

XEV12D

ON-OFF ELECTRONIC EXPANSION VALVE DRIVERS

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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

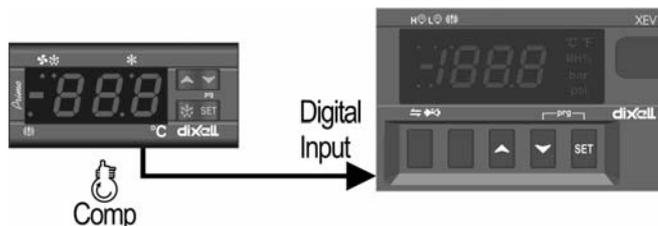
- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical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

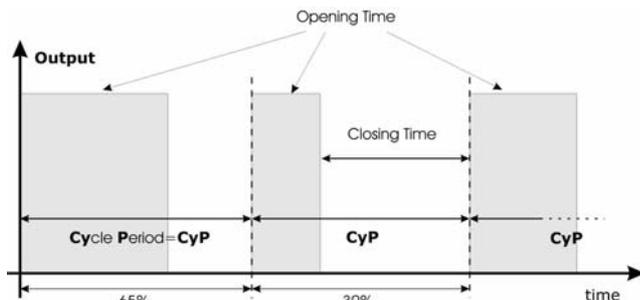
The XEV12D module is able to drive ON/OFF electronic expansion valves. This module permits to regulate the superheat (SH) of the fluid that runs into refrigerating unit in order to obtain optimized performance and a climatic or load conditions independent functioning. XEV12D modules are equipped with two probe inputs, one for 4+20mA or 0+5V pressure transducer and another for Pt1000 or NTC temperature probe. A LAN connection permits to transmit the pressure signal to all other XEV modules in order to use only one pressure transducer in multiplexed cabinet applications. There are also two configurable digital inputs, one of them must be configured to get cooling request. The other digital input can be used to signal to the instrument that defrost is in progress. The display with icons permits a useful visualisation of the superheat (SH), of the percentage of opening valve time or the probe values, the local keyboard allows to program the instrument without other devices. To complete instrument equipment, a RS485 serial link permits to connect XEV12D to dixell monitoring and supervising systems.

3. REGULATION

The superheat regulation is performed only when the cooling request is active. The following scheme shows how device reads the request of cooling:



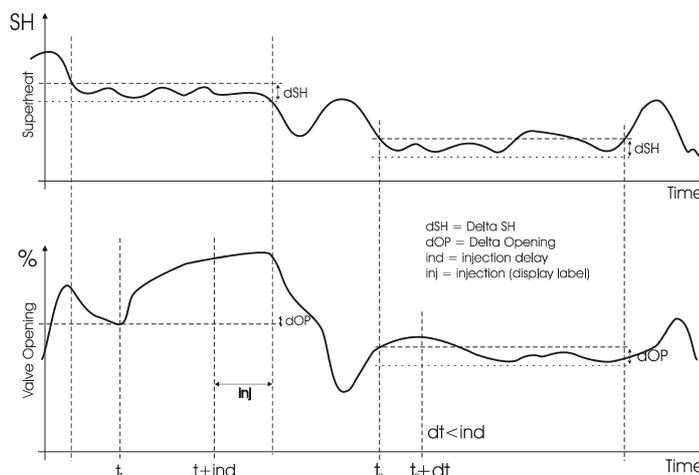
The regulation is obtained with PI controller that it changes the valve opening percentage. Opening percentage is obtained from average of Opening Time respect to CyP time period like following diagram:



With opening percentage we mean percentage of cycle period where valve is open. For example, if CyP=6s and we say: "The valve opening percentage is 50%"; we mean the valve is opened for 3s during cycle period.

3.1 INJECTION SIGNALLING

The graph illustrates how to work the function for injection problems signalling. When superheat stays in dSH (delta SuperHeat) band and valve increases continuously its opening more than dOP (delta OPening) for ind time (injection delay) the driver signals a gas problem. When this event occurs, the behaviour of the valve can be fitted to your demand. Through inj (injection behaviour) parameter you can choose if the valve have to close completely (inj=cL), or if regulation have to continue normally with PI.



4. FRONT PANEL



| | |
|------------|--|
| SET | To display and to modify the set point. In programming mode it selects a parameter or it confirms a value. |
| ▲ | 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 to programming mode.
- SET + ▲ Press and hold this keys combination about 5 seconds to activate valve ON function (described in Plant start section). If you are in programming mode this combination permits to leave it.

4.1 XEV12D LEDS

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

| LED | MODE | Function |
|-----|----------|----------------------------------|
| L | ON | Low pressure alarm |
| H | ON | Maximum Operating Pressure alarm |
| ⏏ | OFF | Valve is closed |
| ⏏ | ON | Valve is opened |
| ↔ | BLINKING | Serial communication present |
| ↔ | OFF | Serial communication absent |
| ⚠ | ON | Superheat alarm |

5. USER INTERFACE

5.1 TO SEE THE READ-ONLY PARAMETERS

- 1) Press and release ▲ key;
- 2) First read-only label is showed;
- 3) Slide labels with ▲ or ▼ arrows;
- 4) Press SET to see read-only value, to change value to see press SET
- 5) To leave, press and release ▲ + SET or wait time-out of about 3 minutes.

5.2 TO SEE THE SET POINT

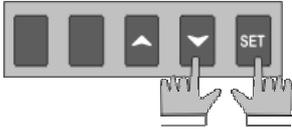
- 1) Press the **SET** key until the set point will be showed;
- 2) To come back to see temperature, wait about 5s or press newly **SET** key.

5.3 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.

5.4 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

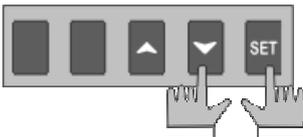
5.5 TO GO TO "PR2" PARAMETERS



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.
4. Insert "321" password through **▲** and **▼** keys, then press SET to confirm.

5.6 TO MODIFY THE PARAMETERS VALUE



To change the parameter's value operate as follows:

1. Enter the Programming mode by pressing the Set and DOWN 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.

6. PARAMETERS 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. |
| PEd | Probe Error delay before stopping regulation: (0÷239 sec. - 240=unlimited) if probe error duration is bigger than PEd then valve totally closes. If PEd=240 valve opening is PEO until probe error finishes. |
| ESF | Enable Start Function: (n÷Y) n= when digital input configured as CCL is activated, normal regulation starts immediately; Y= when digital input configured as CCL is activated valve opens with OPE percentage for time SFd. |
| 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 |
| ind | injection delay: (0.0÷42.0 min: tens of seconds) view paragraph 3.1 |
| dSH | delta SuperHeat: (0.1÷10°C / 1÷50°F) view paragraph 3.1 |
| dOP | delta Opening Percentage: (0÷100%) view paragraph 3.1 |
| inb | injection behaviour: (rEG ÷ cL) when an injection problem is signalled if inb=cL valve will close completely, if inb=rEG valve will regulate normally by PI (see paragraph 3.1). |
| 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. |
| FOt | Forced Opening time-out: (0.0÷24.0 hours: tens of minutes) If Plant starting function is enabled for all FOt time the function is disabled automatically, see Plant starting function paragraph. |

PI PARAMETERS (trained staff)

| | |
|-----|---|
| CyP | Cycle Period: (1 ÷ 15s) it permits to set cycle time. |
| Pb | Proportional band: (0.1 ÷ 50.0 / 1÷90°F) PI proportional band |
| rS | Band Offset: (-12.0 ÷ 12.0°C / -21÷21°F) PI band offset |
| inC | Integration time: (0 ÷ 255s) PI integration time |

PROBE PARAMETERS

| | |
|-----|--|
| tPP | type of Pressure transducer: (PP – LAN) it sets type of pressure transducer to use: PP= 4÷20mA pressure transducer or ratiometric transducer 0÷5V, LAN= the pressure signal arrives from another XEV module. |
|-----|--|

| | |
|-----|--|
| PA4 | Probe value At 4mA or At 0V: (-1.0 ÷ P20 bar / -14 ÷ PSI / -10 ÷ P20 kPa*10) 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 / 500 kPa*10) 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 / -120 ÷ 120 kPa*10) |
| 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, dEF) CCL= cooling call; rL= digital input activates relay; dEF= digital input signals that defrost is active |
| 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, dEF) CCL= cooling call; rL= digital input activates relay; dEF= digital input signals that defrost is active |
| 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 |
| tdA | Type of alarm signalled by relay: (ALL, SH, PrE, di, LOC, inJ) ALL= all alarm; SH= superheat alarm; PrE= pressure alarm; di= activation only when digital input configured as rL is activated; LOC= lock alarm in case of nPA events reached; inJ= activation in cases of injection alarm. |
| LPL | Lower Pressure Limit for superheat regulation: (PA4 ÷ P20 bar / psi / kPa*10) 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 / kPa*10) if suction pressure exceeds maximum operating pressure value, instrument signals situation with alarm LED H (related to PrM parameter) |
| LOP | Lowest Operating Pressure: (PA4 ÷ P20 bar / psi / kPa*10) if the suction pressure comes down to this value a low pressure alarm is signalled with alarm LED L (related to PrM parameter) |
| PHy | Pressure alarm Hysteresis: (0.1 ÷ 5.0 bar / 1÷ 72 PSI / 1÷50 kPa*10) 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 cycle period until MOP alarm is active. When LOP occurs valve will open of the dML percentage every cycle period until LOP alarm is active. |
| tPA | Maximum time between two MOP and/or LOP events: (0.0÷42.0 min: tens of seconds) time interval to calculate the number of the pressure switch activation. |
| nPA | Number of events before locking: (0=Off ÷ 100) number of MOP or LOP events, during the "tPA" interval, before locking instrument. |
| 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, kPa*10) bAr= bar; PSI= psi; PA= KPa*10; ATTENTION: by changing measurement unit, the regulation parameters have to be correctly changed |
| PrM | Pressure visualization Mode: (rEL÷AbS) rEL= relative pressure; AbS= absolute pressure; All pressure parameters depend on this parameter |
| CLt | Cooling time statistic: (0÷48h) time interval used to evaluate a cooling call statistic. During this time comes calculated how much time the cooling call is remained active |
| 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 |
| 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 XWEB3000 system) in this case XEV and thermostat 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 |

7. DIGITAL INPUTS

There are two digital inputs. One of them is free of voltage and the other is at supply voltage and both can be configured as cooling call. In this way the cooling call can arrive via instruments with direct load outputs or via instruments with output without voltage. **One of these inputs must be configured as cooling call.**

8. PLANT STARTING FUNCTION

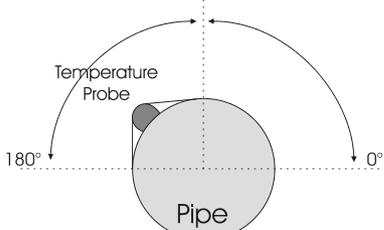
If necessary, by pressing and holding **▲ + SET** keys combination for 5 seconds the driver opens completely the valve and shows on display the **"ON"** label. To disable this function press and hold another time **▲ + SET** keys combination or activate digital input configured as CCL or wait **Fot** time out.

9. ELECTRICAL CONNECTIONS

The instrument are provided with 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.

9.1 PROBES

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



10. 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.

11. HOW TO USE THE HOT KEY

11.1 HOW TO 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 **▲** key; the **"uPL"** message appears followed a by flashing **"End"**
- 3) Push **"SET"** key and the **End** will stop flashing.
- 4) **Turn OFF** the instrument remove the **"Hot Key"**, then turn it **ON** again.

NOTE: the **"Err"** message is displayed for failed programming. In this case push again **▲** key if you want to restart the upload again or remove the **"Hot key"** to abort the operation.

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

- 1) Turn OFF the instrument.
- 2) Insert a programmed **"Hot Key"** into the 5 PIN connector and then turn the Controller ON.
- 3) Automatically the parameter list of the **"Hot Key"** is downloaded into the Controller memory, the **"doL"** message is blinking followed a by flashing **"End"**.
- 4) After 10 seconds the instrument will restart working with the new parameters.
- 5) Remove the **"Hot Key"**.

NOTE: the message **"Err"** is displayed for failed programming. In this case turn the unit off and then on if you want to restart the download again or remove the **"Hot key"** to abort the operation.

12. DISPLAY MESSAGES

| Mess. | Cause | Outputs |
|-------|--|--|
| "OFF" | None of digital inputs configured as CCL are activated | Valve closed |
| "ON" | Plant start function is activated | Valve opened |
| "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 ESF parameter |
| "StF" | Regulation stop caused by Std and Stf | Valve closed |
| "dEF" | Defrost in progress | Valve closed |
| "EE" | Memory anomaly | |

12.1 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.

12.2 ALARM "EE"

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.

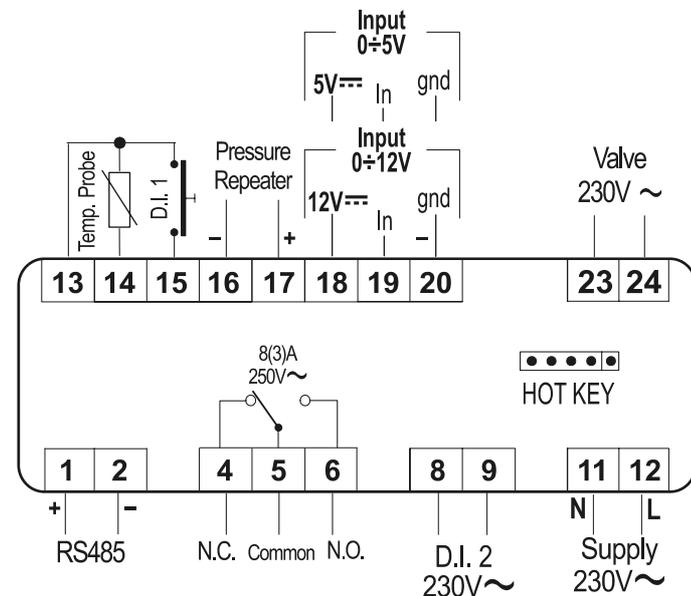
13. TECHNICAL DATA

Housing: self extinguishing ABS.
Case: 4 DIN modules 70x85 mm; depth 61mm
Mounting: DIN RAIL mounted in a omega (3) din rail
Protection: IP20.

Connections: Screw terminal block ≤ 2,5 mm² wiring.
Power supply: 24Vac ±10%; 110Vac ±10%; 230Vac ±10% 50/60Hz 50/60Hz
Power absorption: 6VA max
Display: three digits with icons, red LEDs, height 14,2 mm.
Inputs: 1 temperature probe Pt1000 or NTC;
 1 pressure transducer 4÷20mA o 0÷5V;
Digital inputs: 1 free of voltage
 1 at Main voltage

Outputs for valve: 30W max
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:** ±0,7 °C ±1 digit

14. WIRING CONNECTIONS



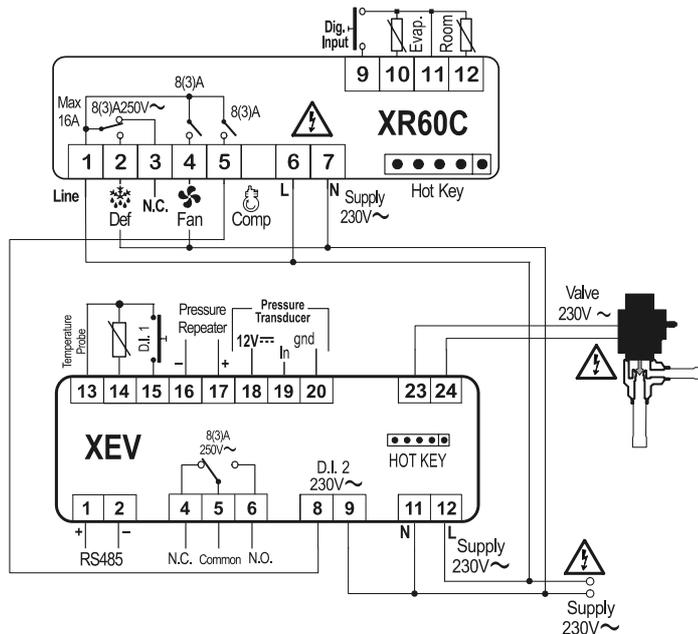
24-110Vac Models: Power supply, high voltage digital input and valve output are respectively 24Vac or 110Vac.

15. 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 |
| ESF | Enable Start Function | n ÷ Y | Y | Pr2 |
| OPE | Start opening Percentage | 0 ÷ 100 % | 85 | Pr2 |
| SFd | Start Function duration | 0.0÷42.0 minutes: tens of seconds | 1.3 | Pr2 |
| ind | injection delay | 0.0÷42.0 minutes: tens of seconds | 10.0 | Pr2 |
| dSH | delta SuperHeat | 0.1 ÷ 10°C / 1÷50°F | 0.1 | Pr2 |
| dOP | delta Opening Percentage | 0 ÷ 100 % | 100 | Pr2 |
| inb | injection behaviour | cL ÷ rEG | rEG | Pr2 |
| Sti | Stop regulation interval | 0.0÷24.0 hours: tens of minutes | 1.3 | Pr2 |
| Std | Stop duration | 0 ÷ 60 min. | 3 | Pr2 |
| MnF | Maximum opening percentage | 0 ÷ 100 % | 100 | Pr2 |
| Fot | Forced Opening time-out | 0.0÷24.0 hours: tens of minutes | 0.1 | Pr2 |
| PI PARAMETERS (trained staff) | | | | |
| CyP | Cycle Period | 1 ÷ 15 s | 6 | Pr1 |
| Pb | Proportional band | 0.1 ÷ 50.0 °C / 1÷90 °F | 4.0 | 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 | PP - LAn | PP | Pr2 |
| PA4 | Probe value at 4mA or at 0V (related to PrM parameter) | -1.0 bar / -14 PSI / -10 kPA*10 ÷ P20 | -0.5 | Pr2 |
| P20 | Probe value at 20mA or at 5V (related to PrM parameter) | PA4 ÷ 50.0 bar / 725 PSI / 500 kPA*10 | 11.0 | Pr2 |

| | | | | |
|-----------------------|--|---|------|-----|
| oPr | Pressure probe calibration | -12.0 ÷ 12.0 bar / -174 ÷ 174 psi / -120 ÷ 120 kPA*10 | 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, DEF | 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, DEF | 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 hours: tens of seconds | 3.3 | Pr2 |
| tdA | Type of alarm signalled by relay | ALL, SH, PrE, DI, LOC, inJ | ALL | Pr2 |
| LPL | Lower pressure limit for superheat regulation (related to PrM parameter) | PA4 ÷ P20 bar / PSI / kPA*10 | -0.5 | Pr2 |
| MOP | Maximum operating pressure threshold (related to PrM parameter) | PA4 ÷ P20 bar / PSI / kPA*10 | 11.0 | Pr2 |
| LOP | Minimum suction pressure limit (related to PrM parameter) | PA4 ÷ P20 bar / PSI / kPA*10 | -0.5 | Pr2 |
| PHy | Pressure alarm Hysteresis | 0.1 ÷ 5.0 bar / 1÷ 72 psi / 1÷50 kPA*10 | 0.1 | Pr2 |
| dML | delta MOP-LOP | 0 ÷ 100% | 30 | Pr2 |
| tPA | Maximum time between two MOP and/or LOP events | 0.0÷42.0 hours: tens of seconds | 0.1 | Pr2 |
| nPA | Number of events before locking | 0(Off) ÷ 100 | 0 | Pr2 |
| MSH | Maximum superheat alarm | LSH ÷ 32.0 °C / LSH ÷ 176 °F | 50.0 | 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 | 0.5 | Pr2 |
| SHd | Superheat alarm activation delay | 0 ÷ 255 s | 10 | 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 - PA | bAr | Pr2 |
| PrM | Type of pressure (Absolute / relative) | rEL - AbS | rEL | Pr2 |
| CLt | Time to evaluate Cooling statistic | 0 ÷ 48 hours | 48 | Pr1 |
| 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 |
| 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 |

16. EXAMPLE OF APPLICATION



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