QUICKSTART FULL

QF300-4 - 04/22

for digital proportionals with LVDT transducer - fieldbus and optional P/Q control

DIRECT OPERATED PROPORTIONAL DIRECTIONAL AND FLOW VALVES

Valve model:

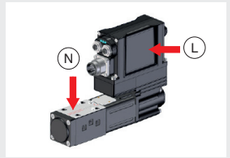
DHZO-TES DKZOR-TES QVHZO-TES
DLHZO-TES DLKZOR-TES QVKZOR-TES

Driver models:

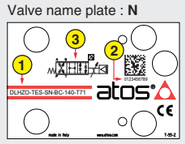
E-RI-TES-N for directional and flow valves without alternated P/Q control **SN**
E-RI-TES-S for directional valves with alternated P/Q control **SP**, **SF**, **SL**

IDENTIFICATION

Valve identification plates and label

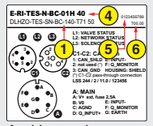


Valve name plate : **N**



1 : valve code
2 : valve matrix code
3 : hydraulic symbol

Driver label : **L**



4 : driver code
5 : driver serial number
6 : 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

Software	USB connection KIT		OR	Bluetooth connection KIT	
	Cable	Isolator		Cable	Adapter
E-SW-* programming software	**E-C-SB-USB/M12**	**E-A-SB-USB/OPT**		**E-C-SB-M12/BTH**	**E-A-SB-USB/BTH**

PROGRAMMING SOFTWARE

The software is available in different versions according to the driver's options:

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

E-SW-FIELDBUS supports also valves without fieldbus communication; E-SW-*/PQ supports also valves without P/Q control

REMARK Atos software is designed for Windows based operative systems - Windows XP SP3 or later

DOWNLOAD AREA

Download area
electronics

Perform the registration at **www.atos.com/en-it/login** by filling the form. In MyAtos area, perform login with personal username and password and then press the **Download area electronics** button

Free version of E-SW-BASIC can be downloaded and used by the "FREE Activation Code"

The software remains active for 10 days from the installation date and then it stops until the user inputs the Activation Code

RELATED DOCUMENTATION - www.atos.com - section Catalog on-line

FS900	Operating and maintenance information - tech. table	**STARTUP E-SW-BASIC**	Software startup guide
FS500	Digital proportional valves with P/Q - tech. table	**STARTUP E-SW-FIELDBUS**	Software startup guide
FS165	DHZO, DKZOR positive spool overlap - tech. table	**STARTUP BLUETOOTH**	Bluetooth adpter startup guide
FS168	DHZO, DKZOR zero spool overlap - tech. table	**E-MAN-RI-LES**	TES/LES - driver operating manual
FS180	DLHZO, DLKZOR servoproportional - tech. table	**E-MAN-RI-LES-S**	TES/LES - driver with S option operating manual
FS412	QVHZO, QVKZOR flow controls - tech. table	**E-MAN-S-BC**	CANopen protocol programming manual
P005	Mounting surface - tech. table	**E-MAN-S-BP**	PROFIBUS DP protocol programming manual
GS500	Programming tools - tech. table	**E-MAN-S-EH**	EtherCAT protocol programming manual
GS510	Fieldbus - tech. table	**E-MAN-S-EW**	POWERLINK protocol programming manual
K800	Electric and electronic connectors - tech. table	**E-MAN-S-EI**	EtherNet/IP protocol programming manual
		E-MAN-S-EP	PROFINET protocol programming manual

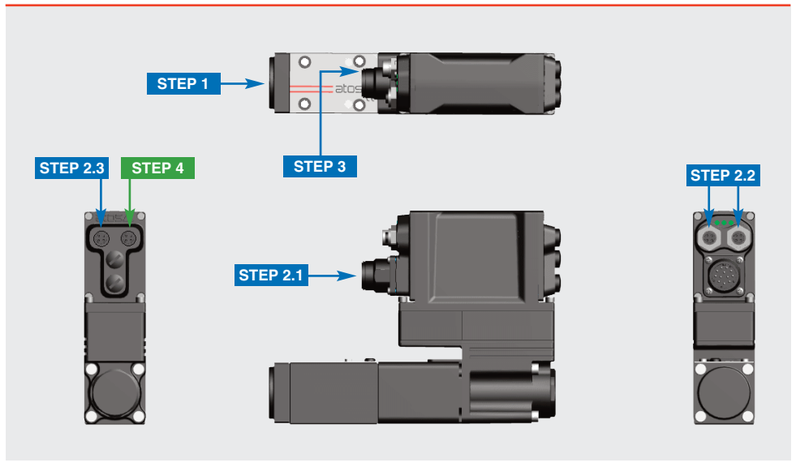
ATTENTION !

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

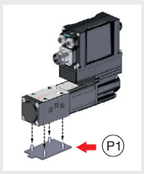
Atos spa - Italy - 21018 Sesto Calende www.atos.com support@atos.com

PRODUCTS OVERVIEW



INSTALLATION			PROGRAMMING
STEP 1	**STEP 2**	**STEP 3**	**STEP 4**
MECHANICAL	**ELECTRICAL**	**HYDRAULICS**	**SOFTWARE**

STEP 1 MECHANICAL



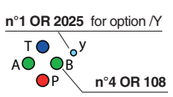
In case of first commissioning, before the valve installation the whole system must be correctly flushed to grant the required cleanliness level
During the flushing operation use on-off or by-pass valves in place of the proportional valve

- 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

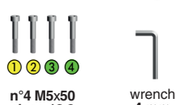
DHZO-TES / DLHZO-TES

Mounting surface layout

4401-03-02-0-05
4401-03-03-0-05
(for /Y without X port)
Valve size ISO 4401: **06**



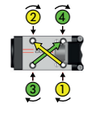
Fastening bolts socket head screws



n°4 M5x50
class:12.9

wrench **4 mm**

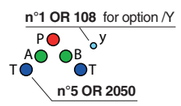
Tightening torque: **8 Nm**



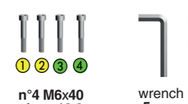
DKZOR-TES / DLKZOR-TES

Mounting surface layout

4401-05-04-0-05
4401-05-05-0-05
(for /Y without X port)
Valve size ISO 4401: **10**



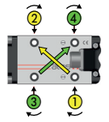
Fastening bolts socket head screws



n°4 M6x40
class:12.9

wrench **5 mm**

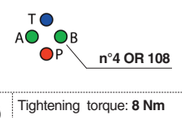
Tightening torque: **15 Nm**



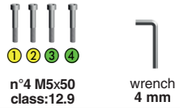
QVHZO-TES

Mounting surface layout

4401-03-02-0-05
Valve size ISO 4401: **06**



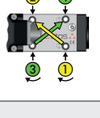
Fastening bolts socket head screws



n°4 M5x50
class:12.9

wrench **4 mm**

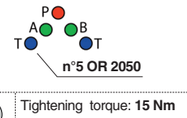
Tightening torque: **8 Nm**



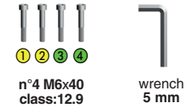
QVKZOR-TES

Mounting surface layout

4401-05-04-0-05
Valve size ISO 4401: **10**



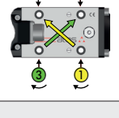
Fastening bolts socket head screws



n°4 M6x40
class:12.9

wrench **5 mm**

Tightening torque: **15 Nm**



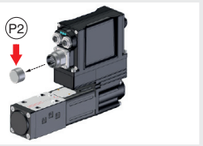
STEP 2 ELECTRICAL

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

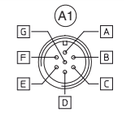
2.1 MAIN CONNECTOR

1 Remove main connector cap **P2**

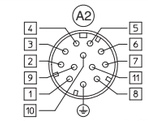


WARNING: remove power supply before any electrical or wiring operations

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

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 /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**	

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**	

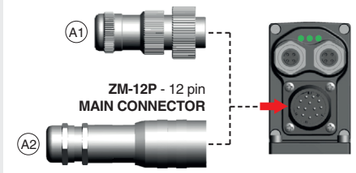
SP, SF, SL standard		
1	**V+**	(power supply 24Vdc)
2	**V0**	(power supply 0Vdc)
3	**ENABLE**	(input 24Vdc)
4	**Q_INPUT+**	(±10Vdc / 4 ÷ 20mA)
5	**INPUT-**	
6	**Q_MONITOR**	(±10Vdc / 4 ÷ 20mA)
7	**F_INPUT+**	(±10Vdc / 4 ÷ 20mA)
8	**F_MONITOR**	(±10Vdc / 4 ÷ 20mA)
9	**D_IN0**	(multiple PID selection -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

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**	

3 Connect the valve to the system

ZM-7P - 7 pin
MAIN CONNECTOR

ZM-12P - 12 pin
MAIN CONNECTOR

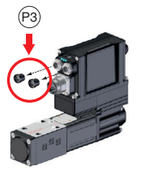


NOTE: the use of above metallic connectors is strongly recommended in order to fulfill EMC requirements

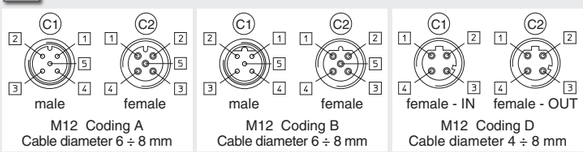
WARNING: a safety fuse is required in series to driver power supply - 2,5 A time lag fuse

2.2 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



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)

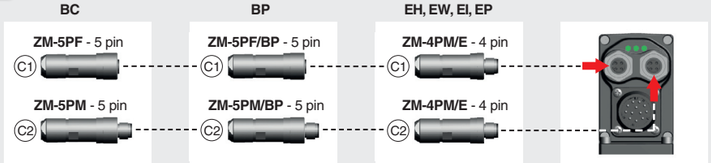
BP		
1	**+5V**	Termination supply signal
2	**LINE-A**	Bus line (high)
3	**DGND**	Data line - termination signal zero
4	**LINE-B**	Bus line (low)
5	**SHIELD**	

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.

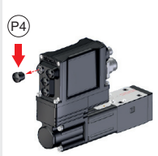
BC **BP** **EH, EW, EI, EP**

ZM-5PF - 5 pin
ZM-5PM - 5 pin
ZM-5PF/BP - 5 pin
ZM-5PM/BP - 5 pin
ZM-4PM/E - 4 pin
ZM-4PM/E - 4 pin

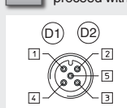


2.3 REMOTE TRANSDUCERS CONNECTOR - only for SP, SF, SL

1 Remove transducer connector cap **P4**



2 Select transducer(s) connection and proceed with wirings operations

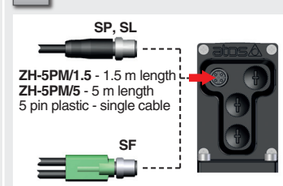


Recommended cable:
D1 3 x 0,25 mm²
D2 5 x 0,25 mm²

SP, SL - Single Transducer		
1	**VF+ 24V**	(power supply 24Vdc)
2	**TR1**	(0 ÷ 10Vdc / 4 ÷ 20mA)
3	**AGND**	
4	**NC**	
5	**NC**	

SF - Double Transducers		
1	**VF+ 24V**	(power supply 24Vdc)
2	**TR1**	(0 ÷ 10Vdc / 4 ÷ 20mA)
3	**AGND**	
4	**TR2**	(0 ÷ 10Vdc / 4 ÷ 20mA)
5	**NC**	

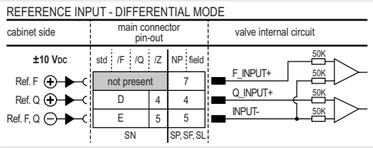
3 Connect the valve to the transducer(s)



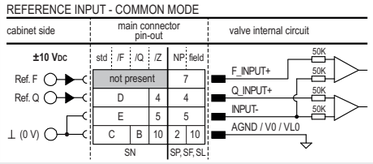
ELECTRICAL WIRING EXAMPLES

MAIN CONNECTOR - VOLTAGE

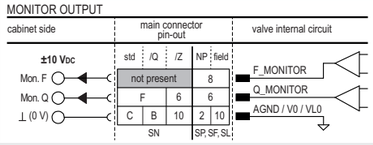
REFERENCE INPUT - DIFFERENTIAL MODE



REFERENCE INPUT - COMMON MODE

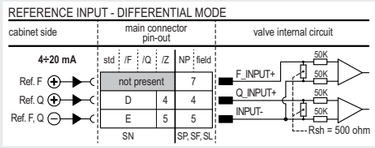


MONITOR OUTPUT

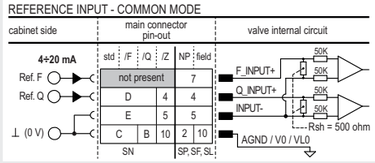


MAIN CONNECTOR - CURRENT

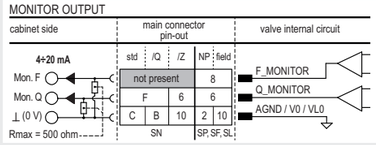
REFERENCE INPUT - DIFFERENTIAL MODE



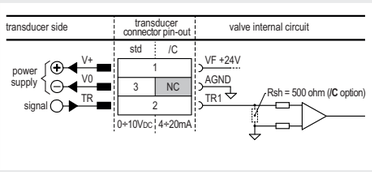
REFERENCE INPUT - COMMON MODE



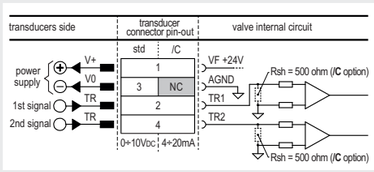
MONITOR OUTPUT



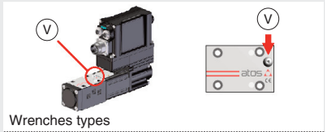
REMOTE TRANSDUCER - only for **SP**, **SL**



REMOTE TRANSDUCERS - only for **SF**



STEP 3 HYDRAULICS



Wrenches types

DHZO DLHZO	3 mm		Tightening torque 4 Nm
DKZOR DLKZOR	4 mm	or 13 mm	Tightening torque 8 Nm

Air bleeding - only **DHZO**, **DLHZO**, **DKZOR** and **DLKZOR:**

- 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 T line for standard valves or on Y line for valves with /Y option

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

STEP 4 SOFTWARE

REMARK proportional valves with integral 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

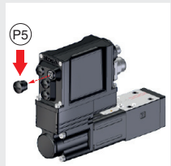
Valve programming can be performed through E-SW software or via fieldbus (not for **NP**)

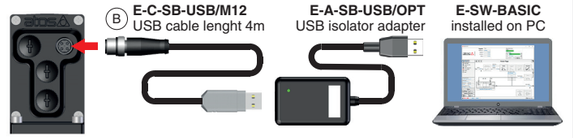
PROGRAMMING						PC
4.1	4.2	4.3	4.4	4.5	4.6	4.7
CONNECTION	FIELDBUS	REFERENCES	P/Q SETUP	SMART TUNING	STORE	BACK UP

4.1 CONNECTION

1 **In order to access valve parameterization:**
- Install E-SW 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

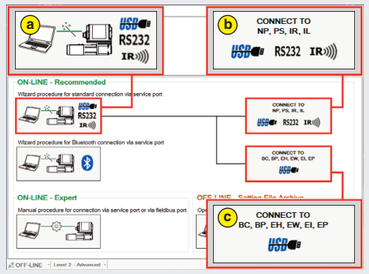




WARNING: drivers USB port is not isolated!
The use of USB isolator adapter is highly recommended for PC protection (see **GS500**)

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

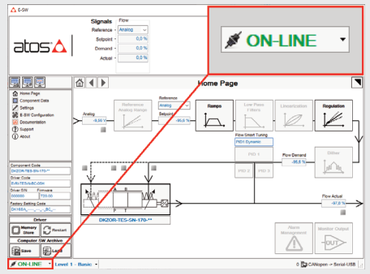
4 Press buttons according the below sequence:
- **a** : **ON-LINE - Recommended** Wizard procedure for standard connection
- **b** : **CONNECT TO NP, PS, IR, IL** for valve without filedbus communication
- **c** : **CONNECT TO BC, BP, EH, EW, EI, EP** for valve with filedbus communication



NOTE: Bluetooth adapter available!
For more info please refer to STARTUP BLUETOOTH guide

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



REMARK: once removed the USB cable E-C-SB-USB/M12, 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**

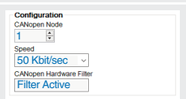
4.2 FIELDBUS - Network Management - only for **BC**, **BP**, **EH**, **EW**, **EI**, **EP**

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

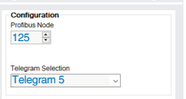
2) E-SW software
- switch to **Level 2 - Advanced** and browse to **Network Management - Configuration** to change below default settings:

BC CANopen
Configuration file: **EDS**



BP PROFIBUS DP
Configuration file: **GSD**

Defaults:
Telegram 3 for **SN**
Telegram 5 for **SP**, **SF**, **SL**



EH EtherCAT
Configuration file: **XML**

Station Alias is assigned automatically by fieldbus master

EW POWERLINK
Configuration file: **XDD**

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

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

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)

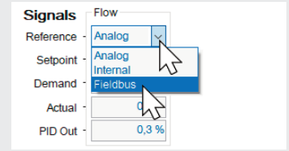
- press **Memory Store** button and in **Fieldbus Parameters** press **Store User** button to save new setting into the driver (see 4.6)
- network configuration settings will be applied at next driver power-on or pressing the **Restart** button

NOTE: configuration files are available in E-SW DVD or in MyAtos area - **www.atos.com**

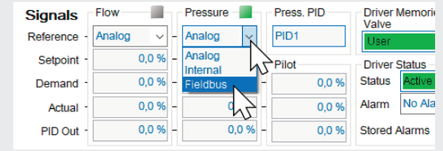
4.3 REFERENCES - only for **BC**, **BP**, **EH**, **EW**, **EI**, **EP**

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**



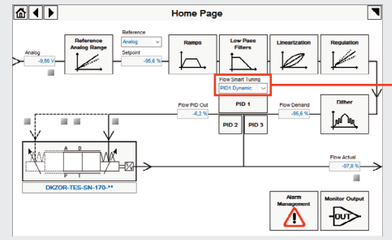
4.4 P/Q SETUP - only for **SP**, **SF**, **SL**

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 level 2 functionality

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
PID1 Dynamic	Fast response time and high sensitivity for best dynamic performances - default
PID2 Balanced	Average response time and sensitivity suitable for major applications
PID3 Smooth	Attenuated response time and sensitivity to improve control stability in critical applications or in environments with electrical disturbances

4.6 STORE

Parameters modifications will be stored into driver permanent memory:

- press **Memory Store** button to access **Driver - Memory Store** window
- press **Store User** buttons to store **Valve Parameters** or **Fieldbus Parameters**

WARNING: During valve or fieldbus 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:

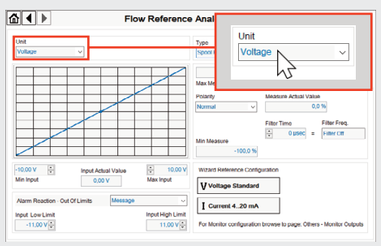
- press **Save** button to access **Computer SW Archive - Setting Files** page, **Setting File Name** pop-up appears
- input a valid name into **Description** field and press **Ok** button

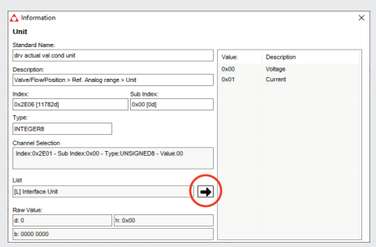
HINT ! - Wizard objects dictionary - only for **BC**, **BP**, **EH**, **EW**, **EI**, **EP**

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

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

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

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