Proportional directional valves type DHZO-A* and DKZOR-A*

direct operated, without position transducer, ISO 4401 size 06 and 10

DHZO-A* and DKZOR-A* are proportional valves, direct operated without position transducer, which provide both directional and non-compensated flow control according to the electronic reference signal. They operate in association with electronic drivers, see section 2, which supply the proportional valves with proper current to align valve regulation to the reference signal supplied to the electronic driver.

They are available in different executions:
- A, without position transducer;
- AE, AES as A plus analogue (AE) or digital (AES) integral electronics;
- AEG, as A plus integral digital cycle generator (see table G120).

The 4-way spool ①, sliding into a 5-chambers body ①, is directly operated by proportional solenoids ⑧. The integral electronics ③ ensures factory presetting, line functionality plus valve-to-valve interchangeability and simplified wiring and installation.

The electronic main connector ⑨ is fully interchangeable for –AE and –AES executions. Standard 7 pin main connector is used for power supply, analog input reference and monitor signals. 12 pin connector is used for AEG version and for option /Z (AES).

Following communication interfaces ⑩ are available for the digital –AES and –AEG execution:
- PS, Serial communication interface.
- BC, CANopen interface (only for –AES) and for option /Z (AES).

They operate in association with electronic drivers, see section 2, which supply the proportional valves with proper current to align valve regulation to the reference signal supplied to the electronic driver.

They are available in different executions:
- A, without position transducer;
- AE, AES as A plus analogue (AE) or digital (AES) integral electronics;
- AEG, as A plus integral digital cycle generator (see table G120).

The 4-way spool ①, sliding into a 5-chambers body ①, is directly operated by proportional solenoids ⑧. The integral electronics ③ ensures factory presetting, line functionality plus valve-to-valve interchangeability and simplified wiring and installation.

The electronic main connector ⑨ is fully interchangeable for –AE and –AES executions. Standard 7 pin main connector is used for power supply, analog input reference and monitor signals. 12 pin connector is used for AEG version and for option /Z (AES).

### 1 MODEL CODE

<table>
<thead>
<tr>
<th>Valve model</th>
<th>-A</th>
<th>-AE</th>
<th>-AES</th>
<th>-AEG</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHZO</td>
<td>PS</td>
<td>0</td>
<td>S</td>
<td>5 / * / * / * / * / *</td>
</tr>
<tr>
<td>DKKZOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spool type (regulating characteristics)</td>
<td>L = linear; S = progressive; D = differential-progressive (as S, but with P,A= Q, P,B= Q/2)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2 ELECTRONIC DRIVERS FOR DHZO-A*

<table>
<thead>
<tr>
<th>Valve model</th>
<th>-A</th>
<th>-AE</th>
<th>-AES</th>
<th>-AEG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sheet</td>
<td>G010</td>
<td>G020</td>
<td>G025</td>
<td>G030</td>
</tr>
</tbody>
</table>

**Note:** For power supply and communication connector see section ⑩ and ⑪.

**Spool size:** ①, ③, ⑤ = see section ⑩

---

**Note:**
- (1) For detailed description of AEG integral cycle generator, see table G120.
- For detailed description of AEG integral cycle generator, see table G120.
### HYDRAULIC CHARACTERISTICS (based on mineral oil ISO VG 46 at 50 °C)

Hydraulic symbols

<table>
<thead>
<tr>
<th>Valve model</th>
<th>DHZO</th>
<th>DKZOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spool type and size</td>
<td>L14</td>
<td>L1</td>
</tr>
<tr>
<td>Pressure limits [bar]</td>
<td>ports P, A, B = 350; T = 210 (250 with external drain /Y)</td>
<td></td>
</tr>
<tr>
<td>Max flow (1) [l/min]</td>
<td>1</td>
<td>1, 3</td>
</tr>
<tr>
<td>at Δp = 10 bar (P-T)</td>
<td>4,5</td>
<td>17</td>
</tr>
<tr>
<td>at Δp = 30 bar (P-T)</td>
<td>8</td>
<td>28</td>
</tr>
<tr>
<td>at Δp = 70 bar (P-T)</td>
<td>14</td>
<td>50</td>
</tr>
<tr>
<td>Response time (2) [ms]</td>
<td>21</td>
<td>80</td>
</tr>
<tr>
<td>Hysteresis [%]</td>
<td>45</td>
<td>120</td>
</tr>
<tr>
<td>Repeatability</td>
<td>60</td>
<td>160</td>
</tr>
</tbody>
</table>

Notes:
- Above performance data refer to valves coupled with Atos electronic drivers, see section 2.
- The flow regulated by the directional proportional valves is not pressure compensated, thus it is affected by the load variations. To keep constant the regulated flow under different load conditions, modular pressure compensators are available (see tab. D150).
- (1) For different Δp, the max flow is in accordance to the diagrams in sections 14.2 and 15.2.

### HYDRAULIC OPTIONS

4.1 Option /B: Solenoid (for valve configuration "S"), and integral electronics at side of port A.

4.2 Option /Y: External drain advisable when the valve is used in double flow path, see section 14.5 and 15.5. Option /Y is mandatory if the pressure in port T exceeds 160 bar.

### GENERAL NOTES

DHZO and DKZOR proportional valves are CE marked according to the applicable Directives (e.g. Immunity/Emission EMC Directive and Low Voltage Directive).

Installation, wirings and start-up procedures must be performed according to the general provisions shown in table F003 and in the installation notes supplied with relevant components.

The electrical signals of the valve (e.g. monitor signals) must not be directly used to activate safety functions, like to switch-ON/OFF the machine’s safety components, as prescribed by the European standards (Safety requirements of fluid technology systems and components-hydraulics, EN-982).

### OPTIONS FOR -A EXECUTION

6.1 Option /6: 6 Vdc coil instead of standard 12 Vdc, to be used in case of power supply 12 Vdc.

6.2 Option /18: 18 Vdc coil instead of standard 12 Vdc, to be used with electronic drivers not supplied by Atos.

6.3 Auxiliary hand lever: this option is available only for DHZO-A with spool type S3, S5, D3, D5, L3, L5.

It allows to operate the valve in absence of electrical power supply. For detailed description of DHZO-A with hand lever option see table E138

- Option /MO: horizontal hand lever
- Option /BV: vertical hand lever
- Option /BMO: horizontal hand lever installed at side of port B
- Option /BMV: vertical hand lever installed at side of port B

The following options allow to operate the valve in absence of electrical power supply by means of a micrometric screw replacing the standard solenoid manual override, see table K500

6.4 Option /N: manual micrometric adjustment

6.5 Option /NV: as N plus handwheel and graduated scale

### CONNECTIONS FOR -A EXECUTION

#### SOLENOID POWER SUPPLY CONNECTOR

<table>
<thead>
<tr>
<th>PIN</th>
<th>Signal description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SUPPLY</td>
</tr>
<tr>
<td>2</td>
<td>SUPPLY</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
</tbody>
</table>

### ANALOG INTEGRAL DRIVERS -AE - OPTIONS

Standard driver execution provides on the 7 pin main connector:

- Power supply: 24 Vdc must be appropriately stabilized or rectified and filtered. A 2.5 A safety fuse is required in series to the driver power supply. Apply at least a 10000 µF/40 V capacitance to single phase rectifiers or a 4700 µF/40 V capacitance to three phase rectifiers.
- Reference input signal: analog differential input with ±10 Vdc nominal range (pin D,E), proportional to desired coil current.
- Monitor output signal: analog output signal proportional to the actual valve’s coil current (1V monitor = 1A coil current).

Following options are available to adapt standard execution to special application requirements:

8.1 Option /It: It provides the 4÷20 mA current reference signal instead of the standard ±10 Vdc. Monitor output signal is still the standard ±10 Vdc. It is normally used in case of long distance between the machine control unit and the valve or where the reference signal can be affected by electrical noise; the valve functioning is disabled in case of reference signal cable breakage.

8.2 Option /IQ: It provides the possibility to enable or disable the valve functioning without cutting the power supply (the valve functioning is disabled but the driver current output stage is still active). To enable the driver supply a 24 Vdc on the enable input signal.

8.2 Possible combined option: /IQ
9.1 ELECTRONIC CONNECTIONS - 7 PIN MAIN CONNECTORS

<table>
<thead>
<tr>
<th>PIN</th>
<th>SIGNAL</th>
<th>TECHNICAL SPECIFICATIONS</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>V+</td>
<td>Power supply 24 Vcc for solenoid power stage and driver logic</td>
<td>Input - power supply</td>
</tr>
<tr>
<td>B</td>
<td>V0</td>
<td>Power supply 0 Vcc for solenoid power stage and driver logic</td>
<td>Gnd - power supply</td>
</tr>
<tr>
<td>C (1)</td>
<td>AGND</td>
<td>Ground - signal zero for MONITOR signal</td>
<td>Gnd - analog signal</td>
</tr>
<tr>
<td></td>
<td>ENABLE</td>
<td>Enable (24 Vcc) or disable (0 Vcc) the driver</td>
<td>(for /Q option)</td>
</tr>
<tr>
<td>D</td>
<td>INPUT+</td>
<td>Reference analog differential input: ±10 Vcc maximum range</td>
<td>Input - analog signal</td>
</tr>
<tr>
<td>E</td>
<td>INPUT-</td>
<td>For single solenoid valves the reference input is 0÷10 Vcc</td>
<td>(4 ÷ 20 mA for /I option)</td>
</tr>
<tr>
<td>F</td>
<td>MONITOR</td>
<td>Monitor analog output: ±10 Vcc maximum range</td>
<td>Output - analog signal</td>
</tr>
<tr>
<td>G</td>
<td>EARTH</td>
<td>Internally connected to the driver housing</td>
<td></td>
</tr>
</tbody>
</table>

Note: (1) with /Q option ENABLE signal replaces AGND on pin C; MONITOR signal is referred to pin B.

A minimum time of 60ms to 160ms have be considered between the driver energizing with the 24 Vcc power supply and when the valve is ready to operate. During this time the current to the valve coils is switched to zero.

10 DIGITAL INTEGRAL DRIVERS -AES - OPTIONS

Standard driver execution provides on the 7 pin main connector:

- **Power supply**: 24Vcc must be appropriately stabilized or rectified and filtered; a 2.5 A safety fuse is required in series to each driver power supply. Apply at least a 10000 μF/40 V capacitance to single phase rectifiers or a 4700 μF/40 V capacitance to three phase rectifiers.
- **Reference input signal**: analog differential input with ±10Vcc nominal range (pin D,E), proportional to desired coil current.
- **Monitor output signal**: analog output signal proportional to the actual valve’s coil current (1V monitor = 1A coil current).

Following options are available to adapt standard execution to special application requirements:

10.1 Option /I

- It provides 4÷20 mA current reference signal instead of the standard ±10 Vcc. Monitor output signal is still the standard 0÷10 Vcc.
- It is normally used in case of long distance between the machine control unit and the valve or where the reference signal can be affected by electrical noise; the valve functioning is disabled in case of reference signal cable breakage.

10.2 Option /Z

- It provides on a 12 pin main connector the above standard features plus:
  - **Logic power supply**: separate power supply for the solenoid (pin 1, 2) and for the digital electronic circuits (pin 9, 10).
  - Cutting solenoid power supply allows to interrupt the valve functioning but keeping energized the digital electronics thus avoiding fault conditions of the machine fieldbus controller. This condition allows to realize safety systems in compliance with European Norms EN13849-1 (ex EN954-1).

  - **Enable Input Signal**: to enable the driver, supply a 24Vcc on pin 3 referred to pin 2: when the Enable signal is set to zero the valve functioning is disabled (zero current to the solenoid) but the driver current output stage is still active. This condition does not comply with European Norms EN13849-1 (ex EN954-1).

  - **Fault Output Signal**: fault output signal indicates fault conditions of the driver (solenoid short circuits/not connected, reference signal cable broken for 4÷20mA input, etc.). Fault presence corresponds to 0 Vcc, normal working corresponds to 24Vcc: (pin 11 referred to pin 2). Fault status is not affected by the Enable input signal.

10.3 Possible combined option: /IZ
# Digital Integral Drivers - AES - Main Functions and Electronic Connections

## 11.1 Electronic Connections - 7 & 12 Pin Main Connectors

<table>
<thead>
<tr>
<th>Standard 7pin</th>
<th>I/Z option 12pin</th>
<th>SIGNAL</th>
<th>TECHNICAL SPECIFICATIONS</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>V+</td>
<td>Power supply 24 Vdc for solenoid power stage (and for driver logic on 7 pin connection)</td>
<td>Input - power supply</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>V0</td>
<td>Power supply 0 Vdc for solenoid power stage (and for driver logic on 7 pin connection)</td>
<td>Gnd - power supply</td>
</tr>
<tr>
<td>-</td>
<td>3</td>
<td>ENABLE</td>
<td>Enable (24[Vdc]) or disable (0[Vdc]) the driver</td>
<td>Input - on/off signal</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>INPUT+</td>
<td>Reference analog input: ±10 Vdc: maximum range</td>
<td>Input - analog signal</td>
</tr>
<tr>
<td>E</td>
<td>-</td>
<td>INPUT-</td>
<td>For single solenoid valves the reference input is 0_V+±10 Vdc (4 ± 20 mA for /I option)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td>AGND</td>
<td>Ground - signal zero for MONITOR signal</td>
<td>Gnd - analog signal</td>
</tr>
<tr>
<td>F</td>
<td>6</td>
<td>MONITOR Monitor analog output: ±10 Vdc: maximum range</td>
<td>Output - analog signal</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>7</td>
<td>NC</td>
<td>do not connect</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>8</td>
<td>NC</td>
<td>do not connect</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>9</td>
<td>VL+</td>
<td>Power supply 24 Vdc for driver logic</td>
<td>Input - power supply</td>
</tr>
<tr>
<td>-</td>
<td>10</td>
<td>VLD</td>
<td>Power supply 0 Vdc for driver logic</td>
<td>Gnd - power supply</td>
</tr>
<tr>
<td>-</td>
<td>11</td>
<td>FAULT</td>
<td>Fault (0 Vdc) or normal working (24 Vdc)</td>
<td>Output - on/off signal</td>
</tr>
<tr>
<td>G</td>
<td>PE</td>
<td>EARTH</td>
<td>Internally connected to the driver housing</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** A minimum time of 270 to 340 ms have be considered between the driver energizing with the 24 VDC power supply and when the valve is ready to operate. During this time the current to the valve coils is switched to zero.

## 11.2 Electronic Connections - 5 Pin Communication Connectors

### PS Serial
- **PIN**
- **SIGNAL**
- **TECHNICAL SPECIFICATIONS**

### BC CANopen
- **PIN**
- **SIGNAL**
- **TECHNICAL SPECIFICATIONS**

### -BP PROFIBUS DP
- **PIN**
- **SIGNAL**
- **TECHNICAL SPECIFICATIONS**

### Software Tools

The functional parameters of digital valves, as the bias, scale ramp and linearization of the regulation characteristic, can be easily set and optimized with the Atos E-SW programming software, available in three different versions according to the driver’s communication interfacing: E-SW-PS (Serial), E-SW-BC (CANopen) and E-SW-BP (PROFIBUS DP).

A proper connection is required between the PC and the electronic driver communication port: for a more detailed description of software interface, PC requirements, adapters, cables and terminators, please see table G500.

Proportional valves with fieldbus communication interface (-BC and -BP) can be directly managed by the machine control unit; it is required to implement adapters, cables and terminators, please see table G500.

On first supply of the E-SW software, it is required to apply for the registration in the Atos download area: www.download.atos.com

Once the registration is completed, the password will be sent by email.

The software remains active for 10 days from the installation date and then it stops until the user inputs his password.

With the password you can also download, in your personal area, the latest releases of the Atos software, manuals, drivers and configuration files.

## 13 Main Characteristics of Proportional Directional Valves

<table>
<thead>
<tr>
<th>Assembly position</th>
<th>Subplate surface finishing</th>
<th>Ambient temperature</th>
<th>Fluid contamination class</th>
<th>Fluid temperature</th>
<th>Coefficient Voltage</th>
<th>Coil resistance R at 20°C</th>
<th>Max. solenoid current</th>
<th>Max. Power</th>
<th>Protection degree (CEI EN-60529)</th>
<th>Duty factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any position</td>
<td>Roughness index, y&lt;sub&gt;R&lt;/sub&gt; flatness ratio 0.01/100 (ISO 1101)</td>
<td>-20°C = +70°C for -A execution, -20°C = +60°C for /AE and /AES executions</td>
<td>ISO 18/15 achieved with in line filters of 10 μm and B10 ≥ 75 (recommended)</td>
<td>-20°C ≤ +80°C (IP67)</td>
<td>12 Vdc coil</td>
<td>3 ± 3,5 Ω</td>
<td>2,2 A</td>
<td>30 Watt</td>
<td>IP65 for -A executions</td>
<td>Continuous rating (RD=100%)</td>
</tr>
</tbody>
</table>

### Table G500

- **Coil Voltage**: DHZ0-A* with 12 V dc coil, DKZ0-A* with 18 V dc coil
- **Coil resistance R at 20°C**: 3 ± 3,5 Ω, 3,8 ± 4,1 Ω, 2,2 ± 2,4 Ω, 12 ± 12,5 Ω
- **Max. solenoid current**: 2,2 A, 2,75 A, 2,6 A, 3,25 A
- **Max. power**: 30 Watt, 35 Watt
- **Protection degree (CEI EN-60529)**: IP65 for -A executions, IP66 for -AE and /AES executions, according to the connector type (see sect. 5.5.11)

**Duty factor**: Continuous rating (RD=100%)
14.1 Regulation diagrams

1 = linear spool L14
2 = linear spool L1
3 = progressive spool S2
4 = linear spool L3
5 = progressive spool S3, L3, D3
6 = linear spool L5
7 = progressive spool S5, L5, D5

Note:
Hydraulic configuration vs reference signal for double solenoid valves (also for option /B):
Reference signal
0 ÷ 10 V 12 ÷ 20 mA  P → A / B → T
Reference signal
0 ÷ 10 V 4 ÷ 12 mA  P → B / A → T

X = Threshold for bias activation depending on the valve type and amplifier type

14.2 Flow /Δp diagrams

stated at 100% of valve stroke

1 = spool L14
2 = spool L1
3 = spool S2
4 = spool S3, L3, D3
5 = spool S5, L5, D5

14.3 Operating limits

1 = spool L14
2 = spool L1
3 = spool S2
4 = spool L3, S3, D3
5 = spool L5, S5, D5

Note:
Hydraulic configuration vs reference signal for double solenoid valves (also for option /B):
Reference signal
0 ÷ 10 V 12 ÷ 20 mA  P → A / B → T
Reference signal
0 ÷ 10 V 4 ÷ 12 mA  P → B / A → T

14.4 Operation as throttle valve

Single solenoid valves (DHZO-**-051) can be used as simple throttle valves: Pmax = 250 bar (option /Y advisable)

<table>
<thead>
<tr>
<th>SPOOL TYPE</th>
<th>L14</th>
<th>L1</th>
<th>S2</th>
<th>L3</th>
<th>S3</th>
<th>L5</th>
<th>S5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max flow Δp [l/min]</td>
<td>6</td>
<td>20</td>
<td>40</td>
<td>80</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
15.1 Regulation diagrams

1 = linear spool L3
2 = progressive spool S3, D3
3 = linear spool L5
4 = progressive spool S5, D5

Note:
Hydraulic configuration vs reference signal for double solenoid valves (also for option (B)):
Reference signal 0÷+10 V
12÷20 mA P → A / B → T
Reference signal 0÷-10 V
4÷12 mA P → B / A → T

X = Threshold for bias activation depending on the valve type and amplifier type

15.2 Flow /Δp diagrams

stated at 100% of valve stroke
1 = spool S3, L3, D3
2 = spool S5, L5, D5

15.3 Operating limits

1 = spool L3, S3, D3
2 = spool L5, S5, D5

15.4 Operation as throttle valve

Single solenoid valves (DKZOR*-151) can be used as simple throttle valves:
Pmax = 250 bar (option /Y advisable)

<table>
<thead>
<tr>
<th>SPOOL TYPE</th>
<th>L3</th>
<th>S3</th>
<th>L5</th>
<th>S5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max flow Δp= 30 bar</td>
<td>100</td>
<td>160</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ISO 4401: 2005
Mounting surface: 4401-03-02-0-05 (see table P005)
(for /Y version, surface 4401-03-03-0-05 without X port)
Fastening bolts: 4 socket head screws M5x50 class 12.9
Tightening torque = 8 Nm
Seals: 4 CR 108, 1 CR 2025
Diameter of ports A, B, P, T: \( \Phi = 7.5 \text{ mm} \) (max)
Diameter of port Y: \( \Phi = 3.2 \text{ mm} \) (only for /Y option)

**DHZO-A-05**

Note: for option /B the solenoid is at side of port A

**DHZO-AE-05**

1. Dotted line =12 poles connector SP-ZH-12P for option /Z

**DHZO-AE-05**

SP-ZH-7P or SP-ZM-7P

**DHZO-AE-07**

SP-ZH-7P or SP-ZM-7P

Note: for option /B the solenoid and the integral electronics are at side of port A

**-AE EXECUTION**

**DHZO-A-07**

Mass: 2.6 kg

**DHZO-AE-07**

Mass: 3.1 kg

**AES EXECUTION**

- **DHZO-AES-**-05

- **DHZO-AEG-**-05

SP-ZH-7P or SP-ZM-7P

SP-ZH-5P or SP-ZM-5P

- **-A**

- **-AE, -AES**

- **-AES/Z**

- **-AEG**

- **-AEG**

- **-Serial (-PS)**

- **or CANopen (-BC)**

- **PROFIBUS DP (-BP)**

**DATA SHEET**

K500

G110, G115, K500

G115, K500

**connectors supplied with the valve**
ISO 4401: 2005
Mounting surface: 4401-05-04-0-05 (see table P005)
(for Y version, surface 4401-05-05-0-05 without X port)
Fastening bolts: 4 socket head screws M6x40 class 12.9
Tightening torque = 15 Nm
Seals: 5 OR 2050; 1 OR 108
Diameter of ports A, B, P, T: Ø 11,2 mm (max)
Diameter of port Y: Ø = 5 mm (only for /Y option)

DKZOR-A-15

DKZOR-A-17

Note: for option /B the solenoid is at side of port A

- AE EXECUTION

DKZOR-AE-15

DKZOR-AE-17

Note: for option /B the solenoid, the position transducer and the integral electronics are at side of port A

- TES EXECUTION

DKZOR-AES--*-15

DKZOR-AEG--*-15

DKZOR-AES--*-17

DKZOR-AEG--*-17

Note: for option /B the solenoid is supplied with the valve

MODEL CODES OF POWER SUPPLY AND COMMUNICATION CONNECTORS (to be ordered separately)

<table>
<thead>
<tr>
<th>VALVE VERSION</th>
<th>-A</th>
<th>-AE, -AES</th>
<th>-AES/Z -AEG</th>
<th>-Serial (-PS) or CANopen (-BC)</th>
<th>PROFIBUS DP (-BP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONNECTOR CODE</td>
<td>SP-666</td>
<td>SP-ZH-7P</td>
<td>SP-ZM-7P</td>
<td>SP-ZH-12P</td>
<td>SP-ZH-5P</td>
</tr>
<tr>
<td>PROTECTION DEGREE</td>
<td>IP65</td>
<td>IP67</td>
<td>IP67</td>
<td>IP65</td>
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connectors supplied with the valve