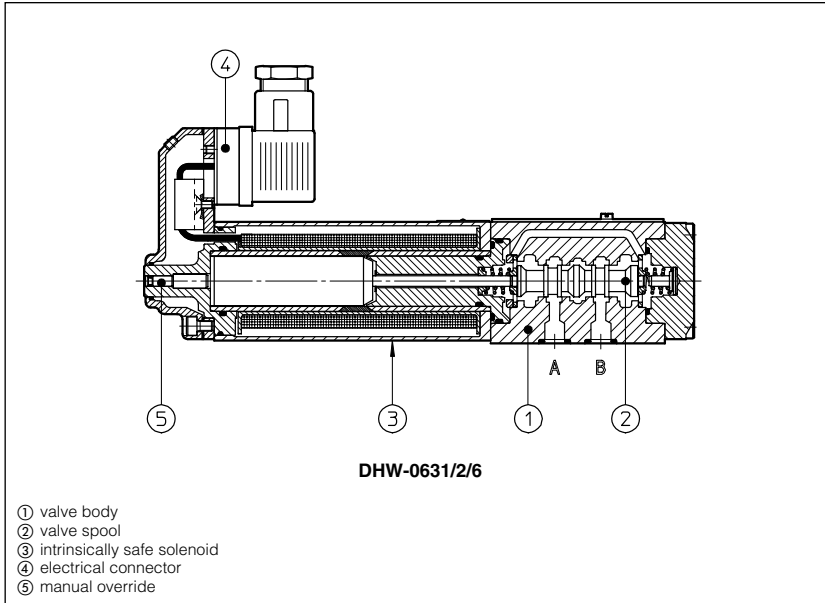


Intrinsically safe solenoid valves

on/off controls - ATEX standards



Intrinsically safe on/off solenoids certified according to ATEX 94/9/CE, protection mode Ex II 1 G, EEx ia IIC T6, IIB T6 or IIA T5 (surface plants with gas or vapours environment, category 1, zone 0, 1 and 2).

"Intrinsically safe" protection is based on the principle of limiting the energy of electric circuits in environments with presence of hazardous atmospheres. For this reason the valves must be supplied through specific "safety barriers" which limitate the max current to the solenoid. Atos provides galvanically insulated barriers for single and double solenoid valves, see section 3, 4 and 13. 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.

1 MODEL CODE OF DIRECTIONAL CONTROLS

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

DHW = spool type - direct
DLOH = poppet type - leak free
DPHW = spool type - piloted

Valve size for all models excluded DLOH

for DHW (ISO 4401): **0** = size 06;
 for DPHW (ISO 4401): **1** = size 10 **2** = size 16; **3** = size 25

Valve configuration, see section 2

Spool type (only for DHW and DPHW), see section 2
 Only for DHW-0713 = spool type 3H for marine applications

Synthetic fluids:
WG = water-glycol
PE = phosphate ester

Design number

Connector type - see section 3

/6 = DIN 43650 (standard)

/H = MIL-C-26482 **/M** = MIL-C-5015

Only for DLOH

-WO = Intrinsically safe solenoid

Options:

Only for DHW and DPHW: **/A** = solenoid at side of port B

Only for DLOH: **/R** = with check valve on port P

2 MAIN DATA OF INTRINSICALLY SAFE SOLENOIDS

Method of protection	EEx ia	IIC T6		IIB T6	IIA T5
	V max	27 V	19,5 V	19,11 V	28 V
I max	130 mA	360 mA	360 mA	250 mA	396 mA
P max	0,9 W	1,64 W	1,72 W	1,8 W	2,8 W
Minimum supply current	≥ 65mA for I.S. barriers see section 3, 4, 12				
Temperature class	T6 < 85°C (T5 < 100°C) on the surface at ambient temperature of 60°C				
Ambient temperature	-20 ÷ +60 °C				

Certification

EEx = explosion proof according to EN 50014, EN 50020, EN50284

ia = intrinsically safe execution

IIC, IIA, IIB = gas group - application in surface plants

T6, T5 = temperature class of the solenoid surface referred to +60°C ambient temperature

Zone 0 (1 and 2) = explosive atmosphere continuously present

3 MODEL CODE OF I.S. BARRIER

3.1 I.S. barrier for double solenoid valves **Y-BXNE 412 01 ***

Supply voltage

0 = 230 Vac

1 = 110 Vac

2 = 24÷48 Vdc

The above barrier can be used both for double or for single solenoid valves.

With the same barrier, two single solenoid valves can be operated but not contemporary, see section 13.

4 TECHNICAL CHARACTERISTICS OF I.S. BARRIER

	Y-BXNE 412
N° output channels	2
Power supply voltage	230 VAC ±10% (50/60 HZ) 110 VAC ±10% (50/60 HZ) 21,6 ÷ 53 Vdc
Power consumption	< 3W
Output voltage U _o	19,5 V
Output current I _o	341 mA
Output power P _o	1,64 W
Galvanic insulation supply/output	2500 Vac / 50 Hz
Storage temperature	-25 °C ÷ +70 °C
Working temperature	-10 °C ÷ +60 °C
Housing material	ABS case
Mounting	on rail EN 50022
Electrical connections	screw terminals
Method of protection	EEx ia IIC
ATEX classification	Ex II 1 G/D

5 MAIN CHARACTERISTICS OF INTRINSICALLY SAFE VALVES

Assembly position	the installation of DHW valves with the axis in vertical position is not recommended. If this type of installation is absolutely necessary, please consult our technical office
Subplate surface finishing	Roughness index $\sqrt{0.4}$ flatness ratio 0,01/100 (ISO 1101)
Ambient temperature	from -20°C to +60°C
Fluid	Hydraulic oil as per DIN 51524 535; for other fluids see section 4
Recommended viscosity	15 ÷ 100 mm ² /s at 40°C (ISO VG 15 ÷ 100) max viscosity 400 mm ² /s
Fluid contamination class	ISO 18/15, achieved with in line filters at 10 µm value to $\beta_{10} \geq 75$ (recommended)
Fluid temperature	-20°C +60°C (standard, /WG and /PE seals)
Fastening bolts for DHW and DLOH	n° 4 socket head screws M5x50 recommended locking torque = 5 Nm

6 CHARACTERISTICS OF INTRINSICALLY SAFE SOLENOIDS

Solenoid code	OW-18/6	OW-18/H	OW-18/M
Nominal resistance at 20°C		150 Ω	
Coil insulation		Class H	
Protection degree	IP65	IP67	IP 66
Duty factor		100%	
Electrical connector	DIN 43650 2 pin+GND	MIL-C-26482 3 pin	MIL-C-5015 3 pin

Dimension [mm]

OW-18/6 (standard)

DIN 43650

Option /H

MIL-C-26482

Option /M

MIL-C-5015

Connector wiring			
/6	/H	/M	Connections
1	A		Coil
2	C		Coil
3	B		GND

7 MODEL CODE OF PRESSURE CONTROLS

AGAM

- 20 / 2 0 / 210 - WO / 6 ** /*

AGAM = pressure relief valve, subplate mounting, see tab. C066
ARAM = pressure relief valve, threaded connections, see tab. C045

Valve size for AGAM:
10 = size 10 (ISO 6264);
20 = size 20 (ISO 6264);
32 = size 32 (ISO 6264);
 for ARAM:
20 = G 3/4";
32 = G 1 1/4"

Number of the different setting pressure values (1, 2, 3)

Valve configuration
0 = venting with de-energized solenoid
1 = venting with energized solenoid
2 = without venting

Synthetic fluids:
WG = water-glycol
PE = phosphate ester

Design number

Connector type - see section 4
/6 = DIN 43650 (standard)
/H = MIL-C-26482
/M = MIL-C-5015

WO = Intrinsically safe solenoid

Pressure range of first/second/third setting:
100 = 10 - 100 bar
210 = 10 - 210 bar
350 = 10 - 350 bar

9 MODEL CODE OF COVERS FOR CARTRIDGE VALVES

LIDEW

- 1 / * - WO / 6 ** /*

Cover type:
LIDBH* = with solenoid valve and shuttle valve for pilot selection
LIDEW* = with solenoid valve for pilot selection
***** = valve configuration, see tab. H030, section 2

Valve size (ISO 7368)
 for LIDBH*: **1** = 16... **5** = 50
 for LIDEW* **1** = 16... **8** = 80

Options:
/E = external attachments X (G 1/4") and underneath port X supplied plugged
/** = restrictors different from standard ones, see tab. H030

Synthetic fluids:
WG = water-glycol
PE = phosphate ester

Design number

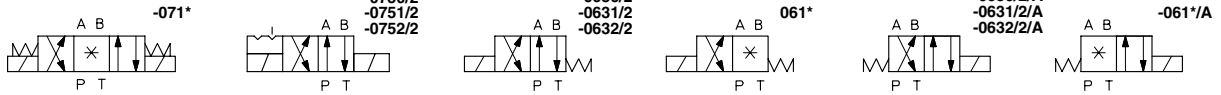
Connector type - see section 4
/6 = DIN 43650 (standard)
/H = MIL-C-26482
/M = MIL-C-5015

WO = Intrinsically safe solenoid

Note: for the code of the ISO cartridge to use with the above covers see tab. H003, section 2 and tab. H030, section 3.

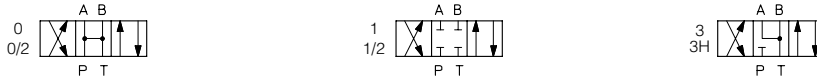
9 HYDRAULIC CONFIGURATIONS OF DIRECTIONAL CONTROLS

Configuration for DHW

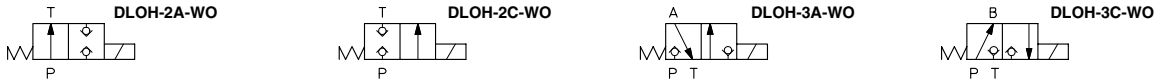


Where the symbol doesn't show the hydraulic connection (*), it depends by the central configuration of the spool

Spools for DHW



DLOH*-WO



DPHW

For valves configuration and spools, see table E080, sections 2 and 3

LIDBH*-WO LIDEW*-WO

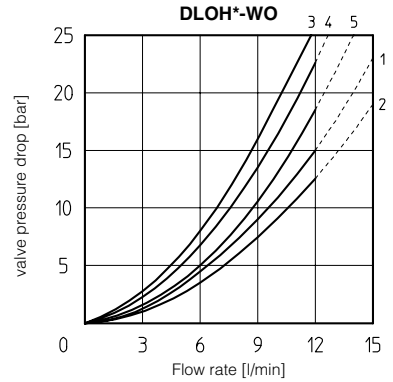
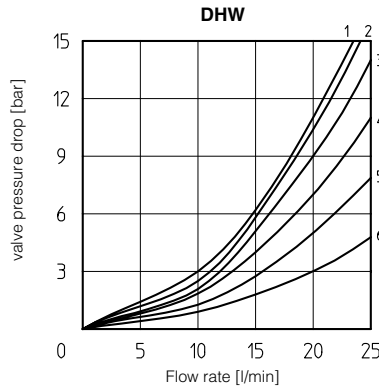
For valves configuration, see table H030, section 2

10 Q/Δp DIAGRAMS based on mineral oil ISO VG 46 at 50°C

DHW type \ Flow direction	0	0/2	1/2	1	3
P→A / P→B	4	5	5	3	3
A→T / B→T	6	2	1	2	4

DLOH type \ Flow direction	2A	2C	3A	3C
P→A / P→B (1)	1	2	4	3
A→T / B→T	-	-	5	4

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

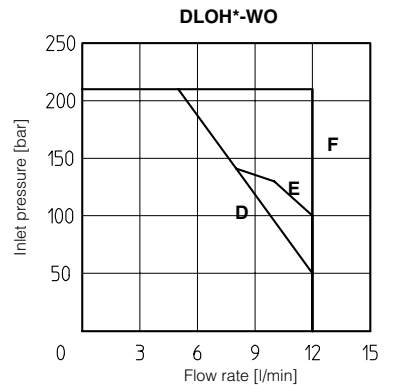
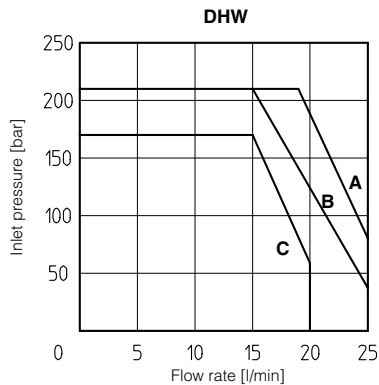


11 OPERATING LIMITS based on mineral oil ISO VG 46 at 50°C

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.

DHW type	0	0/2	1/2	1	3
Diagram	B	B	C	C	A

DLOH type	2A	2C	3A	3C
Diagram	F	F	E	D



11.1 Operating pressure:

Ports P, A, B = 350 bar Port T = 160 bar

11.2 Operating limits (only for DHW-0713H)

Max flow = 10 l/1' - Max pressure = 150 bar

11.3 Flow capability in central position (only for DHW-0713H)

Max flow = 25 l/1' with Δp 10,5 bar

12 INTERNAL LEAKAGES

12.1 DHW internal leakages

18 cm³/min with P=100 bar - fluid viscosity = 43 cSt at 40 °C
 30 cm³/min with P=140 bar - fluid viscosity = 22 cSt at 45 °C

12.2 DLOH*-WO internal leakages based on mineral oil ISO VG 46 at 50°C

less than 5 drops/min (0,36 cm³/min) at max pressure.

13 INTRINSICALLY SAFE BARRIERS

The electric supply to these solenoids must be done through electronic devices situated out of potentially flammable environment (i.e. in safe zone), which limit the electric current to the intrinsically safe solenoid. These electronic devices are normally called "intrinsically safe barriers" approved and certified according to the EEx ia protection mode. To select the proper intrinsically safe barriers following data must be considered:

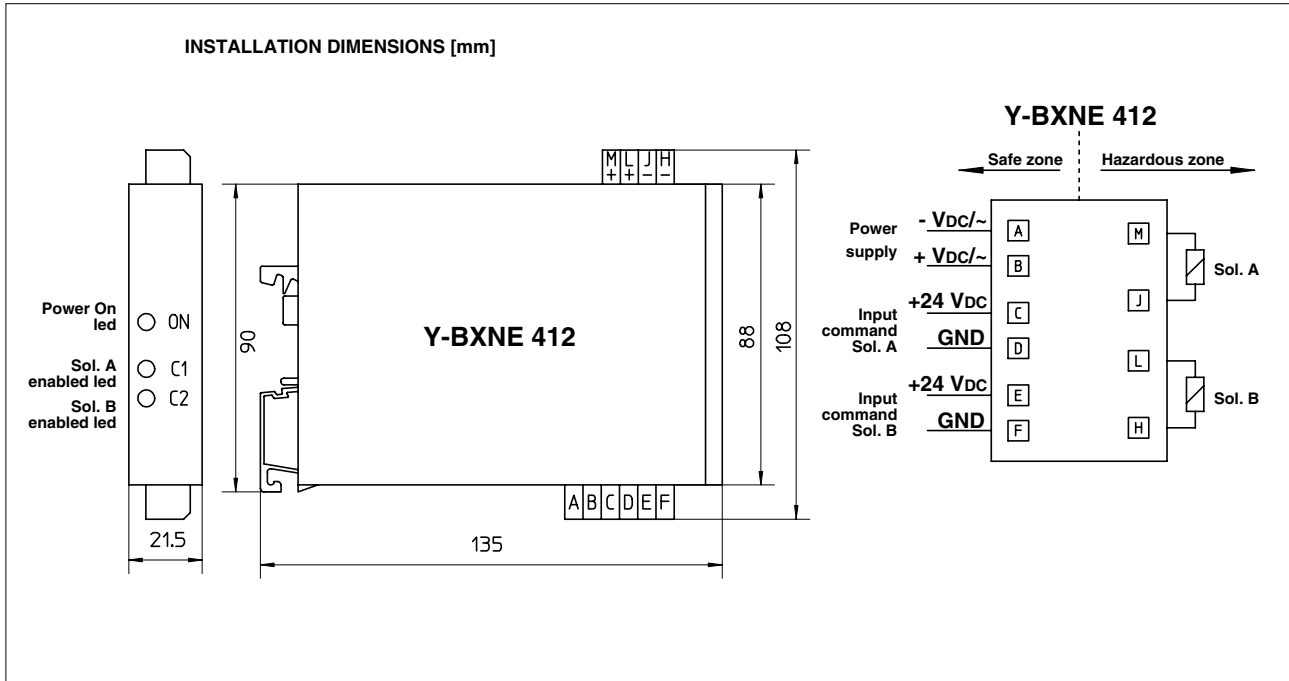
- 1) V_{max} and I_{max} of the solenoid as specified in section 2 must not be exceeded also in fault conditions;
- 2) the resistance of the solenoid is 150Ω and the current supplied by the barrier, in normal operation condition, must be over the min. limit (58 mA) to ensure the valve correct operation (over 70 mA for max performances).

The barriers type Y-BXNE 412 are galvanically isolated electronic devices, developed according to the European Norms EN50014/92, EN50020/94 and certified ATEX 94/9/CE, protection mode EEx ia IIC.

These barriers ensure the optimized functioning of the Atos valves up to the max operating limits specified in section 11.

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 operated contemporary.



14 EXTERNAL PROFILE OF INTRINSICALLY SAFE VALVES

