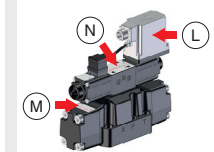## PILOTED OPERATED PROPORTIONAL DIRECTIONAL VALVES

Valve model:
DPZO-AEB-1   DPZO-AEB-2   DPZO-AEB-4   DPZO-AEB-6
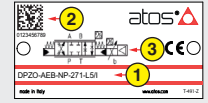
Driver model:
E-RI-AEB
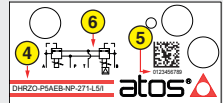
IDENTIFICATION

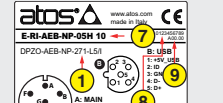Valve identification plates and label

Valve name plate : **M**
Pilot valve name plate : **N**
Driver label : **L**

1 : valve code
2 : valve matrix code
3 : valve hydraulic symbol
4 : pilot valve code
5 : pilot valve matrix code
6 : pilot hydraulic symbol
7 : driver code
8 : driver serial number
9 : factory firmware version

INSTALLATION TOOLS ACCORDING TO VALVE MODEL - not included

Fastening bolts	Wrenches	Main connectors			Transducer cable	IO-Link connector IL
		std, /Q	/Z, /W	/W		
socket head screws	for fastening bolts and air bleeding	7 pin metallic	12 pin metallic	5 pin plastic	5 pin plastic	5 pin metallic
see STEP 1 and STEP 3	see STEP 1 and STEP 3	see STEP 2.1	see STEP 2.1	see STEP 2.2	see STEP 2.2	see STEP 2.3

PROGRAMMING TOOLS - not included

PC software	mobile App	Bluetooth	OR	USB connection KIT	
		Adapter		Cable	Isolator
E-SW-SETUP	Atos CONNECT	E-A-BTH		E-C-SB-USB/M12	E-A-SB-USB/OPT

NOTE: Atos CONNECT supports Atos digital valve drivers equipped with E-A-BTH or with built-in Bluetooth, see STEP 5

PC SOFTWARE

E-SW-SETUP	supports	NP (USB)	IL (IO-Link)	PS (Serial)	IR (Infrared)
		BC (CANopen)	BP (PROFIBUS DP)	EH (EtherCAT)	
		EW (POWERLINK)	EI (EtherNet/IP)	EP (PROFINET RT/IRT)	
	supports	valves with SP, SF, SL alternated p/Q control			

REMARK Atos PC software is designed for Windows based operative systems - Windows 10 or later

PC SOFTWARE DOWNLOAD

Download PC software at www.atos.com accessing to "MyAtos -> Download area electronics"

Free registration by filling the form at www.atos.com/en-it/login

E-SW-SETUP is free and available in Download area

WELCOME
enter your email
Password
Forget your password?
Register

RELATED DOCUMENTATION - www.atos.com

FS900	Operating and maintenance information - tech. table	STARTUP BLUETOOTH	Bluetooth adapter startup guide
FS170	DPZO positive spool overlap - tech. table	E-MAN-RI-AEB	AEB - driver operating manual
P005	Mounting surfaces - tech. table	E-MAN-S-IL	IO-Link protocol programming manual
GS500	Programming tools - tech. table		
GS520	IO-Link features - tech. table		
K800	Electric and electronic connectors - tech. table		

ATTENTION !

The purpose of this quickstart guide is show a logical sequence of basic operations. This guide does not cover all details or variants of Atos valves. All operations described in this document should be performed only by qualified personnel.
Operations and images could be subject to change without notice. For further information please refer to related documentation.
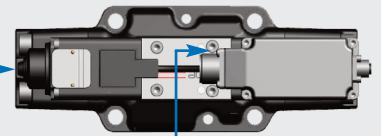
CONTACT US

Atos spa - Italy - 21018 Sesto Calende   www.atos.com   support@atos.com

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PRODUCTS OVERVIEW
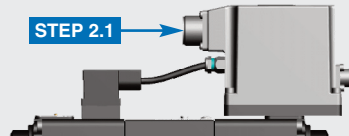
STEP 1
STEP 2.2   STEP 4   STEP 3   STEP 2.1   STEP 2.3
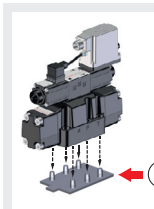
NP   IL

INSTALLATION			PROGRAMMING	
STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
MECHANICAL	ELECTRICAL	HYDRAULICS	PC SOFTWARE	MOBILE APP

STEP 1   MECHANICAL

In case of first commissioning, before the valve installation the whole system must be correctly flushed to grant the required cleanliness level:
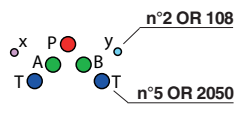During the flushing operation use on-off or by-pass valves in place of the proportional valve

• remove protection pad **P1** located on the valve bottom face only immediately before installation (do not remove connectors caps)
• check the presence and correct positioning of the seals on valve ports
• verify that valve mounting surface is clean and free from damages or burrs
• verify the correct valve orientation according to the pattern of the relevant mounting interface
• lock the fastening bolts respecting below sequence and tightening torque according to valve model

DPZO-AEB-*-1

Mounting surface layout

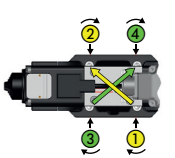4401-05-05-0-05
Valve size ISO 4401: 10

n°2 OR 108
n°5 OR 2050

Fastening bolts socket head screws

Tightening torque: **15 Nm**

n°4 M6x40
class:12.9
wrench 5 mm
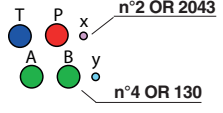
DPZO-AEB-*-2

Mounting surface layout

4401-07-07-0-05
Valve size ISO 4401: 16

n°2 OR 2043
n°4 OR 130

Fastening bolts socket head screws

Tightening torque:
15 Nm for M6
70 Nm for M10
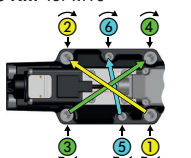
n°4 M10x50
n°2 M6x45
class:12.9
wrench 5 mm / 8 mm
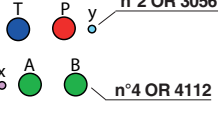
DPZO-AEB-*-4

Mounting surface layout

4401-08-08-0-05
Valve size ISO 4401: 25

n°2 OR 3056
n°4 OR 4112

Fastening bolts socket head screws
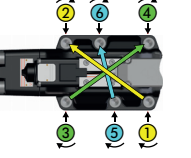
Tightening torque: **125 Nm**

n°6 M12x60
class:12.9
wrench 10 mm
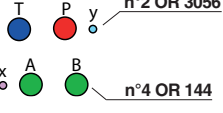
DPZO-AEB-*-6

Mounting surface layout

4401-10-09-0-05
Valve size ISO 4401: 32

n°2 OR 3056
n°4 OR 144

Fastening bolts socket head screws
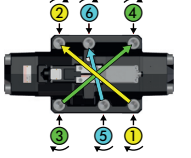
Tightening torque: **600 Nm**

n°6 M20x90
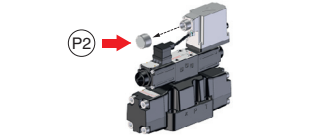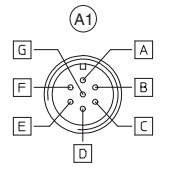class:12.9
wrench 17 mm

STEP 2   ELECTRICAL

This section considers the different valves options, illustrating the multiple variants of the available electrical connections.
The electrical connections have to be wired according to the selected valve code

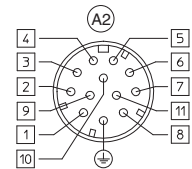#### 2.1   MAIN CONNECTOR - only for NP

1 Remove main connector cap **P2**

WARNING: remove power supply before any electrical or wiring operations

3 Connect the valve to the system

ZM-7P (metallic)
7 PIN MAIN CONNECTOR (A1)

ZM-12P (metallic)
12 PIN MAIN CONNECTOR (A2)

NOTE: the use of above metallic connectors is strongly recommended in order to fulfill EMC requirements

WARNING: a safety fuse is required in series to driver power supply - 2,5 A time lag fuse

2 Select main connector according to valve code and proceed with wirings operations
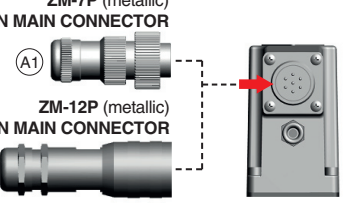
Recommended LiYCY shielded cables:
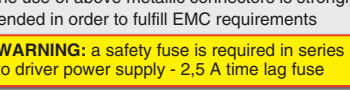7 x 0,75 mm² max 20 m
7 x 1 mm² max 40 m

Recommended LiYCY shielded cable:
12 x 0,75 mm² max 20 m

	Standard	
A	V+	(power supply 24Vᴅᴄ)
B	V0	(power supply 0Vᴅᴄ)
C	AGND	
D	INPUT+	(±10Vᴅᴄ / 4 ÷ 20mA)
E	INPUT-	
F	MONITOR	(±5Vᴅᴄ 1V=1A)
G	EARTH	

	/Q option	
A	V+	(power supply 24Vᴅᴄ)
B	V0	(power supply 0Vᴅᴄ)
C	ENABLE	(input 24Vᴅᴄ)
D	INPUT+	(±10Vᴅᴄ / 4 ÷ 20mA)
E	INPUT-	
F	MONITOR	(±5Vᴅᴄ 1V=1A)
G	EARTH	
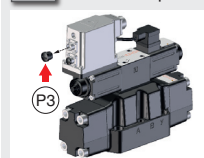
	/Z and /W options	
1	V+	(power supply 24Vᴅᴄ)
2	V0	(power supply 0Vᴅᴄ)
3	ENABLE	(input 24Vᴅᴄ)
4	INPUT+	(±10Vᴅᴄ / 4 ÷ 20mA)
5	INPUT-	
6	MONITOR	(±5Vᴅᴄ 1V=1A)
7	NC	
8	NC	for /Z option
	MONITOR2	(0 ÷ 5Vᴅᴄ) for /W option
9	VL+	(logic power supply 24Vᴅᴄ)
10	VL0	(logic power supply 0Vᴅᴄ)
11	FAULT	(output 24Vᴅᴄ)
PE	EARTH	
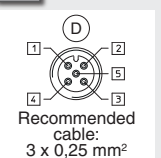
2.2   PRESSURE TRANSDUCERS CONNECTOR - only for /W option

1 Remove transducer connector cap **P3**
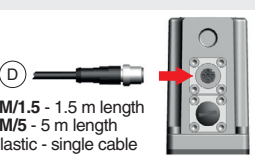
2 Proceed with wirings operations

	/W option	
1	VF+ 24V	(power supply 24Vᴅᴄ)
2	TR	(0 ÷ 10Vᴅᴄ / 4 ÷ 20mA)
3	AGND	
4	NC	
5	NC	

Recommended cable:
3 x 0,25 mm²

3 Connect the valve to the transducer)

ZH-5PM/1.5 - 1.5 m length
ZH-5PM/5 - 5 m length
5 pin plastic - single cable

ELECTRICAL WIRING EXAMPLES - only for NP

MAIN CONNECTOR - VOLTAGE

REFERENCE INPUT - DIFFERENTIAL MODE

cabinet side	main connector pin-out				valve internal circuit
±10 Vᴅᴄ	std	/Q	/Z	/W	
Ref. +	D		4		INPUT+ 50K
Ref. -	E		5		INPUT- 50K

REFERENCE INPUT - COMMON MODE

cabinet side	main connector pin-out				valve internal circuit
±10 Vᴅᴄ	std	/Q	/Z	/W	
Ref.	D		4		INPUT+ 50K
	E		5		INPUT- 50K
⊥ (0 V)	C	B		10	AGND / V0 / VL0

MAIN CONNECTOR - CURRENT

REFERENCE INPUT - DIFFERENTIAL MODE

cabinet side	main connector pin-out				valve internal circuit
4+20 mA	std	/Q	/Z	/W	Rsh = 500 ohm
Ref. +	D		4		INPUT+
Ref. -	E		5		INPUT-

REFERENCE INPUT - COMMON MODE

cabinet side	main connector pin-out				valve internal circuit
4+20 mA	std	/Q	/Z	/W	Rsh = 500 ohm
Ref.	D		4		INPUT+
	E		5		INPUT-
⊥ (0 V)	C	B		10	AGND / V0 / VL0

MAIN CONNECTOR - MONITORS VOLTAGE ONLY

MONITOR OUTPUT

cabinet side	main connector pin-out				valve internal circuit
±5 Vᴅᴄ	std	/Q	/Z	/W	
Mon.	F		6		MONITOR
⊥ (0 V)	C	B		10	AGND / V0 / VL0

MONITOR2 OUTPUT - only for /W option
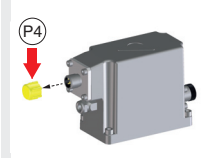
cabinet side	main connector pin-out	valve internal circuit
0÷5 Vᴅᴄ	/W	
Mon.	8	MONITOR2
⊥ (0 V)	10	VL0

PRESSURE TRANSDUCER - only for /W option
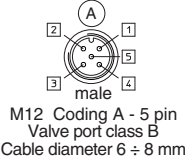
transducer side	transducer connector pin-out		valve internal circuit
	std	/C	
power supply + V+	1		VF +24V
- V0	3	NC	AGND
signal TR	2		TR Rsh = 500 ohm (/C option)
	0÷10Vᴅᴄ	4÷20mA	

2.3   IO-Link CONNECTOR - only for IL

1 Remove IO-Link connector caps **P4**

2 Proceed with wirings operations

1	L+	(power supply 24Vᴅᴄ - IO-Link)
2	P24	(power supply 24Vᴅᴄ - others) (1)
3	L-	(power supply 0Vᴅᴄ - IO-Link)
4	C/Q	IO-Link data-line
5	N24	(power supply 0Vᴅᴄ - others) (1)
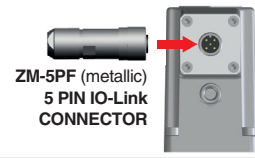
A male
M12 Coding A - 5 pin
Valve port class B
Cable diameter 6 ÷ 8 mm

(1) max power consumption 50 W; for master ports class A connect P24/N24 to an external power supply

3 Connect the valve to the IO-Link network of the system
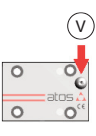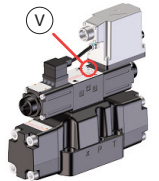
ZM-5PF (metallic)
5 PIN IO-Link CONNECTOR

STEP 3 — HYDRAULICS

Wrench type

3 mm

Tightening torque

4 Nm

Air bleeding:
- release 2 or 3 turns the air bleed screw **V**
- cycle the valve at low pressure until the oil leaking from the **V** port is exempted from air bubbles
- lock the air bleed screw **V**

Consult tech table **FS900** for general guidelines about component's commissioning

STEP 4 — PC SOFTWARE

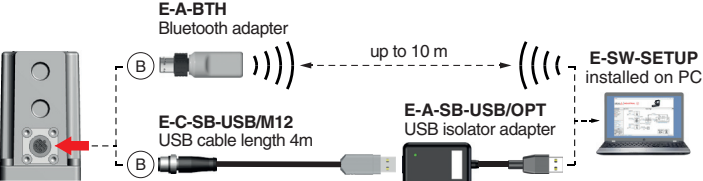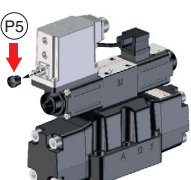**REMARK** proportional valves with on-board electronics are factory preset with default parameter and ready to use after piping and electrical connections. **Play with parameters is optional, not mandatory!**

4.1 CONNECTION

1 **In order to access valve parameterization:**
- Install E-SW-SETUP software on PC
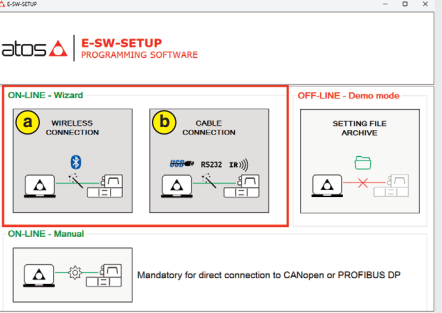- Insert main connector or IO-Link connector to the valve and power on with **24Vᴅᴄ**

2 Remove USB plastic protection cap **P5** and connect valve to the PC as show below via Bluetooth (adapter only) or USB (cable and isolator adapter)

E-A-BTH Bluetooth adapter

up to 10 m

E-SW-SETUP installed on PC

E-C-SB-USB/M12 USB cable length 4m

E-A-SB-USB/OPT USB isolator adapter

⚠ **WARNING: drivers USB port is not isolated!** The use of USB isolator adapter is highly recommended for PC protection (see **GS500**)

3 Launch the PC software using E-SW-SETUP icon:
- **PC software does NOT detect valid connection** communication is not established, please follow wizard procedure **4**
- **PC software detects valid connection** communication automatically established - valve is ON-LINE see **5**

4 In ON-LINE - Wizard press button:
- **a : WIRELESS CONNECTION** Wizard procedure for connection via Bluetooth
- **b : CABLE CONNECTION** Wizard procedure for connection via USB cable

NOTE: for more info about E-A-BTH Bluetooth adapter, please refer to STARTUP BLUETOOTH guide

5 Communication established, valve is ON-LINE and it is possible change parameters

REMARK: once removed the E-A-BTH Bluetooth adapter or E-C-SB-USB/M12 USB cable, screw the plastic protection cap **P5** applying the correct tightening torque, in order to preserve valve's IP protection characteristics
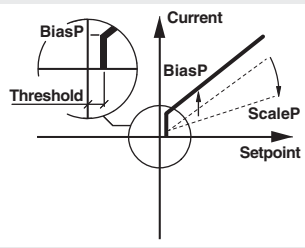

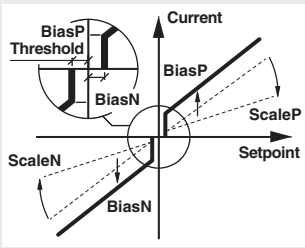Tightening torque 0,6 Nm

---

4.2 CONFIGURATION

Single solenoid directional control valve, 2 positions with positive overlapping and flow control valve

BiasP positive bias
ScaleP positive scale

Threshold = 2%
(200mV or 0,32mA for **/I** option)

Double solenoid directional control valve, 3 positions with positive overlapping

BiasP positive bias
ScaleP positive scale
BiasN negative bias
ScaleN negative scale

Threshold = 2%
(±200mV or ±0,16mA for **/I** option)

BIAS AND SCALE - 2 POSITION VALVES and FLOW CONTROL VALVES

Bias setting: supply input signal just over the Threshold value; increase the Bias until the actuator is start moving, then lightly reduce the Bias just to stop the actuator

Scale setting: supply the max input signal; adjust the Scale to obtain the max actuator speed

BIAS AND SCALE - 3 POSITION VALVES

Follow the same indications reported for 2 position valves and flow controls valves for both valve's solenoids

RAMPS

Ramps setting: select the required ramp configuration and adjust the ramp time to optimize the actuator's acceleration and deceleration

No Ramp : no ramps selected
Single Ramp : setup **Ramp 1**
Double Ramp : setup **Ramp 1** and **2**
Four Ramps : setup **Ramp 1**, **2**, **3** and **4** (only 3 position)
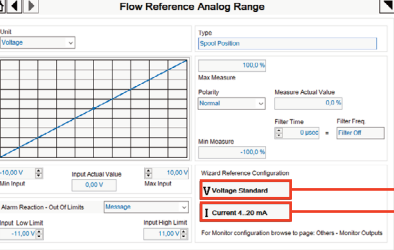
DITHER

Dither setting: factory default 200 Hz

- lower frequencies reduce the hysteresis of the valve, too low values can affect the valve stability
- higher frequencies increase regulation stability, but increase also the hysteresis of the valve

WIZARD REFERENCE - E-SW-SETUP - only for NP

Reference input signal is factory preset according to selected valve code, defaults are ±10 Vᴅᴄ for standard and 4 ÷ 20 mA for /I option. Input signal can be reconfigured via PC software selecting between voltage and current, browsing to **Reference Analog Range** page:
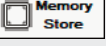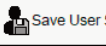

press **Voltage Standard** button to automatically set the analog input signal to voltage

V Voltage Standard

press **Current 4..20 mA** button to automatically set the analog input signal to current

I Current 4..20 mA

REMARK: Voltage Standard or Current 4..20 mA buttons do not act on Monitor output signal configuration! For Monitor output signal configuration browse to page Others - Monitor Output

---

4.3 STORE

Parameters modifications will be stored into driver permanent memory:

- press [Memory Store] button to access **Driver - Memory Save** window
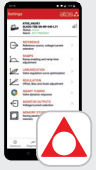- press [Save User Set] button to store **Valve Parameters**

⚠ **WARNING:** during valve parameters storing operations, the driver automatically shuts down the solenoid power supply for a short time. Do not perform any storing commands while the system is working.

4.4 BACK UP

Parameter modifications will be saved into PC memory:

- press [Save] button to access **Computer SW Archive - Setting Files** page, **Setting File Name** pop-up appears
- input a valid name into **Description** field and press **Ok** button

---

STEP 5 — MOBILE APP

ATOS CONNECT for smartphones and tablets is a free downloadable app which allows quick access to valve main functional parameters and configuration via Bluetooth, thus avoiding physical cable connection and significantly reducing commissioning times.
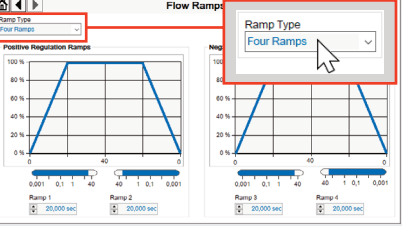
ATOS CONNECT app requirements:
- iOS 14 / Android 9
- Bluetooth Low Energy (BLE), version 4.2 or higher
- Atos digital valves/drivers equipped with E-A-BTH Bluetooth adapter or with built-in Bluetooth
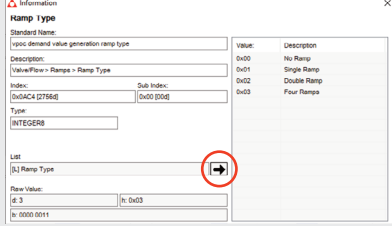
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HINT ! - Wizard objects dictionary - only for **IL**

Press **CTRL** + **H** on the PC keyboard to open the context help form

Move arrow on parameter (e.g. **Ramp Type**) to display the objects dictionary information to access the parameter via IO-Link

If present **List**, press ➡ to display values accepted by the parameter

NOTE: alternatively right click on any parameter

TROUBLESHOOTING

Valve vibration or noise
- presence of air in the solenoid; perform air bleeding procedure – see STEP 3
- dither frequency too low; increase value of the frequency – see STEP 4.2

The valve does not follow the reference signal
- valve is powered off, verify presence of 24 Vdc power supply
- valve is disabled, verify presence of 24 Vdc on enable pin - only for /Q, /Z and /W options
- flow/pressure values exceeding the valve's performance limits, verify that hydraulic operating conditions are in compliance with the valve's characteristics
- big hysteresis or spool stick-slip, reduce the dither frequency
- spool sticking, contact Atos service center
- missing piloting pressure, verify that hydraulic power level is compliant with valve's characteristics
- wrong pilot/drain configuration - check if the pilot/drain configuration of the valve corresponds to the effective system layout

PC software parameters modifications are lost when valve is switched off
- parameter store operation was not performed, check store procedure – see STEP 4, section 4.3

PC software parameters modifications have no effect on the valve
- valve is OFF LINE, check connection procedure – see STEP 4, section 4.1

After the modifications of PC software parameters the valve does not work properly
- restore valve factory parameters using 'Load Factory Set' button, located in 'Driver - Memory Save' window:
  - during restore, the current to the solenoid(s) will be temporarily switched off!
  - factory parameters will be applied at next driver restart or after power off-on sequence!