QUICKSTART FULL OFF-BOARD DRIVER

QF040-0 - 11/22

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

DIN-RAIL DIGITAL DRIVER FOR DIRECTIONAL AND FLOW VALVES

Industrial driver models:
E-BM-TES/LES-N without alternated P/Q control **SN**
E-BM-TES/LES-S with alternated P/Q control **SP**, **SF**, **SL**

Ex-Proof driver models:
E-BM-TES/LES-N **/A** without alternated P/Q control **SN**
E-BM-TES/LES-S **/A** with alternated P/Q control **SP**, **SF**, **SL**

Industrial valve models:

Direct operated
DLHZO-T DHZO-T QVHZO-T
DLKZOR-T DKZOR-T QVKZOR-T

Pilot operated
DPZO-T LIQZP-L
DPZO-L

Ex-Proof valve models:

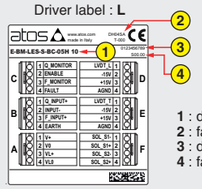
Direct operated
DLHZA-T DHZA-T QVHZA-T
DLKZA-T DKZA-T QVKZA-T

Pilot operated
DPZA-T LIQZA-L
DPZA-L

IDENTIFICATION

Driver identification label

Driver label : **L**



1 : driver code
2 : factory set code
3 : driver serial number
4 : factory firmware version

INSTALLATION TOOLS

Screwdriver	DIN-rail EN60715	Connectors
not included	not included	supplied with the driver
see STEP 1		see STEP 2

PROGRAMMING TOOLS - not included

Software	USB connection KIT		OR	Bluetooth connection KIT	
	Cable	Isolator		Cable	Adapter
E-SW-* programming software	**E-C-SB-USB/BM**	**E-A-SB-USB/OPT**		**E-C-SB-BM/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	drivers with **SP**, **SF**, **SL** alternated P/Q control			

E-SW-FIELDBUS supports also drivers without fieldbus communication; E-SW-*/PQ supports also drivers 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
F***	Proportional valves with one or two LVDT - tech. table	**STARTUP E-SW-FIELDBUS**	Software startup guide
P005	Mounting surface - tech. table	**STARTUP BLUETOOTH**	Bluetooth adpter startup guide
GS240	E-BM-TES/LES drivers - tech. table	**E-MAN-BM-LES**	TES/LES - driver operating manual
GS500	Programming tools - tech. table	**E-MAN-BM-LES-S**	TES/LES - driver with S option operating manual
GS510	Fieldbus - tech. table	**E-MAN-S-BC**	CANopen protocol programming manual
K800	Electric and electronic connectors - tech. table	**E-MAN-S-BP**	PROFIBUS DP protocol programming manual
		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

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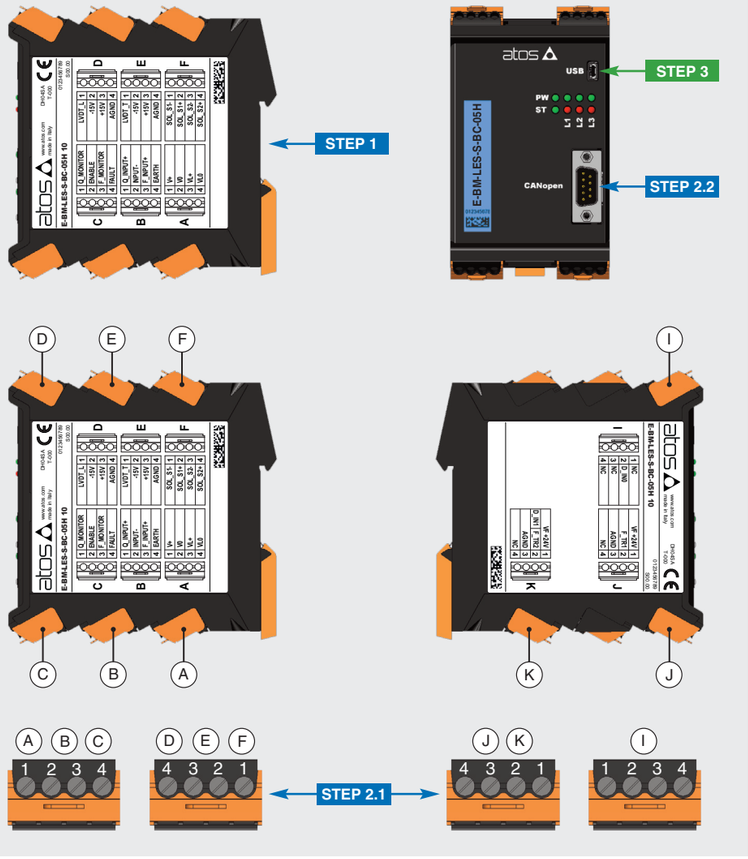
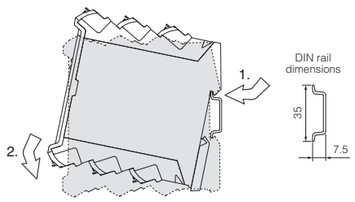
PRODUCTS OVERVIEW



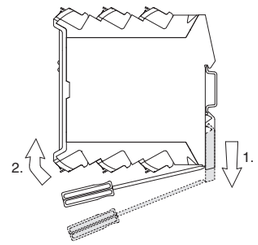
INSTALLATION		PROGRAMMING
STEP 1	**STEP 2**	**STEP 3**
MECHANICAL	**ELECTRICAL**	**SOFTWARE**

STEP 1 MECHANICAL

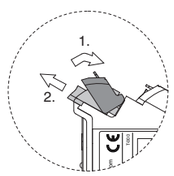
To lock the driver from the DIN rail:
1. place the attach located on the driver bottom on the DIN rail
2. press the driver against the DIN rail until the locking slide clicks



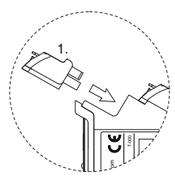
To unlock the driver from the DIN rail:
1. pull down the locking slide with a screwdriver
2. rotate up the driver



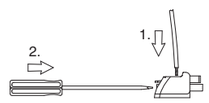
To extract the connectors:
1. push lever
2. pull connector



To insert the connectors:
1. push the connector in its slot



To wire cables in the connectors:
1. insert the cable termination
2. turn screw with a screwdriver



NOTE:
max conductor size 2,5 mm²
tightening torque 0,4 ÷ 0,6 Nm

NOTE: all connectors are supplied with a mechanical coding. This feature ensures a unique insertion of each connector in the own slot (e.g. connector A can not be inserted into connector slot of B,C,D,E,F,J,K,I)

STEP 2 ELECTRICAL

This section considers the different drivers executions, illustrating the multiple variants of the available electrical connections. The electrical connections have to be wired according to the selected driver code

WARNING: remove power supply before any electrical or wiring operations

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

2.1 CONNECTORS

Recommended LiYCY shielded cables: 0,5 mm² max 50 m - for logic - 1,5 mm² max 50 m - for power supply and solenoids

E-BM-TES/LES-N
drivers without alternated P/Q control **SN**

Power supply			
A	1	**V+**	(power supply 24Vdc)
	2	**V0**	(power supply 0Vdc)
	3	**VL+**	(power supply 24Vdc)
	4	**VL0**	(power supply 0Vdc)
Flow reference signal			
B	1	**Q_INPUT+**	(±10Vdc / 4 ÷ 20mA)
	2	**INPUT-**	(negative reference for Q_INPUT+)
	3	**NC**	
	4	**EARTH**	
Flow monitor, enable and fault signals			
C	1	**Q_MONITOR**	(±10Vdc / 4 ÷ 20mA)
	2	**ENABLE**	(input 24Vdc)
	3	**NC**	
	4	**FAULT**	(output 24Vdc)
LVDT position transducer - main stage valve			
D (1)	1	**LVDT_L**	(main stage valve - transducer input signal)
	2	**-15V**	(power supply -15Vdc)
	3	**+15V**	(power supply +15Vdc)
	4	**AGND**	(ground for transducer power and monitor)
LVDT position transducer - direct or pilot valve			
E (2)	1	**LVDT_T**	(direct or pilot valve - transducer input signal)
	2	**-15V**	(power supply -15Vdc)
	3	**+15V**	(power supply +15Vdc)
	4	**AGND**	(ground for transducer power and monitor)
Solenoids			
F	1	**SOL_S1-**	(negative current to solenoid S1)
	2	**SOL_S1+**	(positive current to solenoid S1)
	3	**SOL_S2-**	(negative current to solenoid S2)
	4	**SOL_S2+**	(positive current to solenoid S2)

E-BM-TES/LES-S
drivers with alternated P/Q control (**SP**, **SF**, **SL** software selectable)

Power supply			
A	1	**V+**	(power supply 24Vdc)
	2	**V0**	(power supply 0Vdc)
	3	**VL+**	(power supply 24Vdc)
	4	**VL0**	(power supply 0Vdc)
Flow and pressure/force reference signals			
B	1	**Q_INPUT+**	(±10Vdc / 4 ÷ 20mA)
	2	**INPUT-**	(negative reference for Q_INPUT+ and F_INPUT+)
	3	**F_INPUT+**	(±10Vdc / 4 ÷ 20mA)
	4	**EARTH**	
Flow and pressure/force monitor, enable and fault signals			
C	1	**Q_MONITOR**	(±10Vdc / 4 ÷ 20mA)
	2	**ENABLE**	(input 24Vdc)
	3	**F_MONITOR**	(±10Vdc / 4 ÷ 20mA)
	4	**FAULT**	(output 24Vdc)
LVDT position transducer - main stage valve			
D (1)	1	**LVDT_L**	(main stage valve - transducer input signal)
	2	**-15V**	(power supply -15Vdc)
	3	**+15V**	(power supply +15Vdc)
	4	**AGND**	(ground for transducer power and monitor)
LVDT position transducer - direct or pilot valve			
E (2)	1	**LVDT_T**	(direct or pilot valve - transducer input signal)
	2	**-15V**	(power supply -15Vdc)
	3	**+15V**	(power supply +15Vdc)
	4	**AGND**	(ground for transducer power and monitor)
Solenoids			
F	1	**SOL_S1-**	(negative current to solenoid S1)
	2	**SOL_S1+**	(positive current to solenoid S1)
	3	**SOL_S2-**	(negative current to solenoid S2)
	4	**SOL_S2+**	(positive current to solenoid S2)
Digital input			
I	1	**NC**	
	2	**D_IN0**	(input 24Vdc) **(5)**
	3	**NC**	
	4	**NC**	
Pressure/force transducer signal			
J	1	**VF +24V**	(power supply 24Vdc)
	2	**F_TR1**	(±10Vdc / 4 ÷ 20mA)
	3	**AGND**	
	4	**NC**	
Pressure transducer signal and digital input			
K	1	**VF +24V**	(power supply 24Vdc)
	2	**F_TR2**	(±10Vdc / 4 ÷ 20mA) **(3)**
		D_IN1	(input 24Vdc) **(4) (5)**
	3	**AGND**	
	4	**NC**	

(1) D connector is available only for TES-N versions 01HP / 05HP and LES-*
(2) E connector is available only for TES-* versions 01H / 05H and LES-*
(3) Only for SF control
(4) Only for SP or SL control
(5) NP execution: multiple pressure/force PID selection - Fieldbus execution: general purpose digital input

2.2 FIELDBUS CONNECTORS - only for BC, BP, EH, EW, EI, EP

Select fieldbus connectors according to driver code and proceed with wirings operations

BC

BC (DB9 - 9 pin)		
2	**CAN_L**	Bus line (low)
3	**CAN_GND**	Signal zero data line
5	**CAN_SHLD**	Shield
7	**CAN_H**	Bus line (high)

BP

BP (DB9 - 9 pin)		
1	**SHIELD**	
3	**LINE-B**	Bus line (low)
5	**DGND**	Data line - termination signal zero
6	**+5V**	Termination supply signal
8	**LINE-A**	Bus line (high)

EH , EW , EI , EP

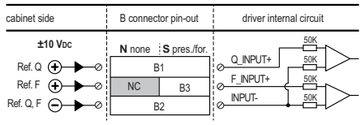
EH - EW - EI - EP (RJ45 - 8 pin)		
1	**TX+**	Transmitter
2	**RX-**	Receiver
3	**TX-**	Transmitter
6	**RX-**	Receiver

NOTE: to interface BP execution with Siemens 6ES7972-0BA12-0XA connector, it is mandatory to use also one of the following adapters to avoid interference with the USB connector:
DG909MF1 - the connector will be oriented upwards
DG909MF3 - the connector will be oriented downwards

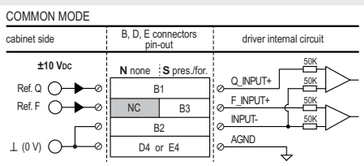
ELECTRICAL WIRING EXAMPLES FOR INDUSTRIAL VALVES - for **Ex-Proof** valves please refer to relevant tech. tables

REFERENCE INPUT - VOLTAGE

DIFFERENTIAL MODE

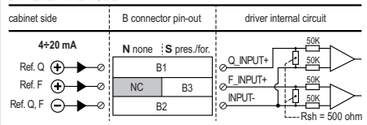


COMMON MODE

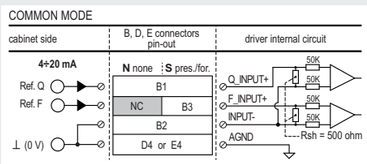


REFERENCE INPUT - CURRENT

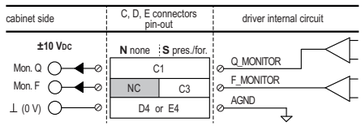
DIFFERENTIAL MODE



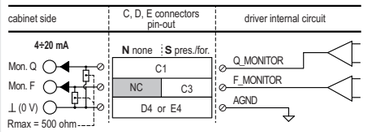
COMMON MODE



MONITOR OUTPUT - VOLTAGE

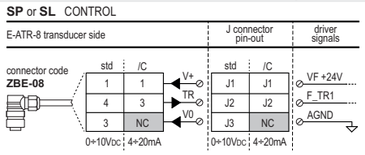


MONITOR OUTPUT - CURRENT

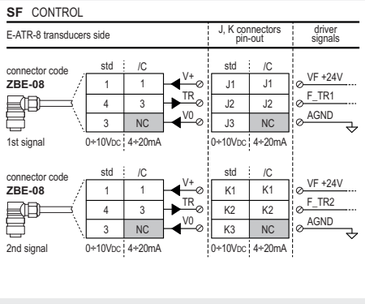


PRESSURE/FORCE TRANSDUCERS - only for **S**

SP or **SL** CONTROL

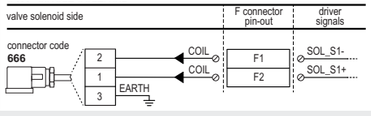


SF CONTROL

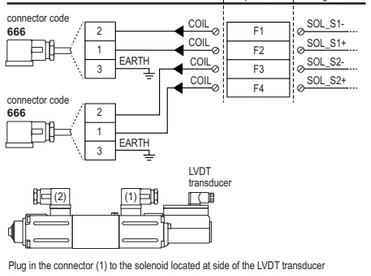


SOLENOIDS

01H SINGLE SOLENOID



05H DOUBLE SOLENOID



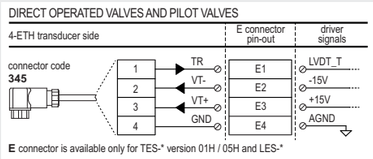
Plug in the connector (1) to the solenoid located at side of the LVDT transducer

Plug in the connector (2) to the solenoid located at opposite side of the LVDT transducer

WARNING: for double solenoid valve pay attention to do not invert the connectors (1) and (2). If they are not inserted as shown in the example, the valve will not work properly and could cause eventual damages to the system.

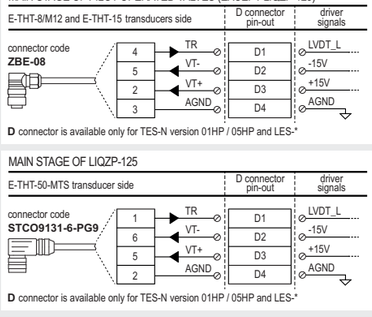
LVDT TRANSDUCERS

DIRECT OPERATED VALVES AND PILOT VALVES



E connector is available only for TES-* version 01H / 05H and LES-*

MAIN STAGE OF PILOT OPERATED VALVES (EXCEPT LIQZP-125)



D connector is available only for TES-N version 01HP / 05HP and LES-*

MAIN STAGE OF PILOT OPERATED VALVES (EXCEPT LIQZP-125)

D connector is available only for TES-N version 01HP / 05HP and LES-*

STEP 3 SOFTWARE

REMARK off-board drivers 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

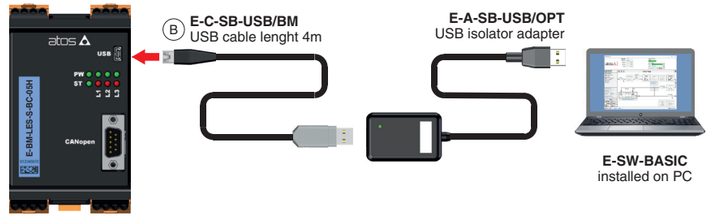
Driver programming can be performed through E-SW software or via fieldbus (not for **NP**)

PROGRAMMING					PC
3.1	3.2	3.3	3.4	3.5	3.6
CONNECTION	FIELDBUS	REFERENCES	P/Q SETUP	STORE	BACK UP

3.1 CONNECTION

1 **In order to access valve parameterization:**
- Install E-SW software on PC
- Complete the electrical installation and power on the driver with **24Vdc**

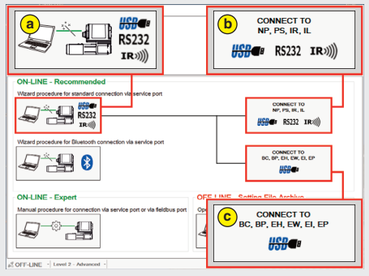
2 Connect driver to the PC as shown below



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 - driver is **ON-LINE** see **5**

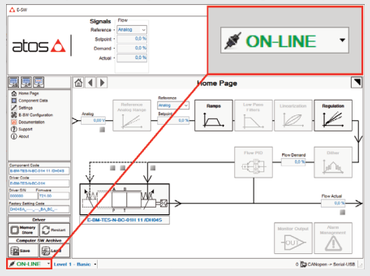
4 Press buttons according the below sequence:
- **(a) : ON-LINE - Recommended** Wizard procedure for standard connection
- **(b) : CONNECT TO NP, PS, IR, IL** for driver without filedbus communication
- **(c) : CONNECT TO BC, BP, EH, EW, EI, EP** for driver with filedbus communication



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

5 Communication established, driver 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 3.2 to change the network setup
- see step 3.3 to change the reference signals setup



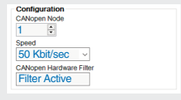
3.2 FIELDBUS - Network Management - only for **BC**, **BP**, **EH**, **EW**, **EI**, **EP**

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

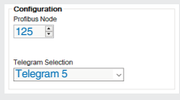
2) E-SW software
- switch to **Level 2 - Advanced** and browse to **Network Management - Configuration** to change below default settings:

BC CANopen
Configuration file: **EDS**



BP PROFIBUS DP
Configuration file: **GSD**

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



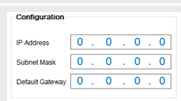
EH EtherCAT
Configuration file: **XML**

Station Alias is assigned automatically by fieldbus master

EW POWERLINK
Configuration file: **XDD**

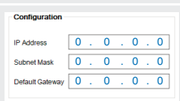
EI EtherNet/IP
Configuration file: **EDS**

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)



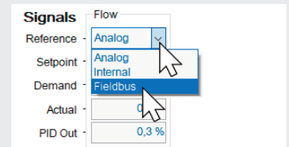
- press **Memory Store** button and in **Fieldbus Parameters** press **Store User** button to save new setting into the driver (see 3.5)
- network configuration settings will be applied at next driver power-on or pressing the **Restart** button

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

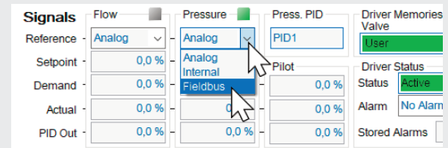
3.3 REFERENCES - only for **BC**, **BP**, **EH**, **EW**, **EI**, **EP**

The source of reference signals for drivers 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**



3.4 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-BM-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.

3.5 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.

3.6 BACK UP

Parameter modifications will be saved into PC memory:

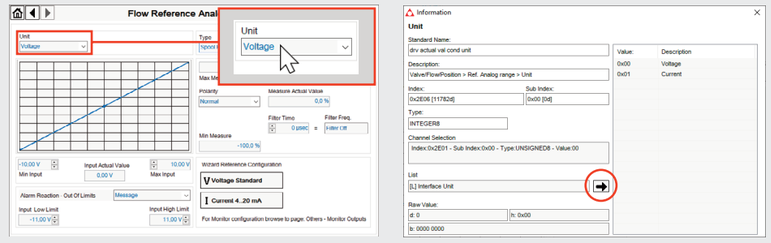
- press **Save** button to access **Computer SW Archive - Setting Files** page, **Setting File Name** pop-up appears
- input a valid name into **Description** field and press **Ok** button

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 tech. table of the connected valve

The valve does not follow the reference signal
- driver is powered off, verify presence of 24 Vdc power supply and the coil(s) connection
- driver is disabled, verify presence of 24 Vdc on enable pin
- 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 pressure in X (for DPZO/E and LIQZP) or P line (DPZO) is compliant with the required value
- wrong pilot/drain configuration - check if the pilot/drain configuration of the valve corresponds to the effective system layout

Software parameters modifications are lost when driver is switched off
- parameter store operation was not performed, check store procedure – see STEP 3, section 3.5

Software parameters modifications have no effect on the valve
- driver is OFF LINE, check connection procedure – see STEP 3, section 3.1

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!
  - perform the bias and scale configurations again!