

XEV22D

DRIVER FOR STEPPER ELECTRONIC EXPANSION VALVES

--- MANUAL FOR RELEASE 0.8 ---

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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.

1.2 SAFETY PRECAUTIONS

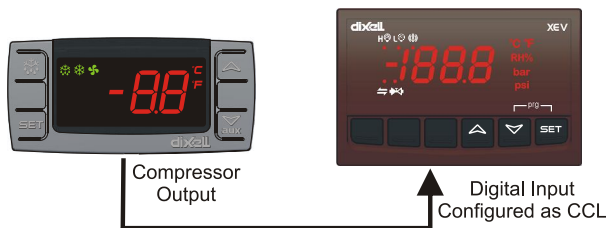
- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning:** disconnect all electrical 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

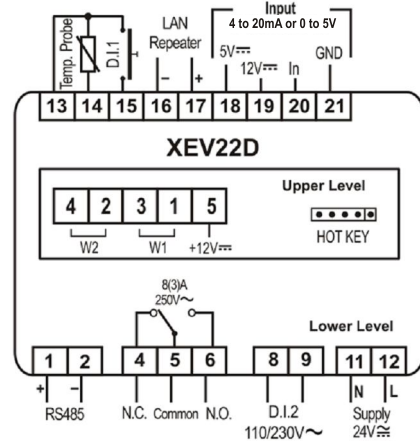
The XEV22D module is able to drive a large variety of **stepper electronic expansion valves**. XEV22D permits to regulate the superheat (SH) of the fluid that runs into refrigerating unit in order to obtain optimized performance and a functioning of the evaporator independently by climatic or load conditions. XEV22D modules are equipped with two probe inputs, one for 4 to 20mA or 0 to 5V pressure transducer and another one for NTC-EU or NTC-US 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 XEV22D to dIXEL monitoring and supervising systems.

3. WIRING CONNECTIONS

The superheat regulation is performed only when the cooling digital input is enabled. The following scheme shows how the device takes the request of cooling:



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 HOT-KEY.



4. VALVE CONNECTIONS AND CONFIGURATION

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

To avoid any possible problem, before connecting the valve configure the driver by making the right changes on the parameters. Select the kind of motor (**tEU** 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	Alco EX4-EX5-EX6	5	75	50	10	500
2	Alco EX7	10	160	75	25	500
3	Alco EX8 500	10	260	80	50	500
4	Danfoss ETS-25/50	7	262	10	10	300
5	Danfoss ETS-100	10	353	10	10	300
6	Danfoss ETS-250/400	11	381	10	10	300
7	Sporlan SEI 0.5-11	0	159	16	5	200
8	Sporlan SER 1.5-20	0	159	12	5	200
9	Sporlan SEI 30	0	319	16	5	200
10	Sporlan SER(I) G,J,K	0	250	12	5	200
11	Sporlan SEI 50	0	638	16	5	200
12	Sporlan SEH(I) 100	0	638	16	5	200
13	Sporlan SEH(I) 175	0	638	16	5	200

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	SPORLAN SEI-SEH	DANFOSS ETS
4	BLUE	WHITE	BLACK
2	BROWN	BLACK	WHITE
3	BLACK	RED	RED
1	WHITE	GREEN	GREEN

5-6 WIRES VALVES (UNIPOLAR)

Connection numbering	SPORLAN	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

XEV22D 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 dIXEL 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	Configuration	Maximum Current
BIPOLAR VALVES (4 wires)	Standard	Maximum Current 0.9A
	Alternative	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 XEV22D LEDES

On display there are some luminous dots. Their meaning is described in the following table:

LED	MODE	Function
	ON	Low pressure alarm
	ON	Maximum Operating Pressure alarm
	OFF	Valve is completely closed
	BLINKING	Valve is moving
	ON	Valve is completely opened
	BLINKING	Serial communication present
	OFF	Serial communication absent
	ON	Superheat alarm

7. USER INTERFACE

7.1 HOW TO: SEE THE READ-ONLY VALUES

- 1) Press and release **UP** button.
- 2) First read-only label is showed;
- 3) Brows parameter labels with **UP** or **DOWN** buttons.
- 4) Press **SET** to see read-only value. To change parameter, press **SET**.
- 5) To leave the fast access menu, press and release **SET+UP** or wait for time-out to expire (about 3 minutes).

7.2 HOW TO: SEE THE SET POINT

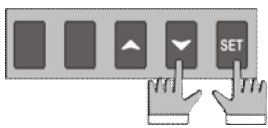
- 1) Press the **SET** buttons until the set point will be showed.
- 2) To come back to see temperature, wait about 5s or press newly **SET** key.

7.3 HOW TO: MODIFY THE SET POINT

To change the set point value operate as follows:

- 1) Press the **SET** button until the set point will be showed.
- 2) Use **UP** or **DOWN** buttons to change its value.
- 3) Press **SET** button to store the new value.

7.4 HOW TO: ENTERING "PR1" PARAMETER MENU



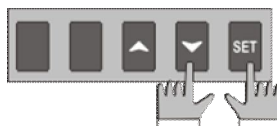
- To enter in "Pr1" level menu:
- 1) Pressing **SET+ DOWN** buttons for about 3 seconds.
 - 2) Instruments shows first parameter in Pr1 menu

7.5 HOW TO: ENTERING "PR2" PARAMETER MENU



- 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.
 4. Insert "321" password through **UP** and **DOWN** buttons, then press **SET** to confirm.

7.6 HOW TO: CHANGE A PARAMETERS VALUE



3. Press the **SET** button to display the value.
4. Use **UP** or **DOWN** to change the value.
5. Press **SET** to store the new value and move to the following parameter.

To exit: Press **SET + UP** or wait 30s without pressing any button.
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 the PrM parameter.

REGULATION

FtY	Kind of gas: (R22, 134, 404, 407, 410, 507, CO2) type of gas used by plant. This is a fundamental parameter for correct functioning of all system.
PEo	Probe Error opening percentage: (0 to 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 to 239sec; 240=On=unlimited) if probe error duration is higher than PEd , valve will close completely and "PF" message will be showed. With 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 to 13) 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	Alco EX4-EX5-EX6	5	75	50	10	500
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7	Sporlan SEI 0.5-11	0	159	16	5	200
8	Sporlan SER 1.5-20	0	159	12	5	200
9	Sporlan SEI 30	0	319	16	5	200
10	Sporlan SER(I) G,J,K	0	250	12	5	200
11	Sporlan SEI 50	0	638	16	5	200
12	Sporlan SEH(I) 100	0	638	16	5	200
13	Sporlan SEH(I) 175	0	638	16	5	200

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

HFS	Kind of motor movement: (HAF; FUL) <ul style="list-style-type: none"> • HAF = half step. Use this setting for the unipolar valve. • FUL = half step. Use this setting for the bipolar valve.
LSt	Minimum number of steps: (0 to USt (*10)) 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 !!!! after changing this parameter the valve will have to be reinitialized. The device performs this procedure automatically and restarts its normal functioning when the programming mode ends.
USt	Maximum number of steps: (LSt to 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 !!!! after changing this parameter the valve will have to be reinitialized. The device performs this procedure automatically and restarts its normal functioning when the programming mode ends.
Est	Extra step in closing phase: (0 to 255 (*10)) it sets the number of extra steps the controller performs, when the valve is closed at start up, to force the closure of the valve.
Sr	Step rate: (10 to 600 step/sec) it is 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 to 100 (*10mA)) it is 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 to 100 (*10mA)) it is 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 to 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 to 42min 00s, res. 10s) it sets start function duration and post-defrost duration. During this phase the alarms are neglected.
Sti	Stop regulation interval: (0.0 to 24h 00min. res. 10min) after regulating continuously for Sti time, the valve closes for Std time in order to prevent ice creation.
Std	Stop duration: (0 to 60 min) it defines stop regulation time after Sti . During this stop display shows StP message.
MnF	Maximum opening percentage at normal Functioning: (0 to 100%) during regulation it sets the maximum valve opening percentage.
FoP	Forced Opening percentage: (0 to 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)

Pb	<p>Proportional band: (0.1 to 50.0°C; 1 to 90°F) PI proportional band. A value bigger than 5°C is advised.</p>
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rS	<p>Band Offset: (-12.0 to 12.0°C; -21 to 21°F) PI band offset. It permits to move the proportional band of the PI. With rS=0 the band is between [SEt to SEt+Pb].</p>	
inC	<p>Integration time: (0 to 255s) PI integration time.</p>	

PROBE PARAMETERS

tPP	<p>Type of Pressure transducer: (420; 5V; LAN) it sets type of pressure transducer to use. 420 = 4 to 20mA pressure transducer; 5V = 0 to 5V ratiometric transducer; LAN = the pressure signal comes from another XEV module.</p>
LPP	<p>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.</p>
PA4	<p>Probe value at 4mA or at 0V: (-1.0 to P20 bar; -14 to P20 psi) pressure value measured by probe at 4mA or at 0V (related to PrM parameter).</p>
P20	<p>Probe value at 20mA or at 5V: (PA4 to 50.0 bar; PA4 to 725 psi) pressure value measured by probe at 20mA or at 5V (related to PrM parameter).</p>
oPr	<p>Pressure probe calibration: -12.0 to 12.0 bar; -174 to 174 psi.</p>
ttE	<p>Type of temperature probe: (PtM; nTC) it allows to set the kind of probe used by the instrument: PtM = PT1000 probe, nTC = NTC-US probe.</p>
otE	<p>Temperature probe calibration: -12.0 to 12.0°C; -21 to 21°F.</p>

DIGITAL INPUTS

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

ALARM

dAo	<p>Alarm delay after restarting regulation: (0.0 to 42min 00s, res. 10s) time between digital input activation (configured as CCL) and alarm signalling. The LSH alarm is always signalled also during this time.</p>
tdA	<p>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 active.</p>
LPL	<p>Lower Pressure Limit for superheat regulation: (PA4 to P20 bar; PA4 to P20 psi) when suction pressure comes down to LPL, the regulation is performed with a LPL fixed value for pressure. When suction pressure comes back to LPL, the normal pressure value is used (related to PrM parameter).</p>
MoP	<p>Maximum Operating Pressure threshold: (LoP to P20bar; LoP to P20 psi) if suction pressure exceeds maximum operating pressure value, the instrument signals this situation with an alarm LED H (related to PrM parameter).</p>
LoP	<p>Lowest Operating Pressure: (PA4 to MoP bar; PA4 to MoP psi) if the suction pressure comes down to this value, a low pressure alarm will be signalled with an alarm LED L (related to PrM parameter).</p>
PHY	<p>Pressure alarm Hysteresis: (0.1 to 5.0 bar, 1 to 72 psi) pressure hysteresis to disable alarm signalling.</p>
dML	<p>Delta MoP-LoP: (0 to 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.</p>
MSH	<p>Maximum SuperHeat alarm: (LSH to 80.0°C; LSH to 144°F) when superheat exceeds this value, an high superheat alarm will be signalled after interval SHd.</p>
LSH	<p>Lowest SuperHeat alarm: (0.0 to MSH°C; 0 to MSH°F) when superheat goes down to this value a low superheat alarm is signalled after interval SHd.</p>
SHY	<p>SuperHeat alarm Hysteresis: (0.0 to 25.5°C; 1 to 77°F) hysteresis for superheat alarm deactivation.</p>
SHd	<p>SuperHeat alarm activation delay: (0 to 255 s) when a superheat alarm occurs, the delay time SHd have to expire before signalling this alarm.</p>
FrC	<p>Fast-recovery Constant: (0 to 100 s) permits to increase integral time when SH is below the set-point. If FrC=0 fast recovery function is disabled.</p>

DISPLAY

Lod	<p>Local display: (SH; PEr; P1; P2) SH = superheat; PEr = valve opening percentage; P1 = value of temperature measured; P2 = pressure measured by P2 probe.</p>
CF	<p>Temperature measurement units: (°C; °F) °C = Celsius degree; °F = Fahrenheit degree. NOTE: by changing measurement unit, the regulation parameters have to be correctly changed.</p>
PMU	<p>Pressure Measurement units: (bAr, PSI) bAr = bar; PSI = psi. NOTE: by changing measurement unit, the regulation parameters have to be correctly changed.</p>
rES	<p>Resolution (only °C): (dE; in) dE = decimal format; in = integer format.</p>
PrM	<p>Pressure visualization Mode: (rEL; AbS) rEL = relative pressure; AbS = absolute pressure. All pressure parameters depend on this parameter.</p>
CLP	<p>Cooling Percentage (read only): Display the cooling percentage.</p>
tP1	<p>Temperature Probe value (read only): it shows temperature probe value from P1.</p>
PPr	<p>Pressure probe value (read only): it shows pressure probe value. The value depends on PrM.</p>
tP2	<p>Temperature from P2 (read only): it shows temperature obtained from conversion of pressure value.</p>
oPP	<p>Opening Percentage (read only): it shows the actual opening percentage of the valve.</p>

d1S	<p>Free of voltage digital input State (read only): it shows the free of voltage digital input.</p>
d2S	<p>High voltage digital input State (read only): it shows the high voltage digital input state.</p>
Adr	<p>RS485 Serial Address: (1 to 247) Identifies the instrument address when connected to a ModBUS compatible monitoring system.</p>
Mod	<p>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.</p>
Ptb	<p>Parameters map: (read only) it identifies parameters map written by factory.</p>
rEL	<p>Release Firmware: (read only) it shows firmware release.</p>
Pr2	<p>Second level menu.</p>

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

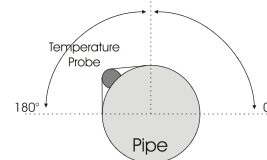
If necessary, by changing FoP parameter it's possible to force the valve opening. For example, by setting FoP=50 the valve will be open at half of full scale. **To disable this function it's necessary to set FoP=nU (default value).** The valve opening is enabled only when CCL digital input is enabled.

11. ELECTRICAL CONNECTIONS

The instrument is provided with pluggable 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 HOT-KEY

13.1 PROGRAM A HOT KEY FROM THE INSTRUMENT (UPLOAD)

- 1) Program one controller with the front keypad.
- 2) When the controller is ON, insert the "Hot-Key" and push UP button; the "uPL" message appears followed a by flashing "End".
- 3) Push SET button and the "End" will stop flashing.
- 4) Turn OFF the instrument, remove the "Hot-Key" and then turn it ON again.

NOTE: the "Err" message is displayed in case of any failed programming operation. In this case, push again UP button if you want to restart the upload again or remove the "Hot-key" to abort the operation.

13.2 PROGRAM AN INSTRUMENT USING A HOT KEY (DOWNLOAD)

- 1) Turn OFF the instrument.
- 2) Insert a pre-programmed "Hot-Key" into the 5-PIN connector and then turn the Controller ON.
- 3) Automatically the parameter list present into the "Hot-Key" will be downloaded into the Controller memory. The "doL" message will blink during this operation, followed a by a flashing "End" label.
- 4) After 10 seconds the instrument will restart working with the new parameters.
- 5) Remove the "Hot-Key".

NOTE: the "Err" message is displayed in case of any failed programming operation. In this case, push again UP button if you want to restart the upload again or remove the "Hot-Key" to abort the operation.

14. DISPLAY MESSAGES

Mess.	Cause	Outputs
"nA"	None of digital inputs configured as CCL are activated	Valve closed
"pF"	The Ped time is elapsed and the regulation is stopped	Valve closed after PEd. There is a probe error
"P1"	Temperature probe fault	According to PEo and PEd.
"P2"	Pressure transducer fault	According to PEo and PEd.
"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 error	-

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" and "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" will flash 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 an omega (3) din rail.
Protection: IP20.

Connections: pluggable screw terminal block ≤ 2.5 mm² wiring.
Power supply: 24Vac/dc ±10%.

Power absorption: depending on connected valve 20VA max.
Display: three digits with icons, red LEDs, height 14.2 mm.

Inputs: 1 temperature probe:
PT1000 probe: -50 to 110°C (-58 to 230°F).
NTC probe: -40 to 110°C (-40 to 230°F).
 1 pressure transducer: 4 to 20mA or 0 to 5V.

Digital inputs: 1 free of voltage.
 1 high voltage.

Outputs for valve: bipolar or unipolar valves.
Data storage: on the non-volatile memory (EEPROM).

Kind of action: 1B.
Pollution degree: normal.

Software Class: A.
Operating temperature: 0 to 55°C (32 to 131°F).

Storage temperature: -25 to 60°C (-13 to 140°F).
Relative humidity: 20 to 85% (no condensing).

Resolution: 0.1°C or 1°F.
Precision a 25°C (77°F): ±0.7°C ±1digit.

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 to 100 %	50	Pr2
Ped	Probe Error delay before stopping regulation	0 to 239 s; on	on	Pr2
tEU	Type of Stepper motor	uP; bP	bP	Pr2
tEP	Automatic Valve configuration	0 to 10	1	Pr2
HFS	Kind of driving	HAF; FUL	FUL	Pr2
LSt	Minimum number of steps	0; USt (*10)	See tEP	Pr2
USt	Maximum number of steps	LSt to 800 (*10)	See tEP	Pr2
EST	Extra steps in closing phase	0 to 255 (*10)	0	Pr2
Sr	Step rate	10 to 600 step/s	See tEP	Pr2
CPP	Current per phase (only bipolar valves)	0 to 100 (*10mA)	See tEP	Pr2
CHd	Holding current per phase (only bipolar valves)	0 to 100 (*10mA)	See tEP	Pr2
oPE	Start opening Percentage	0 to 100 %	85	Pr2
SFd	Start Function duration	0.0 to 42min 00s, res. 10s	1.3	Pr2
Sti	Stop regulation interval	0.0 to 24h 00min, res. 10min	0	Pr2
Std	Stop duration	0 to 60 min	0	Pr2
MnF	Maximum opening percentage	0 to 100 %	100	Pr2
FoP	Forced Opening time-out	0 to 100 %; nU	nU	Pr2
PI PARAMETERS (trained staff)				
Pb	Proportional band	[0.1 to 50.0°C] [1 to 90°F]	[10.0°C] [50°F]	Pr2
rS	Band Offset	[-12.0 to 12.0°C] [-21 to 21°F]	[0.0°C] [0°F]	Pr2
inC	Integration time	0 to 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 to P20 bar] [-14 to P20 psi]	[-0.5 bar] [-7 psi]	Pr2
P20	Probe value at 20mA or at 5V (related to PrM parameter)	[PA4 to 50.0 bar] [PA4 to 725 psi]	[11.0 bar] [159 psi]	Pr2
oPr	Pressure probe calibration	[-12.0 to 12.0 bar] [-174 to 174 psi]	[0.0 bar] [0 psi]	Pr2
tTE	type of temperature probe	PT1000; nTC	nTC	Pr2
otE	Temperature probe calibration	[-12.0 to 12.0°C] [-21 to 21°F]	[0.0°C] [0°F]	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 to 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 to 255 min	0	Pr2
ALARMS				
dAo	Alarm delay after restarting regulation	0.0 to 42min 00s, res. 10s	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 to P20 bar] [PA4 to P20 psi]	[-0.5 bar] [-7 psi]	Pr2
MoP	Maximum operating pressure threshold (related to PrM parameter)	[LoP to P20 bar] [LoP to P20 psi]	[11.0 bar] [159 psi]	Pr2
LoP	Minimum suction pressure limit (related to PrM parameter)	[PA4 to MoP bar] [PA4 to MoP psi]	[-0.5 bar] [-7 psi]	Pr2
PHy	Pressure alarm Hysteresis	[0.1 to 5.0 bar] [1 to 72 psi]	[0.1 bar] [1 psi]	Pr2
dML	delta MoP-LoP	0 to 100%	30	Pr2
MSH	Maximum superheat alarm	[LSH to 80.0°C] [LSH to 176°F]	[80.0°C] [144°F]	Pr1
LSH	Lowest superheat alarm	[0.0 to MSH°C] [0 to MSH°F]	[2.5°C] [2°F]	Pr1
SHY	Superheat hysteresis	[0.1 to 25.5°C] [1 to 77°F]	[0.1°C] [1°F]	Pr2
SHd	Superheat alarm activation delay	0 to 255 s	120	Pr1
FrC	Fast-Recovery Constant	0 to 100 s	50	Pr2
DISPLAY				
Lod	Local display	SH; PEr; P1; P2	SH	Pr1
CF	Temperature measurement units	°C; °F	[°C] [°F]	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 to 247	1	Pr2
Mod	Modbus type	Std; AdU	Std	Pr2
Ptb	Parameters map	---	---	Pr2
rEL	Release software	---	---	Pr2
Pr2	Second level menu	---	---	Pr1



Dixell S.r.l. - 32010 Pieve d'Alpago (BL) ITALY - Z.I. Via dell'Industria, 27
 Tel. +39.0437.9833 r.a. - Fax +39.0437.989313 - www.dixell.com - dixell@emerson.com