# QUICKSTART FULL

QF340-5 - 09/22

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

## PROPORTIONAL AND SERVOPROPORTIONAL CARTRIDGES

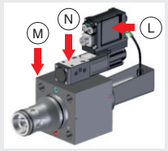
**Valve model:**
LIQZP-LES 2 or 3 way

**Valve model:**
LIQZP-TES 2 way

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

## IDENTIFICATION

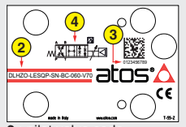
Valve identification plates and label




Cartridge name plate : **M**

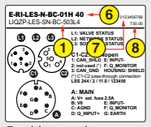

**1** : cartridge code

Pilot valve name plate : **N**




**2** : pilot valve code
**3** : pilot valve matrix code
**4** : pilot hydraulic symbol

Driver label : **L**




**5** : driver code
**6** : driver serial number
**7** : factory firmware version

## INSTALLATION TOOLS ACCORDING TO VALVE MODEL- not included

| Fastening bolts | Wrenches | Main connectors | | Fieldbus connectors | | Transducers cables |
|---|---|---|---|---|---|---|
| | | **SN** | **SN,SP,SL** | **BC,BP** | **EH,EW,EI,EP** | **SP,SL** |
| supplied with the valve | or | | | | | |
| socket head screws | for fastening bolts and air bleeding | 7 pin metallic | 12 pin metallic | 5 pin metallic | 4 pin metallic | 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



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 |
| **FS330** | LIQZP 2-way cartridges, high performance - tech. table | **STARTUP BLUETOOTH** | Bluetooth adpter startup guide |
| **FS340** | LIQZP 3-way cartridges - tech. table | **E-MAN-RI-LES** | TES/LES - driver operating manual |
| **P006** | Mounting surfaces - tech. table | **E-MAN-RI-LES-S** | TES/LES - driver with S option operating manual |
| **GS500** | Programming tools - tech. table | **E-MAN-S-BC** | CANopen protocol programming manual |
| **GS510** | Fieldbus - tech. table | **E-MAN-S-BP** | PROFIBUS DP protocol programming manual |
| **K800** | Electric and electronic connectors - tech. table | **E-MAN-S-EH** | EtherCAT protocol programming manual |
| | | **E-MAN-S-EW** | POWERLINK protocol programming manual |
| | | **E-MAN-S-EI** | EtherNet/IP protocol programming manual |
| | | **E-MAN-S-EP** | PROFINET protocol programming manual |

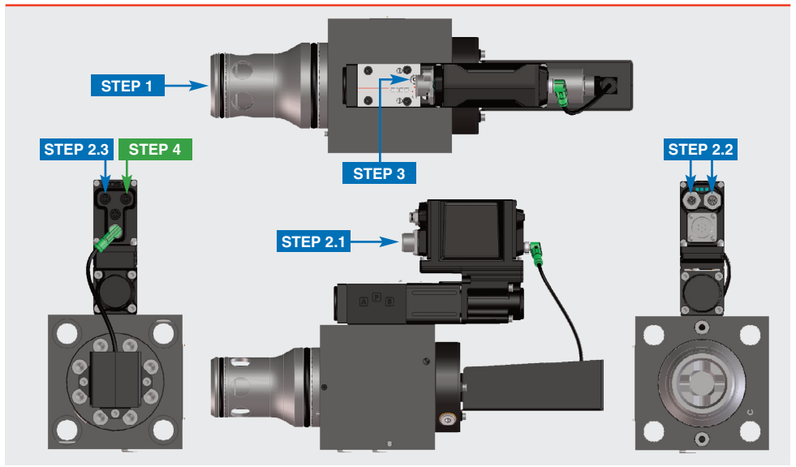
## ATTENTION !

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



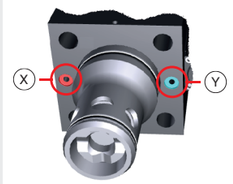

| INSTALLATION | | | PROGRAMMING |
|---|---|---|---|
| STEP 1 | STEP 2 | STEP 3 | STEP 4 |
| MECHANICAL | ELECTRICAL | HYDRAULICS | SOFTWARE |

## STEP 1 MECHANICAL

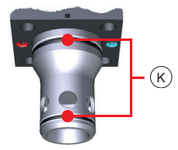
**In case of first commissioning, before the valve installation the whole system must be correctly flushed to grant the required cleanliness level:**

- remove the cartridge protection (do not remove connectors caps)
- check the presence and correct positioning of the seals on the mounting surface ports ( **X** - **Y** ) and on the cartridge ( **K** )

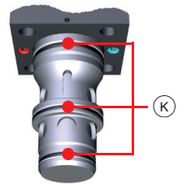
**2 or 3 way**
surface seals




**2 way**
cartridge seals

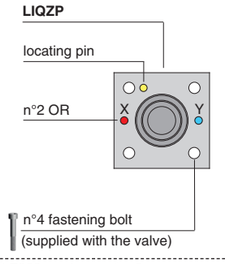



**3 way**
cartridge seals

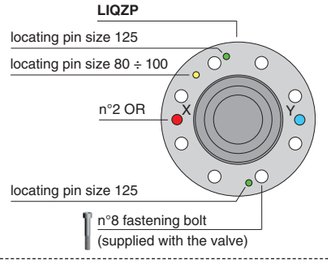



- verify that valve mounting surface and the manifold cavity are clean and free from damages or burrs
- verify the correct valve orientation according to the pattern of the relevant mounting interface
- lock the fastening bolts respecting tightening torque according to valve model

**SIZE 16 to 63**
mounting surface layout
**ISO 7368**




**SIZE 80 to 125**
mounting surface layout
**ISO 7368**




**Notes**: ISO 7368 cavity only for 2 way version

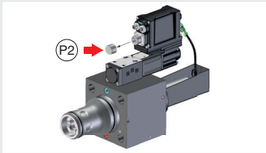
| Type | Size | Fastening Bolt class: 12.9 | Wrench (mm) | Tightening Torque (Nm) | O-Ring (X - Y) |
|---|---|---|---|---|---|
| LIQZP | 16 | n°4 M8 x 90 | 6 | 35 | n°2 OR-108 |
| | 25 | n°4 M12 x 100 | 10 | 125 | n°2 OR-108 |
| | 32 | n°4 M16 x 60 | 14 | 300 | n°2 OR-2043 |
| | 40 | n°4 M20 x 70 | 17 | 600 | n°2 OR-2050 |
| | 50 | n°4 M20 x 80 | 17 | 600 | n°2 OR-3043 |
| | 63 | n°4 M30 x 120 | 22 | 2100 | n°2 OR-3050 |
| | 80 | n°8 M24 x 80 | 19 | 1000 | n°2 OR-4075 |
| | 100 | n°8 M30 x 120 | 22 | 2100 | n°2 OR-4087 |
| | 125 | n°8 M36 x 260 | 27 | 3600 | n°2 OR-37x5 |

## 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

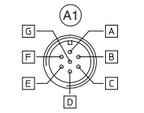
### 2.1 MAIN CONNECTOR

**1** Remove main connector cap **P2**

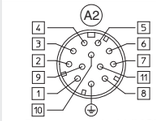



**WARNING:** remove power supply before any electrical or wiring operations

**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** | |

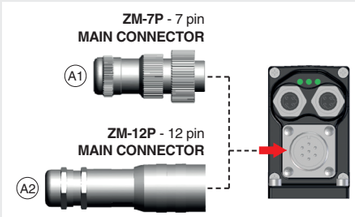
| SN /Z option | | |
|---|---|---|
| 1 | **V+** | (power supply 24Vdc) |
| 2 | **V0** | (power supply 0Vdc) |
| 3 | **ENABLE** | (input 24Vdc) |
| 4 | **Q_INPUT+** | (±10Vdc / 4 ÷ 20mA) |
| 5 | **INPUT-** | |
| 6 | **Q_MONITOR** | (±10Vdc / 4 ÷ 20mA) |
| 7 | **NC** | |
| 8 | **NC** | |
| 9 | **VL+** | (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, 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

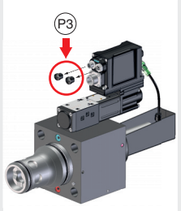



**NOTE:** the use of above metallic connectors is strongly recommended in order to fulfill EMC requirements

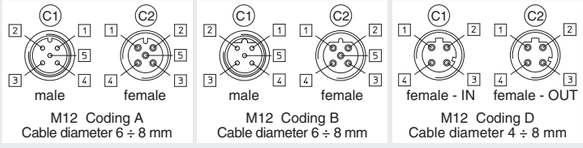
**WARNING:** a safety fuse is required in series to driver power supply - 2,5 A time lag fuse

### 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




M12 Coding A
Cable diameter 6 ÷ 8 mm

M12 Coding B
Cable diameter 6 ÷ 8 mm

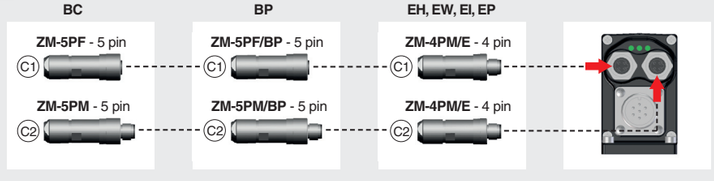
M12 Coding D
Cable diameter 4 ÷ 8 mm

| 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** | |

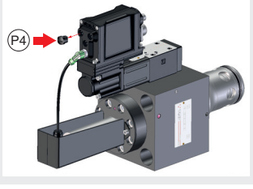
| EH - EW - EI - EP | | |
|---|---|---|
| 1 | **TX+** | Transmitter |
| 2 | **RX-** | Receiver |
| 3 | **TX-** | Transmitter |
| 4 | **RX-** | Receiver |
| housing | **SHIELD** | |

**3** Connect the valve to the fieldbus network. For information about fieldbus terminators see **GS500**

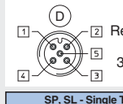



### 2.3 REMOTE TRANSDUCER CONNECTOR - only for SP, SL

**1** Remove transducer connector cap **P4**



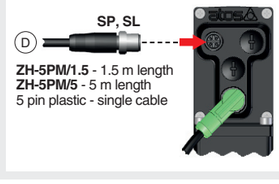

**2** Proceed with wirings operations




Recommended cable:
3 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** | |

**3** Connect the valve to the transducer

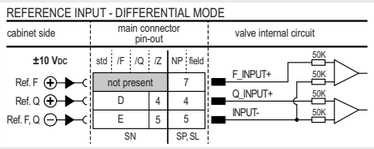



**ZH-5PM/1.5** - 1.5 m length
**ZH-5PM/5** - 5 m length
5 pin plastic - single cable

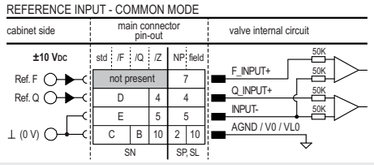
## ELECTRICAL WIRING EXAMPLES

### MAIN CONNECTOR - VOLTAGE

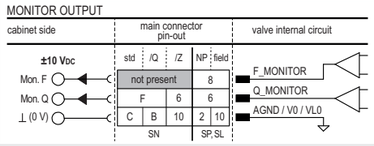
REFERENCE INPUT - DIFFERENTIAL MODE




REFERENCE INPUT - COMMON MODE

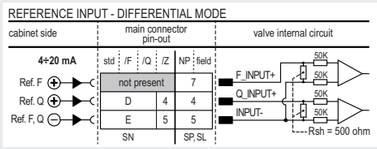



MONITOR OUTPUT

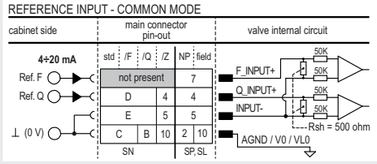



### MAIN CONNECTOR - CURRENT

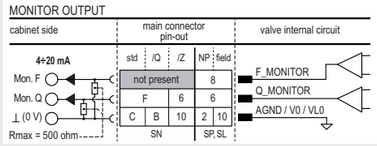
REFERENCE INPUT - DIFFERENTIAL MODE



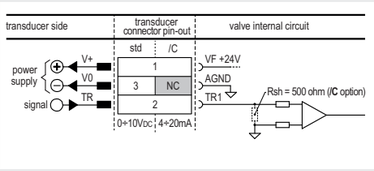

REFERENCE INPUT - COMMON MODE



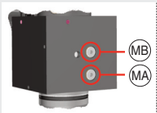

MONITOR OUTPUT




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




## STEP 3 HYDRAULICS

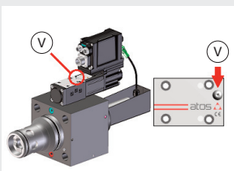



N° 2 plugs:
G 1/4" for size 16 ÷ 100
G 3/8" for size 125

| | size 16 ÷ 100 | size 125 |
|---|---|---|
| Wrench type | 6 mm | 8 mm |
| Tightening torque | 30 Nm | 40 Nm |

**Main stage air bleeding** - only **LES:**

- at the machine commissioning it is advisable to bleed the air from spool piloting chambers, by loosening the **MA** and **MB** plugs




| | |
|---|---|
| Wrench type | 3 mm |
| Tightening torque | 4 Nm |

**Pilot 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.
The check valve is particularly suggested for valves size 63 to 125 installed with the solenoid upward

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

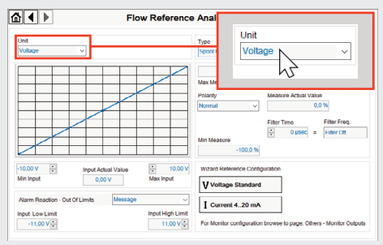
**WARNING:** To avoid overheating and possible damage of the electronic driver, the valves must be never energized without hydraulic supply to the pilot stage. In case of prolonged pauses of the valve operation during the machine cycle, it is always advisable to switch off or disable the driver (option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

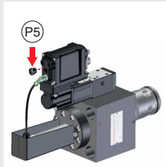
Valve programming can be performed through E-SW software or via fieldbus (not for **NP**)

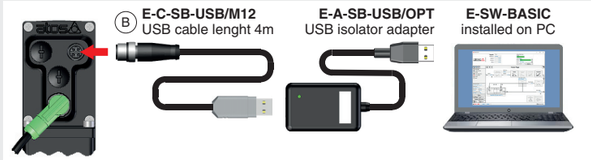
| PROGRAMMING | | | | | | PC |
|---|---|---|---|---|---|---|
| 4.1 | 4.2 | 4.3 | 4.4 | 4.5 | 4.6 | 4.7 |
| CONNECTION | FIELDBUS | REFERENCES | P/Q SETUP | SMART TUNING | STORE | BACK UP |

### 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



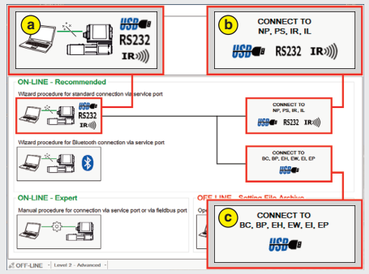

**WARNING: drivers USB port is not isolated!**
The use of USB isolator adapter is highly recommended for PC protection (see **GS500**)

**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:

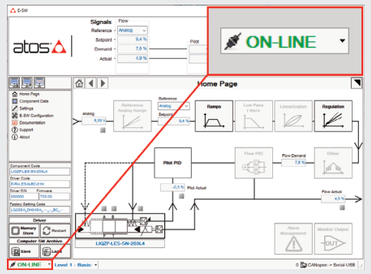
- **a** : **ON-LINE - Recommended**
  Wizard procedure for standard connection
- **b** : **CONNECT TO NP, PS, IR, IL**
  for valve without filedbus communication
- **c** : **CONNECT TO BC, BP, EH, EW, EI, EP**
  for valve with filedbus communication




**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:

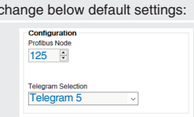
**1) Machine central unit (master)** - please refer to E-MAN-S-** fieldbus protocol programming manual

**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**



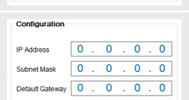

**EH** EtherCAT
Configuration file: **XML**

Station Alias is assigned automatically by fieldbus master


**EW** POWERLINK
Configuration file: **XDD**

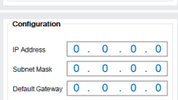

**EI** EtherNet/IP
Configuration file: **EDS**

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)



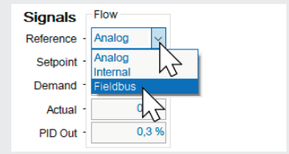

- press **Memory Store** button and in **Fieldbus Parameters** press **Store User** button to save new setting into the driver (see 4.6)
- network configuration settings will be applied at next driver power-on or pressing the **Restart** button

**NOTE:** configuration files are available in USB memory stick of the software or in MyAtos area - **www.atos.com**

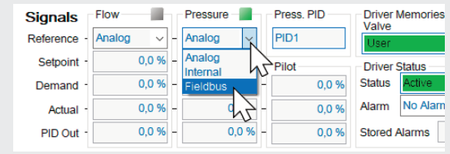
### 4.3 REFERENCES - only for **BC**, **BP**, **EH**, **EW**, **EI**, **EP**

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**, **SL** with fieldbus:
- in **Flow - Reference** select **Fieldbus**




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



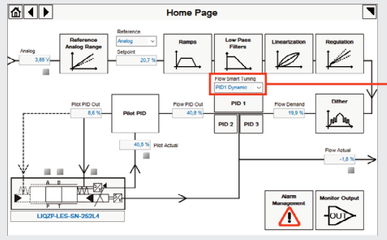

### 4.4 P/Q SETUP - only for **SP**, **SF**, **SL**

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 poppet 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 |

**Note:** smart tuning function not available for LIQZP-TES cartridges

### 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

## 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
- spool sticking, contact Atos service center
- missing piloting pressure, verify that hydraulic power level is compliant with valve's characteristics

**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!