

XEV21D

DRIVER FOR STEPPER ELECTRONIC EXPANSION VALVES

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1. GENERAL WARNING

1.1 PLEASE READ BEFORE USING THIS MANUAL

- This manual is part of the product and should be kept near the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application limits before proceeding.
- Dixell Srl reserves the right to change the composition of its products, even without notice, ensuring the same and unchanged functionality.

1.2 SAFETY PRECAUTIONS

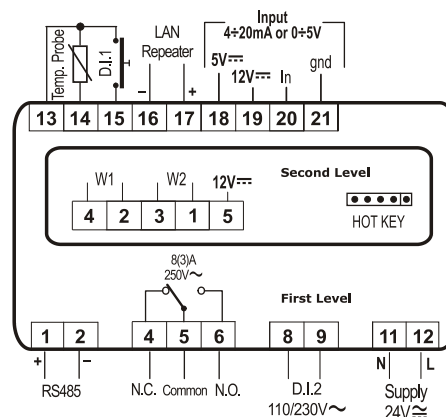
- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical connections before any kind of maintenance.
- Fit the probe where it is not accessible by the End User. The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to "Dixell S.r.l." (see address) with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.
- In case of applications in industrial environments, the use of mains filters (our mod. FT1) in parallel with inductive loads could be useful.

2. GENERAL DESCRIPTION

The **XEV21D** module is able to drive a large variety of **stepper electronic expansion valves**. XEV21D permits to regulate the superheat (SH) of the fluid that runs into refrigerating unit in order to obtain optimized performance and a functioning of the evaporator independent by climatic or load conditions. **XEV21D** modules are equipped with two probe inputs, one for 4÷20mA or 0÷5V pressure transducer and another one for Pt1000 or NTC temperature probe. A LAN connection permits to transmit the pressure signal to others XEV modules in order to use only one pressure transducer in multiplexed cabinet applications. There are also two configurable digital inputs, the first one is free of voltage and the other ones is at high voltage in order to simplify connections with cooling request signal. With the useful display it's possible to see the value of superheat (SH), the degree of opening of the valve or the probe values, the local keyboard allows to program the instrument without any other devices. To complete instrument equipment, a RS485 serial link permits to connect XEV21D to Dixell monitoring and supervising systems.

3. WIRING CONNECTIONS

Please see the following scheme to make the right wirings. With "First Level" are indicated the connections on the floor of the 4 DIN module and, of course, with "Second Level" the connections of the 1st floor that are only for the stepper motor of the valve and for HOTKEY.



4. VALVE CONNECTIONS AND CONFIGURATION

!!!!!!! WARNING !!!!!!!!!!!!!

To avoid possible problems, before connecting the valve configure the driver by making the right changes on the parameters. Select the kind of motor (**tEP** parameter) and check if the valve is present in **tEP** parameter table reported here below:

tEP	Model	LSt (steps*10)	uSt (steps*10)	CPP (mA*10)	CHd (mA*10)	Sr (step/s)
0	Manual settings	Par	Par	Par	Par	Par
1	Sporlan SEI 0.5-20	10	159	20	5	200
2	Sporlan SEI 30	20	319	20	5	200
3	Sporlan SEH 50-250	40	638	20	5	200
4	Alco EX5-EX6	10	75	40	10	450
5	Alco EX7	25	160	75	25	330
6	Alco EX8 330 step/s	25	260	80	50	330
7	Alco EX8 500 step/s	25	260	80	50	500
8	Danfoss ETS-25/50	20	262	14	8	120
9	Danfoss ETS-100	30	353	14	8	120
10	Danfoss ETS-250/400	35	381	14	8	120

If you can see your valve on the table, please select the valve through **tEP** parameter. In this way, you can be sure of a right configuration.

About the connection, please pay attention to the following table to have a quick reference on the connection mode for valves of different manufacturer. In any case, **the unique and valid reference has to be considered the datasheet made by manufacturer of the valve:**

4 WIRES VALVES (BIPOLAR)

Connection numbering	ALCO EX*	ALCO EX5/6	SPORLAN SEI-SHE	DANFOSS ETS
4	WHITE	BLUE	WHITE	BLACK
2	YELLOW	BROWN	BLACK	WHITE
3	BROWN	BLACK	RED	RED
1	GREEN	WHITE	GREEN	GREEN

5-6 WIRES VALVES (UNIPOLAR)

Connection numbering	SPORLAN ESX	SAGINOMIYA
4	ORANGE	ORANGE
2	RED	RED
3	YELLOW	YELLOW
1	BLACK	BLACK
5 - Common	GRAY	GRAY

AFTER MAKING THE CONNECTION, PLEASE SWITCH OFF AND ON THE XEV CONTROLLER IN ORDER TO BE SURE OF THE RIGHT POSITIONING OF THE VALVE.

5. ABSOLUTE MAXIMUM POWER

XEV21D is able to drive a wide range of stepper valves, in the following table are indicated the maximum values of current that the actuator can supply to the stepper wiring. The Dixell transformer to use is the **TF20D**.

NOTE: the electrical power absorption of the valve can be unrelated to refrigeration power that valve has. Before using the actuator, please read the technical manual of the valve supplied by the manufacturer and check the maximum current used to drive the valve in order to verify that they are lower than those indicated below.

VALVE TYPE	BIPOLAR VALVES (4 wires)	Maximum Current 0.9A
	UNIPOLAR VALVES (5-6 wires)	Maximum Current 0.33A

6. FRONT PANEL



SET	To display and to modify the set point. In programming mode it selects a parameter or it confirms a value.
▲	By pressing and releasing this key, it's possible to see the values of the probes. In programming mode it slides the codes of the parameters or it increases their values.
▼	In programming mode it slides the codes of parameters or it decreases their values.

KEYS COMBINATIONS

▼ + ▲	To lock or to unlock the keyboard
SET + ▼	To enter programming mode.

6.1 XEV21D LEDS



The XEV21D frontal has some luminous dots. Their meaning is described in the following table:

LED	MODE	Function
POWER	ON	THE DEVICE IS CORRECTLY POWERED ON
CLOSE	ON	VALVE IS COMPLETELY CLOSED
CLOSE	BLINK	VALVE IS CLOSING
OPEN	ON	VALVE IS COMPLETELY OPENED
OPEN	BLINK	VALVE IS OPENING
Tx/Rx	BLINK	RS485 IS WORKING
ALARM	ON	THERE IS AN ALARM

7. USER INTERFACE

7.1 TO SEE THE READ-ONLY VALUES

Press and release ▲ key;
First read-only label is showed;
Slide labels with ▲ or ▼ narrows;
Press SET to see read-only value. To change parameter you want to see, press SET
To leave the fast access menu, press and release SET+▲ or wait time-out of about 3 minutes.

7.2 TO SEE THE SET POINT

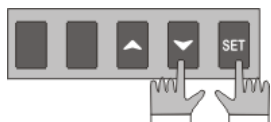
- 1) Press the SET key until the set point will be showed;
- 2) To come back to see temperature, wait about 5s or press newly SET key.

7.3 TO MODIFY THE SET POINT

To change the set point value operate as follows:

- 1) Press the SET key until the set point will be showed;
- 2) Use ▲ or ▼ to change its value.
- 3) Press "SET" to store the new value.

7.4 TO GO TO "PR1" PARAMETERS



To enter in "Pr1" level menu:

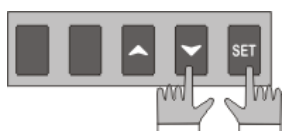
- 1) Pressing SET+▼ keys for about 3 seconds.
- 2) Instruments shows first parameter in Pr1 menu

7.5 TO GO TO "PR2" PARAMETERS

To enter to "Pr2" parameters list:

1. Enter to "Pr1"
2. Select "Pr2" parameter and press SET
3. The "PAS" label will be shown, then "0 - -" with 0 blinking.
Insert "321" password through ▲ and ▼ keys, then press SET to confirm.

7.6 TO MODIFY THE PARAMETERS VALUE



To change the parameter's value operate as follows:

1. Enter the Programming mode by pressing the Set and ▼ key for about 3s.
2. Select the required parameter.

3. Press the "SET" key to display its value
4. Use ▲ or ▼ to change its value.
5. Press "SET" to store the new value and move to the following parameter.

To exit: Press SET + ▲ or wait 30s without pressing a key.

NOTE: the set value is stored even when the procedure is exited by waiting the time-out to expire.

8. PARAMETER LIST

NOTE: All pressure parameters are relatives or absolutes depending on PrM parameter.

REGULATION

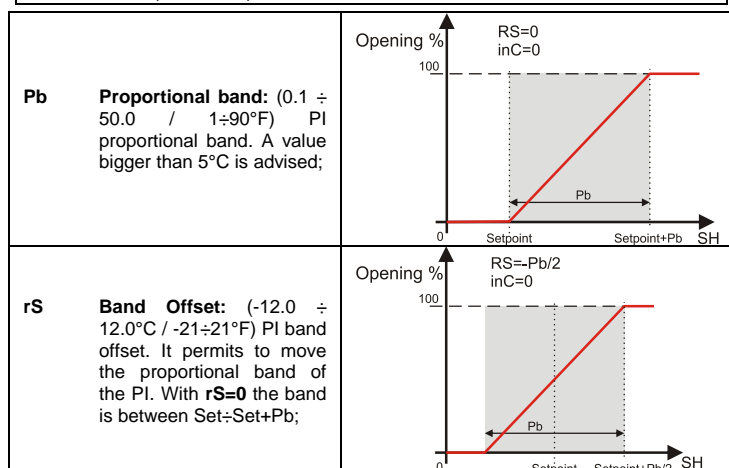
- FTY** Kind of gas (R22, 134, 404, 407, 410, 507, CO2): Type of gas used by plant. **Fundamental parameter for correct functioning of all system.**
- PEO** Probe Error opening percentage: (0÷100%) if a temporary probe error occurs, valve opening percentage is PEO until PED time is elapsed. If PEO is different from 0 it assures cooling also with probe error, because even if the device cannot calculate superheat the valve can work at PEO percentage.
- PEd** Probe Error delay before stopping regulation: (0÷239 sec. - 240=On=unlimited) if probe error duration is bigger than PEd valve closes completely. Pf message is showed. If PEd=On valve opening is PEO until probe error finishes;
- tEU** Type of Stepper motor: (uP- bP) it permits to select the kind of valve. uP= 5-6 wires unipolar valves; bP= 4 wires bipolar valves; **!!!! WARNING !!!!! by changing this parameter the valve has to be reinitialized.**
- tEP** Predefined valve selection: (0÷10) if tEP=0 the user has to modify all the parameters of configuration in order to use the valve. If tEP is different from 0 the device performs a fast configuration of the following parameters: LSt, uSt, Sr, CPP, CHd. To select the right number please read the following table:

tEP	Model	LSt (steps*10)	uSt (steps*10)	CPP (mA*10)	CHd (mA*10)	Sr (step/s)
0	Manual settings	Par	Par	Par	Par	Par
1	Sporlan SEI 0.5-20	10	159	20	5	200
2	Sporlan SEI 30	20	319	20	5	200
3	Sporlan SEH 50-250	40	638	20	5	200
4	Alco EX5-EX6	10	75	40	10	450
5	Alco EX7	25	160	75	25	330
6	Alco EX8 330 step/s	25	260	80	50	330
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8	Danfoss ETS-25/50	20	262	14	8	120
9	Danfoss ETS-100	30	353	14	8	120
10	Danfoss ETS-250/400	35	381	14	8	120

If tEP is different from 0 previous configuration of LSt, uSt, Sr, CPP and CHd are overwritten.

- LSt** Minimum number of steps: (0 ÷ USt) It permits to select the minimum number of steps. At this number of steps the valve should be closed. So it's necessary the reading of manufacturer datasheet to set correctly this parameter. It's the minimum number of steps to stay in advised range of functioning; **!!!! WARNING !!!!! by changing this parameter the valve has to be reinitialized. The device perform this procedure automatically and restart its normal functioning when the programming mode ends;**
- USt** Maximum number of steps: (LSt÷800*10) It permits to select the maximum number of steps. At this number of steps the valve should be completely opened. Read the datasheet provided by manufacturer of the valve to set correctly this parameter. It's the maximum number of steps to stay in advised range of functioning; **!!!! WARNING !!!!! by changing this parameter the valve has to be reinitialized. The device perform this procedure automatically and restart its normal functioning when the programming mode ends;**
- Sr** Step rate (10÷600 step/sec) it's the maximum speed to change step without losing precision (=losing steps). It's advised to stay under the maximum speed;
- CPP** Current per phase (only bipolar valves): (0÷100*10mA) it's the maximum current per phase used to drive valve. It's used **only with bipolar valves**
- CHd** Holding current per phase (only bipolar valves): (0÷100*10mA) it's the current per phase when the valve is stopped for more than 4 minutes. It's used **only with bipolar valves**
- OPE** Start opening Percentage: (0÷100%) Opening valve percentage when start function is active and during post defrost phase. This phase duration is SFd time;
- SFd** Start Function duration: (0.0÷42.0 min: tens of seconds) It sets start function duration and post-defrost duration. **During this phase the alarms are neglected**
- Sti** Stop regulation interval: (0.0÷24.0 hours: tens of minutes) after regulating continuously for Sti time, the valve closes for Std time in order to prevent ice creation.
- Std** Stop duration: (0÷60 min.) it defines stop regulation time after Sti. During this stop display shows StP message
- MnF** Maximum opening percentage at normal Functioning: (0÷100%) during regulation it sets the maximum valve opening percentage.
- FoP** Forced Opening percentage: (0÷100 - nu) if FoP=nu valve works with regulation algorithm. If Fop is different from nu the valve stays at Fop opening percentage. This function could be useful during plant starting or during service operations.

PI PARAMETERS (trained staff)



inC **Integration time:** (0 ÷ 255s) PI integration time

PROBE PARAMETERS

tPP	type of Pressure transducer: (420 – 5V – LAN) it sets type of pressure transducer to use: 420= 4-20mA pressure transducer; 5V= 0-5V ratiometric transducer, LAN= the pressure signal comes from another XEV module.
LPP	Enable pressure probe sending in LAN: (n÷Y) if LPP=Y the value of pressure read by device is sent in LAN. Only one device of the LAN can have LPP=Y
PA4	Probe value At 4mA or At 0V: (-1.0 ÷ P20 bar / -14 ÷ PSI) pressure value measured by probe at 4mA or at 0V (related to PrM parameter)
P20	Probe value 20mA or At 5V: (PA4 ÷ 50.0 bar / 725 psi) pressure value measured by probe at 20mA or at 5V (related to PrM parameter)
oPr	Pressure probe calibration: (-12.0 ÷ 12.0 bar / -174÷174 psi)
ttE	type of tEmperature Probe: (PtM ÷ Ntc) it allows to set the kind of probe used by the instrument: PtM = Pt1000, ntC = NTC probe.
otE	Temperature probe calibration: (-12.0 ÷ 12.0 °C / -21÷21 °F)

DIGITAL INPUTS

i1P	Digital Input 1 (Free of voltage) digital input polarity: (cL,OP) CL= activated when closed; OP= activated when opened
i1F	Digital Input 1 (Free of voltage) digital input function: (CCL, rL) CCL= cooling call; rL= digital input activates relay;
d1d	Digital Input 1 (Free of voltage) activation delay: (0÷255 min.) this activation delay is used only if digital input is configured as rL
i2P	Digital Input 2 (High voltage) digital input polarity: (CL,OP) CL= activated when closed; OP= activated when opened
i2F	Digital Input 2 (High voltage) digital input function: (CCL, rL) CCL= cooling call; rL= digital input activates relay;
d2d	Digital Input 2 (High voltage) activation delay: (0÷255 min.) this activation delay is used only if digital input is configured as rL

ALARM

dAO	Alarm delay after restarting regulation: (0.0÷42.0 min: tens of seconds) time between digital input activation (configured as CCL) and alarm signalling. The LSH alarm is always signalled also during this time;
tdA	Type of alarm signalled by relay: (ALL, SH, PrE, di) ALL= all alarm; SH= superheat alarm; PrE= pressure alarm; di= activation only when digital input configured as rL is activated;
LPL	Lower Pressure Limit for superheat regulation: (PA4 ÷ P20 bar / psi) when suction pressure comes down to LPL the regulation is performed with a LPL fixed value for pressure, when pressure comes back to LPL the normal pressure value is used. (related to PrM parameter)
MOP	Maximum Operating Pressure threshold: (PA4 ÷ P20 bar / psi) if suction pressure exceeds maximum operating pressure value a MOP alarm is signalled. (related to PrM parameter)
LOP	Lowest Operating Pressure: (PA4 ÷ P20 bar / psi) if the suction pressure comes down to this value a low pressure alarm is signalled (related to PrM parameter)
Phy	Pressure alarm Hysteresis: (0.1 ÷ 5.0 bar / 1÷ 72 PSI) alarm hysteresis to disable alarm signalling.
dML	delta MOP-LOP: (0 ÷ 100%) when a MOP alarm occurs valve will close of the dML percentage every one second until MOP alarm is active. When LOP occurs valve will open of the dML percentage every one second until LOP alarm is active.
MSH	Maximum SuperHeat alarm: (LSH÷32.0°C / LSH÷176°F) when superheat exceeds this value an high superheat alarm is signalled after interval SHd
LSH	Lowest SuperHeat alarm: (0.0÷MSH °C / 32÷MSH °F) when superheat goes down to this value a low superheat alarm is signalled after interval SHd
SHy	SuperHeat alarm Hysteresis: (0.0÷25.5°C / 1÷77°F) hysteresis for superheat alarm deactivation
SHd	SuperHeat alarm activation delay: (0÷255s) when a superheat alarm occurs, the time SHd have to pass before signalling alarm
FrC	Fast-recovery Constant: (0÷100s) permits to increase integral time when SH is below the set-point. If FrC=0 fast recovery function is disabled.

DISPLAY

Lod	Local display: (SH, PEr, P1, P2) SH= superheat; PEr = valve opening percentage; P1= value of temperature measured; P2= pressure measured by P2 probe;
CF	Temperature measurement units: (°C÷°F) °C= Celsius degree; °F= Fahrenheit degree; ATTENTION: by changing measurement unit, the regulation parameters have to be correctly changed
PMu	Pressure Measurement units: (bAr, PSI) bAr= bar; PSI= psi; ATTENTION: by changing measurement unit, the regulation parameters have to be correctly changed
rES	Resolution (only °C): (dE÷in)
PrM	Pressure visualization Mode: (rEL÷AbS) rEL= relative pressure; AbS= absolute pressure; All pressure parameters depend on this parameter
CLP	Cooling Percentage (read only): Display the percentage of time during which the cooling call was active in the time interval defined by parameter CLt
tP1	temperature Probe value (read only): it shows temperature probe value from P1
PPr	Pressure probe value (read only): it shows pressure probe value. The value depends on PrM.
tP2	temperature from P2 (read only): it shows temperature obtained from conversion of pressure value
OPP	Opening Percentage (read only): it shows the actual opening percentage of the valve;
d1S	Free of voltage digital input State (read only): it shows the free of voltage digital input;
d2S	High voltage digital input State (read only): it shows the high voltage digital input state;
Adr	RS485 Serial Address: (1÷247) Identifies the instrument address when connected to a ModBUS compatible monitoring system.
Mod	ModBus: (AdU÷StD) AdU= (Only for XWEB systems) in this case XEV and thermostatic controller are considered an alone instrument (it requires a custom library for XWEB); StD= to use XEV in stand-alone mode, in this case normal Modbus-RTU protocol is used;
Ptb	Parameters map: (read only) it identifies parameters map written by factory
rEL	Release Firmware: (read only) it shows firmware release
Pr2	Second level menu

9. DIGITAL INPUTS

The device is provided with two digital inputs. One is free of voltage and the other is at high voltage and both can be configured as cooling call. In this way the cooling signal can come from instruments with direct load outputs or via instruments with output without voltage. **One of these inputs must be configured as cooling call.**

10. FORCED OPENING

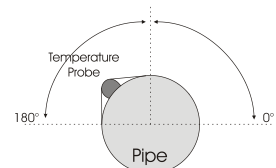
If necessary, by changing **FoP** parameter it's possible to force the valve opening. For example, by setting **FoP=50** the valve will be open at half of full scale. **To disable this function it's necessary to set FoP=nu** (default value). The valve opening is enabled only when CCL digital input is enabled.

11. ELECTRICAL CONNECTIONS

The instrument are provided with disconnectable screw terminal block to connect cables with a cross section up to 2,5 mm². Heat-resistant cables have to be used. Before connecting cables make sure the power supply complies with the instrument's requirements. Separate the probe cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on each relay, in case of heavier loads use a suitable external relay.

11.1 PROBES

Advised temperature probe placement is illustrated in figure nearby. Between 0 and 180 inclination degrees respect to horizontal pipe section. For suction pressure probe there aren't any particular prescriptions



12. RS485 SERIAL LINE

All models can be connected to the monitoring and supervising system XWEB3000. If **Mod=Std** standard ModBUS-RTU protocol is used, if **Mod=AdU** custom XWEB library is required. This last configuration makes possible to use the same serial address of the thermostat that gives the cooling request to XEV. In this way, it's possible to reduce the number of addresses used.

13. HOW TO USE THE HOTKEY

13.1 HOW TO PROGRAM A HOT KEY FROM THE INSTRUMENT (UPLOAD)

- Program one controller with the remote keypad;
- When the controller is ON, insert the "Hot key"; the LEDs in the front of instrument panel blink for about 5 seconds to indicate that transfer operation will start;
- The upload starts automatically and **Alarm** and **Tx/Rx** LEDs are active during operation;
- At the end, the instrument turns ON for about 10 seconds:
 - the **Tx/Rx** LED if the operation is well done;
 - the **Alarm** LED if the operation is wrong.

13.2 HOW TO PROGRAM AN INSTRUMENT USING A HOT KEY (DOWNLOAD)

- Turn OFF the instrument.
- Insert a programmed "Hot Key" into the 5 PIN connector and then turn the Controller ON.
- Automatically the download starts and the LEDs **Alarm** e **Tx/Rx** are active during operation.
- At the end, the instrument turns ON for about 10 seconds:

- the Tx/Rx LED if the operation is well done;
- the Alarm LED if the operation is wrong.

14. DISPLAY MESSAGES

These messages are visible only if the KB1-PRG is connected.

Mess.	Cause	Outputs
"nA"	None of digital inputs configured as CCL are activated	Valve closed
"Pr"	The PE _d time is elapsed and the regulation is stopped	Valve closed after PE _d . There is a probe error
"P1"	Temperature probe fault	according to PE _o and PE _d
"P2"	Pressure transducer fault	according to PE _o and PE _d
"HSH"	High superheat alarm	By PI
"LSH"	Low superheat alarm	Valve Closed
"LPL"	Low pressure limit	see LPL parameter
"MOP"	Maximum Operating Pressure	see dML parameter
"LOP"	Lowest Operating Pressure	see dML parameter
"StF"	Start Function enabled	see SFd parameter
"StP"	Regulation stop caused by Std and Sti	Valve closed
"EE"	Memory anomaly	

14.1 ALARM RECOVERY

Probe alarms "P1", "P2" start few seconds after the fault in the probe; they automatically stop few seconds after the probe restarts normal operation. Check connections before replacing the probe. Max. and min. alarms "HSH" "LSH" "MOP" "LOP" automatically stop as soon as the variable returns to normal values. The instrument is provided with an internal check verifying memory integrity. Alarm "EE" flashes when a failure in the internal memory is detected. In such case call the service.

15. TECHNICAL DATA

Housing: self extinguishing ABS.

Case: 4 DIN modules 70x135mm with male and female connectors; depth 60mm;

Mounting: DIN RAIL mounted in a omega (3) din rail

Protection: IP20.

Connections: disconnectable Screw terminal block $\leq 2,5 \text{ mm}^2$ wiring.

Power supply: 24Vac/dc $\pm 10\%$;

Power absorption: depending on connected valve 20VA max

Inputs: 1 temperature probe Pt1000 or NTC;

1 pressure transducer 4÷20mA o 0÷5V;

Digital inputs: 1 free of voltage

1 at High voltage

Outputs for valve: bipolar or unipolare valves

Data storage: on the non-volatile memory (EEPROM).

Kind of action: 1B; **Pollution grade:** normal; **Software Class:** A

Operating temperature: 0÷60°C; **Storage temperature:** -25÷60 °C.

Relative humidity: 20÷85% (no condensing)

Resolution: 0,1 °C or 1 °F; **Precision a 25°C:** $\pm 0,7 \text{ °C} \pm 1 \text{ digit}$

16. STANDARD VALUES

Label	Description	Range	Default	Level
FtY	Kind of gas	R22 , 134 , 404, 407, 410, 507, CO2	404	Pr2
PEo	Probe Error opening percentage	0 ÷ 100 %	50	Pr2
PEd	Probe Error delay before stopping regulation	0 ÷ 239 s - On	On	Pr2
tEU	Type of Stepper motor	uP - bP	bP	Pr2
tEP	Automatic Valve configuration	0÷10	1	Pr2
LSt	Minimum number of steps	0 - Ust	See tEP	Pr2
USt	Maximum number of steps	LSt - 800*10	See tEP	Pr2
Sr	Step rate	10 ÷ 600 step/s	See tEP	Pr2
CPP	Current per phase (only bipolar valves)	0 ÷ 100 *10mA	See tEP	Pr2
CHd	Holding current per phase (only bipolar valves)	0 ÷ 100 *10mA	See tEP	Pr2
OPE	Start opening Percentage	0 ÷ 100 %	85	Pr2
SF _d	Start Function duration	0.0÷42.0 minutes: tens of seconds	1.3	Pr2
Sti	Stop regulation interval	0.0÷24.0 hours: tens of minutes	0	Pr2
Std	Stop duration	0 ÷ 60 min.	0	Pr2
MnF	Maximum opening percentage	0 ÷ 100 %	100	Pr2
FOP	Forced Opening time-out	0 ÷ 100 % - nu	nu	Pr2
PI PARAMETERS (trained staff)				
Pb	Proportional band	0.1 ÷ 50.0 °C / 1÷90 °F	10.0	Pr2
rS	Band Offset	-12.0 ÷ 12.0 °C / -21 ÷ 21 °F	0.0	Pr2
inC	Integration time	0 ÷ 255 s	120	Pr2
PROBE PARAMETERS				
tPP	Type of pressure transducer	420 - 5V- LAn	420	Pr2

LPP	Enable pressure probe sending in LAN	n ÷ Y	n	Pr2
PA4	Probe value at 4mA or at 0V (related to PrM parameter)	-1.0 bar / -14 PSI	-0.5	Pr2
P20	Probe value at 20mA or at 5V (related to PrM parameter)	PA4 ÷ 50.0 bar / 725 PSI	11.0	Pr2
oPr	Pressure probe calibration	-12.0 ÷ 12.0 bar / -174 ÷ 174 psi	0	Pr2
ttE	type of temperature probe	PtM ÷ ntc	PtM	Pr2
otE	Temperature probe calibration	-12.0 ÷ 12.0 °C / -21 ÷ 21 °F	0	Pr2
DIGITAL INPUTS				
i1P	Free of voltage digital input polarity	cL - OP	CL	Pr2
i1F	Free of voltage digital input function	CCL , rL	CCL	Pr2
d1d	Digital input 1 (free of voltage) activation delay	0 ÷ 255 min.	0	Pr2
i2P	Main voltage digital input polarity	cL - OP	CL	Pr2
i2F	Main voltage digital input function	CCL , rL	CCL	Pr2
d2d	Digital input 2 (Main voltage) activation delay	0 ÷ 255min.	0	Pr2
ALARMS				
dAO	Alarm delay after restarting regulation	0.0÷42.0 min: tens of seconds	10.0	Pr2
tdA	Type of alarm signalled by relay	ALL, SH, PrE, DI	ALL	Pr2
LPL	Lower pressure limit for superheat regulation (related to PrM parameter)	PA4 ÷ P20 bar / PSI	-0.5	Pr2
MOP	Maximum operating pressure threshold (related to PrM parameter)	PA4 ÷ P20 bar / PSI	11.0	Pr2
LOP	Minimum suction pressure limit (related to PrM parameter)	PA4 ÷ P20 bar / PSI	-0.5	Pr2
PHy	Pressure alarm Hysteresis	0.1 ÷ 5.0 bar / 1 ÷ 72 PSI	0.1	Pr2
dML	delta MOP-LOP	0 ÷ 100%	30	Pr2
MSH	Maximum superheat alarm	LSH ÷ 32.0 °C / LSH ÷ 176 °F	80.0	Pr1
LSH	Lowest superheat alarm	0.0 ÷ MSH °C / 32 ÷ MSH °F	2.5	Pr1
SHy	Superheat hysteresis	0.1 ÷ 25.5 °C / 1 ÷ 77°F	0.1	Pr2
SHd	Superheat alarm activation delay	0 ÷ 255 s	120	Pr1
FrC	Fast-Recovery Constant	0÷100 s	50	Pr2
DISPLAY				
Lod	Local display	SH - PEr - P1 - P2	SH	Pr1
CF	Temperature measurement units	°C - °F	°C	Pr2
PMu	Pressure measurement unit	bAr - PSI	bAr	Pr2
rES	Resolution (only °C)	dE - in	dE	Pr2
PrM	Type of pressure (Absolute / relative)	rEL - AbS	rEL	Pr2
CLP	Cooling call percentage	Read only	---	Pr2
tP1	Temperature probe value	Read only	---	Pr1
PPr	Pressure probe value	Read only	---	Pr1
tP2	Temperature converted from pressure probe	Read only	---	Pr1
OPP	Acutal Opening percentage	Read only	---	Pr1
d1S	Free of voltage digital input state	Read only	---	Pr1
d2S	Main voltage digital input state	Read only	---	Pr1
Adr	Serial address	1÷247	1	Pr2
Mod	Modbus type	Std - AdU	StD	Pr2
Ptb	Parameters map	---	---	Pr2
rEL	Release software	---	---	Pr2
Pr2	Second level menu	---	---	Pr1

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