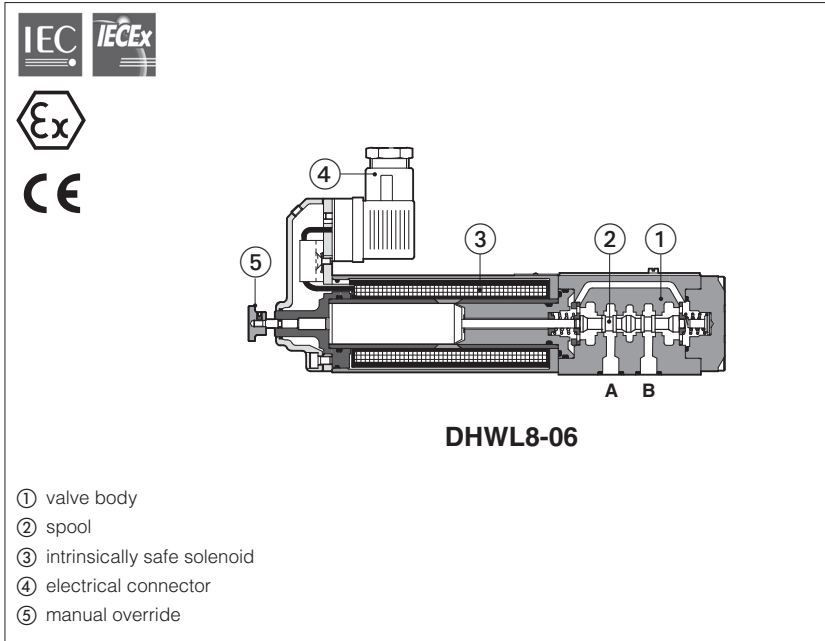


Solenoid directional valves type **DHWL8**

direct operated, ISO 4401 size 06, **intrinsically safe, low leakage execution**

Availability and price only on request



On-off directional valves size 06 in **low leakage execution**, equipped with **Ex certified solenoids**, ideal for hydraulic systems assisted by accumulators operating in hazardous environments. They are equipped with spool diameter 8 mm accurately coupled to the body, granting very low internal leakages, see section 15

DHWL8: equipped with intrinsically safe solenoids, protection mode **Ex-ia (ib)**, certified ATEX or IECEx for gas group II or group I (mining)

SIL compliance with IEC 61508.

Mounting surface: **ISO 4401 size 06**

Max flow: DHWL8 = **20 l/min**

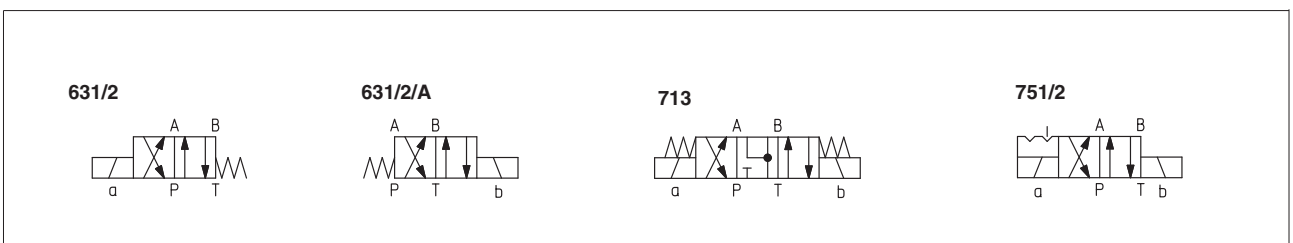
Max pressure: DHWL8 = **250 bar**

1 MODEL CODE OF INTRINSICALLY SAFE VERSION

DHWL8	/	*	-	0	63	/	1/2	/	*	/	6	/	**	/	*
Solenoid valve, size 06, low leakage, intrinsically safe execution													Series number		Seals material, see section 7: - = NBR PE = FKM BT = HNBR
Certification type: - = omit for ATEX Group II M = ATEX Group I (mining) IE = IECEx Group II IEM = IECEx Group I (Mining)															
Valve size (ISO 4401) 0 = 06															
Valve configuration , see section 2															
Spool type , see section 2															
												Connector type DIN 43650, see section 8			
												Options: A = solenoid at side of port B (for single solenoid valves) WP = prolonged manual override			

The manual override operation can be possible only if the pressure at T port is lower than 50 bar

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



3 INTRINSICALLY SAFE SOLENOIDS: MAIN DATA

Solenoid code	Group II ATEX	OW-18/6
	Group I ATEX (mining)	OWM-18/6
	Group II IECEx	OWI-18/6
	Group I IECEx (mining)	OWIM-18/6
Nominal resistance at 20°C		150
Coil insulation		Class H
Protection degree		IP65
Duty factor		100%
Electrical connector		DIN 43650 2 pin+GND

3.1 Certification

Solenoids group II for surface plants with gas environment category 1, zone 0, 1 and 2

- ATEX 94/9/CE, Ex II 1 G, Ex ia IIC T6 (IIB T6 or IIA T5)
- IECEx, worldwide recognized safety certification Ex ia IIC T6 (IIB T6, IIA T5) Ga

Solenoids group I for surface, tunnels or mining plants

- ATEX 94/9/CE, Ex I M2 Ex ia I
- IECEx, worldwide recognized safety certification Ex ia (ib) I Mb

4 SIL compliance with IEC 61508: 2010

- **SC3** (systematic capability)
- max **SIL 2** (HFT = 0 if the hydraulic system does not provide the redundancy for the specific safety function where the component is applied)
- max **SIL 3** (HFT = 1 if the hydraulic system provides the redundancy for the specific safety function where the component is applied)

5 INTRINSICALLY SAFE SOLENOIDS: ELECTRICAL AND TEMPERATURE DATA

Method of protection	Ex ia / Ex ib according to EN60079-0: 2006, EN60079-11:2007						
Gas group	I and IIC			I and IIB	I and IIA	I	
Temperature class	T6			T6	T5	-	
Electrical characteristic	V max	27 V	19,5 V	19,11 V	28 V	28 V	12,4 V
	I max	130 mA	360 mA	360 mA	250 mA	396 mA	2200 mA
	P max	0,9 W	1,64 W	1,72 W	1,8 W	2,8 W	6,82 W
Minimum supply current	≥ 75mA, for I.S. barriers see section 9 to 12						
Surface temperature (ambient temp. 60°C)	≤ 85°C				≤ 100°C		150 °C
Ambient temperature	-40 ÷ +60°C (1)					-20 ÷ +60°C	

- (1) The group II solenoids are ATEX certified for minimum temperature -40°C.
Select /BT in the valve code for the application with minimum temperature -40°C

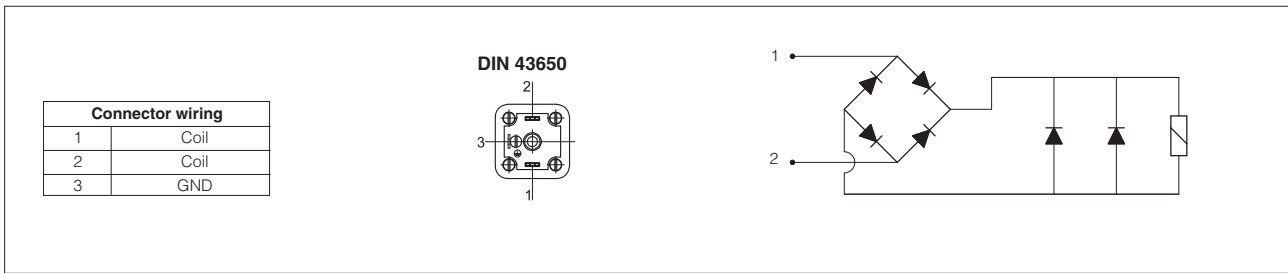
6 MAIN CHARACTERISTICS

Assembly position / location	Horizontal position only
Subplate surface finishing	Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)
Ambient temperature	Standard execution = -30°C ÷ +70°C /PE option = -20°C ÷ +70°C /BT option = -40°C ÷ +70°C
Flow direction	As shown in the symbols of table 2
Operating pressure	Ports P,A,B: 250 bar; Port T 160 bar
Maximum flow	20 l/min, see Q/Δp diagram at section 13 and operating limits at section 14

7 SEALS AND HYDRAULIC FLUID - for other fluids not included in below table, consult our technical office

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 mm ² /s - max allowed range 2.8 ÷ 500 mm ² /s		
Fluid contamination class	ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 μm (β10 ≥75 recommended)		
Hydraulic fluid	Suitable seals type	Classification	Ref. Standard
Mineral oils	NBR, FKM, HNBR	HL, HLP, HLPD, HVLP, HVLDP	DIN 51524
Flame resistant without water	FKM	HFDR, HFDR	ISO 12922
Flame resistant with water	NBR, HNBR	HFC	

8 WIRING



9 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 Ex 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 6 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 75 mA to ensure the valve correct operation.

The barriers type Y-BXNE 412 are galvanically isolated electronic devices, developed according to the European Norms EN60079-0/06, EN60079-11/07 and certified ATEX 94/9/CE, protection mode Ex ia IIC.

These barriers ensure the optimized functioning of the Atos valves up to the max operating limits specified in section 14.

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.

10 MODEL CODE OF I.S. BARRIER

10.1 I.S. barrier for double solenoid valves Y-BXNE 412 00 *

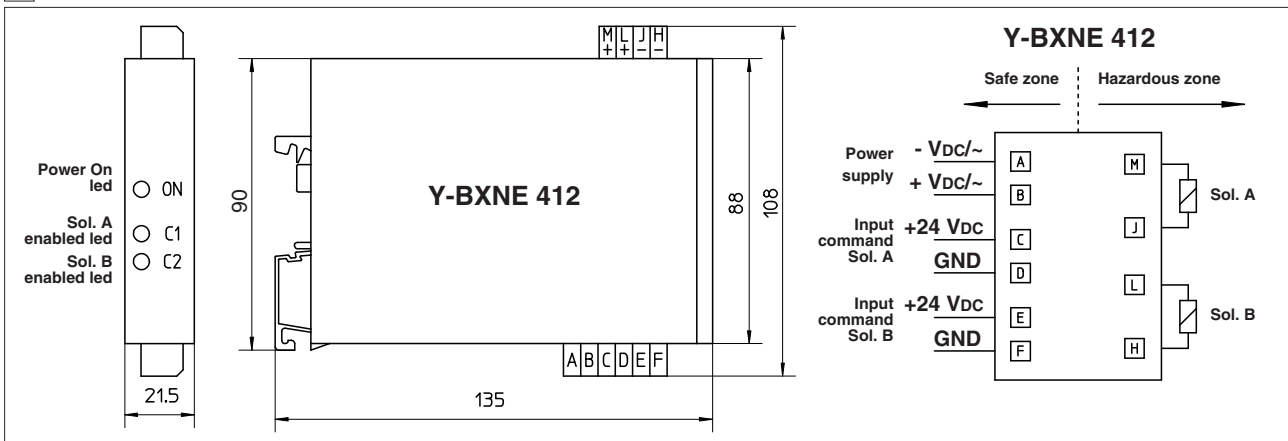
Supply voltage
E = 110/230 V_{AC}
2 = 24÷48 V_{DC}

The above barrier can be used both for double or for single solenoid valves
 With one barrier, two single solenoid valves can be operated but not contemporary

11 TECHNICAL CHARACTERISTICS OF I.S. BARRIER

	Y-BXNE 412
N° output channels	2
Power supply voltage	110÷230 V _{AC} ±10% (50/60 HZ) 21,6 ÷ 53 V _{DC}
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 V _{AC} / 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	Ex ia IIC
ATEX classification	Ex II 1 G/D

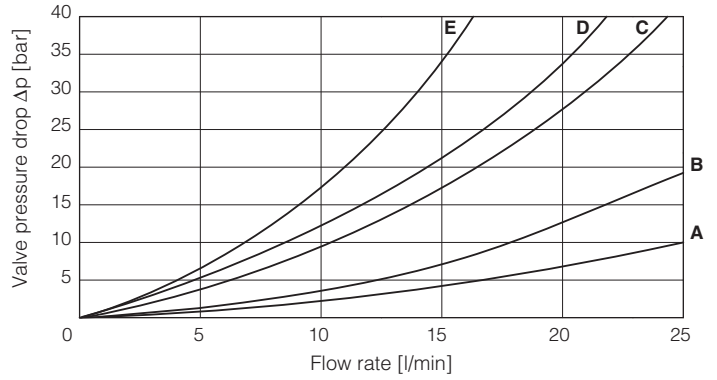
12 INSTALLATION DIMENSIONS OF I.S. BARRIER [mm]



13 Q/ΔP DIAGRAMS based on mineral oil ISO VG 46 at 50°C

DHWL8

Flow direction Spool type	P→A		P→B		A→T		B→T		P→T		A→T		B→T	
	center	center	center	center	center	center	center	center	center	center	center	center	center	center
0	A	A	A	A	A	A	E							
1	C	C	C	B	B	B								
1/2	B	A	C	C	D									
3	C	C	A	A									E	



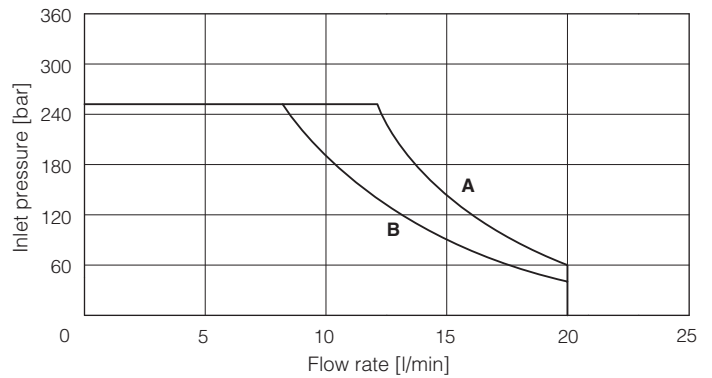
14 OPERATING LIMITS based on mineral oil ISO VG 46 at 50°C

The diagrams have been obtained with warm solenoids and power supply at lowest value ($V_{nom} - 10\%$). The curves refer to application with symmetrical flow through the valve (i.e. P→A and B→T). In case of asymmetric flow and if the valves have the devices for controlling the switching times the operating limits must be reduced.

DHWL8

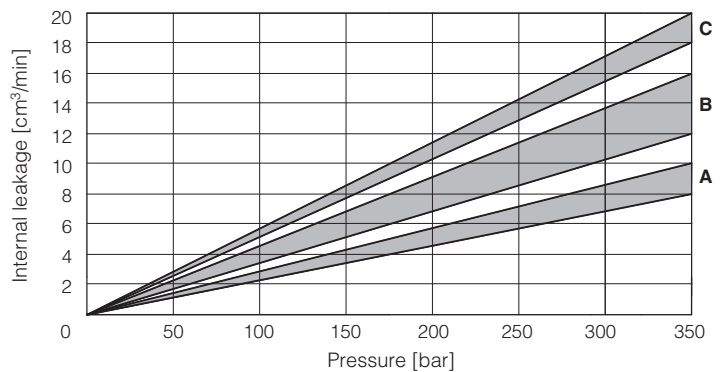
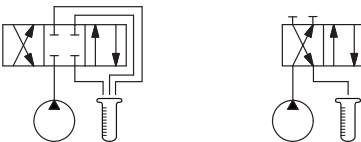
Curve	spool type/current supply
A	all spools / 80 mA
B	all spools / 75 mA

note: valve P/Q limits depends to the current supply provided from the intrinsically safe barrier. In the diagrams are reported the P/Q limits at current 75 mA and 80 mA



15 INTERNAL LEAKAGES based on mineral oil at viscosity 15 cSt

Spool type	center pos.	P→A		P→B	
		B→T	A→T	A→T	B→T
0		C	C		
1	C	B	B		
1/2		A	A		
3	C	B	B		



16 DIMENSIONS for DHWL8 [mm]

ISO 4401: 2005

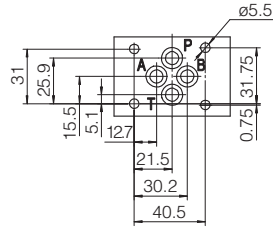
Mounting surface: 4401-03-02-0-05 (see table P005)

Fastening bolts: 4 socket head screws M5x50 class 12.9

Tightening torque = 8 Nm

Seals: 4 OR 108;

Diameter of ports A, B, P, T: \varnothing 7,5 mm (max)

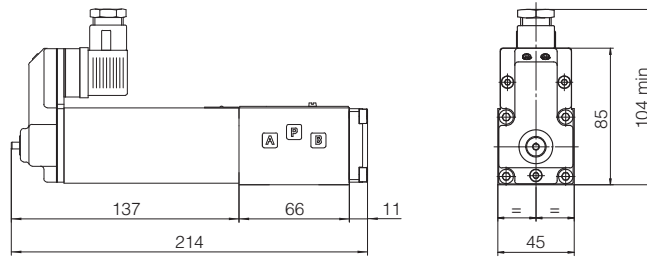
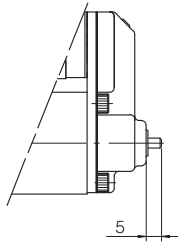


P = PRESSURE PORT
A, B = USE PORT
T = TANK PORT

Mass (Kg)	
DHWL8-06	3
DHWL8-07	5

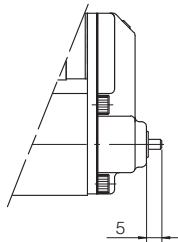
DHWL8-06

Standard version

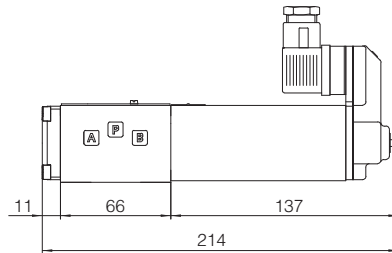


Mining version

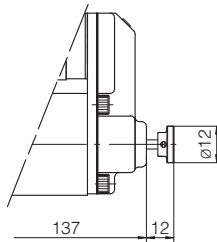
(different cover shape for mining version)



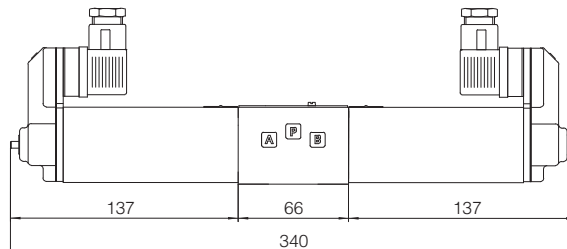
DHWL8-06/A



Option /WP



DHWL8-07



Note: the connector is supplied with the valves