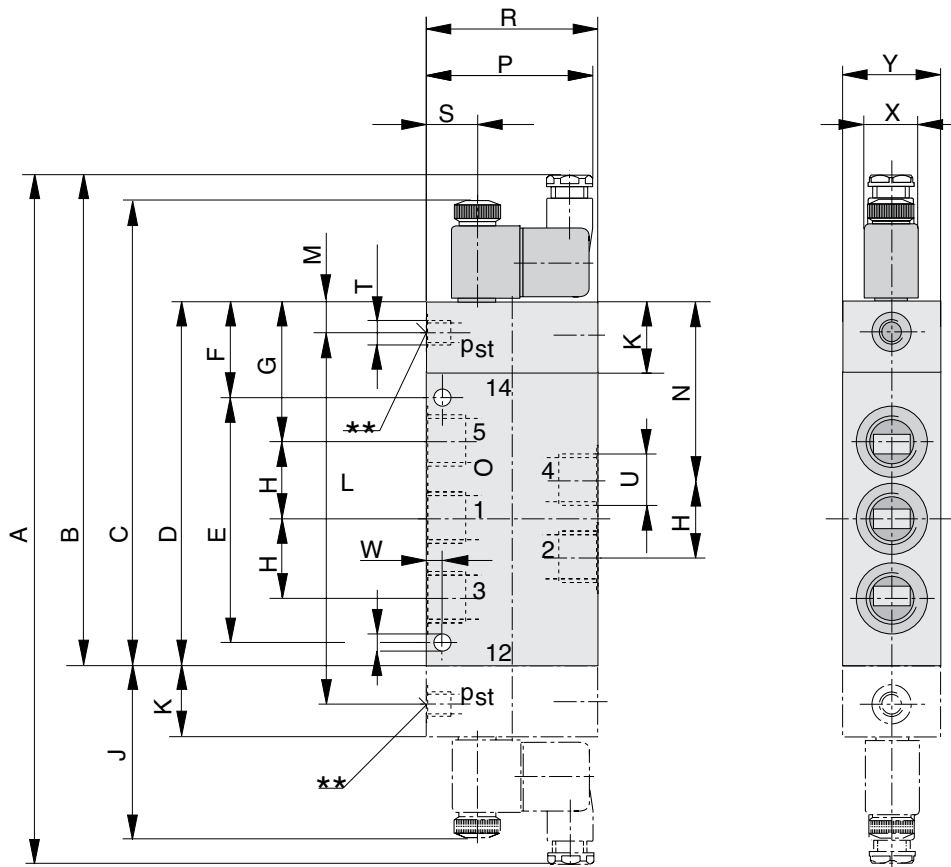


\*- Manual Override  
 Push: Non-Locking  
 Push & Turn: Locking

|     | A                  | B                   | C                       | D                       | E                   | F                   | G                   | H                   | J                 | K                   | L                 | M                   | N                   | O                  | P                  |
|-----|--------------------|---------------------|-------------------------|-------------------------|---------------------|---------------------|---------------------|---------------------|-------------------|---------------------|-------------------|---------------------|---------------------|--------------------|--------------------|
| 1/8 | <b>8.19</b><br>208 | <b>5.51</b><br>140  | <b>5.04</b><br>128      | <b>3.44</b><br>87.5     | <b>2.19</b><br>55.5 | <b>0.94</b><br>24   | <b>1.32</b><br>33.5 | <b>0.71</b><br>18   | <b>2.20</b><br>56 | <b>0.61</b><br>15.5 | <b>2.13</b><br>54 | <b>0.96</b><br>24.5 | <b>1.67</b><br>42.5 | <b>0.22</b><br>5.5 | <b>2.48</b><br>63  |
| 1/4 | <b>9.09</b><br>231 | <b>6.26</b><br>159  | <b>5.83</b><br>148      | <b>4.17</b><br>106      | <b>2.64</b><br>67   | <b>1.16</b><br>29.5 | <b>1.61</b><br>41   | <b>0.87</b><br>22   | <b>2.44</b><br>62 | <b>0.79</b><br>20   | <b>2.60</b><br>66 | <b>1.18</b><br>30   | <b>2.05</b><br>52   | <b>0.26</b><br>6.5 | <b>2.48</b><br>63  |
|     | R                  | S                   | T                       | U                       | W                   | X                   | Y                   | Z                   | AA                | AB                  | AC                | AD                  | AE                  | AF                 | AG                 |
| 1/8 | <b>1.57</b><br>40  | <b>0.61</b><br>15.5 | <b>1/8 npt</b><br>G 1/8 | <b>1/8 npt</b><br>G 1/8 | <b>0.20</b><br>5    | --<br>--            | <b>0.87</b><br>22   | <b>0.65</b><br>16.6 | <b>0.31</b><br>8  | <b>0.20</b><br>5    | <b>M5</b><br>M5   | <b>0.41</b><br>10.5 | --<br>--            | <b>0.13</b><br>3.2 | <b>0.22</b><br>5.6 |
| 1/4 | <b>2.05</b><br>52  | <b>0.61</b><br>15.5 | <b>1/8 npt</b><br>G 1/8 | <b>1/4 npt</b><br>G 1/4 | <b>0.24</b><br>6    | <b>0.87</b><br>22   | <b>1.26</b><br>32   | <b>0.98</b><br>25   | <b>0.43</b><br>11 | <b>0.22</b><br>5.5  | <b>M5</b><br>M5   | <b>0.39</b><br>10   | --<br>--            | --<br>--           | --<br>--           |

Dimensions: BOLD= Inches; STANDARD= mm

**Size: 1/2**



\*- Manual Override  
Push: Non-Locking  
Push & Turn: Locking

[illegible]

Dimensions: BOLD= Inches; STANDARD= mm

# 5/2-Way Valve

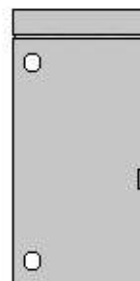
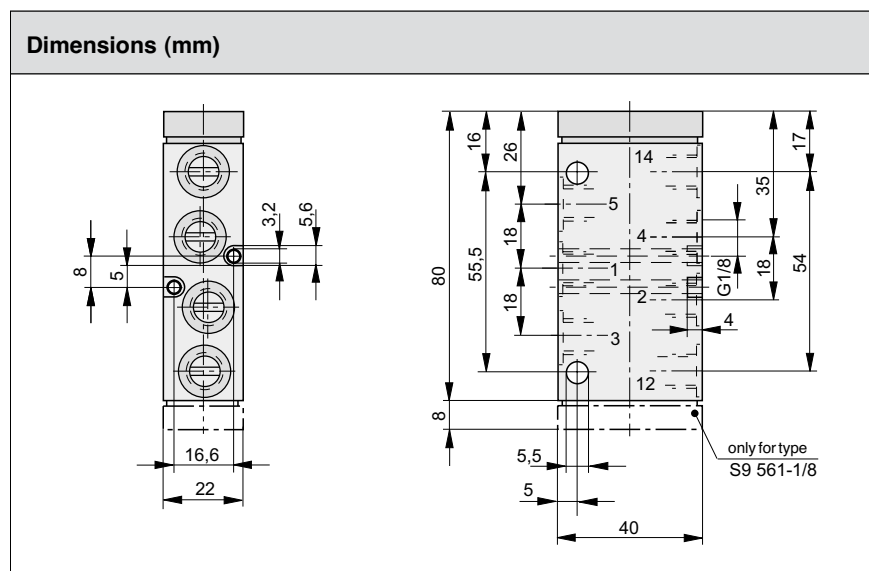
## 1/8

**Actuation: Air Pilot**

- Single Air Pilot
- Double Air Pilot

| Characteristics to VDI 3290 |                                          |            |                                                            |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------|------------------------------------------|------------|------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics             | Symbol                                   | Unit       | Description                                                |                                                                              |                                    |  |
| General Features            |                                          |            |                                                            |                                                                              |                                    |  |
| Type                        |                                          |            | Spool valve                                                |                                                                              |                                    |  |
| Mounting                    |                                          |            | 2 screws M5                                                |                                                                              |                                    |  |
| Tube connection             |                                          |            | Thread                                                     |                                                                              |                                    |  |
| Port size                   |                                          | NPT (G)    | 1/8                                                        |                                                                              |                                    |  |
| Weight (mass)               |                                          | lbs. (kg)  | .35 (.160) Single Air Pilot<br>.37 (.170) Double Air Pilot |                                                                              |                                    |  |
| Installation                |                                          |            | In any position                                            |                                                                              |                                    |  |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                                      | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                                      |                                                                              |                                    |  |
| Medium                      |                                          |            | Filtered compressed air                                    |                                                                              |                                    |  |
| Lubrication                 |                                          |            | With or without oil mist lubrication <sup>1)</sup>         |                                                                              |                                    |  |
| Pneumatic Characteristics   |                                          |            |                                                            |                                                                              |                                    |  |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                                     |                                                                              |                                    |  |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | 0 (0)<br>145 (10)                                          |                                                                              |                                    |  |
| Nominal flow                | Q <sub>N</sub>                           | Cv (l/min) | .5 (500)                                                   |                                                                              |                                    |  |
| Actuation                   |                                          |            |                                                            |                                                                              |                                    |  |
| Air Pilot                   |                                          |            | Direct                                                     |                                                                              |                                    |  |
| Actuation Pressure Range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | 30 (2)<br>145 (10)                                         | Single Air Pilot                                                             |                                    |  |
|                             | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | 22 (1.5)<br>145 (10)                                       | Double Air Pilot                                                             |                                    |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448



| Version 1/8                        | Metric Version |              | NPT Version   |              |
|------------------------------------|----------------|--------------|---------------|--------------|
| Actuation                          | Type Number    | Order Number | Type Number   | Order Number |
| 5/2 Single Air Pilot/Spring Return | S9 561RF-1/8   | PA 10310     | S9 561RF-1/8U | PD 47240     |
| 5/2 Double Air Pilot               | S9 561-1/8     | PA 10311     | S9 561-1/8U   | PD 47239     |

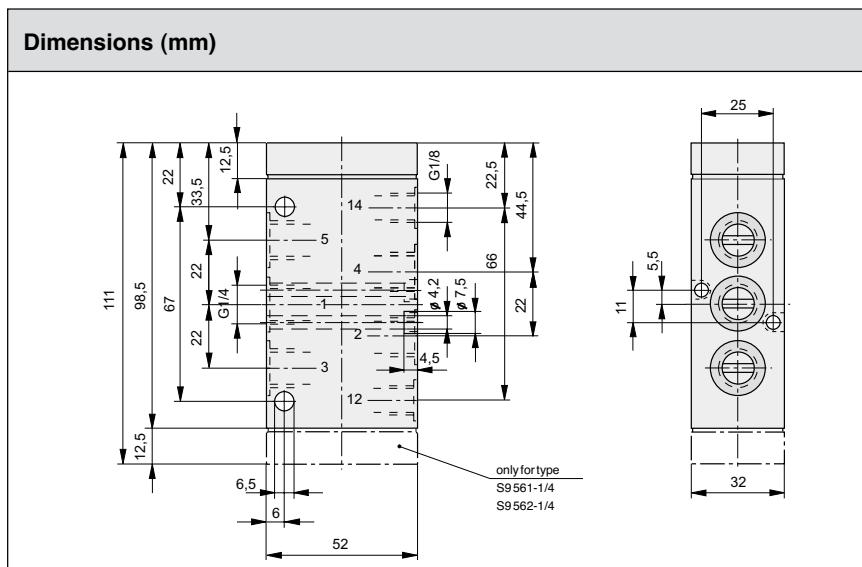
# 5/2-Way Valve 1/4

**Actuation: Air Pilot**

- Single Air Pilot
- Double Air Pilot

| Characteristics to VDI 3290 |                                        |            |                                                            |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------|----------------------------------------|------------|------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics             | Symbol                                 | Unit       | Description                                                |                                                                              |                                    |  |
| General Features            |                                        |            |                                                            |                                                                              |                                    |  |
| Type                        |                                        |            | Spool valve                                                |                                                                              |                                    |  |
| Mounting                    |                                        |            | 2 screws M5                                                |                                                                              |                                    |  |
| Tube connection             |                                        |            | Thread                                                     |                                                                              |                                    |  |
| Port size                   |                                        | NPT (G)    | 1/8                                                        |                                                                              |                                    |  |
| Weight (mass)               |                                        | lbs. (kg)  | 1.08 (.49) Single Air Pilot<br>1.12 (.51) Double Air Pilot |                                                                              |                                    |  |
| Installation                |                                        |            | In any position                                            |                                                                              |                                    |  |
| Ambient temperature range   | $\vartheta_{min}$<br>$\vartheta_{max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                                      | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range    | $\vartheta_{min}$<br>$\vartheta_{max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                                      |                                                                              |                                    |  |
| Medium                      |                                        |            | Filtered compressed air                                    |                                                                              |                                    |  |
| Lubrication                 |                                        |            | With or without oil mist lubrication <sup>1)</sup>         |                                                                              |                                    |  |
| Pneumatic Characteristics   |                                        |            |                                                            |                                                                              |                                    |  |
| Nominal pressure            | p <sub>n</sub>                         | psi (bar)  | 87 (6)                                                     |                                                                              |                                    |  |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>   | psi (bar)  | 0 (0)<br>145 (10)                                          |                                                                              |                                    |  |
| Nominal flow                | Q <sub>N</sub>                         | Cv (l/min) | 1.3 (1300)                                                 |                                                                              |                                    |  |
| Actuation                   |                                        |            |                                                            |                                                                              |                                    |  |
| Air Pilot                   |                                        |            | Direct                                                     |                                                                              |                                    |  |
| Actuation Pressure Range    | p <sub>min</sub><br>p <sub>max</sub>   | psi (bar)  | 30 (2)<br>145 (10)                                         | Single Air Pilot                                                             |                                    |  |
|                             | p <sub>min</sub><br>p <sub>max</sub>   | psi (bar)  | 22 (1.5)<br>145 (10)                                       | Double Air Pilot                                                             |                                    |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448



| Version 1/4                        | Metric Version |              | NPT Version   |              |
|------------------------------------|----------------|--------------|---------------|--------------|
| Actuation                          | Type Number    | Order Number | Type Number   | Order Number |
| 5/2 Single Air Pilot/Spring Return | S9 561RF-1/4   | PA 12676     | S9 561RF-1/4U | PD 47242     |
| 5/2 Double Air Pilot               | S9 561-1/4     | PA 12677     | S9 561-1/4U   | PD 47241     |

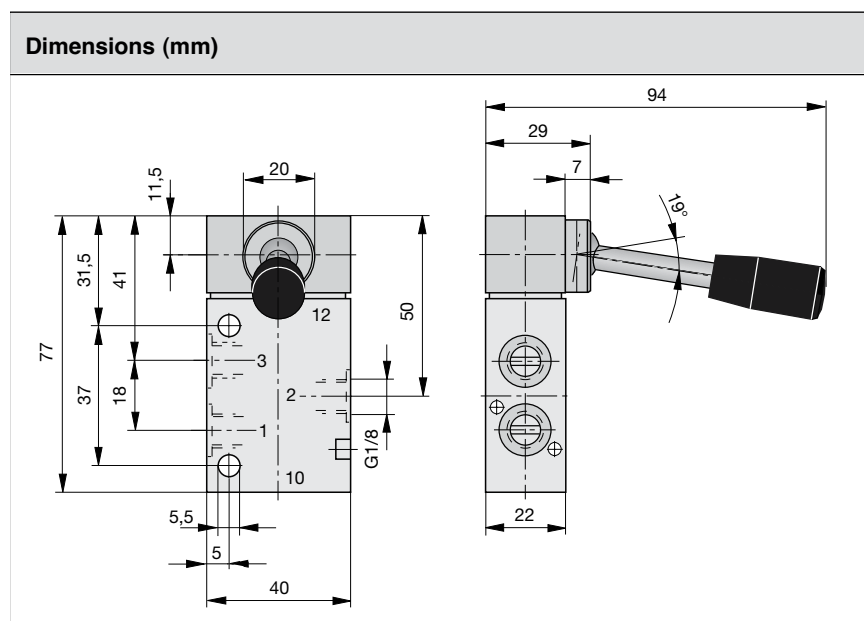
# 3/2-Way Valve 1/8

Actuation: Hand lever

- Detent
- Spring Return

| Characteristics to VDI 3290 |                                          |            | Pressures quoted as gauge pressure                 |                                                                              |
|-----------------------------|------------------------------------------|------------|----------------------------------------------------|------------------------------------------------------------------------------|
| Characteristics             | Symbol                                   | Unit       | Description                                        |                                                                              |
| General Features            |                                          |            |                                                    |                                                                              |
| Type                        |                                          |            | Spool valve                                        |                                                                              |
| Mounting                    |                                          |            | 2 screws M5                                        |                                                                              |
| Tube connection             |                                          |            | Thread                                             |                                                                              |
| Port size                   |                                          | NPT (G)    | 1/8                                                |                                                                              |
| Weight (mass)               |                                          | lbs. (kg)  | .356 (.162)                                        |                                                                              |
| Installation                |                                          |            | In any position                                    |                                                                              |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                              |                                                                              |
| Medium                      |                                          |            | Filtered compressed air                            |                                                                              |
| Lubrication                 |                                          |            | With or without oil mist lubrication <sup>1)</sup> |                                                                              |
| Pneumatic Characteristics   |                                          |            |                                                    |                                                                              |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar)  | 131 (6)                                            |                                                                              |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | 0 (0)<br>145 (10)                                  |                                                                              |
| Nominal flow                | Q <sub>N</sub>                           | Cv (l/min) | 4.5 (450)                                          |                                                                              |
| Actuation                   |                                          |            |                                                    |                                                                              |
| Manual control              |                                          |            | Direct                                             |                                                                              |
| Stroke                      |                                          | in (mm)    | .177 (4.5)                                         |                                                                              |
| Actuation force             | F <sub>b</sub>                           | lbf (N)    | 1.57 (7) detent<br>2.25 (10) spring                |                                                                              |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448



| Version 1/8                  | Metric Version |              | NPT Version   |              |
|------------------------------|----------------|--------------|---------------|--------------|
| Actuation                    | Type Number    | Order Number | Type Number   | Order Number |
| 3/2 Hand Lever/Detent        | S9 311-1/8     | PA 10293     | S9 311-1/8U   | PD 45467     |
| 3/2 Hand Lever/Spring Return | S9 311RF-1/8   | PA 10294     | S9 311RF-1/8U | PD 45468     |

# 5/2-Way Valve 1/8

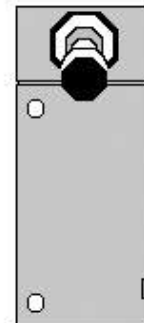
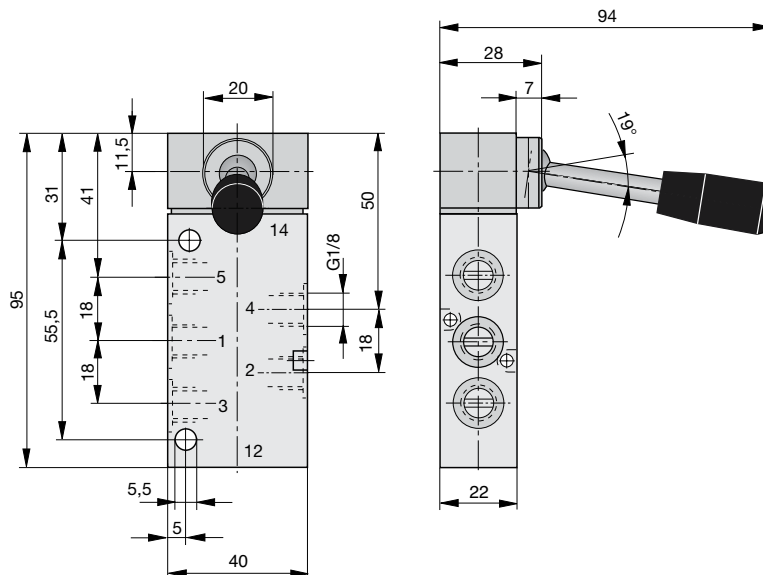
Actuation: Hand lever

- Detent
- Spring Return

| Characteristics to VDI 3290 |                                          |            | Pressures quoted as gauge pressure                 |                                                                              |
|-----------------------------|------------------------------------------|------------|----------------------------------------------------|------------------------------------------------------------------------------|
| Characteristics             | Symbol                                   | Unit       | Description                                        |                                                                              |
| General Features            |                                          |            |                                                    |                                                                              |
| Type                        |                                          |            | Spool valve                                        |                                                                              |
| Mounting                    |                                          |            | 2 screws M5                                        |                                                                              |
| Tube connection             |                                          |            | Thread                                             |                                                                              |
| Port size                   |                                          | NPT (G)    | 1/8                                                |                                                                              |
| Weight (mass)               |                                          | lbs. (kg)  | .429 (.195)                                        |                                                                              |
| Installation                |                                          |            | In any position                                    |                                                                              |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                              |                                                                              |
| Medium                      |                                          |            | Filtered compressed air                            |                                                                              |
| Lubrication                 |                                          |            | With or without oil mist lubrication <sup>1)</sup> |                                                                              |
| Pneumatic Characteristics   |                                          |            |                                                    |                                                                              |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                             |                                                                              |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | 0 (0)<br>145 (10)                                  |                                                                              |
| Nominal flow                | Q <sub>N</sub>                           | Cv (l/min) | .5 (500)                                           |                                                                              |
| Actuation                   |                                          |            |                                                    |                                                                              |
| Manual control              |                                          |            | Direct                                             |                                                                              |
| Stroke                      |                                          | in (mm)    | .177 (4.5)                                         |                                                                              |
| Actuation force             | F <sub>b</sub>                           | lbf (N)    | 1.57 (7) detent<br>2.25 (10) spring                |                                                                              |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

## Dimensions (mm)



| Version 1/8                  | Metric Version |              | NPT Version   |              |
|------------------------------|----------------|--------------|---------------|--------------|
| Actuation                    | Type Number    | Order Number | Type Number   | Order Number |
| 5/2 Hand Lever/Detent        | S9 511-1/8     | PA 10308     | S9 511-1/8U   | PD 45469     |
| 5/2 Hand Lever/Spring Return | S9 511RF-1/8   | PA 10309     | S9 511RF-1/8U | PD 45470     |

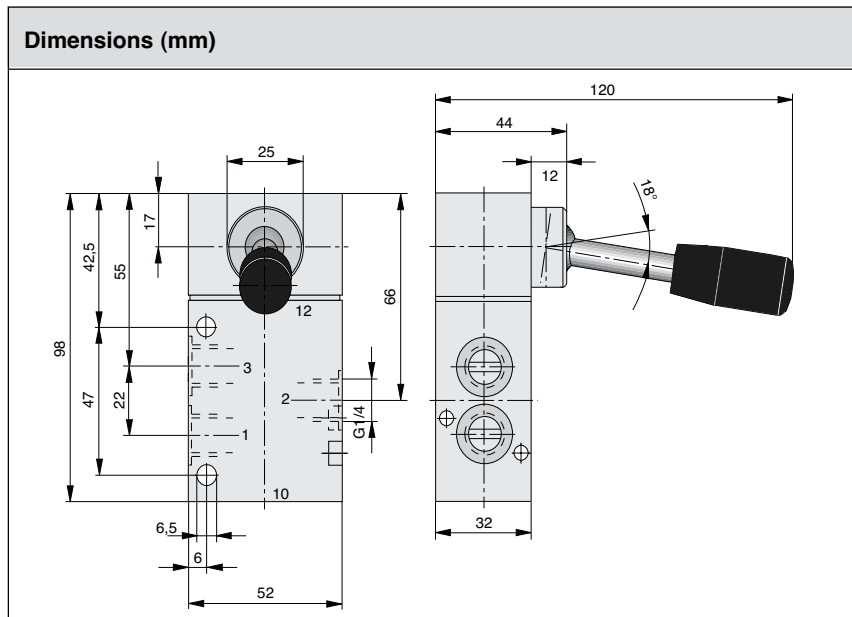
# 3/2-Way Valve 1/4

Actuation: Hand lever

- Detent
- Spring Return
- Safety Detent

| Characteristics to VDI 3290 |                                          | Pressures quoted as gauge pressure |                                                      |                                                                              |
|-----------------------------|------------------------------------------|------------------------------------|------------------------------------------------------|------------------------------------------------------------------------------|
| Characteristics             | Symbol                                   | Unit                               | Description                                          |                                                                              |
| General Features            |                                          |                                    |                                                      |                                                                              |
| Type                        |                                          |                                    | Spool valve                                          |                                                                              |
| Mounting                    |                                          |                                    | 2 screws M6                                          |                                                                              |
| Tube connection             |                                          |                                    | Thread                                               |                                                                              |
| Port size                   |                                          | NPT (G)                            | 1/4                                                  |                                                                              |
| Weight (mass)               |                                          | lbs. (kg)                          | .81 (.37)                                            |                                                                              |
| Installation                |                                          |                                    | In any position                                      |                                                                              |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)                            | 14 (-10)<br>140 (+60)                                | Note:<br>When using below freezing point it is necessary to consult factory. |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)                            | 14 (-10)<br>158 (+70)                                |                                                                              |
| Medium                      |                                          |                                    | Filtered compressed air                              |                                                                              |
| Lubrication                 |                                          |                                    | With or without oil mist lubrication <sup>1)</sup>   |                                                                              |
| Pneumatic Characteristics   |                                          |                                    |                                                      |                                                                              |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar)                          | 87 (6)                                               |                                                                              |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)                          | 0 (0)<br>145 (10)                                    |                                                                              |
| Nominal flow                | Q <sub>N</sub>                           | Cv (l/min)                         | 1.3 (1300)                                           |                                                                              |
| Actuation                   |                                          |                                    |                                                      |                                                                              |
| Manual control              |                                          |                                    | Direct                                               |                                                                              |
| Stroke                      |                                          | in (mm)                            | .256 (6.5)                                           |                                                                              |
| Actuation force             | F <sub>b</sub>                           | lbf (N)                            | 2.25 (10) detent & safety detent<br>3.37 (15) spring |                                                                              |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448



| Version 1/4                    | Metric Version |              | NPT Version   |              |
|--------------------------------|----------------|--------------|---------------|--------------|
| Actuation                      | Type Number    | Order Number | Type Number   | Order Number |
| 3/2 Hand Lever/Detent          | S9 311-1/4     | PA 12708     | S9 311-1/4U   | PD 45477     |
| 3/2 Hand Lever/Spring Return   | S9 311RF-1/4   | PA 12709     | S9 311RF-1/4U | PD 45478     |
| 3/2 Hand Lever/Detent (safety) | S9 311S-1/4    | PA 12710     | S9 311RF-1/4U | PD 45479     |

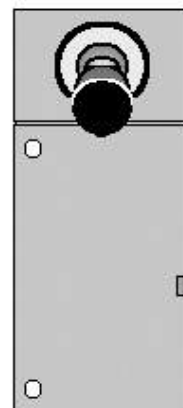
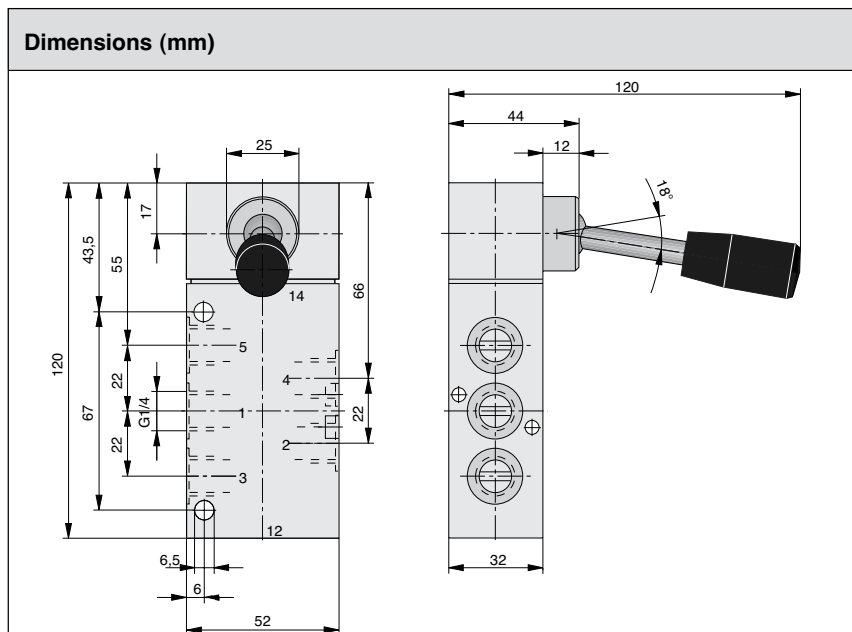
# 5/2-Way Valve 1/4

Actuation: Hand lever

- Detent
- Spring Return
- Safety Detent

| Characteristics to VDI 3290 |                                          |            |                                                    |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------|------------------------------------------|------------|----------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics             | Symbol                                   | Unit       | Description                                        |                                                                              |                                    |  |
| General Features            |                                          |            |                                                    |                                                                              |                                    |  |
| Type                        |                                          |            | Spool valve                                        |                                                                              |                                    |  |
| Mounting                    |                                          |            | 2 screws M6                                        |                                                                              |                                    |  |
| Tube connection             |                                          |            | Thread                                             |                                                                              |                                    |  |
| Port size                   |                                          | NPT (G)    | 1/4                                                |                                                                              |                                    |  |
| Weight (mass)               |                                          | lbs. (kg)  | 1.14 (.52)                                         |                                                                              |                                    |  |
| Installation                |                                          |            | In any position                                    |                                                                              |                                    |  |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                              |                                                                              |                                    |  |
| Medium                      |                                          |            | Filtered compressed air                            |                                                                              |                                    |  |
| Lubrication                 |                                          |            | With or without oil mist lubrication <sup>1)</sup> |                                                                              |                                    |  |
| Pneumatic Characteristics   |                                          |            |                                                    |                                                                              |                                    |  |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                             |                                                                              |                                    |  |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | 0 (0)<br>145 (10)                                  |                                                                              |                                    |  |
| Nominal flow                | Q <sub>N</sub>                           | Cv (l/min) | 1.3 (1300)                                         |                                                                              |                                    |  |
| Actuation                   |                                          |            |                                                    |                                                                              |                                    |  |
| Manual control              |                                          |            | Direct                                             |                                                                              |                                    |  |
| Stroke                      |                                          | in (mm)    | .256 (6.5)                                         |                                                                              |                                    |  |
| Actuation force             | F <sub>b</sub>                           | lbf (N)    | 2.25 (10) detent<br>3.37 (15) spring               |                                                                              |                                    |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448



| Version 1/4                    | Metric Version |              | NPT Version   |              |
|--------------------------------|----------------|--------------|---------------|--------------|
| Actuation                      | Type Number    | Order Number | Type Number   | Order Number |
| 5/2 Hand Lever/Detent          | S9 511-1/4     | PA 12671     | S9 511-1/4U   | PD 45480     |
| 5/2 Hand Lever/Spring Return   | S9 511RF-1/4   | PA 12672     | S9 511RF-1/4U | PD 45481     |
| 5/2 Hand Lever/Detent (safety) | S9 511S-1/4    | PA 12673     | S9 511S-1/4U  | PD 45482     |

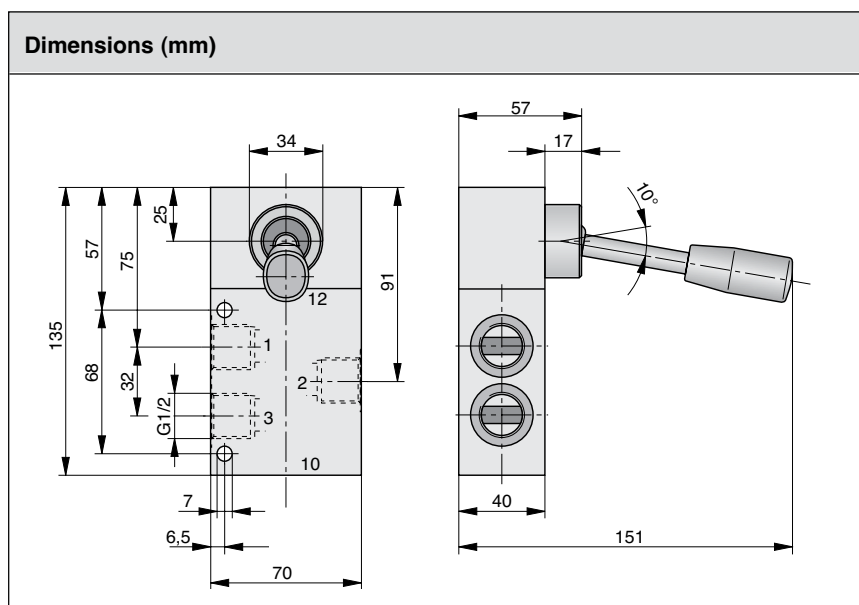
# 3/2-Way Valve 1/2

**Actuation: Hand lever**

- Detent
- Spring Return

| Characteristics to VDI 3290 |                                          |            |                                                    |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------|------------------------------------------|------------|----------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics             | Symbol                                   | Unit       | Description                                        |                                                                              |                                    |  |
| General Features            |                                          |            |                                                    |                                                                              |                                    |  |
| Type                        |                                          |            | Spool valve                                        |                                                                              |                                    |  |
| Mounting                    |                                          |            | 2 screws M6                                        |                                                                              |                                    |  |
| Tube connection             |                                          |            | Thread                                             |                                                                              |                                    |  |
| Port size                   |                                          | NPT (G)    | 1/2                                                |                                                                              |                                    |  |
| Weight (mass)               |                                          | lbs. (kg)  | 1.98 (.9)                                          |                                                                              |                                    |  |
| Installation                |                                          |            | In any position                                    |                                                                              |                                    |  |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                              |                                                                              |                                    |  |
| Medium                      |                                          |            | Filtered compressed air                            |                                                                              |                                    |  |
| Lubrication                 |                                          |            | With or without oil mist lubrication <sup>1)</sup> |                                                                              |                                    |  |
| Pneumatic Characteristics   |                                          |            |                                                    |                                                                              |                                    |  |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                             |                                                                              |                                    |  |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | 0 (0)<br>145 (10)                                  |                                                                              |                                    |  |
| Nominal flow                | Q <sub>N</sub>                           | Cv (l/min) | 3.5 (3500)                                         |                                                                              |                                    |  |
| Actuation                   |                                          |            |                                                    |                                                                              |                                    |  |
| Manual control              |                                          |            | Direct                                             |                                                                              |                                    |  |
| Stroke                      |                                          | in (mm)    | .370 (9.4)                                         |                                                                              |                                    |  |
| Actuation force             | F <sub>b</sub>                           | lbf (N)    | 3.37 (15) detent<br>8.99 (40) spring               |                                                                              |                                    |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448



| Version 1/2                  | Metric Version |              | NPT Version   |              |
|------------------------------|----------------|--------------|---------------|--------------|
| Actuation                    | Type Number    | Order Number | Type Number   | Order Number |
| 3/2 Hand Lever/Detent        | S9 311-1/2     | PA 16404     | S9 311-1/2U   | PD 45492     |
| 3/2 Hand Lever/Spring Return | S9 311RF-1/2   | PA 16405     | S9 311RF-1/2U | PD 45493     |

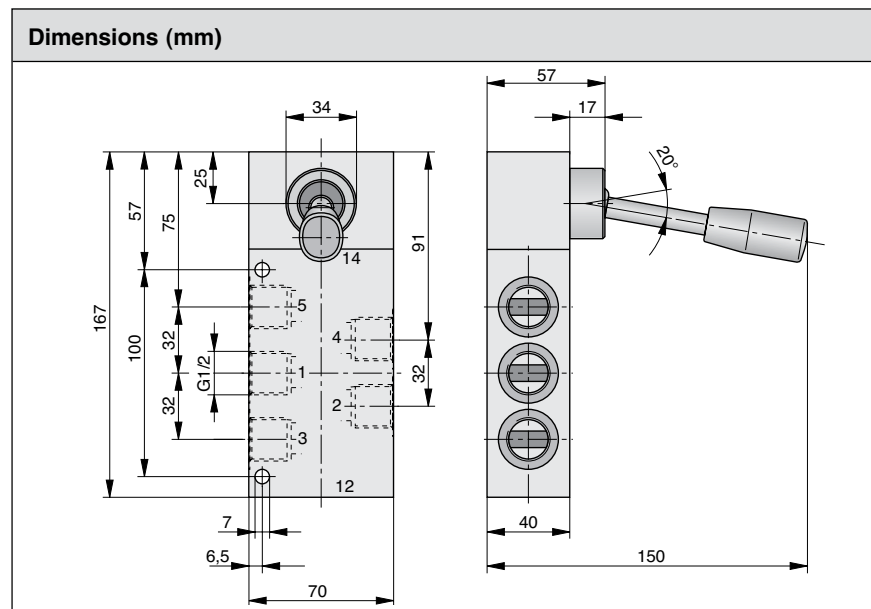
# 5/2-Way Valve 1/2

**Actuation: Hand lever**

- Detent
- Spring Return

| Characteristics to VDI 3290 |  |                                          |            |                                                    | Pressures quoted as gauge pressure                                           |  |
|-----------------------------|--|------------------------------------------|------------|----------------------------------------------------|------------------------------------------------------------------------------|--|
| Characteristics             |  | Symbol                                   | Unit       | Description                                        |                                                                              |  |
| General Features            |  |                                          |            |                                                    |                                                                              |  |
| Type                        |  |                                          |            | Spool valve                                        |                                                                              |  |
| Mounting                    |  |                                          |            | 2 screws M6                                        |                                                                              |  |
| Tube connection             |  |                                          |            | Thread                                             |                                                                              |  |
| Port size                   |  |                                          | NPT (G)    | 1/2                                                |                                                                              |  |
| Weight (mass)               |  |                                          | lbs. (kg)  | 2.64 (1.20)                                        |                                                                              |  |
| Installation                |  |                                          |            | In any position                                    |                                                                              |  |
| Ambient temperature range   |  | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |  |
| Medium temperature range    |  | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                              |                                                                              |  |
| Medium                      |  |                                          |            | Filtered compressed air                            |                                                                              |  |
| Lubrication                 |  |                                          |            | With or without oil mist lubrication <sup>1)</sup> |                                                                              |  |
| Pneumatic Characteristics   |  |                                          |            |                                                    |                                                                              |  |
| Nominal pressure            |  | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                             |                                                                              |  |
| Operating pressure range    |  | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | 0 (0)<br>145 (10)                                  |                                                                              |  |
| Nominal flow                |  | Q <sub>N</sub>                           | Cv (l/min) | 3.5 (3500)                                         |                                                                              |  |
| Actuation                   |  |                                          |            |                                                    |                                                                              |  |
| Manual control              |  |                                          |            | Direct                                             |                                                                              |  |
| Stroke                      |  |                                          | in (mm)    | .370 (9.4)                                         |                                                                              |  |
| Actuation force             |  | F <sub>b</sub>                           | lbf (N)    | 3.37 (15) detent<br>8.99 (40) spring               |                                                                              |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448



| Version 1/2                  | Metric Version |              | NPT Version   |              |
|------------------------------|----------------|--------------|---------------|--------------|
| Actuation                    | Type Number    | Order Number | Type Number   | Order Number |
| 5/2 Hand Lever/Detent        | S9 511-1/2     | PA 16367     | S9 511-1/2U   | PD 45495     |
| 5/2 Hand Lever/Spring Return | S9 511RF-1/2   | PA 16366     | S9 511RF-1/2U | PD 45494     |

| Characteristics to VDI 3290 |                                          |            |                                                    |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------|------------------------------------------|------------|----------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics             | Symbol                                   | Unit       | Description                                        |                                                                              |                                    |  |
| General Features            |                                          |            |                                                    |                                                                              |                                    |  |
| Type                        |                                          |            | Spool valve                                        |                                                                              |                                    |  |
| Mounting                    |                                          |            | 2 screws M5                                        |                                                                              |                                    |  |
| Tube connection             |                                          |            | Thread                                             |                                                                              |                                    |  |
| Port size                   |                                          | NPT (G)    | 1/8                                                |                                                                              |                                    |  |
| Weight (mass)               |                                          | lbs. (kg)  | .429 (.195)                                        |                                                                              |                                    |  |
| Installation                |                                          |            | In any position                                    |                                                                              |                                    |  |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                              |                                                                              |                                    |  |
| Medium                      |                                          |            | Filtered compressed air                            |                                                                              |                                    |  |
| Lubrication                 |                                          |            | With or without oil mist lubrication <sup>1)</sup> |                                                                              |                                    |  |
| Pneumatic Characteristics   |                                          |            |                                                    |                                                                              |                                    |  |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                             |                                                                              |                                    |  |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | 0 (0)<br>145 (10)                                  |                                                                              |                                    |  |
| Nominal flow                | Q <sub>N</sub>                           | Cv (l/min) | .5 (500)                                           |                                                                              |                                    |  |
| Actuation                   |                                          |            |                                                    |                                                                              |                                    |  |
| Manual control              |                                          |            | Direct                                             |                                                                              |                                    |  |
| Stroke                      |                                          | in (mm)    | .177 (4.5)                                         |                                                                              |                                    |  |
| Actuating force             | F <sub>b</sub>                           | lbf (N)    | G,E,B: 1.57 (7)<br>RFG, RFE, RFB: 2.25 (10)        |                                                                              |                                    |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

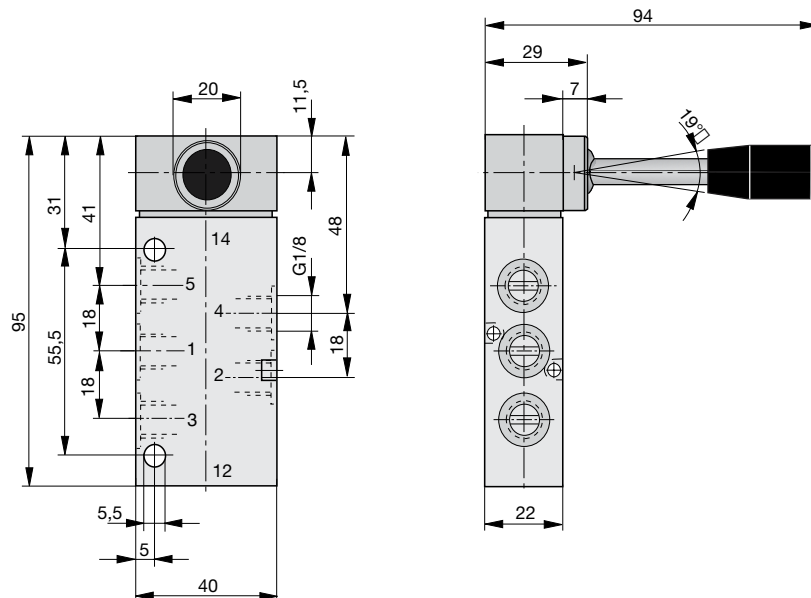
# 5/3-Way Valve 1/8

**Actuation: Hand lever**

- Detent
- Spring Center



## Dimensions (mm)



| Version 1/8                          |        | Metric Version |              | NPT Version    |              |
|--------------------------------------|--------|----------------|--------------|----------------|--------------|
| Actuation                            | Symbol | Type Number    | Order Number | Type Number    | Order Number |
| 5/3-way Hand Lever/Detent; Blocked   |        | S9 511G-1/8    | PA 10321     | S9 511G-1/8U   | PD 45471     |
| 5/3-way Hand Lever/Detent; Exhausted |        | S9 511E-1/8    | PA 10322     | S9 511E-1/8U   | PD 45472     |
| 5/3-way Hand Lever/Detent; Dual      |        | S9 511B-1/8    | PA 10323     | S9 511B-1/8U   | PD 45473     |
| 5/3-way Hand Lever/Spring; Blocked   |        | S9 511RFG-1/8  | PA 10324     | S9 511RFG-1/8U | PD 45474     |
| 5/3-way Hand Lever/Spring; Exhausted |        | S9 511RFE-1/8  | PA 10325     | S9 511RFE-1/8U | PD 45475     |
| 5/3-way Hand Lever/Spring; Dual      |        | S9 511RFB-1/8  | PA 10326     | S9 511RFB-1/8U | PD 45476     |

| Characteristics to VDI 3290 |                                          |            |                                                    |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------|------------------------------------------|------------|----------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics             | Symbol                                   | Unit       | Description                                        |                                                                              |                                    |  |
| General Features            |                                          |            |                                                    |                                                                              |                                    |  |
| Type                        |                                          |            | Spool valve                                        |                                                                              |                                    |  |
| Mounting                    |                                          |            | 2 screws M6                                        |                                                                              |                                    |  |
| Tube connection             |                                          |            | Thread                                             |                                                                              |                                    |  |
| Port size                   |                                          | NPT (G)    | 1/4                                                |                                                                              |                                    |  |
| Weight (mass)               |                                          | lbs. (kg)  | 1.14 (.52)                                         |                                                                              |                                    |  |
| Installation                |                                          |            | In any position                                    |                                                                              |                                    |  |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                              |                                                                              |                                    |  |
| Medium                      |                                          |            | Filtered compressed air                            |                                                                              |                                    |  |
| Lubrication                 |                                          |            | With or without oil mist lubrication <sup>1)</sup> |                                                                              |                                    |  |
| Pneumatic Characteristics   |                                          |            |                                                    |                                                                              |                                    |  |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                             |                                                                              |                                    |  |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | 0 (0)<br>145 (10)                                  |                                                                              |                                    |  |
| Nominal flow                | Q <sub>N</sub>                           | Cv (l/min) | RFG, RFB: 1.3 (1300)<br>RFE: 1.0 (1000)            |                                                                              |                                    |  |
| Actuation                   |                                          |            |                                                    |                                                                              |                                    |  |
| Manual control              |                                          |            | Direct                                             |                                                                              |                                    |  |
| Stroke                      |                                          | in (mm)    | .256 (6.5)                                         |                                                                              |                                    |  |
| Actuating force             | F <sub>b</sub>                           | lbf (N)    | G,E,B: 2.25 (10)<br>RFG, RFE, RFB: 3.37 (15)       |                                                                              |                                    |  |

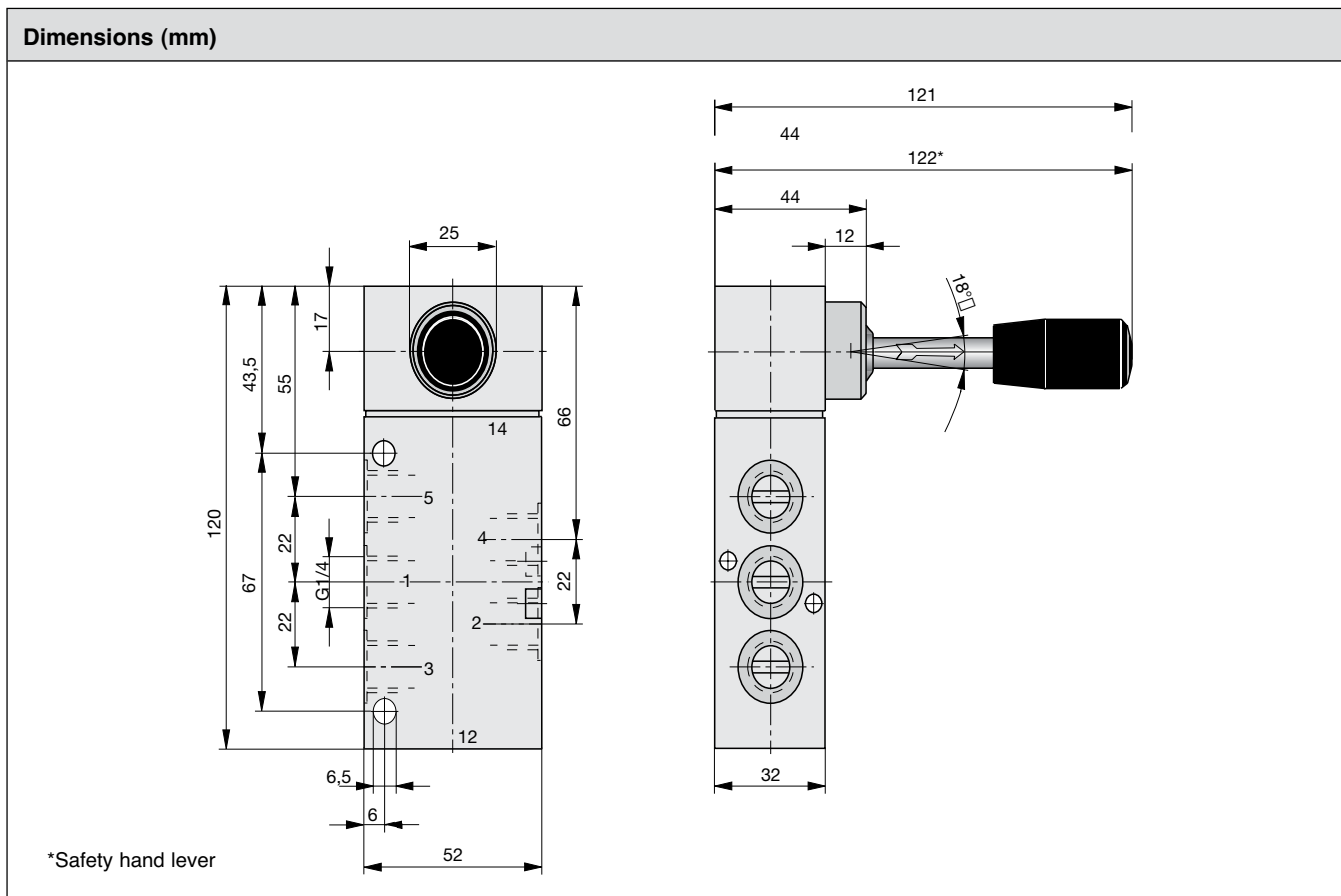
<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

# 5/3-Way Valve 1/4

**Actuation: Hand lever**

- Detent
- Spring Center
- Safety Detent





| Version 1/4                                   |        | Metric Version |              | NPT Version    |              |
|-----------------------------------------------|--------|----------------|--------------|----------------|--------------|
| Actuation                                     | Symbol | Type Number    | Order Number | Type Number    | Order Number |
| 5/3-way Hand Lever/Detent; Blocked            |        | S9 511G-1/4    | PA 12687     | S9 511G-1/4U   | PD 45483     |
| 5/3-way Hand Lever/Detent; Exhausted          |        | S9 511E-1/4    | PA 12688     | S9 511E-1/4U   | PD 45484     |
| 5/3-way Hand Lever/Detent; Dual               |        | S9 511B-1/4    | PA 12689     | S9 511B-1/4U   | PD 45485     |
| 5/3-way Hand Lever/Spring; Blocked            |        | S9 511RFG-1/4  | PA 12690     | S9 511RFG-1/4U | PD 45486     |
| 5/3-way Hand Lever/Spring; Exhausted          |        | S9 511RFE-1/4  | PA 12691     | S9 511RFE-1/4U | PD 45487     |
| 5/3-way Hand Lever/Spring; Dual               |        | S9 511RFB-1/4  | PA 12692     | S9 511RFB-1/4U | PD 45488     |
| 5/3-way Hand Lever/Detent; Blocked (safety)   |        | S9 511SG-1/4   | PA 12693     | S9 511SG-1/4U  | PD 45489     |
| 5/3-way Hand Lever/Detent; Exhausted (safety) |        | S9 511SE-1/4   | PA 12694     | S9 511SE-1/4U  | PD 45490     |
| 5/3-way Hand Lever/Detent; Dual (safety)      |        | S9 511SB-1/4   | PA 12695     | S9 511SB-1/4U  | PD 45491     |

## 5/3-Way Valve

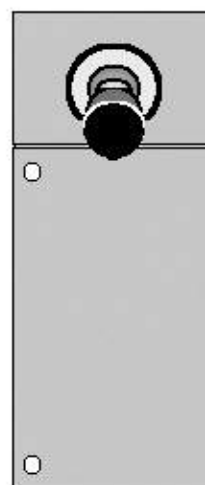
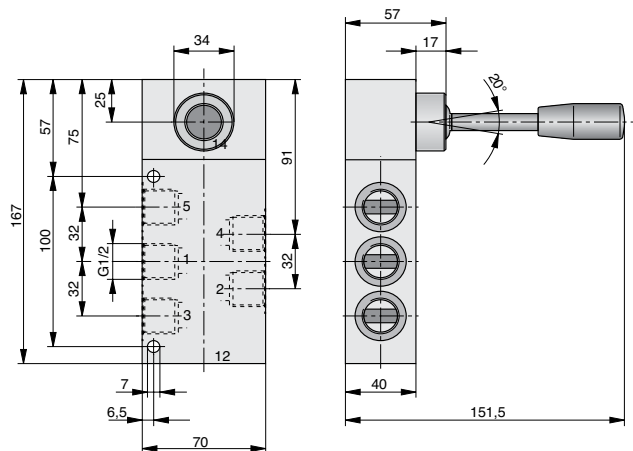
**Actuation:** Hand lever

- Detent

| Characteristics to VDI 3290 |                                          | Pressures quoted as gauge pressure |                                                    |                                                                              |
|-----------------------------|------------------------------------------|------------------------------------|----------------------------------------------------|------------------------------------------------------------------------------|
| Characteristics             | Symbol                                   | Unit                               | Description                                        |                                                                              |
| General Features            |                                          |                                    |                                                    |                                                                              |
| Type                        |                                          |                                    | Spool valve                                        |                                                                              |
| Mounting                    |                                          |                                    | 2 screws M6                                        |                                                                              |
| Tube connection             |                                          |                                    | Thread                                             |                                                                              |
| Port size                   |                                          | NPT (G)                            | 1/2                                                |                                                                              |
| Weight (mass)               |                                          | lbs. (kg)                          | 2.64 (1.20)                                        |                                                                              |
| Installation                |                                          |                                    | In any position                                    |                                                                              |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)                            | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)                            | 14 (-10)<br>158 (+70)                              |                                                                              |
| Medium                      |                                          |                                    | Filtered compressed air                            |                                                                              |
| Lubrication                 |                                          |                                    | With or without oil mist lubrication <sup>1)</sup> |                                                                              |
| Pneumatic Characteristics   |                                          |                                    |                                                    |                                                                              |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar)                          | 87 (6)                                             |                                                                              |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)                          | 0 (0)<br>145 (10)                                  |                                                                              |
| Nominal flow                | Q <sub>N</sub>                           | Cv (l/min)                         | 3.5 (3500)                                         |                                                                              |
| Actuation                   |                                          |                                    |                                                    |                                                                              |
| Manual control              |                                          |                                    | Direct                                             |                                                                              |
| Stroke                      |                                          | in (mm)                            | .370 (9.4)                                         |                                                                              |
| Actuating force             | F <sub>b</sub>                           | lbf (N)                            | 3.37 (15)                                          |                                                                              |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

### Dimensions (mm)



| Version 1/2                        |                                                                                     | Metric Version |              | NPT Version  |              |
|------------------------------------|-------------------------------------------------------------------------------------|----------------|--------------|--------------|--------------|
| Actuation                          | Symbol                                                                              | Type Number    | Order Number | Type Number  | Order Number |
| 5/3-way Hand Lever/Detent; Blocked |  | S9 511G-1/2    | PA 16369     | S9 511G-1/2U | PD 45496     |

# 5/2-Way Valve 1/4

## Interference Sensing Module

The interference sensing module was designed to automatically reverse the direction of a pneumatic cylinder, when it detects an obstruction. Loss of back pressure, caused by an obstruction, triggers the built-in pressure switch to shift the valve and retract the cylinder.

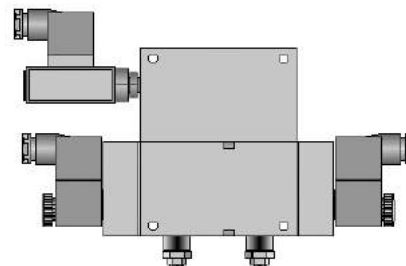
## Applications:

- Doors
- Machine Guards
- Conveyor Transfer
- Pallet Handling
- Feed Systems
- Elevator Systems
- Variable Height Pick & Place

| Pressures quoted as gauge pressure        |            |                                           |
|-------------------------------------------|------------|-------------------------------------------|
| Characteristics                           | Unit       | Description                               |
| <b>General Features</b>                   |            |                                           |
| Type                                      |            | Body ported valve                         |
| Style                                     |            | Spool valve                               |
| Port size                                 | G          | 1/4                                       |
| Weight (mass)                             | lbs. (kg)  | 1.43 (0.65)                               |
| Installation                              |            | In any position                           |
| Ambient temperature<br>minimum<br>maximum | °F (°C)    | 14 (-10)<br>140 (+60)                     |
| Medium temperature<br>minimum<br>maximum  | °F (°C)    | 14 (-10)<br>158 (+70)                     |
| <b>Pneumatic Characteristics</b>          |            |                                           |
| Medium                                    |            | Air                                       |
| Nominal pressure                          | psi (bar)  | 87 (6)                                    |
| Operating pressure<br>minimum<br>maximum  | psi (bar)  | 22 (1.5)<br>116 (8)                       |
| Nominal flow                              | Cv (l/min) | 1.3 (1300)                                |
| Filtration                                |            | 40 micron recommended                     |
| Lubrication                               |            | With or without lubrication <sup>1)</sup> |
| <b>Electrical Characteristics</b>         |            |                                           |
| Voltage<br>AC<br>DC                       | V          | 110, 220<br>12, 24                        |
| Duty cycle                                |            | Continuous duty                           |
| Electric protection                       |            | IP65 to DIN 40050                         |
| Insulating Material                       |            | VDE 0580                                  |
| Connection                                |            | Plug to DIN 43650 form B                  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

| Version 1/4  |                   |       |         |
|--------------|-------------------|-------|---------|
| Order Number | Description       | Ports | Voltage |
| IS0250-0133  | 5/2-way IS-module | G1/4  | 12vDC   |
| IS0250-0233  | 5/2-way IS-module | G1/4  | 24vDC   |
| IS0250-5733  | 5/2-way IS-module | G1/4  | 110vAC  |
| IS0250-6133  | 5/2-way IS-module | G1/4  | 220vAC  |



| Characteristics to VDI 3290                                           |                                          |                  |                                                            |                                                                              | Pressures quoted as gauge pressure    |  |
|-----------------------------------------------------------------------|------------------------------------------|------------------|------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------|--|
| Characteristics                                                       | Symbol                                   | Unit             | Description                                                |                                                                              |                                       |  |
| General Features                                                      |                                          |                  |                                                            |                                                                              |                                       |  |
| Type                                                                  |                                          |                  | Ceramic spool valve                                        |                                                                              |                                       |  |
| Mounting                                                              |                                          |                  | On base plate, to ISO 5599                                 |                                                                              |                                       |  |
| Tube connection                                                       |                                          |                  | Base plate                                                 |                                                                              |                                       |  |
| Port size                                                             |                                          |                  | G1/4 (base plate)                                          |                                                                              |                                       |  |
| Weight (mass)                                                         |                                          | lbs. (kg)        | 1.01 (0.46) signal solenoid<br>1.30 (0.59) double solenoid |                                                                              |                                       |  |
| Installation                                                          |                                          |                  | In any position                                            |                                                                              |                                       |  |
| Ambient temperature range                                             | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)          | 14 (-10)<br>140 (+60)                                      | Note:<br>When using below freezing point it is necessary to consult factory. |                                       |  |
| Medium temperature range                                              | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)          | 14 (-10)<br>140 (+60)                                      |                                                                              |                                       |  |
| Medium                                                                |                                          |                  | Filtered compressed air                                    |                                                                              |                                       |  |
| Lubrication                                                           |                                          |                  | With or without oil mist lubrication <sup>1)</sup>         |                                                                              |                                       |  |
| Pneumatic Characteristics                                             |                                          |                  |                                                            |                                                                              |                                       |  |
| Nominal pressure                                                      | p <sub>n</sub>                           | psi (bar)        | 87 (6)                                                     |                                                                              |                                       |  |
| Operating pressure range                                              | p <sub>min</sub>                         | psi (bar)        | 29 (2)                                                     |                                                                              |                                       |  |
|                                                                       |                                          |                  | -1 (Version S)                                             |                                                                              |                                       |  |
|                                                                       | p <sub>max</sub>                         | psi (bar)        | 174 (12)                                                   |                                                                              |                                       |  |
| Nominal flow                                                          | Q <sub>N</sub>                           | Cv (l/min)       | 5/2-way valve                                              | 5/3-way valve                                                                |                                       |  |
|                                                                       |                                          |                  | 1.7 (1680)                                                 | 1.7 (1680)                                                                   |                                       |  |
| Actuation                                                             |                                          |                  |                                                            |                                                                              |                                       |  |
| Electrical                                                            |                                          |                  | Pilot operated<br>Pilot operated with external pilot air   |                                                                              |                                       |  |
| Actuation pressure range                                              | p <sub>at min</sub>                      | psi (bar)        | 29 (2)                                                     |                                                                              |                                       |  |
|                                                                       | p <sub>at max</sub>                      | psi (bar)        | 145 (10)                                                   |                                                                              |                                       |  |
| Voltage type                                                          |                                          |                  | AC                                                         | DC                                                                           |                                       |  |
| Nominal Voltage<br>Standard version<br>Low watt. version              | U <sub>n</sub><br>U <sub>n</sub>         | V<br>V           | 220<br>220                                                 | 24<br>24                                                                     | Further voltages available on request |  |
| Initial Power Consumption<br>Standard version<br>Low watt. version    |                                          | VA (W)<br>VA (W) | 11<br>7.8                                                  | 4.8<br>2.7                                                                   |                                       |  |
| Continuous Power Consumption<br>Standard version<br>Low watt. version |                                          | VA (W)<br>VA (W) | 8.5<br>4.9                                                 | 4.8<br>2.7                                                                   |                                       |  |
| Duty cycle                                                            | ED                                       | %                | Continuous Duty                                            |                                                                              |                                       |  |
| Electrical protection                                                 |                                          |                  | IP65 to DIN 40050 (with plug)                              |                                                                              |                                       |  |
| Insulating material                                                   |                                          |                  | VDE 0580                                                   |                                                                              |                                       |  |
| Connection                                                            |                                          |                  | Plug to DIN 43650 form B                                   |                                                                              |                                       |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

# 5/2-Way Valve 5/3-Way Valve

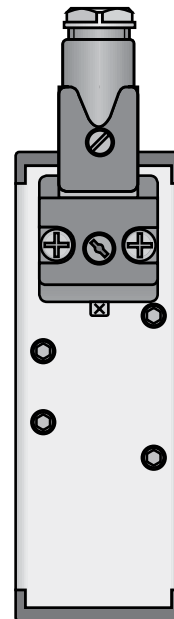
ISO 5599  
Size 1

## Actuation: Solenoid

- Single Solenoid
- Double Solenoid
- Spring Center

## Delivery Includes:

valve  
mounting screws  
gasket  
solenoid coil(s)



| Characteristics to VDI 3290      Pressures quoted as gauge pressure |                                          |            |                                                    |                                                                              |
|---------------------------------------------------------------------|------------------------------------------|------------|----------------------------------------------------|------------------------------------------------------------------------------|
| Characteristics                                                     | Symbol                                   | Unit       | Description                                        |                                                                              |
| General Features                                                    |                                          |            |                                                    |                                                                              |
| Type                                                                |                                          |            | Ceramic spool valve                                |                                                                              |
| Mounting                                                            |                                          |            | On base plate, to ISO 5599                         |                                                                              |
| Tube connection                                                     |                                          |            | Base plate                                         |                                                                              |
| Port size                                                           |                                          |            | G1/4 (base plate)                                  |                                                                              |
| Weight (mass)                                                       |                                          | lbs. (kg)  | .70 (0.32)                                         |                                                                              |
| Installation                                                        |                                          |            | In any position                                    |                                                                              |
| Ambient temperature range                                           | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |
| Medium temperature range                                            | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                              |                                                                              |
| Medium                                                              |                                          |            | Filtered compressed air                            |                                                                              |
| Lubrication                                                         |                                          |            | With or without oil mist lubrication <sup>1)</sup> |                                                                              |
| Pneumatic Characteristics                                           |                                          |            |                                                    |                                                                              |
| Nominal pressure                                                    | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                             |                                                                              |
| Operating pressure range                                            | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | -13 (-0.9)<br>174 (12)                             |                                                                              |
| Nominal flow                                                        | Q <sub>N</sub>                           | Cv (l/min) | 5/2-way valve                                      | 5/3-way valve                                                                |
|                                                                     |                                          |            | 1.7 (1680)                                         | 1.7 (1680)                                                                   |
| Actuation                                                           |                                          |            |                                                    |                                                                              |
| Pneumatic                                                           |                                          |            | Direct                                             |                                                                              |
| Actuation pressure range                                            | p <sub>st min</sub>                      | psi (bar)  | 29 (2)                                             |                                                                              |
|                                                                     | p <sub>st max</sub>                      | psi (bar)  | 145 (10)                                           |                                                                              |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

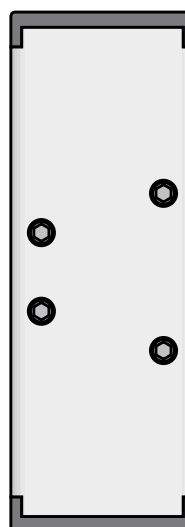
# 5/2-Way Valve 5/3-Way Valve ISO 5599 Size 1

## Actuation: Air Pilot

- Single Air Pilot
- Double Air Pilot
- Spring Center

## Delivery Includes:

valve  
mounting screws  
gasket



| Characteristics to VDI 3290                                           |                                          |                  | Pressures quoted as gauge pressure                         |                                                                              |
|-----------------------------------------------------------------------|------------------------------------------|------------------|------------------------------------------------------------|------------------------------------------------------------------------------|
| Characteristics                                                       | Symbol                                   | Unit             | Description                                                |                                                                              |
| General Features                                                      |                                          |                  |                                                            |                                                                              |
| Type                                                                  |                                          |                  | Ceramic spool valve                                        |                                                                              |
| Mounting                                                              |                                          |                  | On base plate, to ISO 5599                                 |                                                                              |
| Tube connection                                                       |                                          |                  | Base plate                                                 |                                                                              |
| Port size                                                             |                                          |                  | G3/8 (base plate)                                          |                                                                              |
| Weight (mass)                                                         |                                          | lbs. (kg)        | 1.54 (0.70) single solenoid<br>1.83 (0.83) double solenoid |                                                                              |
| Installation                                                          |                                          |                  | In any position                                            |                                                                              |
| Ambient temperature range                                             | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)          | 14 (-10)<br>140 (+60)                                      | Note:<br>When using below freezing point it is necessary to consult factory. |
| Medium temperature range                                              | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)          | 14 (-10)<br>140 (+60)                                      |                                                                              |
| Medium                                                                |                                          |                  | Filtered compressed air                                    |                                                                              |
| Lubrication                                                           |                                          |                  | With or without oil mist lubrication <sup>1)</sup>         |                                                                              |
| Pneumatic Characteristics                                             |                                          |                  |                                                            |                                                                              |
| Nominal pressure                                                      | p <sub>n</sub>                           | psi (bar)        | 87 (6)                                                     |                                                                              |
| Operating pressure range                                              | p <sub>min</sub>                         | psi (bar)        | 29 (2)                                                     |                                                                              |
|                                                                       |                                          |                  | -1 (Version S)                                             |                                                                              |
|                                                                       | p <sub>max</sub>                         | psi (bar)        | 174 (12)                                                   |                                                                              |
| Nominal flow                                                          | Q <sub>N</sub>                           |                  | 5/2-way valve                                              | 5/3-way valve                                                                |
|                                                                       |                                          | Cv (l/min)       | 4.3 (4320)                                                 | 4.3 (4320)                                                                   |
| Actuation                                                             |                                          |                  |                                                            |                                                                              |
| Electrical                                                            |                                          |                  | Pilot operated<br>Pilot operated with external pilot air   |                                                                              |
| Actuation pressure range                                              | p <sub>st min</sub>                      | bar              | 2                                                          |                                                                              |
|                                                                       | p <sub>st max</sub>                      | bar              | 12                                                         |                                                                              |
| Voltage type                                                          |                                          |                  | AC                                                         | DC                                                                           |
| Nominal Voltage<br>Standard version<br>Low watt. version              | U <sub>n</sub><br>U <sub>n</sub>         | V<br>V           | 220<br>220<br>Further voltages available on request        | 24<br>24                                                                     |
| Initial Power Consumption<br>Standard version<br>Low watt. version    |                                          | VA (W)<br>VA (W) | 11<br>7.8                                                  | 4.8<br>2.7                                                                   |
| Continuous Power Consumption<br>Standard version<br>Low watt. version |                                          | VA (W)<br>VA (W) | 8.5<br>4.9                                                 | 4.8<br>2.7                                                                   |
| Duty cycle                                                            | ED                                       | %                | Continuous Duty                                            |                                                                              |
| Electrical protection                                                 |                                          |                  | IP65 to DIN 40050 (with plug)                              |                                                                              |
| Insulating material                                                   |                                          |                  | VDE 0580                                                   |                                                                              |
| Connection                                                            |                                          |                  | Plug to DIN 43650 form B                                   |                                                                              |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

# 5/2-Way Valve 5/3-Way Valve

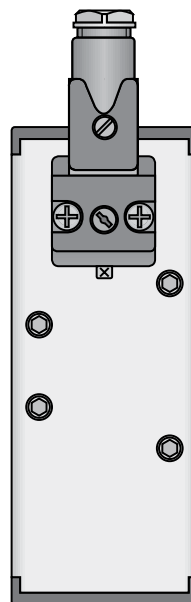
ISO 5599  
Size 2

## Actuation: Solenoid

- Single Solenoid
- Double Solenoid
- Spring Center

## Delivery Includes:

valve  
mounting screws  
gasket  
solenoid coil(s)



| Characteristics to VDI 3290 |                                          |            |                                                    |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------|------------------------------------------|------------|----------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics             | Symbol                                   | Unit       | Description                                        |                                                                              |                                    |  |
| General Features            |                                          |            |                                                    |                                                                              |                                    |  |
| Type                        |                                          |            | Ceramic spool valve                                |                                                                              |                                    |  |
| Mounting                    |                                          |            | On base plate, to ISO 5599                         |                                                                              |                                    |  |
| Tube connection             |                                          |            | Base plate                                         |                                                                              |                                    |  |
| Port size                   |                                          |            | G3/8 (base plate)                                  |                                                                              |                                    |  |
| Weight (mass)               |                                          | lbs. (kg)  | 1.23 (0.56)                                        |                                                                              |                                    |  |
| Installation                |                                          |            | In any position                                    |                                                                              |                                    |  |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                              |                                                                              |                                    |  |
| Medium                      |                                          |            | Filtered compressed air                            |                                                                              |                                    |  |
| Lubrication                 |                                          |            | With or without oil mist lubrication <sup>1)</sup> |                                                                              |                                    |  |
| Pneumatic Characteristics   |                                          |            |                                                    |                                                                              |                                    |  |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                             |                                                                              |                                    |  |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | -13 (-0.9)<br>174 (12)                             |                                                                              |                                    |  |
| Nominal flow                | Q <sub>N</sub>                           | Cv (l/min) | 5/2-way valve                                      | 5/3-way valve                                                                |                                    |  |
|                             |                                          |            | 4.3 (4320)                                         | 4.3 (4320)                                                                   |                                    |  |
| Actuation                   |                                          |            |                                                    |                                                                              |                                    |  |
| Pneumatic                   |                                          |            | Direct                                             |                                                                              |                                    |  |
| Actuation pressure range    | p <sub>st min</sub>                      | psi (bar)  | 29 (2)                                             |                                                                              |                                    |  |
|                             | p <sub>st max</sub>                      | psi (bar)  | 174 (12)                                           |                                                                              |                                    |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

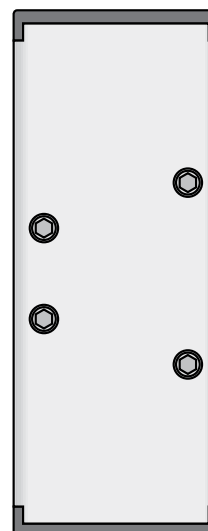
# 5/2-Way Valve 5/3-Way Valve ISO 5599 Size 2

## Actuation: Air Pilot

- Single Air Pilot
- Double Air Pilot
- Spring Center

## Delivery Includes:

valve  
mounting screws  
gasket



| Characteristics to VDI 3290                                           |                                          |                  |                                                            |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------------------------------------------------|------------------------------------------|------------------|------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics                                                       | Symbol                                   | Unit             | Description                                                |                                                                              |                                    |  |
| General Features                                                      |                                          |                  |                                                            |                                                                              |                                    |  |
| Type                                                                  |                                          |                  | Ceramic spool valve                                        |                                                                              |                                    |  |
| Mounting                                                              |                                          |                  | On base plate, to ISO 5599                                 |                                                                              |                                    |  |
| Tube connection                                                       |                                          |                  | Base plate                                                 |                                                                              |                                    |  |
| Port size                                                             |                                          |                  | G1/2 (base plate)                                          |                                                                              |                                    |  |
| Weight (mass)                                                         |                                          | lbs. (kg)        | 2.71 (1.23) single solenoid<br>3.01 (1.37) double solenoid |                                                                              |                                    |  |
| Installation                                                          |                                          |                  | In any position                                            |                                                                              |                                    |  |
| Ambient temperature range                                             | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)          | 14 (-10)<br>140 (+60)                                      | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range                                              | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)          | 14 (-10)<br>140 (+60)                                      |                                                                              |                                    |  |
| Medium                                                                |                                          |                  | Filtered compressed air                                    |                                                                              |                                    |  |
| Lubrication                                                           |                                          |                  | With or without oil mist lubrication <sup>1)</sup>         |                                                                              |                                    |  |
| Pneumatic Characteristics                                             |                                          |                  |                                                            |                                                                              |                                    |  |
| Nominal pressure                                                      | p <sub>n</sub>                           | psi (bar)        | 87 (6)                                                     |                                                                              |                                    |  |
| Operating pressure range                                              | p <sub>min</sub>                         | psi (bar)        | 29 (2)                                                     |                                                                              |                                    |  |
|                                                                       |                                          |                  | -1 (Version S)                                             |                                                                              |                                    |  |
|                                                                       | p <sub>max</sub>                         | psi (bar)        | 174 (12)                                                   |                                                                              |                                    |  |
| Nominal flow                                                          | Q <sub>N</sub>                           | Cv (l/min)       | 5/2-way valve                                              |                                                                              | 5/3-way valve                      |  |
|                                                                       |                                          |                  | 6.5 (6540)                                                 |                                                                              | 6.5 (6540)                         |  |
| Actuation                                                             |                                          |                  |                                                            |                                                                              |                                    |  |
| Electrical                                                            |                                          |                  | Pilot operated<br>Pilot operated with external pilot air   |                                                                              |                                    |  |
| Actuation pressure range                                              | p <sub>st min</sub>                      | psi (bar)        | 29 (2)                                                     |                                                                              |                                    |  |
|                                                                       | p <sub>st max</sub>                      | psi (bar)        | 145 (10)                                                   |                                                                              |                                    |  |
| Voltage type                                                          |                                          |                  | AC                                                         |                                                                              | DC                                 |  |
| Nominal Voltage<br>Standard version<br>Low watt. version              | U <sub>n</sub><br>U <sub>n</sub>         | V<br>V           | 220<br>220                                                 |                                                                              | 24<br>24                           |  |
|                                                                       |                                          |                  | Further voltages available on request                      |                                                                              |                                    |  |
| Initial Power Consumption<br>Standard version<br>Low watt. version    |                                          | VA (W)<br>VA (W) | 11<br>7.8                                                  |                                                                              | 4.8<br>2.7                         |  |
| Continuous Power Consumption<br>Standard version<br>Low watt. version |                                          | VA (W)<br>VA (W) | 8.5<br>4.9                                                 |                                                                              | 4.8<br>2.7                         |  |
| Duty cycle                                                            | ED                                       | %                | Continuous Duty                                            |                                                                              |                                    |  |
| Electrical protection                                                 |                                          |                  | IP65 to DIN 40050 (with plug)                              |                                                                              |                                    |  |
| Insulating material                                                   |                                          |                  | VDE 0580                                                   |                                                                              |                                    |  |
| Connection                                                            |                                          |                  | Plug to DIN 43650 form B                                   |                                                                              |                                    |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

# 5/2-Way Valve 5/3-Way Valve

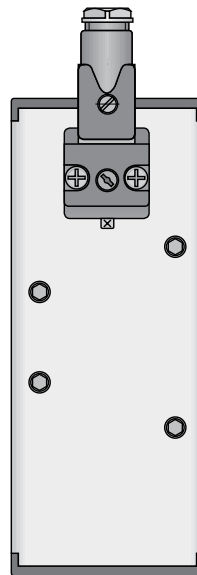
## ISO 5599 Size 3

### Actuation: Solenoid

- Single Solenoid
- Double Solenoid
- Spring Center

### Delivery Includes:

valve  
mounting screws  
gasket  
solenoid coil(s)



| Characteristics to VDI 3290 |                                          |           |                                                    |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------|------------------------------------------|-----------|----------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics             | Symbol                                   | Unit      | Description                                        |                                                                              |                                    |  |
| General Features            |                                          |           |                                                    |                                                                              |                                    |  |
| Type                        |                                          |           | Ceramic spool valve                                |                                                                              |                                    |  |
| Mounting                    |                                          |           | On base plate, to ISO 5599                         |                                                                              |                                    |  |
| Tube connection             |                                          |           | Base plate                                         |                                                                              |                                    |  |
| Port size                   |                                          |           | G1/2 (base plate)                                  |                                                                              |                                    |  |
| Weight (mass)               |                                          | lbs. (kg) | 2.42 (1.1)                                         |                                                                              |                                    |  |
| Installation                |                                          |           | In any position                                    |                                                                              |                                    |  |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)   | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)   | 14 (-10)<br>140 (+60)                              |                                                                              |                                    |  |
| Medium                      |                                          |           | Filtered compressed air                            |                                                                              |                                    |  |
| Lubrication                 |                                          |           | With or without oil mist lubrication <sup>1)</sup> |                                                                              |                                    |  |
| Pneumatic Characteristics   |                                          |           |                                                    |                                                                              |                                    |  |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar) | 87 (6)                                             |                                                                              |                                    |  |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar) | -13 (-0.9)<br>174 (12)                             |                                                                              |                                    |  |
| Nominal flow                | Q <sub>N</sub>                           | 1/min     | 5/2-way valve                                      | 5/3-way valve                                                                |                                    |  |
|                             |                                          |           | 6.5 (6540)                                         | 6.5 (6540)                                                                   |                                    |  |
| Actuation                   |                                          |           |                                                    |                                                                              |                                    |  |
| Pneumatic                   |                                          |           | Direct                                             |                                                                              |                                    |  |
| Actuation pressure range    | p <sub>st min</sub>                      | psi (bar) | 29 (2)                                             |                                                                              |                                    |  |
|                             | p <sub>st max</sub>                      | psi (bar) | 174 (12)                                           |                                                                              |                                    |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

# 5/2-Way Valve 5/3-Way Valve

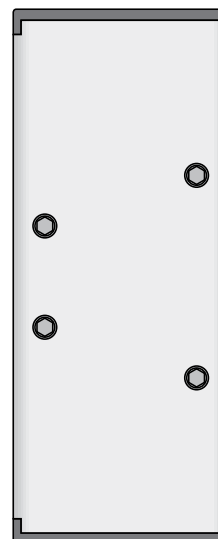
## ISO 5599 Size 3

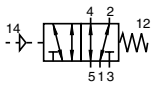
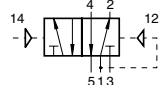
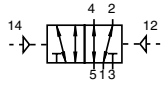
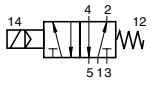
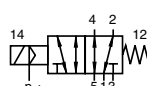
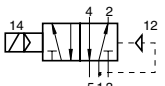
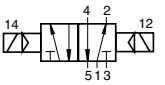
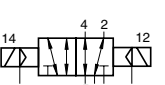
### Actuation: Air Pilot

- Single Air Pilot
- Double Air Pilot
- Spring Center

### Delivery Includes:

valve  
mounting screws  
gasket

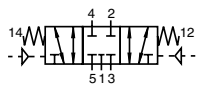
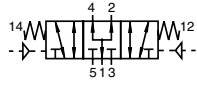
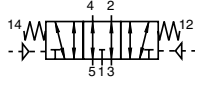
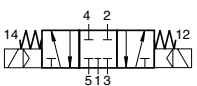
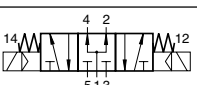
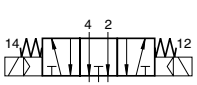
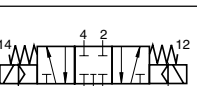
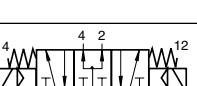
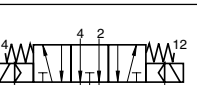


| ORDER INSTRUCTIONS: 5/2-Way Valves                              |                                                                                     |                  |               |         |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------|---------------|---------|
| Actuation                                                       | Symbol                                                                              | Type Number      | Order Number  | Size    |
| 5/2 Single Air Pilot<br>Spring Return                           |    | S20561RF-01      | PA 12891      | VDMA 01 |
|                                                                 |                                                                                     | S20561RF-1       | PA 12869      | Size 1  |
|                                                                 |                                                                                     | S20561RF-2       | PA 16425      | Size 2  |
|                                                                 |                                                                                     | S20561RF-3       | PA 16426      | Size 3  |
| 5/2 Single Air Pilot<br>Air Spring Return                       |    | S20561R-01       | PA 12892      | VDMA 01 |
|                                                                 |                                                                                     | S20561R-1        | PA 12870      | Size 1  |
|                                                                 |                                                                                     | S20561R-2        | PA 16428      | Size 2  |
|                                                                 |                                                                                     | S20561R-3        | PA 16429      | Size 3  |
| 5/2 Double Air Pilot                                            |    | S20561-01        | PA 12893      | VDMA 01 |
|                                                                 |                                                                                     | S20561-1         | PA 12868      | Size 1  |
|                                                                 |                                                                                     | S20561-2         | PA 16422      | Size 2  |
|                                                                 |                                                                                     | S20561-3         | PA 16423      | Size 3  |
| 5/2 Single Solenoid<br>Spring Return                            |    | S20581RF-01-..   | PA 12886-..33 | VDMA 01 |
|                                                                 |                                                                                     | S20581RF-1-..    | PA 12875-..33 | Size 1  |
|                                                                 |                                                                                     | S20581RF-2-..    | PA 16441-..33 | Size 2  |
|                                                                 |                                                                                     | S20581RF-3-..    | PA 16442-..33 | Size 3  |
| 5/2 Single Solenoid<br>Spring Return<br>with external pilot air |    | S20581S-RF-01-.. | PA 12896-..33 | VDMA 01 |
|                                                                 |                                                                                     | S20581S-RF-1-..  | PA 12882-..33 | Size 1  |
|                                                                 |                                                                                     | S20581S-RF-2-..  | PA 16456-..33 | Size 2  |
|                                                                 |                                                                                     | S20581S-RF-3-..  | PA 16462-..33 | Size 3  |
| 5/2 Single Solenoid<br>Air Spring Return                        |   | S20581R-01-..    | PA 12887-..33 | VDMA 01 |
|                                                                 |                                                                                     | S20581R-1-..     | PA 12876-..33 | Size 1  |
|                                                                 |                                                                                     | S20581R-2-..     | PA 16444-..33 | Size 2  |
|                                                                 |                                                                                     | S20581R-3-..     | PA 16445-..33 | Size 3  |
| 5/2 Double Solenoid                                             |  | S20581-01-..     | PA 12888-..33 | VDMA 01 |
|                                                                 |                                                                                     | S20581-1-..      | PA 12874-..33 | Size 1  |
|                                                                 |                                                                                     | S20581-2-..      | PA 16438-..33 | Size 2  |
|                                                                 |                                                                                     | S20581-3-..      | PA 16439-..33 | Size 3  |
| 5/2 Double Solenoid<br>with external pilot air                  |  | S20581S-01-..    | PA 12898-..33 | VDMA 01 |
|                                                                 |                                                                                     | S20581S-1-..     | PA 12880-..33 | Size 1  |
|                                                                 |                                                                                     | S20581S-2-..     | PA 16454-..33 | Size 2  |
|                                                                 |                                                                                     | S20581S-3-..     | PA 16460-..33 | Size 3  |

| Voltage Range |            | Coil Number | Order Code |
|---------------|------------|-------------|------------|
| Nominal       | Secondary  |             |            |
| 12 vDC        | --         | KZ 3518     | 01         |
| 24 vDC        | 60 50/60Hz | KZ 3519     | 02         |
| 110 50/60Hz   | 48 vDC     | KZ 3521     | 57         |
| 220 50/60Hz   | 110 vDC    | KZ 3522     | 61         |



• Other voltages available. Contact factory.

| ORDER INSTRUCTIONS: 5/3-Way Valves                              |                                                                                     |                   |               |         |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------|---------------|---------|
| Actuation                                                       | Symbol                                                                              | Type Number       | Order Number  | Size    |
| 5/3 Double Air Pilot<br>Closed Center                           |    | S20561RFG-01      | PA 12894      | VDMA 01 |
|                                                                 |                                                                                     | S20561RFG-1       | PA 12871      | Size 1  |
|                                                                 |                                                                                     | S20561RFG-2       | PA 16431      | Size 2  |
|                                                                 |                                                                                     | S20561RFG-3       | PA 16432      | Size 3  |
|                                                                 |    | S20561RFB-1       | PA 12873      | Size 1  |
|                                                                 |                                                                                     | S20561RFB-2       | PA 16437      | Size 2  |
|                                                                 |                                                                                     |                   |               |         |
|                                                                 |                                                                                     |                   |               |         |
|                                                                 |    | S20561RFE-01      | PA 12895      | VDMA 01 |
|                                                                 |                                                                                     | S20561RFE-1       | PA 12872      | Size 1  |
|                                                                 |                                                                                     | S20561RFE-2       | PA 16434      | Size 2  |
|                                                                 |                                                                                     | S20561RFE-3       | PA 16435      | Size 3  |
| 5/3 Double Solenoid<br>Closed Center                            |    | S20581RFG-01      | PA 12889-..33 | VDMA 01 |
|                                                                 |                                                                                     | S20581RFG-1-..    | PA 12877-..33 | Size 1  |
|                                                                 |                                                                                     | S20581RFG-2-..    | PA 16447-..33 | Size 2  |
|                                                                 |                                                                                     | S20581RFG-3-..    | PA 16448-..33 | Size 3  |
|                                                                 |    | S20581RFB-1-..    | PA 12879-..33 | Size 1  |
|                                                                 |                                                                                     | S20581RFB-2-..    | PA 16453-..33 | Size 2  |
|                                                                 |                                                                                     |                   |               |         |
|                                                                 |                                                                                     |                   |               |         |
|                                                                 |    | S20581RFE-01      | PA 12890-..33 | VDMA 01 |
|                                                                 |                                                                                     | S20581RFE-1-..    | PA 12878-..33 | Size 1  |
|                                                                 |                                                                                     | S20581RFE-2-..    | PA 16450-..33 | Size 2  |
|                                                                 |                                                                                     | S20581RFE-3-..    | PA 16451-..33 | Size 3  |
| 5/3 Double Solenoid<br>with external air pilot<br>Closed Center |  | S20581S-RFG-01-.. | PA 12900-..33 | VDMA 01 |
|                                                                 |                                                                                     | S20581S-RFG-1-..  | PA 12883-..33 | Size 1  |
|                                                                 |                                                                                     | S20581S-RFG-2-..  | PA 16457-..33 | Size 2  |
|                                                                 |                                                                                     | S20581S-RFG-3-..  | PA 16463-..33 | Size 3  |
|                                                                 |  | S20581S-RFB-1-..  | PA 12885-..33 | Size 1  |
|                                                                 |                                                                                     | S20581S-RFB-2-..  | PA 16459-..33 | Size 2  |
|                                                                 |                                                                                     |                   |               |         |
|                                                                 |                                                                                     |                   |               |         |
|                                                                 |  | S20581S-RFE-01-.. | PA 12899-..33 | VDMA 01 |
|                                                                 |                                                                                     | S20581S-RFE-1-..  | PA 12884-..33 | Size 1  |
|                                                                 |                                                                                     | S20581S-RFE-2-..  | PA 16458-..33 | Size 2  |
|                                                                 |                                                                                     | S20581S-RFE-3-..  | PA 16464-..33 | Size 3  |

| Voltage Range |            | Coil Number | Order Code |
|---------------|------------|-------------|------------|
| Nominal       | Secondary  |             |            |
| 12 vDC        | --         | KZ 3518     | 01         |
| 24 vDC        | 60 50/60Hz | KZ 3519     | 02         |
| 110 50/60Hz   | 48 vDC     | KZ 3521     | 57         |
| 220 50/60Hz   | 110 vDC    | KZ 3522     | 61         |



• Other voltages available. Contact factory.

| Characteristics to VDI 3290                   |                                          |            |                                                              |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------------------------|------------------------------------------|------------|--------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics                               | Symbol                                   | Unit       | Description                                                  |                                                                              |                                    |  |
| General Features                              |                                          |            |                                                              |                                                                              |                                    |  |
| Type                                          |                                          |            | Spool valve                                                  |                                                                              |                                    |  |
| Mounting                                      |                                          |            | 2 screws M5                                                  |                                                                              |                                    |  |
| Tube connection                               |                                          |            | Thread                                                       |                                                                              |                                    |  |
| Port size                                     |                                          | NPT (G)    | 1/8                                                          |                                                                              |                                    |  |
| Weight (mass)                                 |                                          | lbs. (kg)  | .616 (0.280) Single solenoid<br>.913 (0.415) Double solenoid |                                                                              |                                    |  |
| Installation                                  |                                          |            | In any position                                              |                                                                              |                                    |  |
| Ambient temperature range                     | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                                        | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range                      | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                                        |                                                                              |                                    |  |
| Medium                                        |                                          |            | Filtered compressed air                                      |                                                                              |                                    |  |
| Lubrication                                   |                                          |            | With or without oil mist lubrication <sup>1)</sup>           |                                                                              |                                    |  |
| Pneumatic Characteristics                     |                                          |            |                                                              |                                                                              |                                    |  |
| Nominal pressure                              | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                                       |                                                                              |                                    |  |
| Operating pressure range                      | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | Single solenoid<br>29 (2)<br>145 (10)                        |                                                                              |                                    |  |
|                                               | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | Double solenoid<br>22 (1.5)<br>145 (10)                      |                                                                              |                                    |  |
| Nominal flow                                  | Q <sub>N</sub>                           | Cv (l/min) | .5 (500)                                                     |                                                                              |                                    |  |
| Actuation                                     |                                          |            |                                                              |                                                                              |                                    |  |
| Electrical                                    |                                          |            | Pilot operated                                               |                                                                              |                                    |  |
| Voltage                                       |                                          |            | AC                                                           | DC                                                                           |                                    |  |
| Nominal voltage*<br>Standard version          | U <sub>n</sub>                           | V          | 220                                                          | 24                                                                           |                                    |  |
| Initial power consumption<br>Standard version |                                          | VA (W)     | 8.5                                                          | 2.5                                                                          |                                    |  |
| Continuous consumption<br>Standard version    |                                          | VA (W)     | 6.0                                                          | 2.5                                                                          |                                    |  |
| Duty cycle                                    | ED                                       | %          | Continuous Duty                                              |                                                                              |                                    |  |
| Electrical protection                         |                                          |            | IP65 to DIN 40050 (with plug)                                |                                                                              |                                    |  |
| Insulating material                           |                                          |            | VDE 0580                                                     |                                                                              |                                    |  |
| Connection                                    |                                          |            | Plug to DIN 43650 form B                                     |                                                                              |                                    |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

# 5/2-Way Valve 1/8

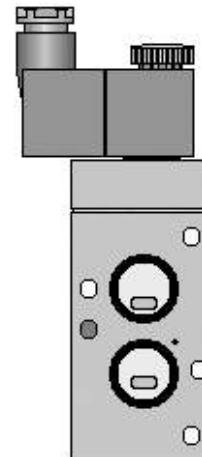
with NAMUR connection

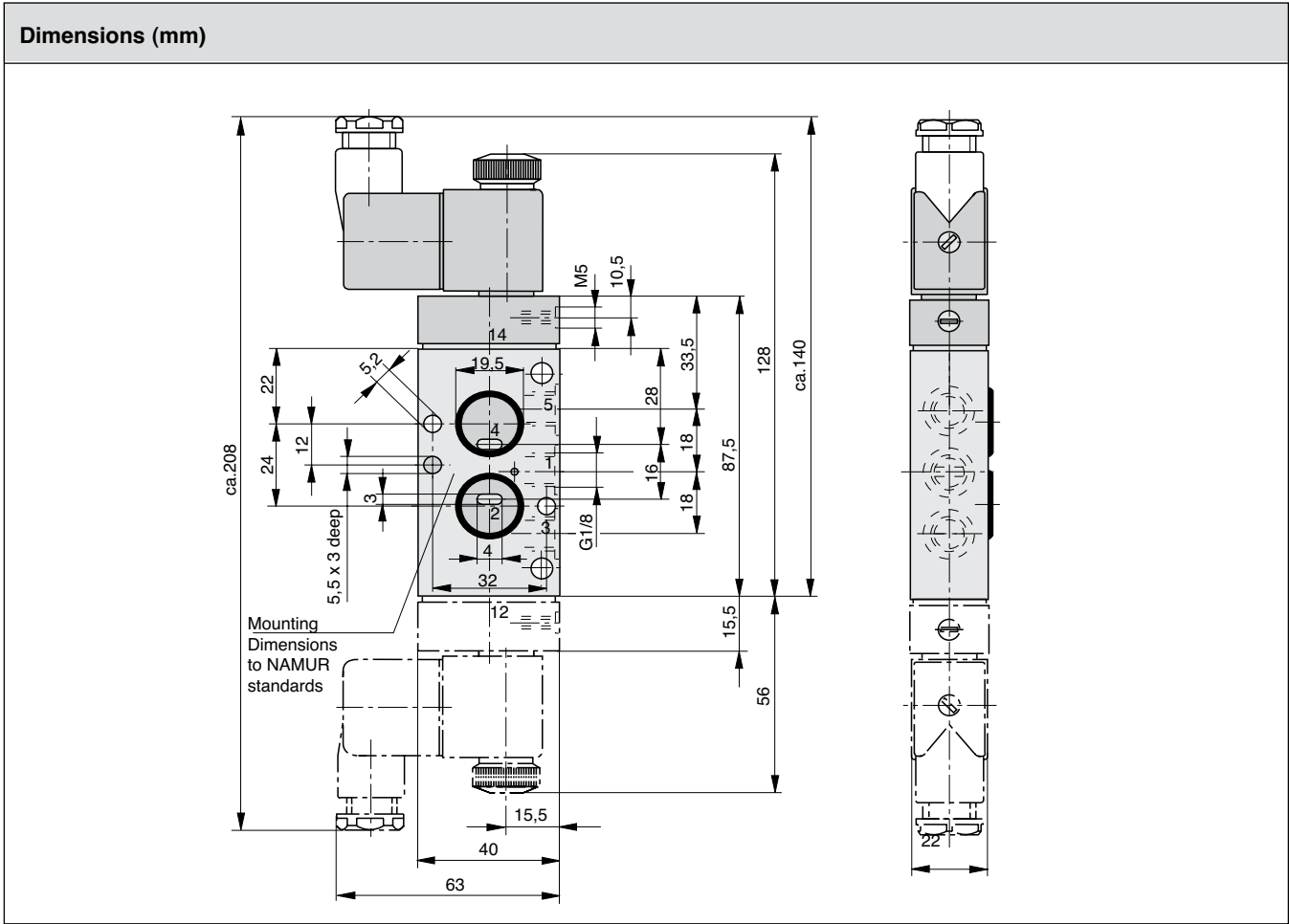
**Actuation: Solenoid**

- Single Solenoid
- Double Solenoid

## Delivery Includes:

valve  
mounting screws  
coding pin  
o-rings





| Version 1/8                       |        | Metric Version  |               | NPT Version      |               |
|-----------------------------------|--------|-----------------|---------------|------------------|---------------|
| Actuation                         | Symbol | Type Number     | Order Number  | Type Number      | Order Number  |
| 5/2 Single Solenoid/Spring Return |        | S9 581RF-1/8-SO | PD 34143-..33 | S9 581RF-1/8U-SO | PD 45502-..33 |
| 5/2 Double Solenoid               |        | S9 581-1/8-SO   | PD 34984-..33 | S9 581-1/8U-SO   | PD 45503-..33 |

| Voltage Range |            | Coil Number | Order Code |
|---------------|------------|-------------|------------|
| Nominal       | Secondary  |             |            |
| 12 vDC        | --         | KZ 3674     | 01         |
| 24 vDC        | 60 50/60Hz | KZ 3673     | 02         |
| 110 50/60Hz   | 48 vDC     | KZ 3669     | 57         |
| 220 50/60Hz   | 110 vDC    | KZ 3672     | 61         |
| 24 50/60Hz    | --         | KZ 3675     | 51         |

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.



**Accessory:**

| Order #        | Description                                   |
|----------------|-----------------------------------------------|
| NAMURPLATE-1/8 | Converts the 5/2-way valve to a 3/2-way valve |

| Characteristics to VDI 3290                   |                                        |            |                                                          |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------------------------|----------------------------------------|------------|----------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics                               | Symbol                                 | Unit       | Description                                              |                                                                              |                                    |  |
| General Features                              |                                        |            |                                                          |                                                                              |                                    |  |
| Type                                          |                                        |            | Spool valve                                              |                                                                              |                                    |  |
| Mounting                                      |                                        |            | 2 screws M5                                              |                                                                              |                                    |  |
| Tube connection                               |                                        |            | Thread                                                   |                                                                              |                                    |  |
| Port size                                     |                                        | NPT (G)    | 1/4                                                      |                                                                              |                                    |  |
| Weight (mass)                                 |                                        | lbs. (kg)  | 1.32 (0.6) Single solenoid<br>1.54 (0.7) Double solenoid |                                                                              |                                    |  |
| Installation                                  |                                        |            | In any position                                          |                                                                              |                                    |  |
| Ambient temperature range                     | $\vartheta_{min}$<br>$\vartheta_{max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                                    | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range                      | $\vartheta_{min}$<br>$\vartheta_{max}$ | °F (°C)    | 14 (-10)<br>158 (+70)                                    |                                                                              |                                    |  |
| Medium                                        |                                        |            | Filtered compressed air                                  |                                                                              |                                    |  |
| Lubrication                                   |                                        |            | With or without oil mist lubrication <sup>1)</sup>       |                                                                              |                                    |  |
| Pneumatic Characteristics                     |                                        |            |                                                          |                                                                              |                                    |  |
| Nominal pressure                              | p <sub>n</sub>                         | psi (bar)  | 87 (6)                                                   |                                                                              |                                    |  |
| Operating pressure range                      | p <sub>min</sub><br>p <sub>max</sub>   | psi (bar)  | Single solenoid<br>29 (2)<br>145 (10)                    |                                                                              |                                    |  |
|                                               |                                        | psi (bar)  | Double solenoid<br>22 (1.5)<br>145 (10)                  |                                                                              |                                    |  |
| Nominal flow                                  | Q <sub>N</sub>                         | Cv (l/min) | 1.3 (1300)                                               |                                                                              |                                    |  |
| Actuation                                     |                                        |            |                                                          |                                                                              |                                    |  |
| Electrical                                    |                                        |            | Pilot operated                                           |                                                                              |                                    |  |
| Voltage                                       |                                        |            | AC                                                       | DC                                                                           |                                    |  |
| Nominal voltage*<br>Standard version          | U <sub>n</sub>                         | V          | 220                                                      | 24                                                                           |                                    |  |
| Initial power consumption<br>Standard version |                                        | VA (W)     | 8.5                                                      | 2.5                                                                          |                                    |  |
| Continuous consumption<br>Standard version    |                                        | VA (W)     | 6.0                                                      | 2.5                                                                          |                                    |  |
| Duty cycle                                    | ED                                     | %          | Continuous Duty                                          |                                                                              |                                    |  |
| Electrical protection                         |                                        |            | IP65 to DIN 40050 (with plug)                            |                                                                              |                                    |  |
| Insulating material                           |                                        |            | VDE 0580                                                 |                                                                              |                                    |  |
| Connection                                    |                                        |            | Plug to DIN 43650 form B                                 |                                                                              |                                    |  |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

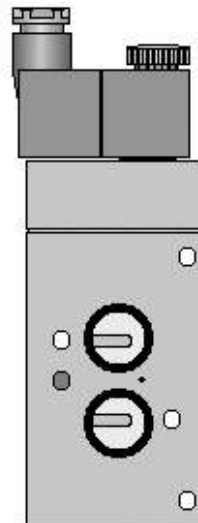
# 5/2-Way Valve 1/4

with NAMUR connection

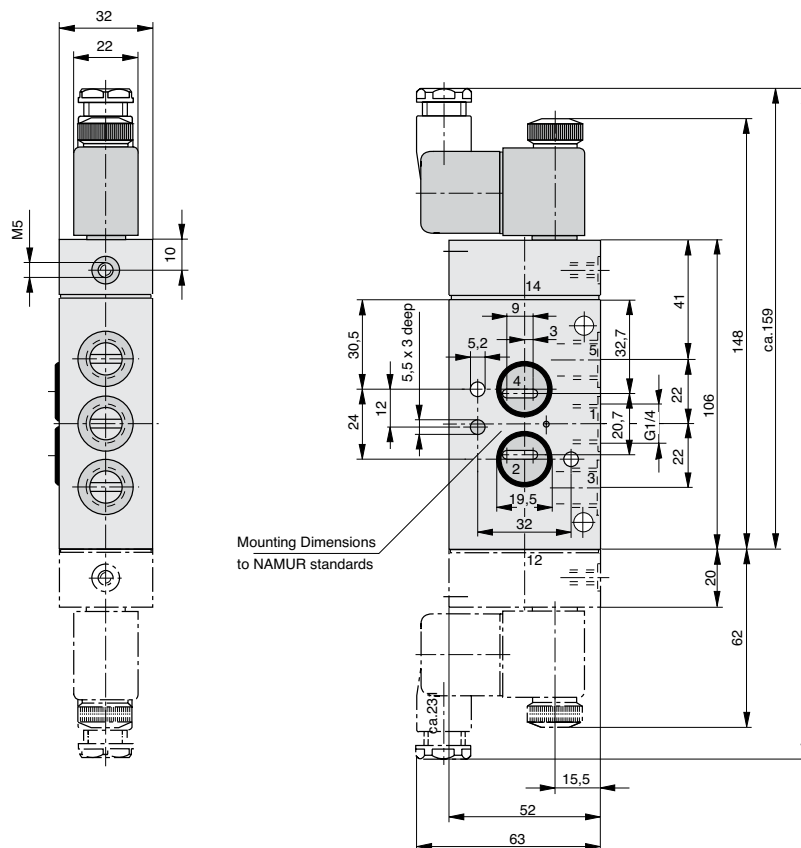
**Actuation: Solenoid**

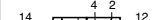
- Single Solenoid
- Double Solenoid

**Delivery Includes:**  
valve  
mounting screws  
coding pin  
o-rings



### Dimensions (mm)



| Version 1/4                       |                                                                                     | Metric Version  |               | NPT Version      |               |
|-----------------------------------|-------------------------------------------------------------------------------------|-----------------|---------------|------------------|---------------|
| Actuation                         | Symbol                                                                              | Type Number     | Order Number  | Type Number      | Order Number  |
| 5/2 Single Solenoid/Spring Return |  | S9 581RF-1/4-SO | PD 34985-..33 | S9 581RF-1/4U-SO | PD 45504-..33 |
| 5/2 Double Solenoid               |  | S9 581-1/4-SO   | PD 34986-..33 | S9 581-1/4U-SO   | PD 45505-..33 |

| Voltage Range |            | Coil Number | Order Code |
|---------------|------------|-------------|------------|
| Nominal       | Secondary  |             |            |
| 12 vDC        | --         | KZ 3674     | <b>01</b>  |
| 24 vDC        | 60 50/60Hz | KZ 3673     | <b>02</b>  |
| 110 50/60Hz   | 48 vDC     | KZ 3669     | <b>57</b>  |
| 220 50/60Hz   | 110 vDC    | KZ 3672     | <b>61</b>  |
| 24 50/60Hz    | --         | KZ 3675     | <b>51</b>  |

- Other voltages available. Contact factory.
- Explosion proof coils available. Contact factory.
- UL/CSA rated coils available. Contact factory.



**Accessory:**

**Order #**

NAMURPLATE-1/4

### Description

Converts the 5/2-way valve to a 3/2-way valve

| Characteristics to VDI 3290 |                                            |            |                                                    |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------|--------------------------------------------|------------|----------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics             | Symbol                                     | Unit       | Description                                        |                                                                              |                                    |  |
| General Features            |                                            |            |                                                    |                                                                              |                                    |  |
| Type                        |                                            |            | Spool valve                                        |                                                                              |                                    |  |
| Mounting                    |                                            |            | 2 screws M5 (M3)                                   |                                                                              |                                    |  |
| Tube connection             |                                            |            | Thread                                             |                                                                              |                                    |  |
| Port size                   |                                            | NPT (G)    | 1/8                                                |                                                                              |                                    |  |
| Weight (mass)               |                                            | lbs. (kg)  | .594 (.27)                                         |                                                                              |                                    |  |
| Installation                |                                            |            | In any position                                    |                                                                              |                                    |  |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$   | °F (°C)    | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$   | °F (°C)    | 14 (-10)<br>158 (+70)                              |                                                                              |                                    |  |
| Medium                      |                                            |            | Filtered compressed air                            |                                                                              |                                    |  |
| Lubrication                 |                                            |            | With or without oil mist lubrication <sup>1)</sup> |                                                                              |                                    |  |
| Pneumatic Characteristics   |                                            |            |                                                    |                                                                              |                                    |  |
| Nominal pressure            | p <sub>n</sub>                             | psi (bar)  | 87 (6)                                             |                                                                              |                                    |  |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>       | psi (bar)  | 0 (0)<br>145 (10)                                  |                                                                              |                                    |  |
| Nominal flow                | Q <sub>N</sub>                             | Cv (l/min) | .5 (500)                                           |                                                                              |                                    |  |
| Actuation                   |                                            |            |                                                    |                                                                              |                                    |  |
| Pneumatic                   |                                            |            | Direct                                             |                                                                              |                                    |  |
| Actuating pressure range    | p <sub>st min</sub><br>p <sub>st max</sub> | psi (bar)  | 29 (2)<br>145 (10)                                 |                                                                              |                                    |  |

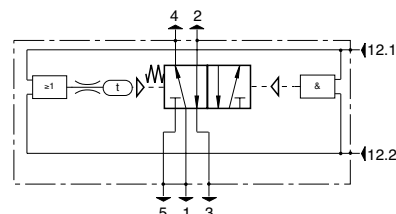
<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

# 5/2-Way Valve

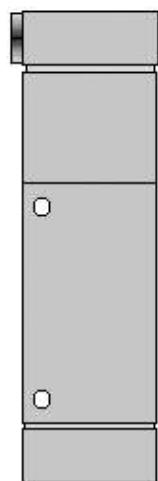
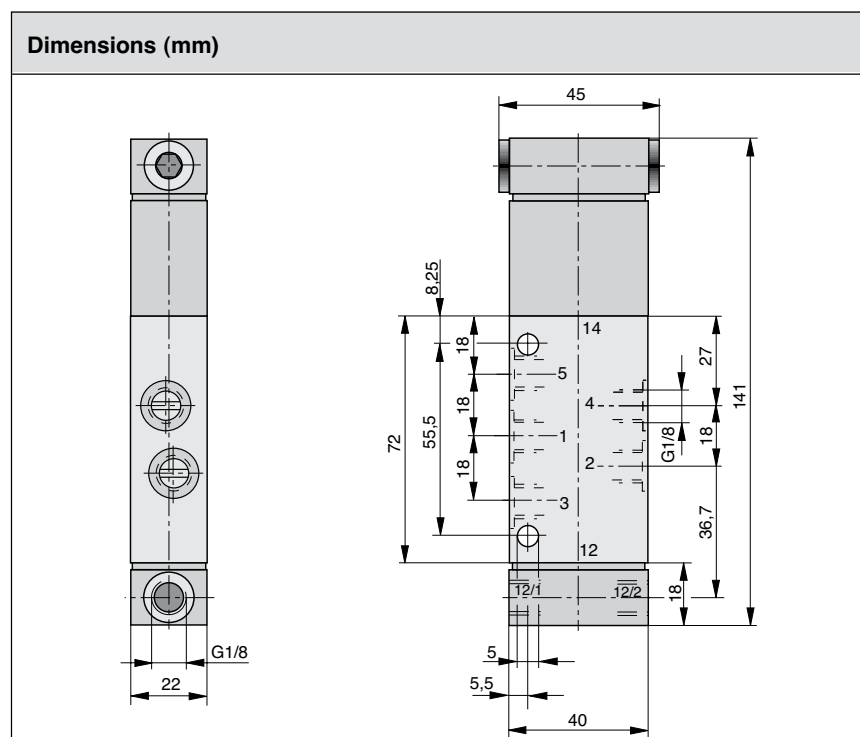
## 1/8

for two-hand safety operation

Actuation: Pneumatic



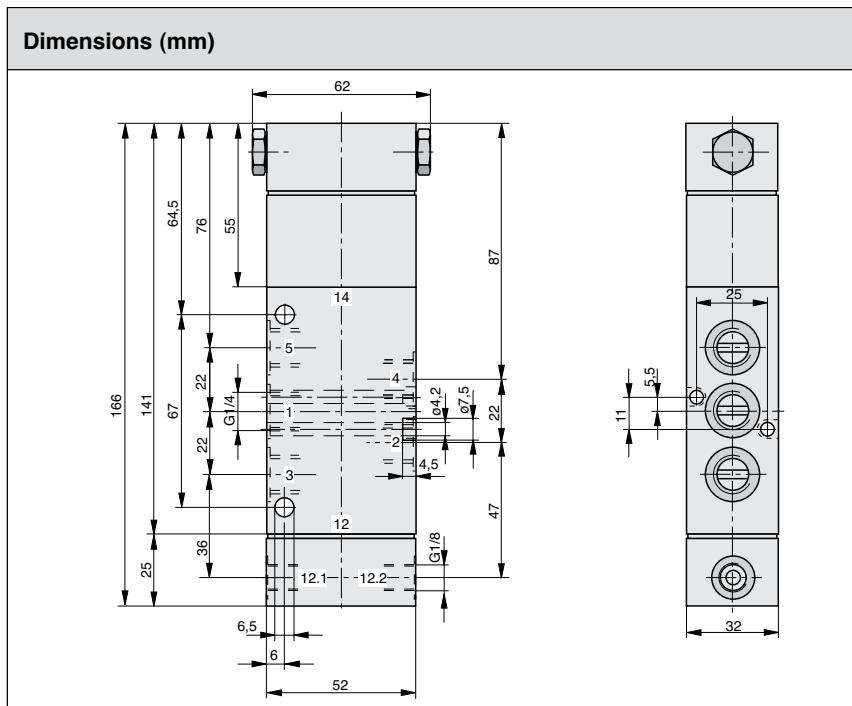
- The valve switches from outlet 4 to outlet 2 only if both signal inputs are actuated simultaneously or within 0.5 seconds.
- The valve will not switch again until both signal inputs are stopped.
- For the safety of operating personnel in manufacturing processes such as pressing, bending, stamping, deburring etc.
- Not suitable for control systems of eccentric or similar presses.



| Version 1/8           | Metric Version     |              | NPT Version         |              |
|-----------------------|--------------------|--------------|---------------------|--------------|
| Description           | Type Number        | Order Number | Type Number         | Order Number |
| Two-hand safety valve | S9 563/65RF-1/8-SO | PD 37673     | S9 563/65RF-1/8U-SO | PD 45506     |

| Characteristics to VDI 3290 |                                            | Pressures quoted as gauge pressure |                                                    |                                                                              |
|-----------------------------|--------------------------------------------|------------------------------------|----------------------------------------------------|------------------------------------------------------------------------------|
| Characteristics             | Symbol                                     | Unit                               | Description                                        |                                                                              |
| General Features            |                                            |                                    |                                                    |                                                                              |
| Type                        |                                            |                                    | Spool valve                                        |                                                                              |
| Mounting                    |                                            |                                    | 2 screws M6                                        |                                                                              |
| Tube connection             |                                            |                                    | Thread                                             |                                                                              |
| Port size                   |                                            | NPT (G)                            | 1/4                                                |                                                                              |
| Weight (mass)               |                                            | lbs. (kg)                          | 1.41 (.64)                                         |                                                                              |
| Installation                |                                            |                                    | In any position                                    |                                                                              |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$   | °F (°C)                            | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$   | °F (°C)                            | 14 (-10)<br>158 (+70)                              |                                                                              |
| Medium                      |                                            |                                    | Filtered compressed air                            |                                                                              |
| Lubrication                 |                                            |                                    | With or without oil mist lubrication <sup>1)</sup> |                                                                              |
| Pneumatic Characteristics   |                                            |                                    |                                                    |                                                                              |
| Nominal pressure            | p <sub>n</sub>                             | psi (bar)                          | 87 (6)                                             |                                                                              |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>       | psi (bar)                          | 0 (0)<br>145 (10)                                  |                                                                              |
| Nominal flow                | Q <sub>N</sub>                             | Cv (l/min)                         | 1.3 (1300)                                         |                                                                              |
| Actuation                   |                                            |                                    |                                                    |                                                                              |
| Pneumatic                   |                                            |                                    | Directly                                           |                                                                              |
| Control pressure range      | p <sub>st min</sub><br>p <sub>st max</sub> | psi (bar)                          | 44 (3)<br>145 (10)                                 |                                                                              |

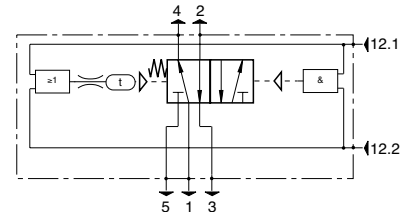
<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448



# 5/2-Way Valve 1/4

for two-hand safety operation

**Actuation: Pneumatic**

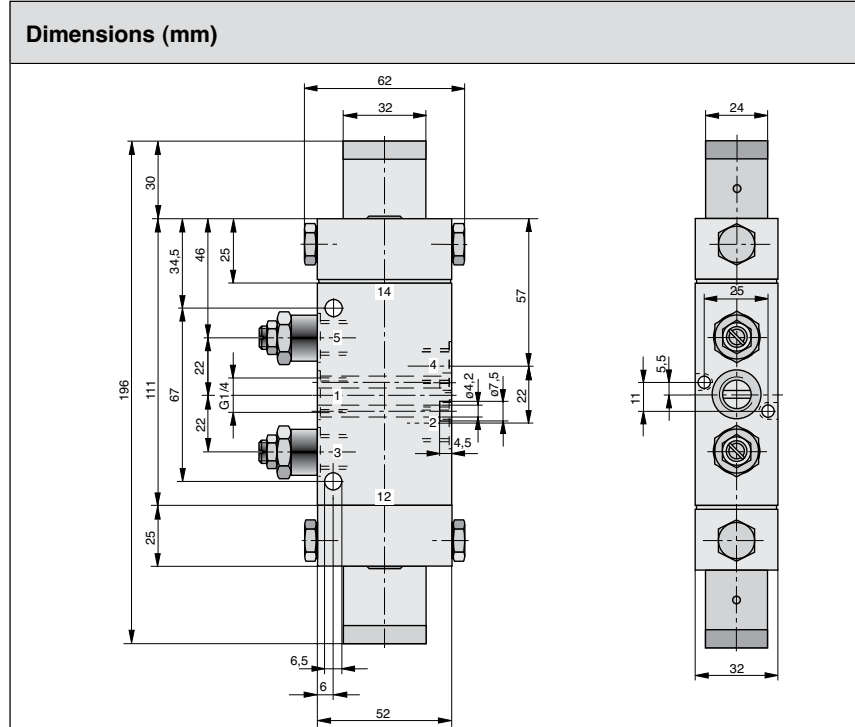


- The valve switches from outlet 4 to outlet 2 only if both signal inputs are actuated simultaneously or within 0.5 seconds.
- The valve will not switch again until both signal inputs are stopped.
- For the safety of operating personnel in manufacturing processes such as pressing, bending, stamping, deburring etc.
- Not suitable for control systems of eccentric or similar presses.

| Version 1/4           | Metric Version     |              | NPT Version         |              |
|-----------------------|--------------------|--------------|---------------------|--------------|
| Description           | Type Number        | Order Number | Type Number         | Order Number |
| Two-hand safety valve | S9 563/65RF-1/4-SO | PD 37173     | S9 563/65RF-1/4U-SO | PD 45507     |

| Characteristics to VDI 3290 |                                            | Pressures quoted as gauge pressure |                                                    |                                                                              |
|-----------------------------|--------------------------------------------|------------------------------------|----------------------------------------------------|------------------------------------------------------------------------------|
| Characteristics             | Symbol                                     | Unit                               | Description                                        |                                                                              |
| General Features            |                                            |                                    |                                                    |                                                                              |
| System                      |                                            |                                    | Spool valve                                        |                                                                              |
| Mounting                    |                                            |                                    | 2 screws M6 (M4)                                   |                                                                              |
| Tube connection             |                                            |                                    | Thread                                             |                                                                              |
| Port size                   |                                            | NPT (G)                            | 1/4                                                |                                                                              |
| Weight (mass)               |                                            | lbs. (kg)                          | 1.43 (0.65)                                        |                                                                              |
| Installation                |                                            |                                    | In any position                                    |                                                                              |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$   | °F (°C)                            | 14 (-10)<br>140 (+60)                              | Note:<br>When using below freezing point it is necessary to consult factory. |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$   | °F (°C)                            | 14 (-10)<br>158 (+70)                              |                                                                              |
| Medium                      |                                            |                                    | Filtered compressed air                            |                                                                              |
| Lubrication                 |                                            |                                    | With or without oil mist lubrication <sup>1)</sup> |                                                                              |
| Pneumatic Characteristics   |                                            |                                    |                                                    |                                                                              |
| Nominal pressure            | p <sub>n</sub>                             | psi (bar)                          | 87 (6)                                             |                                                                              |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>       | psi (bar)                          | 36 (3)<br>118 (8)                                  |                                                                              |
| Nominal flow                | Q <sub>N</sub>                             | Cv (l/min)                         | 1.3 (1300)                                         |                                                                              |
| Actuation                   |                                            |                                    |                                                    |                                                                              |
| Pneumatic                   |                                            |                                    | Direct                                             |                                                                              |
| Actuating pressure range    | p <sub>st min</sub><br>p <sub>st max</sub> | psi (bar)                          | 36 (3)<br>118 (8)                                  |                                                                              |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

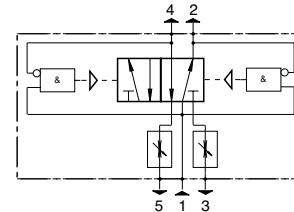


# 5/2-Way Valve

## 1/4

oscillating valve

Actuation: Pneumatic

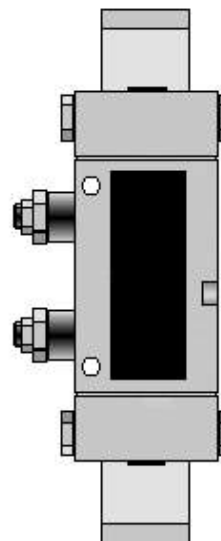


The oscillating valve automatically generates reciprocating movements, for applications such as shaking, feeding, hammering, plunging, scraping, wiping, winding, tensioning, raking, diverting, spraying, cleaning, and dipping.

The oscillating valve is supplied with two built-in flow control valves. This makes it easy to adjust the stroke frequency of the actuator.

### Pneumatic Version:

If compressed air is introduced into inlet port 1, the outlet ports 4 and 2 are alternately supplied with air.



| Version 1/4       | Metric Version   |              | NPT Version       |              |
|-------------------|------------------|--------------|-------------------|--------------|
| Description       | Type Number      | Order Number | Type Number       | Order Number |
| Oscillating valve | S9 568/68-1/4-SO | PD 34796     | S9 568/68-1/4U-SO | PD 45508     |

| Characteristics to VDI 3290 Pressures quoted as gauge pressure |            |                                           |
|----------------------------------------------------------------|------------|-------------------------------------------|
| Characteristics                                                | Unit       | Description                               |
| <b>General Features</b>                                        |            |                                           |
| Type                                                           |            | Body ported valve                         |
| Style                                                          |            | Spool valve                               |
| Mounting                                                       |            | 2 screws M6 (M4)                          |
| Tube connection                                                |            | Thread                                    |
| Port size                                                      | NPT (G)    | 1/4                                       |
| Weight (mass)                                                  | lbs. (kg)  | 1.70 (.77)                                |
| Installation                                                   |            | In any position                           |
| Ambient temperature<br>minimum<br>maximum                      | °F (°C)    | 14 (-10)<br>140 (+60)                     |
| Medium temperature<br>minimum<br>maximum                       | °F (°C)    | 14 (-10)<br>158 (+70)                     |
| <b>Pneumatic Characteristics</b>                               |            |                                           |
| Medium                                                         |            | Air                                       |
| Nominal pressure                                               | psi (bar)  | 131 (6)                                   |
| Operating pressure<br>minimum<br>maximum                       | psi (bar)  | 36 (3)<br>118 (8)                         |
| Nominal flow                                                   | Cv (l/min) | 1.3 (1300)                                |
| Filtration                                                     |            | 40 micron recommended                     |
| Lubrication                                                    |            | With or without lubrication <sup>1)</sup> |
| <b>Electrical Characteristics</b>                              |            |                                           |
| Voltage<br>AC<br>DC                                            | V          | 110, 220<br>12, 24                        |
| Duty cycle                                                     |            | Continuous Duty                           |
| Electric protection                                            |            | IP65 to DIN 40050                         |
| Insulating Material                                            |            | VDE 0580                                  |
| Connection                                                     |            | Plug to DIN 43650 form B                  |
| <b>Actuation</b>                                               |            |                                           |
| Electric<br>manual override                                    |            | (Internal) pilot operated<br>yes          |

<sup>1)</sup> We recommend the use of mineral oil type VG32 to ISO 3448

| Version 1/4   |                           |          |         |
|---------------|---------------------------|----------|---------|
| Order Number  | Description               | Ports    | Voltage |
| PD 47166-0133 | 5/2-way oscillating valve | 1/4" NPT | 12vDC   |
| PD 47166-0233 | 5/2-way oscillating valve | 1/4" NPT | 24vDC   |
| PD 47166-5733 | 5/2-way oscillating valve | 1/4" NPT | 110vAC  |
|               |                           |          |         |

# 5/2-Way Valve

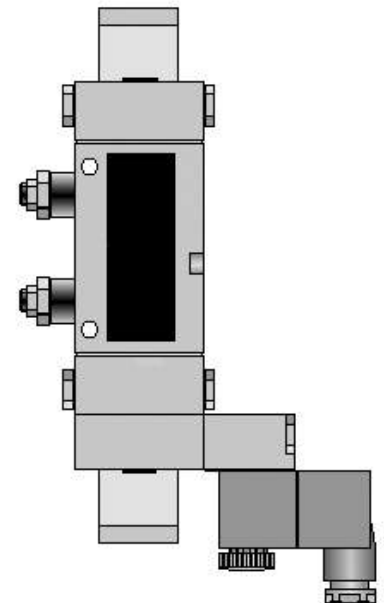
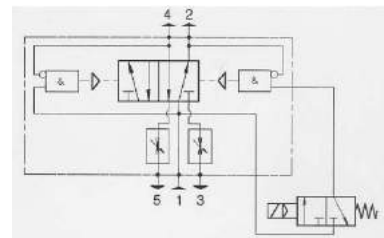
## 1/4

Oscillating Valve

Actuation: Electric

### Electric Version:

Compressed air is introduced into inlet port 1. The outlet ports 4 and 2 are alternately supplied with air, for as long as an electrical signal is present at the solenoid coil.



| Characteristics to VDI 3290 |                                          |            |                                                  |                                                                              | Pressures quoted as gauge pressure |  |
|-----------------------------|------------------------------------------|------------|--------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|--|
| Characteristics             | Symbol                                   | Unit       | Description                                      |                                                                              |                                    |  |
| General Features            |                                          |            |                                                  |                                                                              |                                    |  |
| System                      |                                          |            | Poppet valve                                     |                                                                              |                                    |  |
| Mounting                    |                                          |            | After removing the rubber footing<br>4 screws M8 |                                                                              |                                    |  |
| Tube connection             |                                          |            | Thread                                           |                                                                              |                                    |  |
| Port size                   |                                          |            | G1/4                                             |                                                                              |                                    |  |
| Weight (mass)               |                                          | lbs. (kg)  | 3.08 (1.5)                                       |                                                                              |                                    |  |
| Installation                |                                          |            | In any position                                  |                                                                              |                                    |  |
| Ambient temperature range   | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>131 (+55)                            | Note:<br>When using below freezing point it is necessary to consult factory. |                                    |  |
| Medium temperature range    | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                            |                                                                              |                                    |  |
| Medium                      |                                          |            | Filtered compressed air                          |                                                                              |                                    |  |
| Lubrication                 |                                          |            | Oil mist lubrication compatible with Buna N      |                                                                              |                                    |  |
| Pneumatic Characteristics   |                                          |            |                                                  |                                                                              |                                    |  |
| Nominal pressure            | p <sub>n</sub>                           | psi (bar)  | 87 (6)                                           |                                                                              |                                    |  |
| Operating pressure range    | p <sub>min</sub><br>p <sub>max</sub>     | psi (bar)  | 0 (0)<br>145 (10)                                |                                                                              |                                    |  |
| Nominal flow                | Q <sub>N</sub>                           | Cv (l/min) | 1.4 (1400)                                       |                                                                              |                                    |  |
| Actuation                   |                                          |            |                                                  |                                                                              |                                    |  |
| Manual control              |                                          |            | Direct                                           |                                                                              |                                    |  |
| Stroke                      |                                          | mm         | 2                                                |                                                                              |                                    |  |
| Actuating force             | F <sub>b</sub>                           | lbf (N)    | 6.74 (30)                                        |                                                                              |                                    |  |

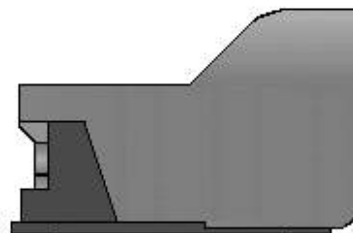
# 3/2-Way Valve 1/4

**Actuation: Foot Pedal**

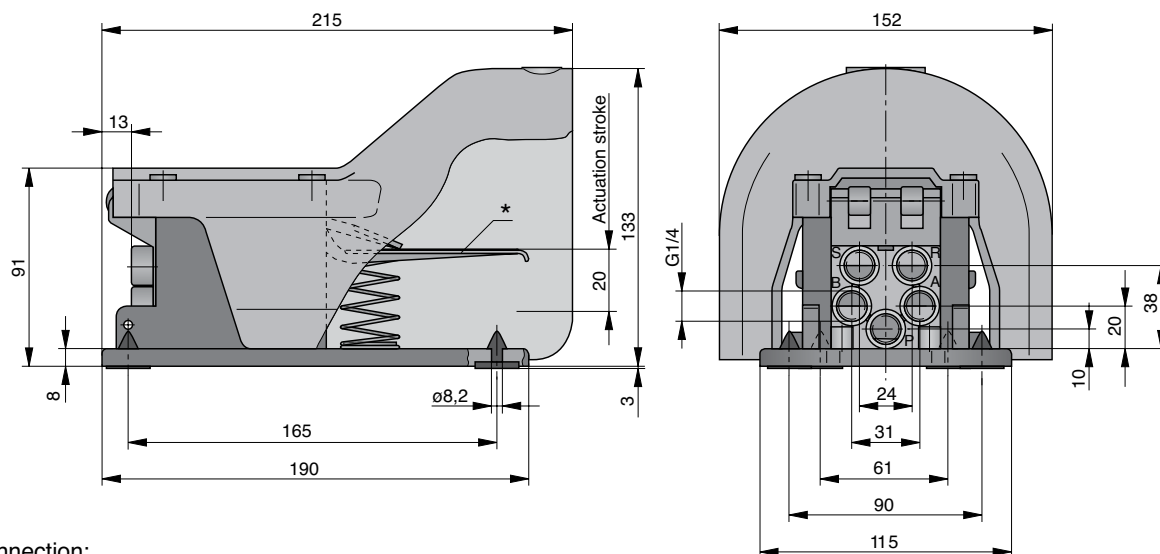
- Detent
- Spring Return

**Delivery Includes:**

valve  
toe guard



## Dimensions (mm)



## Connection:

Version "normally closed": P, B, S

Version "normally open": P, A, R

\* Only for version "both switch positions indexed" - return is only effected after actuating the locking pedal.

## Mounting instruction:

Only use screw connections with max. wrench size across flats of 15.

## METRIC ONLY

| Version G1/4 |               |        |              |              |
|--------------|---------------|--------|--------------|--------------|
| Actuation    | Return        | Symbol | Type Number  | Order Number |
| Pedal        | Spring return |        | F331RF-08NG* | KZ 4410      |
|              |               |        | F331RF-08NO* | KZ 4411      |
| Pedal        | Detent        |        | F331-08NG*   | KZ 4408      |
|              |               |        | F331-08NO*   | KZ 4409      |

\*NG = normally closed, NO = normally open

| Characteristics to VDI 3290 Pressures quoted as gauge pressure |                                          |            |                                                  |
|----------------------------------------------------------------|------------------------------------------|------------|--------------------------------------------------|
| Characteristics                                                | Symbol                                   | Unit       | Description                                      |
| <b>General Features</b>                                        |                                          |            |                                                  |
| System                                                         |                                          |            | Poppet valve                                     |
| Mounting                                                       |                                          |            | After removing the rubber footing<br>4 screws M8 |
| Tube connection                                                |                                          |            | Thread                                           |
| Port size                                                      |                                          |            | G1/4                                             |
| Weight (mass)                                                  |                                          | lbs. (kg)  | 3.08 (1.5)                                       |
| Installation                                                   |                                          |            | In any position                                  |
| Ambient temperature range                                      | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>131 (+55)                            |
| Medium temperature range                                       | $\vartheta_{\min}$<br>$\vartheta_{\max}$ | °F (°C)    | 14 (-10)<br>140 (+60)                            |
| Medium                                                         |                                          |            | Filtered compressed air                          |
| Lubrication                                                    |                                          |            | Oil mist lubrication compatible<br>with Buna N   |
| <b>Pneumatic Characteristics</b>                               |                                          |            |                                                  |
| Nominal pressure                                               | $p_n$                                    | psi (bar)  | 87 (6)                                           |
| Operating pressure range                                       | $p_{\min}$<br>$p_{\max}$                 | psi (bar)  | 0 (0)<br>145 (10)                                |
| Nominal flow                                                   | $Q_N$                                    | Cv (l/min) | 1.4 (1400)                                       |
| <b>Actuation</b>                                               |                                          |            |                                                  |
| Manual control                                                 |                                          |            | Direct                                           |
| Stroke                                                         |                                          | mm         | 2                                                |
| Actuating force                                                | Fb                                       | lbf (N)    | 6.74 (30)                                        |

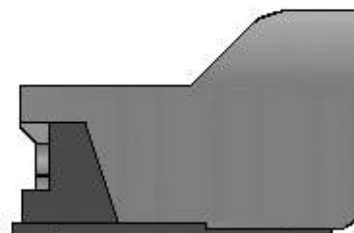
# 5/2-Way Valve 1/4

**Actuation: Foot Pedal**

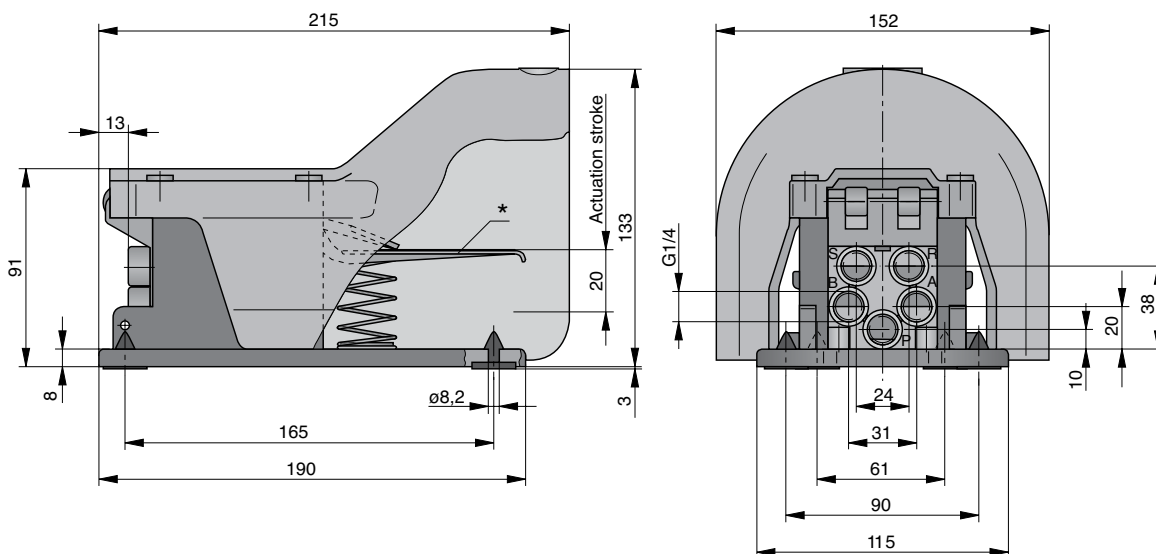
- Detent
- Spring Return

**Delivery Includes:**

valve  
toe guard



## Dimensions (mm)



\* Only for version "both switch positions indexed" - return is only effected after actuating the locking pedal.

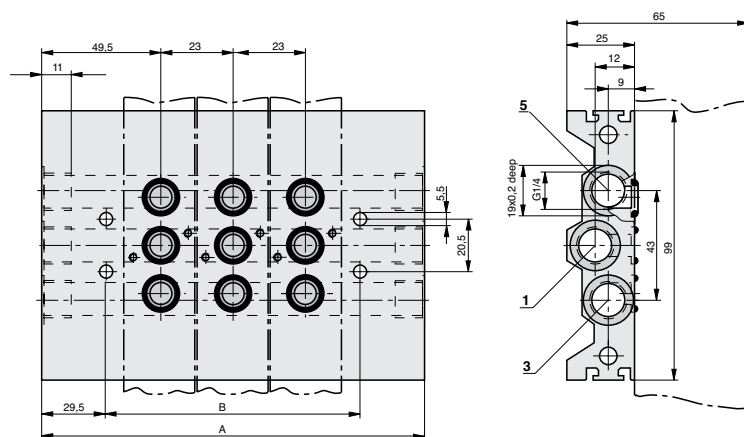
Mounting instruction:  
Only use screw connections with  
max. wrench size across flats of 15.

## METRIC ONLY

| Version G1/4 |               |        |             |              |
|--------------|---------------|--------|-------------|--------------|
| Actuation    | Return        | Symbol | Type Number | Order Number |
| Pedal        | Spring return |        | F531RF-08   | KZ 4413      |
| Pedal        | Detent        |        | F531-08     | KZ 4412      |

## Dimensions (mm)

For dimensions A and B see table



Drawing shows: RPSL-S9-1/8-3

# RPS-Supply Manifolds

for directional valves of the S9-1/8 Series

## Metric Only

Body Ported Valves

## Dimension Table (mm)

| Type #         | # of valves | A   | B   |
|----------------|-------------|-----|-----|
| RPSL-S9-1/8-2  | 2           | 74  | 63  |
| RPSL-S9-1/8-3  | 3           | 96  | 86  |
| RPSL-S9-1/8-4  | 4           | 118 | 109 |
| RPSL-S9-1/8-5  | 5           | 140 | 132 |
| RPSL-S9-1/8-6  | 6           | 162 | 155 |
| RPSL-S9-1/8-7  | 7           | 184 | 178 |
| RPSL-S9-1/8-8  | 8           | 206 | 201 |
| RPSL-S9-1/8-9  | 9           | 228 | 224 |
| RPSL-S9-1/8-10 | 10          | 250 | 247 |

## Material

| Description      | Material           |
|------------------|--------------------|
| RPS-supply mani. | Al, anodized       |
| Screws           | Galvanized steel   |
| O-ring           | Oil-resist. rubber |

## Accessories

| Description          | Order No. |
|----------------------|-----------|
| Complete cover strip | PD 32956  |
| Flow divider         | PD 42483  |

## Versions:

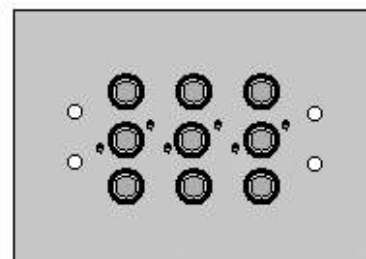
5/2-way valves  
5/3-way valves

## Delivery Includes:

RPS-supply manifold  
mounting screws  
o-rings

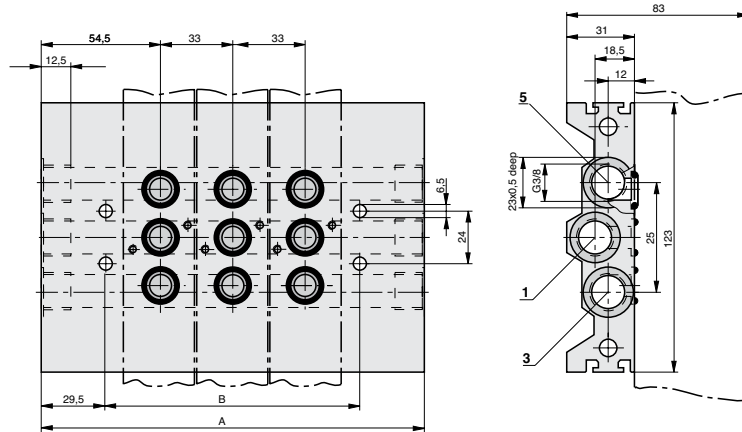
## Order Instructions

| Type #         | Order #       | Manifold | Quantity<br>Screws | O-rings | Weight<br>(kg) |
|----------------|---------------|----------|--------------------|---------|----------------|
| RPSL-S9-1/8-2  | PD 44813-0002 | 1        | 4                  | 6       | 0.47           |
| RPSL-S9-1/8-3  | PD 44813-0003 | 1        | 6                  | 9       | 0.57           |
| RPSL-S9-1/8-4  | PD 44813-0004 | 1        | 8                  | 12      | 0.67           |
| RPSL-S9-1/8-5  | PD 44813-0005 | 1        | 10                 | 15      | 0.77           |
| RPSL-S9-1/8-6  | PD 44813-0006 | 1        | 12                 | 18      | 0.87           |
| RPSL-S9-1/8-7  | PD 44813-0007 | 1        | 14                 | 21      | 0.97           |
| RPSL-S9-1/8-8  | PD 44813-0008 | 1        | 16                 | 24      | 1.07           |
| RPSL-S9-1/8-9  | PD 44813-0009 | 1        | 18                 | 27      | 1.17           |
| RPSL-S9-1/8-10 | PD 44813-0010 | 1        | 20                 | 30      | 1.27           |



## Dimensions (mm)

For dimensions A and B see table



Drawing shows: RPSL-S9-1/4-3

# RPS-Supply Manifolds

for directional valves of the  
S9-1/4 Series

## Metric Only

Body Ported Valves

## Dimension Table (mm)

| Type #         | # of valves | A   | B   |
|----------------|-------------|-----|-----|
| RPSL-S9-1/4-2  | 2           | 96  | 83  |
| RPSL-S9-1/4-3  | 3           | 129 | 116 |
| RPSL-S9-1/4-4  | 4           | 162 | 149 |
| RPSL-S9-1/4-5  | 5           | 195 | 182 |
| RPSL-S9-1/4-6  | 6           | 228 | 215 |
| RPSL-S9-1/4-7  | 7           | 261 | 248 |
| RPSL-S9-1/4-8  | 8           | 294 | 281 |
| RPSL-S9-1/4-9  | 9           | 327 | 314 |
| RPSL-S9-1/4-10 | 10          | 360 | 347 |

## Material

| Description      | Material           |
|------------------|--------------------|
| RPS-supply mani. | Anodized alum.     |
| Screws           | Galvanized steel   |
| O-ring           | Oil-resist. rubber |

## Accessories

| Description     | Order No. |
|-----------------|-----------|
| Cover strip kit | PD 32957  |
| Flow divider    | PD 42516  |

## Versions:

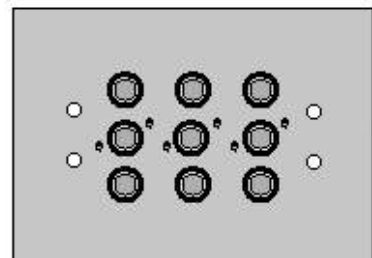
5/2-way valves  
5/3-way valves

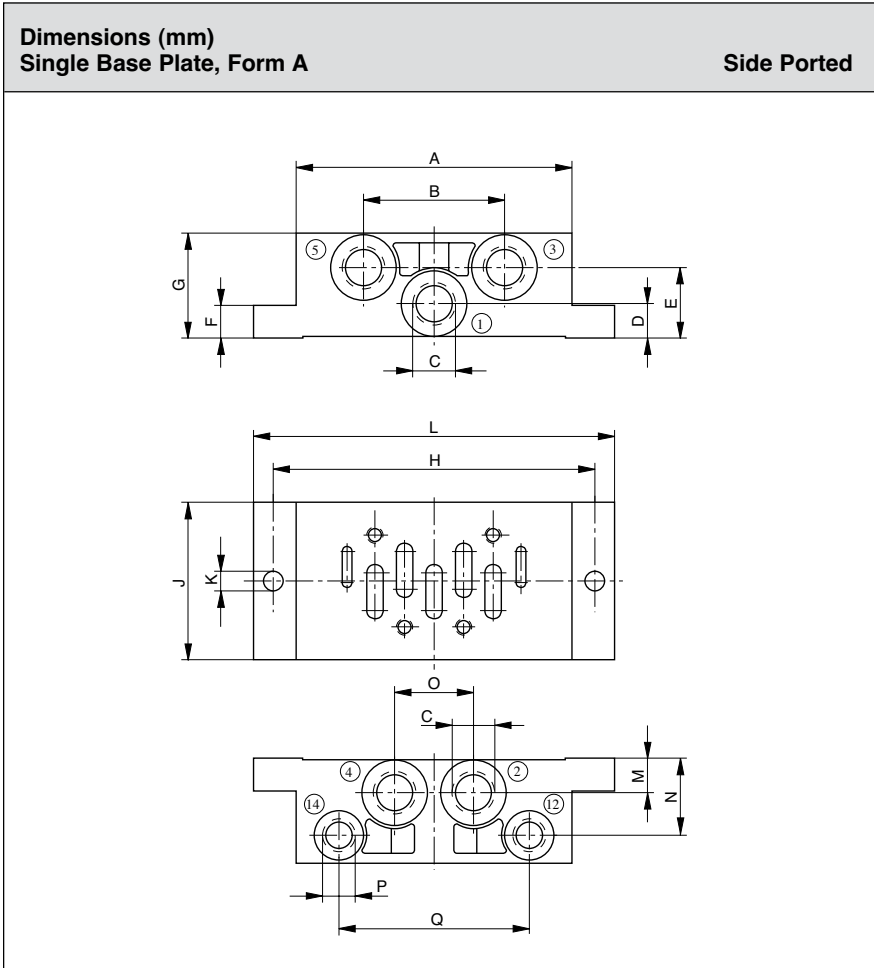
## Delivery Includes:

RPS-supply manifold  
mounting screws  
o-rings

## Order Instructions

| Type #         | Order #       | Manifold | Quantity<br>Screws | O-rings | Weight<br>(kg) |
|----------------|---------------|----------|--------------------|---------|----------------|
| RPSL-S9-1/4-2  | PD 44814-0002 | 1        | 4                  | 6       | 0.845          |
| RPSL-S9-1/4-3  | PD 44814-0003 | 1        | 6                  | 9       | 1.045          |
| RPSL-S9-1/4-4  | PD 44814-0004 | 1        | 8                  | 12      | 1.245          |
| RPSL-S9-1/4-5  | PD 44814-0005 | 1        | 10                 | 15      | 1.445          |
| RPSL-S9-1/4-6  | PD 44814-0006 | 1        | 12                 | 18      | 1.645          |
| RPSL-S9-1/4-7  | PD 44814-0007 | 1        | 14                 | 21      | 1.845          |
| RPSL-S9-1/4-8  | PD 44814-0008 | 1        | 16                 | 24      | 2.045          |
| RPSL-S9-1/4-9  | PD 44814-0009 | 1        | 18                 | 27      | 2.245          |
| RPSL-S9-1/4-10 | PD 44814-0010 | 1        | 20                 | 30      | 2.445          |





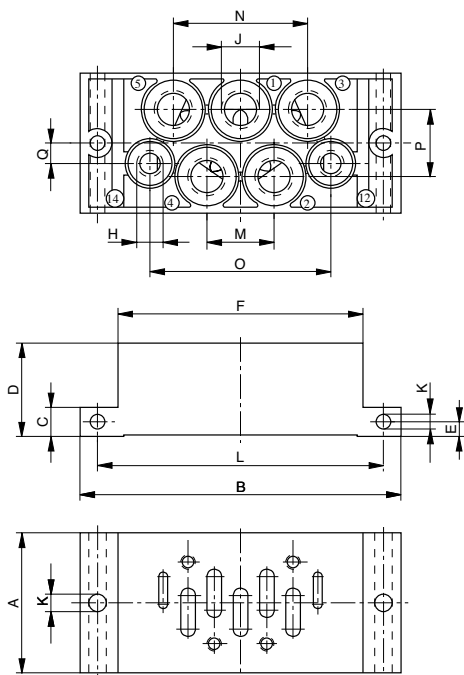
# **Base Plates** **ISO 5599** **Size: 1, 2, 3**

- Single Base Plates**
- To VDMA 24345 Form A  
Side Ported
  - To VDMA 24345 Form B  
Bottom Ported

| Dimension Table (mm) |     |     |     |      |      |    |     |     |
|----------------------|-----|-----|-----|------|------|----|-----|-----|
| ISO Size             | A   | B   | C   | D    | E    | F  | G   | H   |
| 1                    | 84  | 43  | 1/4 | 10.5 | 21.5 | 10 | 32  | 98  |
| 2                    | 95  | 56  | 3/8 | 14   | 26   | 13 | 40  | 112 |
| 3                    | 119 | 68  | 1/2 | 17   | 17   | 18 | 32  | 136 |
| ISO Size             | J   | K   | L   | M    | N    | O  | P   | Q   |
| 1                    | 48  | 5.5 | 110 | 10.5 | 23.5 | 24 | 1/8 | 58  |
| 2                    | 57  | 6.6 | 124 | 14   | 30   | 30 | 1/8 | 74  |
| 3                    | 71  | 6.6 | 149 | 17   | 22   | 32 | 1/8 | 90  |

| Order Instructions |       |                |             |
|--------------------|-------|----------------|-------------|
| ISO Size           | Ports | Order Number   |             |
|                    |       | Metric Version | NPT Version |
| 1                  | 1/4   | KX 9076        | 600C01      |
|                    | 3/8   |                | 642K91      |
| 2                  | 3/8   | KX 9433        | 601C01      |
|                    | 1/2   |                | 643K91      |
| 3                  | 1/2   | KX 9434        | 602C01      |
|                    | 3/4   |                | 644K91      |



**Dimensions (mm)**  
**Single Base Plate, Form B**
**Bottom Ported**
**Intermediate Plate**  
**Form C**

**End Plate Set, Form D**  
**for Intermediate Plate**
**Dimension Table (mm)**

| ISO Size | A  | B   | C  | D  | E   | F   | H    | J    | K   | L   | M  | N  | O  | P  | Q   |
|----------|----|-----|----|----|-----|-----|------|------|-----|-----|----|----|----|----|-----|
| 1        | 46 | 110 | 10 | 30 | 5   | 84  | G1/8 | G1/4 | 5.5 | 98  | 23 | 46 | 62 | 23 | 7.5 |
| 2        | 56 | 124 | 13 | 35 | 6.5 | 95  | G1/8 | G3/8 | 6.6 | 112 | 28 | 56 | 73 | 27 | 7.5 |
| 3        | 71 | 149 | 18 | 32 | 9   | 119 | G1/8 | G1/2 | 6.6 | 136 | 34 | 68 | 90 | 35 | 10  |

**Order Instructions**

| ISO Size | Ports | Order Number |
|----------|-------|--------------|
| 1        | G1/4  | KX 9077      |
| 2        | G3/8  | KX 9436      |
| 3        | G1/2  | KX 9437      |

**Order Instructions**

| ISO Size | Description                                               | Order Number |
|----------|-----------------------------------------------------------|--------------|
| 1        | manifold subbase, G1/4, Form C                            | KX 9079      |
| 2        | manifold subbase, G3/8, Form C                            | KX 9419      |
| 3        | manifold subbase, G1/2, Form C                            | KX 9420      |
| 1        | end plate set, G3/8, Form D                               | KX 9078      |
| 2        | end plate set, G1/2, Form D                               | KX 9421      |
| 3        | end plate set, G1, Form D                                 | KX 9422      |
|          | adapter plate to combine size 1 to size 2                 | KX 9430      |
|          | adapter plate to combine size 1 to size 3                 | KX 9432      |
|          | adapter plate to combine size 2 to size 3                 | KX 9431      |
| 1        | cover strip kit                                           | KX 9082      |
| 2        | cover strip kit                                           | KX 9423      |
| 3        | cover strip kit                                           | KX 9424      |
| 1        | intermediate plate, with built-in flow control valves     | 701B77       |
| 2        | intermediate plate, with built-in flow control valves     | 702B77       |
| 3        | intermediate plate, with built-in flow control valves     | 722K77       |
| 1        | intermediate plate, with ONE built-in pressure regulator  | 620C91       |
| 2        | intermediate plate, with ONE built-in pressure regulator  | 624C91       |
| 3        | intermediate plate, with ONE built-in pressure regulator  | 628C91       |
| 1        | intermediate plate, with TWO built-in pressure regulators | 621C91       |
| 2        | intermediate plate, with TWO built-in pressure regulators | 625C91       |
| 3        | intermediate plate, with TWO built-in pressure regulators | 629C91       |

## Accessories

| Exhaust Mufflers |           |
|------------------|-----------|
| Order Number     | Port Size |
| KY 2010          | G1/8      |
| KY 2011          | G1/4      |
| KY 2012          | G3/8      |
| KY 2013          | G1/2      |
| KY-U2010         | 1/8" NPT  |
| KY-U2011         | 1/4" NPT  |
| KY-U2013         | 1/2" NPT  |

| Metric Conversion Fittings |                  |
|----------------------------|------------------|
| Order Number               | Port Size        |
| 2521-1/8-02                | G1/8 to 1/8" NPT |
| 2521-1/4-04                | G1/4 to 1/4" NPT |
| 2521-3/8-06                | G3/8 to 3/8" NPT |
| 2521-1/2-08                | G1/2 to 1/2" NPT |

| Exhaust Flow Controls |           |
|-----------------------|-----------|
| Order Number          | Port Size |
| KY 6952               | G1/8      |
| KY 6953               | G1/4      |
| KY 6954               | G1/2      |
| ASP-1SC               | 1/8" NPT  |
| ASP-2SC               | 1/4" NPT  |

| Port Plugs   |           |
|--------------|-----------|
| Order Number | Port Size |
| 0205-1000    | G1/8      |
| 0205-1300    | G1/4      |
| 0205-1600    | G3/8      |
| 0205-2000    | G1/2      |
| 0205-1100    | 1/8" NPT  |
| 0205-1400    | 1/4" NPT  |
| 0205-1800    | 3/8" NPT  |
| 0205-2200    | 1/2" NPT  |

## Spare Parts

| Replacement Solenoid Coils:<br>1/8" & 1/4" Body Ported Valves |         |
|---------------------------------------------------------------|---------|
| Order Number                                                  | Voltage |
| KZ 3674                                                       | 12vDC   |
| KZ 3673                                                       | 24vDC   |
| KZ 3669                                                       | 110vAC  |
| KZ 3672                                                       | 220vAC  |
| KZ 3675                                                       | 24vAC   |

| Replacement Solenoid Coils:<br>1/2" Body Ported Valves & ISO Valves |         |
|---------------------------------------------------------------------|---------|
| Order Number                                                        | Voltage |
| KZ 3518                                                             | 12vDC   |
| KZ 3519                                                             | 24vDC   |
| KZ 3521                                                             | 110vAC  |
| KZ 3522                                                             | 220vAC  |
| KZ 3518                                                             | 24vAC   |

| Replacement DIN Connector Plugs |                                                           |
|---------------------------------|-----------------------------------------------------------|
| Order Number                    | Description                                               |
| KY 9393                         | Replacement DIN connector plug                            |
| C12213N21                       | DIN connector plug w/1/2" NPTF conduit entry              |
| PD 34991                        | Solenoid retaining nut                                    |
| KW 0766                         | Lighted wafer seal, for DIN connector plug, 24vDC         |
| KZ 3759                         | DIN connector plug w/surge suppression, 12 & 24vDC        |
| KX 5368                         | DIN connector plu w/surge suppression, 110 & 220vAC       |
| KY 3018                         | DIN connector plug w/surge suppression, LED, 12 & 24vDC   |
| KW 0718                         | DIN connector plug w/surge suppression, LED, 110 & 220vAC |

| Seal Kits: S9 Solenoid Valves |          |          |          |
|-------------------------------|----------|----------|----------|
| Actuation                     | 1/8"     | 1/4"     | 1/2"     |
| 5/2 Single                    | PD 35534 | PD 35536 | PD 35578 |
| 5/2 Double                    | PD 35520 | PD 35526 | PD 35577 |
| 5/3 Blocked                   | PD 35525 | PD 35531 | PD 35579 |
| 5/3 Exhaust                   | PD 35524 | PD 35530 | PD 35581 |
| 5/3 Dual                      | PD 35523 | PD 35529 | PD 35580 |

| RPS Supply Manifolds: 1/8<br>PD 44813-.... |                |
|--------------------------------------------|----------------|
| Order Number                               | Description    |
| 88-37H643-75                               | O-ring (10x2)  |
| ZP 3986                                    | Screws (M3x40) |

| RPS Supply Manifolds: 1/4<br>PD 44814-.... |                |
|--------------------------------------------|----------------|
| Order Number                               | Description    |
| 88-52H643-75                               | O-ring (13x2)  |
| ZP 3988                                    | Screws (M4x55) |

## Notes

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**Notes**

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## Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

### WARNING:

**FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:**

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

### 1. GENERAL INSTRUCTIONS

- 1.1. Scope:** This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.
- 1.2. Fail-Safe:** Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.
- 1.3. Relevant International Standards:** For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules Relating to Systems. See [www.iso.org](http://www.iso.org) for ordering information.
- 1.4. Distribution:** Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.
- 1.5. User Responsibility:** Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:
  - Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
  - Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
  - Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
  - Assuring compliance with all applicable government and industry standards.
- 1.6. Safety Devices:** Safety devices should not be removed, or defeated.
- 1.7. Warning Labels:** Warning labels should not be removed, painted over or otherwise obscured.
- 1.8. Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to [www.parker.com](http://www.parker.com), for telephone numbers of the appropriate technical service department.

### 2. PRODUCT SELECTION INSTRUCTIONS

- 2.1. Flow Rate:** The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.
- 2.2. Pressure Rating:** Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.
- 2.3. Temperature Rating:** Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.
- 2.4. Environment:** Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.
- 2.5. Lubrication and Compressor Carryover:** Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.
- 2.6. Polycarbonate Bowls and Sight Glasses:** To avoid potential polycarbonate bowl failures:
  - Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
  - Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, ketones, esters or certain alcohols.
  - Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

## Safety Guide

**2.7. Chemical Compatibility:** For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5

- 2.8. Product Rupture:** Product rupture can cause death, serious personal injury, and property damage.
- Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
  - Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
  - Consult product labeling or product literature for pressure rating limitations.

### 3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

- 3.1. Component Inspection:** Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.
- 3.2. Installation Instructions:** Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at [www.parker.com](http://www.parker.com).
- 3.3. Air Supply:** The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

### 4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- 4.1. Maintenance:** Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.
- 4.2. Installation and Service Instructions:** Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at [www.parker.com](http://www.parker.com).
- 4.3. Lockout / Tagout Procedures:** Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – (Lockout / Tagout)
- 4.4. Visual Inspection:** Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
  - Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
  - Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
  - Any observed improper system or component function: Immediately shut down the system and correct malfunction.
  - Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

**Caution: Leak detection solutions should be rinsed off after use.**

- 4.5. Routine Maintenance Issues:**
- Remove excessive dirt, grime and clutter from work areas.
  - Make sure all required guards and shields are in place.
- 4.6. Functional Test:** Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.
- 4.7. Service or Replacement Intervals:** It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
- Previous performance experiences.
  - Government and / or industrial standards.
  - When failures could result in unacceptable down time, equipment damage or personal injury risk.
- 4.8. Servicing or Replacing of any Worn or Damaged Parts:** To avoid unpredictable system behavior that can cause death, personal injury and property damage:
- Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
  - Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
  - Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
  - Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
  - After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
  - Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.
- 4.9. Putting Serviced System Back into Operation:** Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.

## Offer of Sale

## Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and Divisions ("Company") and its authorized distributors, are hereby offered for sale at prices to be established by the Company, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any such item, when communicated to the Company, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

**1. Terms and Conditions of Sale:** All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

**2. Payment:** Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

**3. Delivery:** Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

**4. Warranty:** Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from the Company. **THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED.**

**NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGN OR SPECIFICATIONS.**

**5. Limitation of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.**

**6. Changes, Reschedules and Cancellations:** Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

**7. Special Tooling:** A tooling charge may be imposed for any special tooling, including without limitations, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter,

discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

**8. Buyer's Property:** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer, or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

**9. Taxes:** Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

**10. Indemnity For Infringement of Intellectual Property Rights:** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter "Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

**11. Force Majeure:** Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

**12. Entire Agreement/Governing Law:** The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.



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