Intrinsically safe solenoid directional valves

on-off spool type, direct - ATEX or IECEx

DHW

On-off, spool type, directional valves equipped with intrinsically safe solenoids certified for safe operation in hazardous environment with potentially explosive atmosphere.

Certifications:
- ATEX or IECEx: II 1G Ex ia IIC, IIB, IIA surface plants zone 0, 1 and 2
- ATEX or IECEx: IM2 Ex ia IMb, Ex ib IMb surface, tunnels or mining plants

DHW are SIL compliance with IEC 61508
See section [?] for certification data

The valves must be electrically powered through specific “safety barriers” limiting the max current to the solenoid, see section [3]

Size: 06
Max flow: up to 25 l/min
Max pressure: 350 bar

1 MODEL CODE

DHW / * - 0 71 3H / * / 6 *

Intrinsically safe valve, spool type, direct

Seals material, see section [1]:
- = NBR
PE = FKM
BT = HNBR (1)

Series number

Connector type
6 = DIN 43650 (standard)

Options (2): A = solenoid at side of port B WP = prolonged manual override

Configuration, see section [2]:

Spool type, see section [4]:

(1) Not for certification M and IEM, Group I (mining)
(2) Possible combined options: all combinations are available

⚠️ The pressure at T port makes difficult the manual override operation that can be possible only if its value is lower than 50 bar

2 CONFIGURATION and SPOOLS (representation according to ISO 1219-1)

Configuration for DHW

Spools for DHW

Configuration for DHW

Spools for DHW

Note: Spool type 3H is available only for configuration 71. It is similar to spool type 3 but with higher flow capability A-B → T in central position, see section [19]
### GENERAL CHARACTERISTICS

- **Assembly position / location**: Horizontal position only
- **Subplate surface finishing to ISO 4401**: Acceptable roughness index, Ra ≤ 0.8 recommended Ra 0.4 - flatness ratio 0.01/100)
- **MTTFd values according to EN ISO 13849**: 150 years, for further details see technical table P007
- **Ambient temperature Standard**: -20°C + +60°C /PE option = -20°C + +70°C / BT option = -40°C + +70°C
- **Storage temperature range Standard**: -20°C + +80°C /PE option = -20°C + +80°C / BT option = -40°C + +70°C
- **Surface protection**: Zinc coating with black passivation - salt spray test (EN ISO 9227) > 200h
- **Compliance**: Intrinsically safe protection “Ex ia”, see section (1)

### SEALS AND HYDRAULIC FLUIDS
- **Seals, recommended fluid temperature**: NBR seals (standard) = -20°C + +60°C, with HFC hydraulic fluids = -20°C + +50°C
- **Recommended viscosity**: 15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s

### HYDRAULIC CHARACTERISTICS
- **Operating pressure**: Ports P, A, B: 350 bar; Port T 160 bar
- **Rated flow**: See Q/Δp diagrams at section (2)
- **Maximum flow**: 25 l/min, see operating limits at section (11)

### ELECTRICAL CHARACTERISTICS
- **Nominal resistance at 20°C**: 150 Ω
- **Coil insulation**: Class H
- **Working voltage**: 12 ÷ 26 V
- **Minimum supply current**: 65mA, from I.S. barriers
- **Protection degree**: IP66
- **Duty factor**: 100%
- **Electrical connector**: DIN 43650 2 pin+GND

### 6 SEALS AND HYDRAULIC FLUIDS
- **Seal types for other fluids not included in below table, consult our technical office**

### 7 CERTIFICATION DATA

- **Valve type**: DHW, DHW/IE, DHW/M, DHW/IEM
- **Certification**: ATEX (Group II), IECEx (Group II), ATEX (mining) (Group I), IECEx (mining) (Group I)
- **Soloid code**: OW-18/6, OWI-18/6, OW-18/6, OWIM-18/6
- **Type examination certificate (1)**: CESI 02, ATEX 013, CES 12.0017, CESI 02, ATEX 013, CES 12.0017

### WARNING:
- Service work performed on the valve by the end user or not qualified personnel invalidates the certification

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**NOTE:** The type examination certificates can be downloaded from www.atos.com (1) Performance limitations in case of flame resistant fluids with water:
- max operating pressure = 210 bar
- max fluid temperature = 50°C

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(1) The type examination certificates can be downloaded from www.atos.com
(2) Only for /BT option

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**IMPORTANT:** The ignition temperature of the hydraulic fluid must be 50°C higher than the max solenoid surface temperature

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**WARNING:** Service work performed on the valve by the end user or not qualified personnel invalidates the certification
9. **EX PROOF SOLENOIDS WIRING**

<table>
<thead>
<tr>
<th>Connector wiring</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>DIN 43650</td>
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</tbody>
</table>

10. **Q/p diagrams** based on mineral oil ISO VG 46 at 50°C

11. **OPERATING LIMITS** based on mineral oil ISO VG 46 at 50°C

The diagrams refer to warm solenoids and power supply provided by the Atos barrier type **Y-BXNE-412**.

For DHW valves the curves refer to application with symmetrical flow through the valve (i.e., P→A and B→T). In case of asymmetric flow the operating limits must be reduced.

12. **INTERNAL LEAKAGES** based on mineral oil ISO VG 46 at 50°C

13. **INTRINSICALLY SAFE BARRIERS** - see tech. table GX010

Intrinsically safe valves must be powered through safety barriers certified according to Ex-ie protection mode, limiting the energy to the solenoid.

To select the proper intrinsically safe barriers following data must be considered:

1) $V_{\text{max}}$ and $I_{\text{max}}$ of the solenoid as specified in section 7 must not be exceeded also in fault conditions;

2) the resistance of the solenoid is 150 Ω and the current supplied by the barrier, in normal operation condition, must be over the min. limit (65 mA) to ensure the valve correct operation (over 70 mA for max performances).

The barriers type Y-BXNE 412 are galvanically isolated electronic devices, complying with European Norms EN60079-0/06, EN60079-11/07 and ATEX certified according to protection mode Ex ia IIC.

These barriers ensure the optimized functioning of the Atos valves up to the max operating limits specified in section 4.

The barriers Y-BXNE-412 are double channel type, suitable to operate valves with double or single solenoid. Two single solenoid valves can be connected to the barrier (one to each channel) but they cannot be contemporary operated.

**MODEL CODE OF I.S. BARRIER**

<table>
<thead>
<tr>
<th>Y-BXNE 412 00</th>
<th>a</th>
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</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td></td>
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<tr>
<td>E = 110/230 VAC</td>
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<tr>
<td>2 = 24÷48 VDC</td>
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</tbody>
</table>
ISO 4401: 2005 (see table P005)
Mounting surface: 4401-03-02-0-05
Fastening bolts: 4 socket head screws:
M5x50 class 12.9
Tightening torque = 8 Nm
Seals: 4 OR 108
Ports P,A,B,T: Ø = 7.5 mm (max)

Note: the connector is supplied with the valve

Valve's bottom view

Mass [kg]

<table>
<thead>
<tr>
<th>Valve</th>
<th>Mass [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHW-06</td>
<td>2.4</td>
</tr>
<tr>
<td>DHW-06*/A</td>
<td>2.4</td>
</tr>
<tr>
<td>DHW-07*</td>
<td>4</td>
</tr>
</tbody>
</table>

P = PRESSURE PORT
A, B = USE PORT
T = TANK PORT

DHW/M
(different cover shape)

Option NWP

Related Documentation:
- X010 Basics for electrohydraulics in hazardous environments
- X050 Summary of Atos intrinsically safe components certified to ATEX, IECEx
- EX950 Operating and maintenance information for intrinsically safe valves
- P005 Mounting surfaces for electrohydraulic valves