Intrinsically safe solenoid directional valves
on-off poppet type, leak free, direct - ATEX or IECEx

DLWH
On-off poppet type, directional valves designed for application in hydraulic systems with leak-free requirements and 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

See section for certification data
The valves must be electrically powered through specific “safety barriers” limiting the max current to the solenoid, see section

Size: 06
Max flow: up to 12 l/min
Max pressure: 350 bar

1 MODEL CODE

<table>
<thead>
<tr>
<th>DLWH / * - 2A / * / 6 / *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsically safe valve, poppet type, direct</td>
</tr>
</tbody>
</table>

Certification type:
- = Omit for ATEX Group II
M = ATEX Group I (mining)
IE = IECEx Group II
IEM = IECEx Group I (mining)

Configuration:
2A = 2 way, open in rest position
2C = 2 way, closed in rest position
3A = 3 way, A-T connection in rest position
3C = 3 way, P-B connection in rest position

(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 VALVE CONFIGURATION

<table>
<thead>
<tr>
<th>DLWH-2A</th>
<th>DLWH-2A/R</th>
<th>DLWH-2C</th>
<th>DLWH-2C/R</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Diagram" /></td>
<td><img src="image" alt="Diagram" /></td>
<td><img src="image" alt="Diagram" /></td>
<td><img src="image" alt="Diagram" /></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>DLWH-3A</th>
<th>DLWH-3A/R</th>
<th>DLWH-3C</th>
<th>DLWH-3C/R</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Diagram" /></td>
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<td><img src="image" alt="Diagram" /></td>
<td><img src="image" alt="Diagram" /></td>
</tr>
</tbody>
</table>

Connecter type
6 = DIN 43650 (standard)

Options (2):
R = with check valve on port P
WP = prolonged manual override

Seals material, see section:
- = NBR
PE = FKM
BT = HNBR (1)
3 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 + 70°C /PE option = -20°C + 70°C /BT option = -40°C + 70°C

Surface protection
Zinc coating with black passivation

Compliance
Intrinsically safe protection “Ex ia”, see section 7
RoHs Directive 2011/65/EU as last update by 2015/65/EU
REACH Regulation (EC) n°1907/2006

4 HYDRAULIC CHARACTERISTICS

Operating pressure
Ports P, A, B: 350 bar;
Port T 160 bar

Rated flow
See Q/Δp diagrams at section 9

Maximum flow
12 l/min, see operating limits at section 10

5 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

Seals, recommended fluid temperature
NBR seals (standard) = -20°C + 60°C, with HFC hydraulic fluids = -20°C + 50°C
FKM seals (PE option) = -20°C + 80°C
HNBR seals (BT option) = -40°C + 60°C, with HFC hydraulic fluids = -40°C + 50°C

Recommended viscosity
15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s

Max fluid contamination level
ISO 4406 class 20/18/15 - NAS 1638 class 9, see also filter section at www.atos.com or KTF catalog

Hydraulic fluid

<table>
<thead>
<tr>
<th>Classification</th>
<th>Ref. Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral oils</td>
<td>DIN 51524</td>
</tr>
<tr>
<td>Flame resistant without water</td>
<td>FKM, HFC</td>
</tr>
<tr>
<td>Flame resistant with water</td>
<td>HNBR, FKM, HNBR</td>
</tr>
</tbody>
</table>

7 CERTIFICATION DATA

Valve type
DLWH

Certification
ATEX (Group II)
IECEX (Group II)
ATEX (mining) (Group I)
IECEX (mining) (Group I)

Solenoid code
OW-18/6
OWI-18/6
OWM-18/6
OWN-18/6

Type examination certificate (1)
CESI 02
ATEX 013
IECEX 12.0017
CESI 02
ATEX 013
IECEX 12.0017

Method of protection
IIA T5 Ga
IIIB T6 Ga
IIC T6 Ga

Electrical characteristics (max values)

<table>
<thead>
<tr>
<th>Ui [V]</th>
<th>Ii [mA]</th>
<th>Pi [W]</th>
<th>Ci , Li</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>396</td>
<td>2.8</td>
<td>0</td>
</tr>
<tr>
<td>28</td>
<td>250</td>
<td>1.8</td>
<td>0.9</td>
</tr>
<tr>
<td>27</td>
<td>130</td>
<td>1.64</td>
<td>1.72</td>
</tr>
<tr>
<td>19.5</td>
<td>360</td>
<td>19.11</td>
<td>19.5</td>
</tr>
<tr>
<td>19.11</td>
<td>360</td>
<td>19.11</td>
<td>12.4</td>
</tr>
</tbody>
</table>

Temperature class
T5
T6

Surface temperature (ambient temp. +60°C)
≤ 100°C
≤ 85°C
≤ 150°C

Ambient temperature
-20 + 60°C
-40 + 60°C
-20 + 60°C

Applicable standards
EN 60079-0
EN 60079-11
EN 60079-26
IEC 60079-0
IEC 60079-11
IEC 60079-26

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

WARNING: service work performed on the valve by the end users or not qualified personnel invalidates the certification.
SOLENOIDS WIRING

DIN 43650

Connector wiring
6: Connections
1: Coil
2: Coil
3: GND

DIAGRAMS based on mineral oil ISO VG 46 at 50°C

configuration
Flow direction
P→A / P→B (1)
A→T / B→T

2A 2C 3A 3C
1 1 2 4
2 5 4

(1) For two-way valves pressure drop refers to P→T

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.

In case of asymmetric flow the operating limits must be reduced.

INTERNAL LEAKAGES

DLWH internal leakages based on mineral oil ISO VG 46 at 50°C
less than 5 drops/min (0.36 cm³/min) at max pressure.

INTRINSICALLY SAFE BARRIERS - see tech. table GX010

The electric supply to these valves must be done through intrinsically safe barriers situated out of potentially flammable environment (i.e. in safe zone), which limit the electric current to the intrinsically safe solenoid. The "intrinsically safe" circuit is virtually unable to produce electrical surges or thermic effects able to cause explosion in hazardous environments also in presence of specific break-down situations. The intrinsically safe barriers must be approved and certified according to the Ex ia protection mode.

To select the proper intrinsically safe barriers following data must be considered:
1) Vmax and Imax of the solenoid as specified in section 8 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 9.

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

Y-BXNE 412 00 *

Supply voltage
E = 110/230 Vac
2 = 24÷48 Vdc
**INSTALLATION DIMENSIONS [mm]**

**DLWH-2A, DLWH-2C**
ISO 4401: 2005  
Mounting surface: 4401-03-02-0-05  
(see table P005)

- Fastening bolts:  
  4 socket head screws M5x50 class 12.9
- Tightening torque = 8 Nm
- Seals: 2 OR 108
- Diameter of ports P, T: Ø 7.5 mm (max)

**Valve’s bottom view**

**Note:** the connector is supplied with the valve

**DLWH-3A, DLWH-3C**
ISO 4401: 2005  
Mounting surface: 4401-03-02-0-05  
(see table P005)

- Fastening bolts:  
  4 socket head screws M5x50 class 12.9
- Tightening torque = 8 Nm
- Seals: 4 OR 108
- Diameter of ports P, A, B, T: Ø 7.5 mm (max)

**Valve’s bottom view**

**Option /WP**

**Mass [kg]**

<table>
<thead>
<tr>
<th>Valve</th>
<th>Mass [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLWH-02</td>
<td>2.3</td>
</tr>
<tr>
<td>DLWH-03</td>
<td>2.3</td>
</tr>
</tbody>
</table>

**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