PILOTED OPERATED PROPORTIONAL DIRECTIONAL VALVES
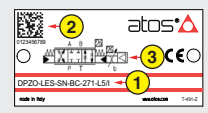
Valve model:

DPZO-LES-1	DPZO-LES-4M
DPZO-LES-2	DPZO-LES-6
DPZO-LES-4	DPZO-LES-8

Valve model:

DPZO-TES-1	DPZO-TES-4M
DPZO-TES-2	DPZO-TES-6
DPZO-TES-4	

Driver models:
E-RI-LES/TES-N for piloted valves without alternated p/Q control **SN**
E-RI-LES/TES-S for piloted valves with alternated p/Q control **SP, SF, SL**
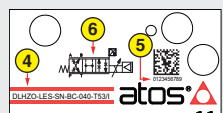
IDENTIFICATION

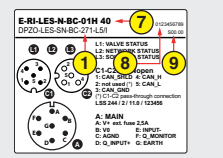Valve identification plates and label

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		Fieldbus connectors		Transducers cables	
		SN	SN,SP,SF,SL	BC,BP	EH,EW,EI,EP	SP,SL	SF
socket head screws	for fastening bolts and air bleeding	7 pin metallic	12 pin metallic	5 pin metallic	4 pin metallic	5 pin plastic	5 pin plastic
see STEP 1 and STEP 3		see STEP 2.1		see STEP 2.2		see STEP 2.3	

PROGRAMMING TOOLS - not included

PC software	mobile App	Bluetooth OR Adapter	USB connection KIT	
			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

RELATED DOCUMENTATION - www.atos.com

FS900	Operating and maintenance information - tech. table	**STARTUP BLUETOOTH**	Bluetooth adapter startup guide
FS500	Digital proportional valves with p/Q - tech. table	E-MAN-RI-LES	TES/LES - driver operating manual
FS172	DPZO one LVDT positive spool overlap - tech. table	E-MAN-RI-LES-S	TES/LES - driver with S option operating manual
FS175	DPZO two LVDT positive spool overlap - tech. table	E-MAN-S-BC	CANopen protocol programming manual
FS178	DPZO two LVDT zero spool overlap - tech. table	E-MAN-S-BP	PROFIBUS DP protocol programming manual
P005	Mounting surface - tech. table	E-MAN-S-EH	EtherCAT protocol programming manual
GS500	Programming tools - tech. table	E-MAN-S-EW	POWERLINK protocol programming manual
GS510	Fieldbus - tech. table	E-MAN-S-EI	EtherNet/IP protocol programming manual
K800	Electric and electronic connectors - tech. table	E-MAN-S-EP	PROFINET protocol programming manual

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.
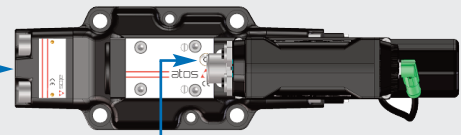
CONTACT US

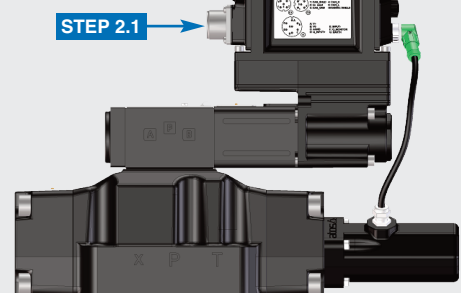Atos spa - Italy - 21018 Sesto Calende   www.atos.com   support@atos.com
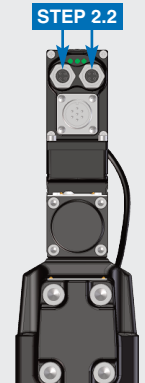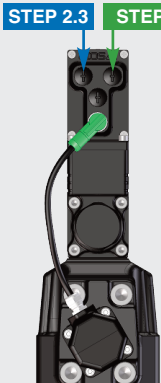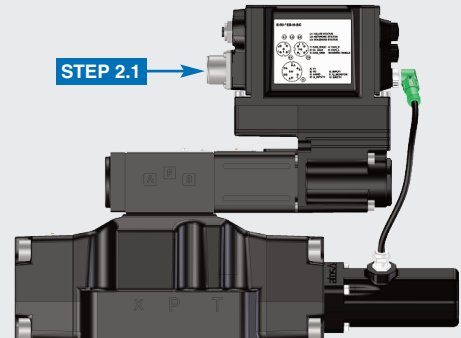

PRODUCTS OVERVIEW

STEP 1
STEP 2.3
STEP 4
STEP 3
STEP 2.2
STEP 2.1

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-LES-*-1   DPZO-TES-*-1
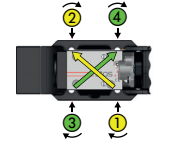
Mounting surface layout
4401-05-05-0-05
Valve size ISO 4401: **10**
n°2 OR 108
n°5 OR 2050

Fastening bolts socket head screws
Tightening torque: **15 Nm**
n°4 M6x40 class:12.9
wrench 5 mm

DPZO-LES-*-2   DPZO-TES-*-2

Mounting surface layout
4401-07-07-0-05
Valve size ISO 4401: **16**
n°2 OR 2043
n°4 OR 130
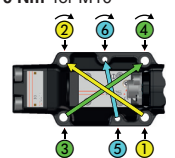
Fastening bolts socket head screws
Tightening torque:
15 Nm for M6
70 Nm for M10
wrench 5 mm
wrench 8 mm
n°4 M10x50   n°2 M6x45 class:12.9

DPZO-LES-*-4   DPZO-TES-*-4

Mounting surface layout
4401-08-08-0-05
Valve size ISO 4401: **25**
n°2 OR 3056
n°4 OR 4112
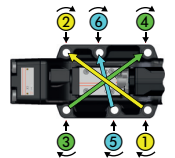
Fastening bolts socket head screws
Tightening torque: **125 Nm**
n°6 M12x60 class:12.9
wrench 10 mm

DPZO-LES-*-4M   DPZO-TES-*-4M

Mounting surface layout
4401-08-08-0-05
Valve size ISO 4401: **27**
n°2 OR 3056
n°4 OR 4131
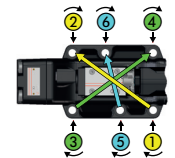
Fastening bolts socket head screws
Tightening torque: **125 Nm**
n°6 M12x60 class:12.9
wrench 10 mm

DPZO-LES-*-6   DPZO-TES-*-6

Mounting surface layout
4401-10-09-0-05
Valve size ISO 4401: **32**
n°2 OR 3056
n°4 OR 144
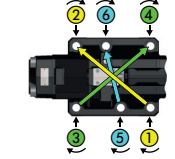
Fastening bolts socket head screws
Tightening torque: **600 Nm**
n°6 M20x90 class:12.9
wrench 17 mm

DPZO-LES-*-8

Mounting surface layout
4401-10-09-0-05
Valve size ISO 4401: **35**
n°2 OR 3056
n°4 OR 156
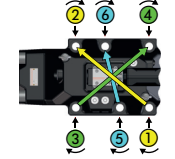
Fastening bolts socket head screws
Tightening torque: **600 Nm**
n°6 M20x100 class:12.9
wrench 17 mm

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

WARNING: for electrical connections of safety proportional valves please refer to technical tables:
FY100 safety proportionals **/U** with double power supply   -   **FY200** safety proportionals **/K** with on-off signals

2.1   MAIN CONNECTOR

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 - 7 pin MAIN CONNECTOR (A1)

ZM-12P - 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

A1 / A2 connector pinout

SN   standard

A	V+	(power supply 24VDC)
B	V0	(power supply 0VDC)
C	AGND	
D	Q_INPUT+	(±10VDC / 4 ÷ 20mA)
E	INPUT-	
F	Q_MONITOR	(±10VDC / 4 ÷ 20mA)
G	EARTH	

SN   /Q option

A	V+	(power supply 24VDC)
B	V0	(power supply 0VDC)
C	ENABLE	(input 24VDC)
D	Q_INPUT+	(±10VDC / 4 ÷ 20mA)
E	INPUT-	
F	Q_MONITOR	(±10VDC / 4 ÷ 20mA)
G	EARTH	

SN   /F option

A	V+	(power supply 24VDC)
B	V0	(power supply 0VDC)
C	AGND	
D	Q_INPUT+	(±10VDC / 4 ÷ 20mA)
E	INPUT-	
F	FAULT	(output 24VDC)
G	EARTH	

SN   /Z option

1	V+	(power supply 24VDC)
2	V0	(power supply 0VDC)
3	ENABLE	(input 24VDC)
4	Q_INPUT+	(±10VDC / 4 ÷ 20mA)
5	INPUT-	
6	Q_MONITOR	(±10VDC / 4 ÷ 20mA)
7	NC	
8	NC	
9	VL+	(power supply 24VDC)
10	VL0	(power supply 0VDC)
11	FAULT	(output 24VDC)
PE	EARTH	

SP, SF, SL   standard

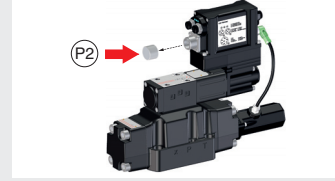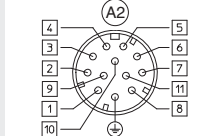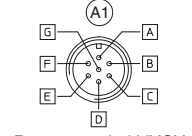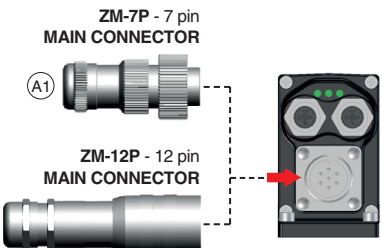|		
1	V+	(power supply 24VDC)
2	V0	(power supply 0VDC)
3	ENABLE	(input 24VDC)
4	Q_INPUT+	(±10VDC / 4 ÷ 20mA)
5	INPUT-	
6	Q_MONITOR	(±10VDC / 4 ÷ 20mA)
7	F_INPUT+	(±10VDC / 4 ÷ 20mA)
8	F_MONITOR	(±10VDC / 4 ÷ 20mA)
9	D_IN0	(multiple PID selection - NP)
	VL+	(power supply 24VDC - fieldbus)
10	D_IN1	(multiple PID selection - NP)
	VL0	(power supply 0VDC - fieldbus)
11	FAULT	(output 24VDC)
PE	EARTH	

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

2.2   FIELDBUS CONNECTORS - only for BC, BP, EH, EW, EI, EP
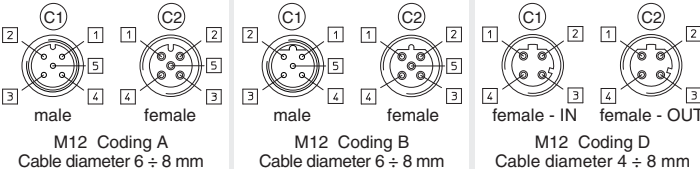
1 Remove fieldbus connectors caps **P3**

2 Select fieldbus connectors according to valve code and proceed with wirings operations

male (C1) / female (C2)
M12 Coding A Cable diameter 6 ÷ 8 mm
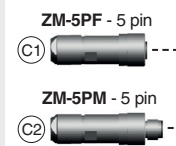
male (C1) / female (C2)
M12 Coding B Cable diameter 6 ÷ 8 mm

female - IN (C1) / female - OUT (C2)
M12 Coding D Cable diameter 4 ÷ 8 mm

BC

1	CAN_SHLD	Shield
2	not used	
3	CAN_GND	Signal zero data line
4	CAN_H	Bus line (high)
5	CAN_L	Bus line (low)

BP
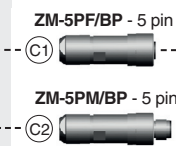
1	+5V	Termination supply signal
2	LINE-A	Bus line (high)
3	DGND	Data line - termination signal zero
4	LINE-B	Bus line (low)
5	SHIELD	

EH - EW - EI - EP

1	TX+	Transmitter
2	RX+	Receiver
3	TX-	Transmitter
4	RX-	Receiver
housing	SHIELD	

3 Connect the valve to the fieldbus network. For information about fieldbus terminators see **GS500**. The use of above metallic connectors is strongly recommended in order to fulfill EMC requirements.

BC
ZM-5PF - 5 pin (C1)
ZM-5PM - 5 pin (C2)

BP
ZM-5PF/BP - 5 pin (C1)
ZM-5PM/BP - 5 pin (C2)

EH, EW, EI, EP
ZM-4PM/E - 4 pin (C1)
ZM-4PM/E - 4 pin (C2)
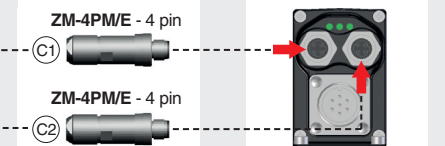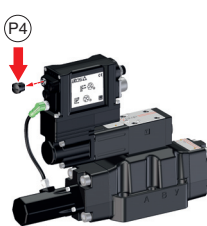
2.3   REMOTE TRANSDUCERS CONNECTOR - only for SP, SF, SL
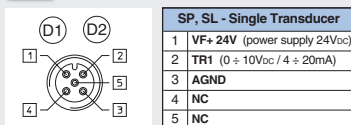
1 Remove transducer connector cap **P4**
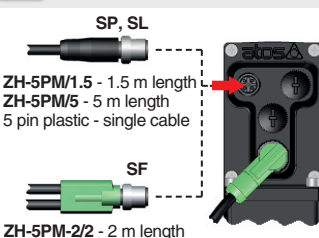
2 Select transducer(s) connection and proceed with wirings operations

SP, SL - Single Transducer (D1)

1	VF+ 24V	(power supply 24VDC)
2	TR1	(0 ÷ 10VDC / 4 ÷ 20mA)
3	AGND	
4	NC	
5	NC	

SF - Double Transducers (D2)

1	VF+ 24V	(power supply 24VDC)
2	TR1	(0 ÷ 10VDC / 4 ÷ 20mA)
3	AGND	
4	TR2	(0 ÷ 10VDC / 4 ÷ 20mA)
5	NC	

Recommended cable:
(D1) 3 x 0,25 mm²
(D2) 5 x 0,25 mm²

3 Connect the valve to the transducer(s)

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

SF
ZH-5PM-2/2 - 2 m length
4 pin - plastic - double cable

ELECTRICAL WIRING EXAMPLES

MAIN CONNECTOR - VOLTAGE

REFERENCE INPUT - DIFFERENTIAL MODE

REFERENCE INPUT - COMMON MODE

MONITOR OUTPUT

REMOTE TRANSDUCER - only for **SP, SL**

MAIN CONNECTOR - CURRENT

REFERENCE INPUT - DIFFERENTIAL MODE

REFERENCE INPUT - COMMON MODE

MONITOR OUTPUT

REMOTE TRANSDUCERS - only for **SF**

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**

NOTE: to facilitate bleeding operations, apply a light backpressure (1 or 2 bar) by adding a check valve on Y line

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

> **WARNING:** To avoid overheating and possible damage of the electronic driver, the valves must be never energized without hydraulic supply to the pilot stage. In case of prolonged pauses of the valve operation during the machine cycle, it is always advisable to switch off or disable the driver (option /Q or /Z)

HINT ! - Wizard objects dictionary - only for **BC, BP, EH, EW, EI, EP**

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

Move arrow on parameter (e.g. **Unit**) to display the objects dictionary information to access the parameter via fieldbus

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

NOTE: alternatively right click on any parameter

STEP 4 — PC SOFTWARE

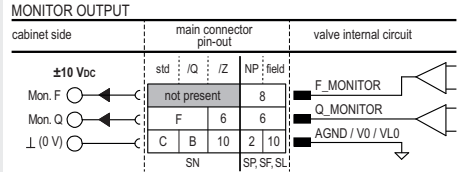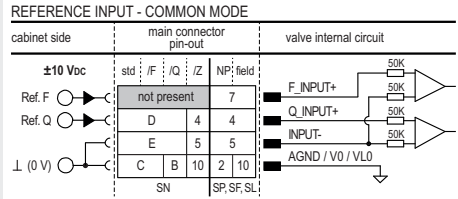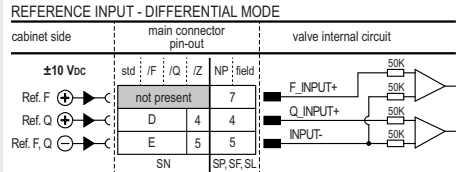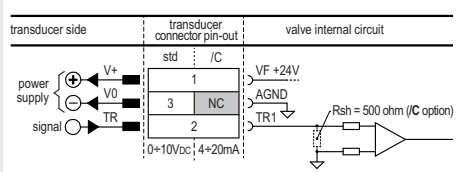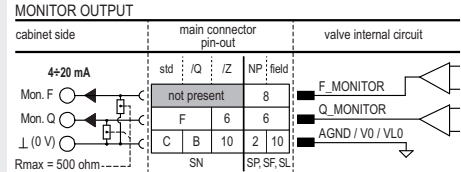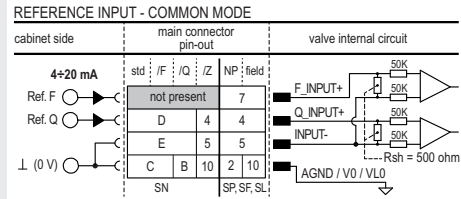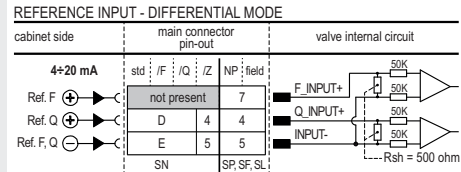**REMARK** proportional valves with on-board electronics are factory preset with default parameters, only few programming operations are mandatory for:
• **BC, BP, EH, EW, EI, EP** setup the network parameters and the source of reference signals
• **SP, SF, SL** setup the feedback's scale for remote transducers and the pressure/force PID parameters
Valve programming can be performed through E-SW-SETUP software or via fieldbus (not for **NP**)

4.1 CONNECTION

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

2 Remove USB plastic protection cap **P5** and connect valve to the PC as shown 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

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

NOTE: for **BC, BP, EH, EW, EI, EP** please also refer to the following parameter settings:
• see step 4.2 to change the network setup
• see step 4.3 to change the reference signals setup

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

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 FIELDBUS - Network Management - only for BC, BP, EH, EW, EI, EP

Node, Station Alias, IP Address, Baudrate, etc... can be set through:
1) Machine central unit (master) - please refer to E-MAN-S-** fieldbus protocol programming manual
2) E-SW-SETUP software
• browse to **Network Management - Configuration** to change below default settings:

BC CANopen
Configuration file: **EDS**

Configuration
CANopen Node: 1
Speed: 50 Kbit/sec
CANopen Hardware Filter: Filter Active

BP PROFIBUS DP
Configuration file: **GSD**

Configuration
Profibus Node: 125
Defaults:
Telegram 3 for SN
Telegram 5 for SP, SF, SL
Telegram Selection: Telegram 5

EH EtherCAT
Configuration file: **XML**

Configuration
Station Alias: 0

Station Alias is assigned automatically by fieldbus master

EW POWERLINK
Configuration file: **XDD**

Configuration
Node ID: 1

EI EtherNet/IP
Configuration file: **EDS**

IP Address, Subnet Mask and Default Gateway are assigned by fieldbus master, IPconfig or BOOTP/DHCP utility

Configuration
IP Address: 0 . 0 . 0 . 0
Subnet Mask: 0 . 0 . 0 . 0
Default Gateway: 0 . 0 . 0 . 0

EP PROFINET
Configuration file: **GSDML**

IP Address, Subnet Mask, Default Gateway and Station Name are assigned automatically by fieldbus master (e.g. Discovery and Configuration Protocol)

Configuration
IP Address: 0 . 0 . 0 . 0
Subnet Mask: 0 . 0 . 0 . 0
Default Gateway: 0 . 0 . 0 . 0

• press **Memory Store** button and press **Save User Set** button to save new setting into the driver (see 4.6)
• network configuration settings will be applied at next driver power on or pressing the **Restart** button

NOTE: configuration files are available in MyAtos area - **www.atos.com**

4.3 REFERENCES - only for BC, BP, EH, EW, EI, EP

The source of reference signals for valves with fieldbus:
• is preset as **Analog** by factory default
• can be managed through machine control unit by setting the source from **Analog** to **Fieldbus**

1 For SN, SP, SF, SL with fieldbus:
• in **Flow - Reference** select **Fieldbus**

2 Only for SP, SF, SL with fieldbus:
• in **Pressure/Force - Reference** select **Fieldbus**

4.4 p/Q SETUP - only for SP, SF, SL

The scaling procedure of the remote transducers feedbacks and pressure/force PID tuning are mandatory!
Please refer to E-MAN-RI-LES-S operating manual.

> **WARNING:** the system may be damaged and/or perform uncontrolled movements, due to vibrations and/or undesired transitions between controls **p** and **Q** or not executing at all the pressure/force limitation, if the operations listed in this paragraph are not performed.

4.5 SMART TUNING - E-SW-SETUP

Smart tuning allows to adjust the valve dynamic response in order to match different performance requirements.

The valve is provided with 3 factory setting for the spool control:

dynamic fast response time and high sensitivity for best dynamic performances (default factory setting)

balanced average response time and sensitivity suitable for major applications

smooth attenuated response time and sensitivity to improve control stability in critical applications or in environments with electrical disturbances

NOTE: smart tuning function not available for DPZO-TES valves

1 = dynamic
2 = balanced
3 = smooth

4.6 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.

4.7 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

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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

Download on the App Store
GET IT ON Google Play
EXPLORE IT ON AppGallery

TROUBLESHOOTING

Valve vibration or noise
• presence of air in the solenoid; perform air bleeding procedure – see STEP 3

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 and /Z options
• flow/pressure values exceeding the valve's performance limits, verify that hydraulic operating conditions are incompliance with the valve's characteristics
• 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 4.6

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!