atos

QUICKSTART FULL OFF-BOARD DRIVER
for digital proportionals with pressure transducer - fieldbus

DIN-RAIL DIGITAL DRIVER FOR HIGH PERFORMANCE PRESSURE VALVES

Industrial driver model:	Ex-proof driver model:
E-BM-RES	E-BM-RES /A

Industrial valve models:		Ex-proof valve models:	
RZMO-R	RZGO-R	RZMA-R	RZGA-R
AGMZO-R	AGRCZO-R	AGMZA-R	AGRCZA-R
	LIMZO-R		LIMZA-R
	LIRZO-R		LIRZA-R
	LICZO-R		LICZA-R

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 2.1

PROGRAMMING TOOLS - not included

PC software	USB connection KIT	
	Cable	Isolator
E-SW-SETUP	**E-C-SB-USB/BM**	**E-A-SB-USB/OPT**

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	**E-MAN-BM-RES**	RES - driver operating manual
F*	High performance pressure valves tech. table	**E-MAN-S-BC**	CANopen protocol programming manual
P005	Mounting surface - tech. table	**E-MAN-S-BP**	PROFIBUS DP protocol programming manual
GS203	E-BM-RES drivers - tech. table	**E-MAN-S-EH**	EtherCAT protocol programming manual
GS500	Programming tools - tech. table		
GS510	Fieldbus - tech. table		
K800	Electric and electronic connectors - tech. table		

ATTENTION !

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

CONTACT US

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PRODUCTS OVERVIEW

STEP 1

STEP 2.2

STEP 3

INSTALLATION		PROGRAMMING
STEP 1	STEP 2	STEP 3
MECHANICAL	ELECTRICAL	SOFTWARE

STEP 2.1

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

DIN rail dimensions
35
7.5

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,E,F,G,H)

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

A		Power supply	
	1	V+	(power supply 24Vdc)
	2	V0	(power supply 0Vdc)
	3	VL+	(power supply 24Vdc)
	4	VL0	(power supply 0Vdc)

B		Enable and fault signals	
	1	ENABLE	(input 24Vdc)
	2	FAULT	(output 24Vdc)
	3	VL0	(ground for ENABLE and FAULT)
	4	EARTH	

C		Solenoid	
	1	SOL_S1-	(negative current to solenoid S1)
	2	SOL_S1+	(positive current to solenoid S1)
	3	NC	
	4	NC	

E		Pressure transducer	
	1	VF +24V	(power supply 24Vdc)
	2	TR+	(4 ÷ 20mA)
	3	NC	
	4	AGND	(ground for transducer and potentiometer)

F		Valve signal and potentiometer power supply	
	1	+5V_REF	(power supply +5Vdc)
	2	P_INPUT+	(0 ÷ 10Vdc / 4 ÷ 20mA)
	3	INPUT-	(negative reference for P_INPUT+)
	4	-5V_REF	(power supply -5Vdc)

G		Monitor signals	
	1	EARTH	
	2	AGND	(ground for P_MONITOR and potentiometer)
	3	NC	
	4	P_MONITOR	(0 ± 10Vdc / 4 ÷ 20mA)

H		Digital inputs	
	1	VL0	(power supply 0Vdc for digital input)
	2	D_IN1	(input 24Vdc)
	3	D_IN3	(input 24Vdc)
	4	VL+	(power supply 24Vdc for digital input)

2.2   FIELDBUS CONNECTORS - only for BC, BP, EH

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

BC

BP

EH

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 (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 (RJ45 - 8 pin)		
1	TX+	Transmitter
2	RX-	Receiver
3	TX-	Transmitter
6	RX-	Receiver

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

REFERENCE INPUT - VOLTAGE

DIFFERENTIAL MODE

cabinet side	F connector pin-out	driver internal circuit
0÷10 Voc		
Ref. +	F2	P_INPUT+ 50K
Ref. −	F3	INPUT- 50K

COMMON MODE

cabinet side	F, G connectors pin-out	driver internal circuit
0÷10 Voc		
Ref.	F2	P_INPUT+ 50K
	F3	INPUT- 50K
⊥ (0 V)	G2	AGND

REFERENCE INPUT - CURRENT

DIFFERENTIAL MODE

cabinet side	F connector pin-out	driver internal circuit
4÷20 mA		Rsh = 500 ohm
Ref. +	F2	P_INPUT+ 50K
Ref. −	F3	INPUT- 50K

COMMON MODE

cabinet side	F, G connectors pin-out	driver internal circuit
4÷20 mA		Rsh = 500 ohm
Ref.	F2	P_INPUT+ 50K
	F3	INPUT- 50K
⊥ (0 V)	G2	AGND

MONITOR OUTPUT - VOLTAGE

MONITOR OUTPUT

cabinet side	G connector pin-out	driver internal circuit
0÷10 Voc		
Mon.	G4	P_MONITOR
⊥ (0 V)	G2	AGND

MONITOR OUTPUT - CURRENT

MONITOR OUTPUT

cabinet side	G connector pin-out	driver internal circuit
4÷20 mA		
Mon.	G4	P_MONITOR
⊥ (0 V)	G2	AGND
Rmax = 500 ohm		

SOLENOID

01H   SINGLE SOLENOID

valve solenoid side	C connector pin-out	driver signals
connector code 666		
2 COIL	C1	SOL_S1-
1 COIL	C2	SOL_S1+
EARTH		

PRESSURE TRANSDUCER - ONLY CURRENT

PRESSURE TRANSDUCER

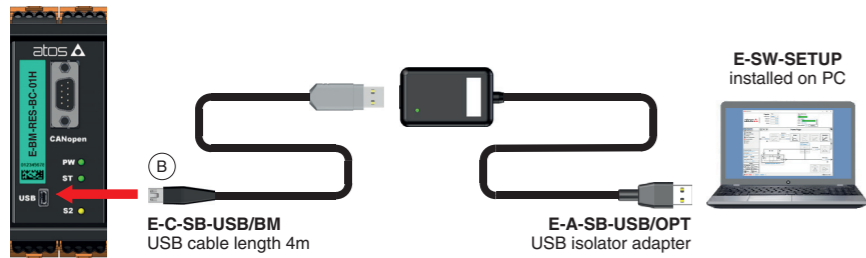| E-ATR-8 transducer side	E connector pin-out	driver signals
connector code ZBE-08		
1 V+	E1	VF +24V
3 TR	E2	TR+
	4÷20mA	

REMARK off-board drivers are factory preset with default parameters, only few programming operations are mandatory for setup the network parameters and the source of reference signals

Driver programming can be performed through E-SW-SETUP software or via fieldbus

3.1 CONNECTION

1 **In order to access valve parameterization:**
• Install E-SW-SETUP software on PC
• Complete the electrical installation and power on the driver with **24Vdc**
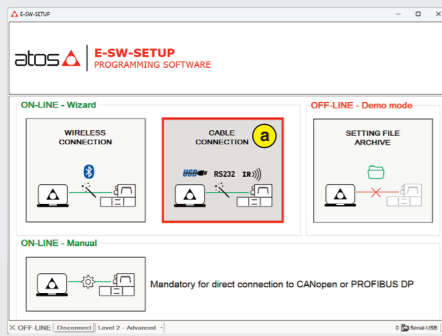
2 Connect driver to the PC as shown below

E-SW-SETUP
installed on PC

E-C-SB-USB/BM
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 : CABLE CONNECTION
  Wizard procedure for connection via USB cable

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

NOTE: 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

NOTE: Bluetooth not available for E-BM-RES
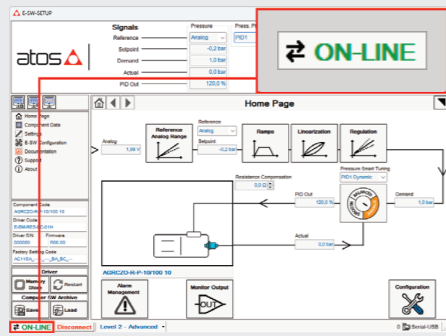
3.2 FIELDBUS - Network Management - only for BC, BP, EH

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**

Defaults: Telegram 3

Configuration
Profibus Node
125
Telegram Selection
Telegram 3

EH EtherCAT
Configuration file: **XML**

Station Alias is assigned automatically by fieldbus master

Configuration
Station Alias
0

• press **Memory Store** button and press **Save User Set** 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 MyAtos area - **www.atos.com**

3.3 REFERENCES - only for BC, BP, EH

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**

In **Pressure - Reference** select **Fieldbus**
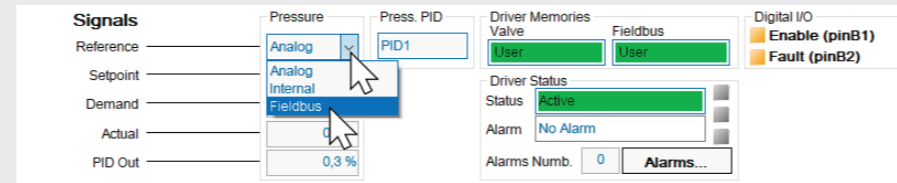
3.4 SMART TUNING - E-SW-SETUP

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 pressure control:

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

balanced average response time suitable for major applications

smooth attenuated response time for slow regulation without overshoots

1 = dynamic
2 = balanced
3 = smooth
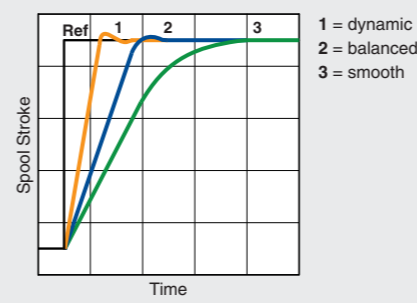
3.5 STORE

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.

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

3.7 CONFIGURATION

All valves

BIAS AND SCALE

Bias setting: supply the input signal equal to 0 bar
• **relief valves:** increase the Bias until the pressure starts to increase, then lightly reduce the Bias just to bring back the pressure lightly over the minimum regulated value
• **reducing valves:** increase the Bias until is reached the minimum desired value of starting pressure

Scale setting: supply the max input signal; adjust the Scale to obtain the max regulated pressure

BiasP positive bias
ScaleP positive scale

RAMPS

Ramps setting: select the required ramp configuration and adjust the ramp time to optimize the pressure response according to the system characteristics

No Ramp : no ramps selected
Single Ramp : setup Ramp 1
Double Ramp : setup Ramp 1 and 2

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

Reference input signal is factory preset according to selected valve code, defaults are 0 ÷ 10 Vdc for standard and 4 ÷ 20 mA for /I option. Input signal can be reconfigured via PC software selecting between voltage and current, browsing to **Reference Analog Range** page:
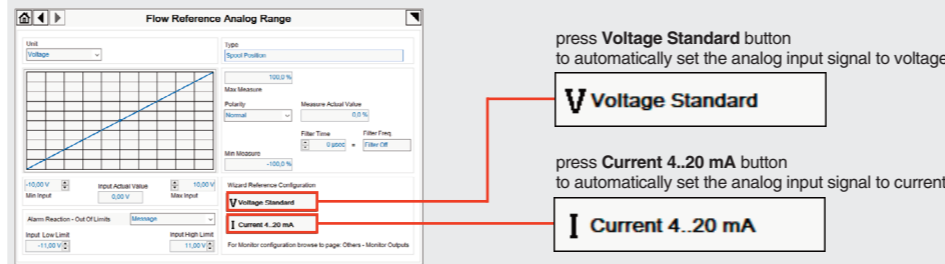
press **Voltage Standard** button to automatically set the analog input signal to voltage

V **Voltage Standard**

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

I **Current 4..20 mA**

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

HINT ! - Wizard objects dictionary - only for BC, BP, EH

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
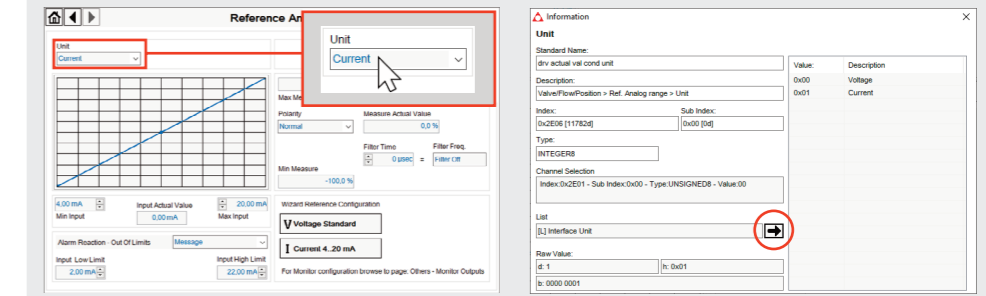
NOTE: alternatively right click on any parameter

TROUBLESHOOTING

Valve vibration or noise
• presence of air in the solenoid; perform air bleeding procedure – see tech. table of the connected valve
• dither frequency too low; increase value of the frequency – please refer to E-MAN-BM-RES operating manual

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 in compliance with the valve's characteristics
• big hysteresis or spool stick-slip, reduce the dither frequency
• the mechanical pressure limiter interferes with the regulation (only AGMZO and AGRCZO with /P option and only LIRZO, LICZO, LIMZO sizes 16, 25, 32 and /P option) – check the pressure limiter setting
• spool sticking, contact Atos service center
• poppet sticking (only LIRZO, LICZO, LIMZO) – contact Atos service center
• missing piloting pressure, verify that the system pressure is compliant with valve's characteristics
• wrong pilot/drain connection - check if the pilot/drain configuration of the valve corresponds to the effective system layout

Pressure instability or vibration
• select PID4 to operate the valve in open loop:
  - if the instability still persists, check eventual anomalies in the hydraulic circuit as the presence of air
  - if the instability disappears, select an alternative configuration within PID selection 1, 2 or 3 which better matches the application requirements
  - if no one of the above selection fulfills the application, tune P - I - D parameters at E-SW-SETUP software to obtain the desired dynamic response

PC 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

PC 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 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 to off!
  - factory parameters will be applied at next driver restart or after power off-on sequence!
  - perform the bias and scale configurations again!