

QUICK REFERENCE GUIDE

XEV20D

- FW REL. 2.5 -

CONTENTS

CONTENTS	1
1. GENERAL RECOMMENDATIONS	1
2. COMPATIBILITY OF USE	1
3. GENERAL RULES	2
4. INSTALLATION AND MAINTENANCE	2
5. MAXIMUM POWERS ALLOWED	3
6. SPECIFICATIONS	3
7. WIRING DIAGRAMS	3
8. CONNECTION TO XEC SUPERCAP	4
9. SERIAL - CAN BUS LINE	5
10. MEANING OF THE LED LIGHTS	5

1. GENERAL RECOMMENDATIONS



Please read before using this manual any further.

- This manual is an integral part of the product and must be kept close to the device for quick and easy consultation.
- The regulator must not be used for purposes other than those described below, and it especially cannot be used as a safety device.
- Check application limits before proceeding.
- Dixell S.r.l. reserves the right to change the composition of its products, even without notice, ensuring the same and unchanged functionality.

1.1 SAFETY PRECAUTIONS

- Symbol warns the user about the presence of non-insulated "dangerous voltage" inside the product area, which may cause electric shock.
- Symbol warns the user about the presence of important operating and maintenance (assistance) instructions found in the documentation attached to the device.
- Dixell Srl reserves the right to vary the composition of its products without prior notice to the customer, ensuring the identical and unchanged features of the same.
- This manual is part of the product and must always be kept near the device for easy and quick reference. The device cannot be used as a safety device. Verify the limits of application before using the device.
- Verify that the power supply voltage is correct before connecting the device. Do not expose it to water or humidity. Use the controller only within the operating limits, avoiding sudden temperature changes and high atmospheric humidity, which may result in the formation of condensate.
- Warning: disconnect all the electric connections before performing maintenance. Insert the probe where it cannot be reached by the End User. The device must not be opened. Consider the maximum current that can be applied to each relay.
- Make sure that the wires for the probes, the loads and the electrical power supply are separated and sufficiently distant from each other, without crossing or intertwining with each other. In the case of applications in industrial environments, it may be useful to use the main filters in parallel with the inductive loads.
- The customer shall bear full responsibility and risk for product configuration in order to achieve the results pertaining to installation and/or final equipment/system. Upon the customer's request and following a specific agreement, Dixell S.r.l. may be present during the start-up of the final machine/application, as a consultant, however, under no circumstances can the company be held responsible for the correct operation of the final equipment/system.
- Since Dixell products form part of a high level of technology, a qualification/configuration/programming/commissioning stage is required to use them as best as possible. Otherwise, these products may malfunction and Dixell cannot be held responsible. The product must not be used in any way that differs from that stipulated in the documentation.
- The device must always be inserted inside an electrical panel that can only be accessed by authorized personnel. For safety purposes, the keyboard must be the only part that can be reached.
- The device must never be hand-held while being used.
- It is good practice to bear the following in mind for all Dixell products:
 - Prevent the electronic circuits from getting wet as contact made with water, humidity or any other type of liquid can damage them. Comply with the temperature and humidity limits specified in the manual in order to store the product correctly.
 - The device must not be installed in particularly hot environments as high temperatures can damage it (electronic circuits and/or plastic components forming part of the casing). Comply with the temperature and humidity limits specified in the manual in order to store the product correctly.
 - Under no circumstances is the device to be opened - the user does not require the internal components. Please contact qualified service personnel for any assistance.

- Prevent the device from being dropped, knocked or shaken as either can cause irreparable damage.
- Do not clean the device with corrosive chemical products, solvents or aggressive detergents.
- The device must not be used in applications that differ from that specified in the following material.



Separate the power supply of the device from the rest of the electrical devices connected inside the electrical panel. The secondary circuit of the transformer must never be connected to the earth.

1.2 PRODUCT DISPOSAL (WEEE)

With reference to Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 and to the relative national legislation, please note that:

- There lies the obligation not to dispose of electrical and electronic waste as municipal waste but to separate the waste.
- Public or private collection points must be used for disposal, in accordance with local laws. Furthermore, at the end of the product's life, it is also possible to return this to the retailer when a new purchase is made.
- This equipment may contain hazardous substances. Improper use or incorrect disposal can have adverse effects on human health and the environment.
- The symbol shown on the product or the package indicates that the product was placed on the market after 13th August 2005 and must be disposed of as separated waste.
- Should the product be disposed of incorrectly, sanctions may be applied as stipulated in applicable local regulations regarding waste disposal.

2. COMPATIBILITY OF USE

2.1 MAIN FEATURES

XEV20D is a **bipolar** or **unipolar** motorized driver (Stepper) for electronic expansion valves. This driver is developed for use in combination with the **ISaGRAF®** environment and programmable devices in the **iPRO series**.

The main features are:

- controlling one or two electronic expansion valves:
- compatibility with various valve models
- compatibility with various types of refrigerant
- manual adjustment (PID) or self-adaptive overheating
- 4 analogue inputs
- Can Bus for ipro connection



In case of 2 expansion valves they **MUST HAVE** the same STEP RATE.

2.2 CONNECTIONS / INSTALLATION

The devices must not be installed in environments where the following situations are present:

- Temperature and humidity out of the range stipulated in the instrument label. Frequent and sudden changes in temperature and/or humidity.
- Direct sunlight and weathering in general
- High mechanical stress (vibrations and/or impact)
- Sulphur and ammonia gas, smoke and salt spray that can cause corrosion and/or oxidation
- Presence of flammable or explosive gas
- Dust
- Devices that generate electromagnetic interference

Place the device inside the electrical panels, paying attention to the following:

- the distance between the device and the electrical power components
- the distance between the device and the power cables
- sufficient space for the cooling air

Always comply with the laws and regulations applicable in the country where the device is installed.

Always protect the device for it to always be accessible solely by authorized personnel.

In case of malfunctions, always contact the relative distributor for the device to be repaired.

3. GENERAL RULES

Comply with the following recommendations during the installation process in order to prevent the device from malfunctioning.

- Separate the signal cables from the power cables (it is recommended to use BELDEN 8772-type shielded cables).
- Separate the cables of the analogue inputs from those of the digital inputs and the serial line cables from the power cables (resistive as well as inductive), in order to prevent malfunction due to electromagnetic interference.
- Separate the power of the device from that of the other electrical components.
- Never connect the secondary of the supply transformer to the earth.
- The low voltage connections must have reinforced insulation.

4. INSTALLATION AND MAINTENANCE

XEV20D is a slave device, which means that it receives commands from another "master" device; in particular, instructions are given by an iPro controller through a CANBUS (10DIN version) or LAN (4DIN version) connection.

Operating parameters are sent by an iPro and then they are stored in a special retentive memory area inside the driver.

The necessary parameters for operation are:

This memory stores the values of the following parameters:

- 1) **valve type** (0= disabled valves; 1= both unipolar valves / 2= both bipolar valves and Wavemode type of command; 18 = both bipolar valves and Normal mode type of command)
- 2) **valve 1 step rate** (expressed in tens of ms 16-10000)
- 3) **valve 2 step rate** (expressed in tens of ms 16-10000)
- 4) **valve 1 maximum number of steps** (0-8500)
- 5) **valve 2 maximum number of steps** (0-8500)
- 6) **valve 1 movement current** (0-100 *10mA)
- 7) **valve 2 movement current** (0-100 *10mA)
- 8) **valve 1 maintenance current** (1-100 *10mA)
- 9) **valve 2 maintenance current** (1-100 *10mA)
- 10) **unipolar valve 1 configuration** (Current/ no current with valve in position – adjustment steps expressed in whole steps/half steps)
- 11) **unipolar valve 2 configuration** (Current/ no current with valve in position – adjustment steps expressed in whole steps/half steps)



Whenever the master device (iPro) tells the driver a new value for one of the aforementioned parameters, the driver itself proceeds with the complete closure of the valve.

The XEV20D drivers issued by Dixell are tested but not configured: this means that the parameters in the flash memory are set to a default value (specifically, the "valve type" parameter = 0).

4.1 VALVES CONNECTIONS TABLE

Read carefully the table below to learn how to connect valves produced by different OEMs:

4-WIRE VALVES (BIPOLAR)

Terminal number	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 – Common	----	----	----	----

5-WIRE VALVES (UNIPOLAR)

Terminal number	SPORLAN	SAGINOMIYA
4	ORANGE	ORANGE
2	RED	RED
3	YELLOW	YELLOW
1	BLACK	BLACK
5 – Common	GREY	GREY

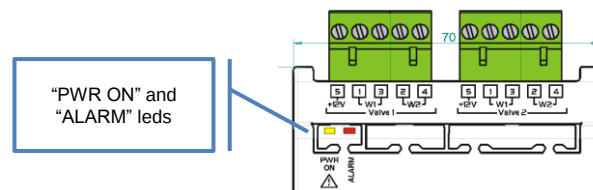
The maximum distance between a XEV valve driver and the valve **must not exceed 10 meters**; **shielded cables** with a section greater than or equal to 0.325 mm² (AWG22) must be used.

4.2 DRIVER POWER-ON

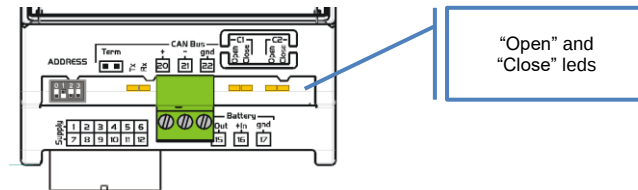
At power-on XEV20D reads the parameters in the flash memory.

At this point:

- If "valve type" = 0, no action is taken on the valve and both "PWR ON" and "ALARM" leds remain on steady.



- If "valve type" ≠ 0, the driver itself commands the complete closure of the valve. During this phase the "Close" led blinks.

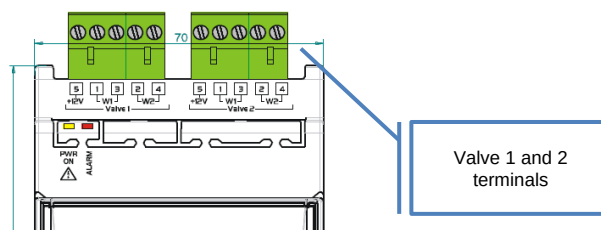


Once the valve has been closed (the "Close" led remains on steady), the driver waits to receive instructions from iPro.

4.3 IPRO+XEV20D TESTING PROCEDURE

During the first connection, the replacement of a valve body or the first test of a unit, it is necessary to follow the procedure below:

1. Disable any unit adjustment;
2. Cut off power to the whole unit;
3. Disconnect the connector dedicated to valve wiring.



4. In case the connection of the valve body involves the modification of its operating parameters, proceed as follows:
 - a. Power the unit, disconnecting the body valve from XEV20D.
 - b. Set the new parameters of the valve using the iPro application.
 - c. Remove power from the unit.
5. Connect the body valve to XEV20D driver.
6. Power the unit.



Valve wires must not be connected or disconnected, whenever the driver is powered. This action may damage the driver and the valve windings.

5. MAXIMUM POWERS ALLOWED

XEV20D can control a large variety of motorized valves. The table below shows the maximum current values that the valve windings can absorb. Select the transformer that is suitable for the application on the basis of that shown in the table. The type of DIXELL transformer to use is indicated for every operating mode.

NOTE: carefully read the technical manual supplied by the manufacturer of the valve body before using the driver in order to prevent changing the data provided by the manufacturers of the valves, and verify that the required currents are lower than those shown in the table below in order to prevent damaging the control module.

TYPE OF VALVE	CONFIGURATION	
	ONE VALVE	TWO VALVES
	Entire step	Entire step
BIPOLAR Valves (4 wires)	Current 0.9A max → TF20D	Current 0.9A max per valve → TF40D
UNIPOLAR valves (5-6 wires)	Current 0.33A max → TF20D	Current 0.33A max per valve → TF20D

6. SPECIFICATIONS

6.1 ANALOGUE INPUTS

Number of inputs:	4
Type of analogue input: (configurable via software parameter)	Inputs 1 and 2: NTC (-50T110°C; 10KΩ at 25°C) PTC (-55T115°C; 990Ω at 25°C) PT1000 (-50T100°C; 1K Ω at 0°C) Inputs 3 and 4: NTC (-50T110°C; 10KΩ at 25°C) PTC (-55T115°C; 990Ω at 25°C) PT1000 (-50T100°C; 1K Ω at 0°C) In voltage: 0 to 5V (input resistance 3.7KΩ) In current: 4 to 20 mA (input resistance 100Ω)
Precision (at 25°C):	NTC, PTC, PT1000: ±1°C 0-5V: ±100mV 4-20mA ±0.30mA
Measurement and adjustment field:	-50°C ÷ 110°C (-58 °F ÷ 230°F) NTC probe -50°C ÷ 150°C (32 °F ÷ 302°F) PTC probe -50°C ÷ 100°C (32 °F ÷ 212°F) PT1000 probe -0 bar ÷ 50 bar (0 psi ÷ 302 psi) pressure probe
Resolution	0.1 °C 1 °F 0.1 bar

6.2 DIGITAL INPUTS

Digital inputs can be configured via software as digital inputs:

Type: (configurable via software parameter)	Non opto-insulated potential free contact Max cable length 10m
Number of inputs:	4
Notes:	Do not use live contacts in order to prevent the instrument from being damaged.

6.3 ELECTRICAL SPECIFICATIONS

Power Supply:	24Vac/dc -10% ÷ 10%, 50/60Hz
Consumption:	Max. 10VA
Connectors:	Molex connectors with wiring for low voltage (power supply, probes, digital inputs, analogue outputs) STELVIO quick coupling screw connectors for low voltage (LAN) STELVIO quick coupling screw connectors for relay outputs (250Vac, 6A max)

6.4 PLASTIC CONTAINER

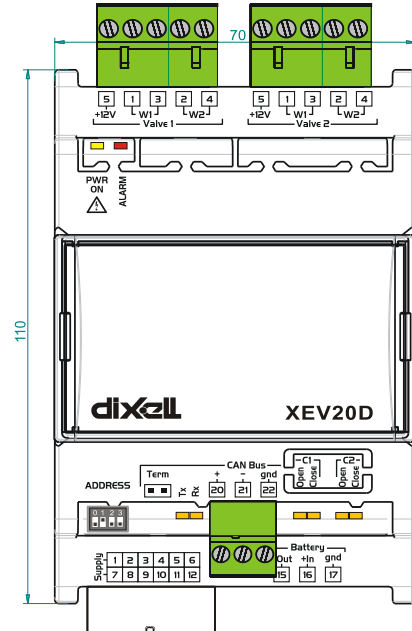
Assembly:	On a DIN rail (EN 50022, DIN 43880) Fastened with screws via the removable plastic flaps.
Material:	PC-ABS Thermoplastic
Self-extinguishing:	V0 (UL94)
Comparative Tracking Index (CTI):	300V
Colour:	Black
Frontal protection:	IP20

6.5 OPERATING CONDITIONS

Operating temperature:	-10°C ÷ 60°C
Storage temperature:	-30°C ÷ 85°C
Relative humidity:	20% ÷ 85%

EMC

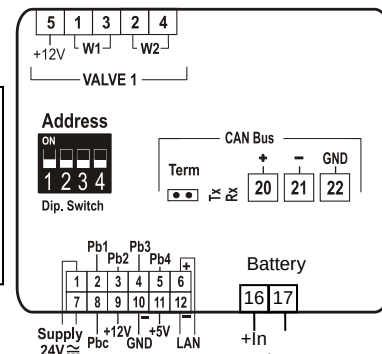
7. WIRING DIAGRAMS



7.1 VERSION FOR ONE VALVE

If the power supply is Vdc, follow the polarity as shown below:

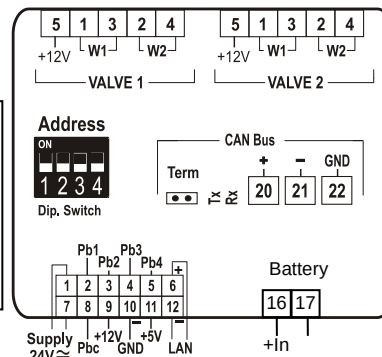
Pin 1 = +
Pin 7 = -



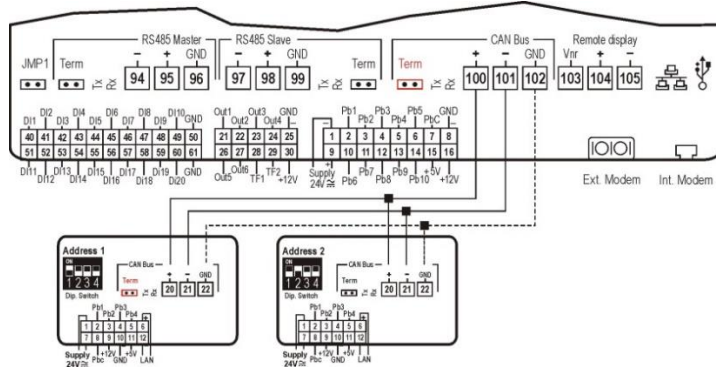
7.2 VERSION FOR TWO VALVES

If the power supply is Vdc, follow the polarity as shown below:

Pin 1 = +
Pin 7 = -



7.3 CONNECTION TO IPRO

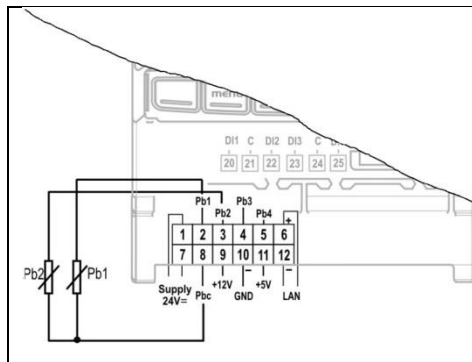


7.4 CONNECTION TO ANALOGUE INPUTS

7.4.1 Temperature probes (NTC and PTC)

2-row sensors that do not require polarity to be respected.

Each sensor must be connected through one of the inputs (from Pb1 to Pb10) and the common (PbC) as shown in the diagram below.



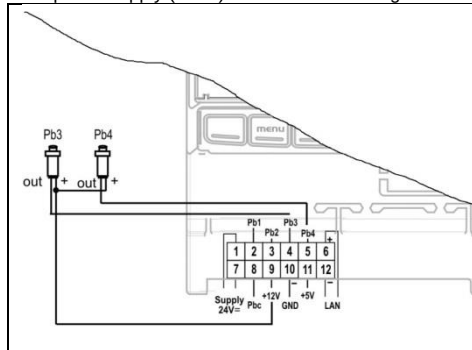
Recommendations:

- follow the diagram of the device used, for the numbering.
- the configuration is determined by the application.
- if used as a digital input (potential free - not live), use the same connection configuration as of the sensors.

7.4.2 Pressure transducers and current probes (4 - 20 mA)

2-row sensors that require +12Vdc power supply.

Each sensor must be connected through one of the inputs (from Pb1 to Pb10) and the power supply (+12V) as shown in the diagram below.

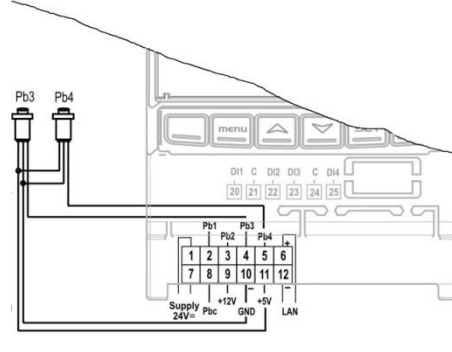


Recommendations:

- follow the diagram of the device used, for the numbering.
- the configuration is determined by the application.

7.4.3 Pressure transducers and ratiometric pressure transducers (0 - 5V)

3-row sensors that require +5Vdc power supply.



Recommendations:

- follow the diagram of the device used, for the numbering.
- the configuration is determined by the application.

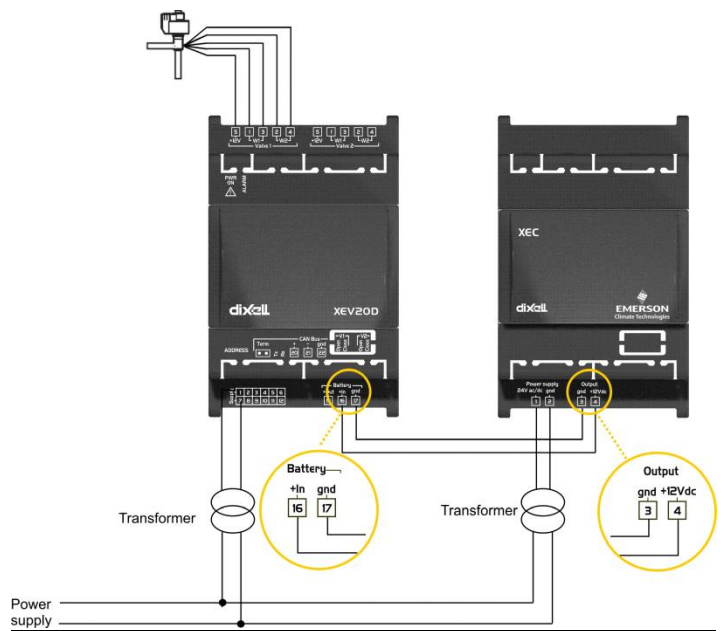
8. CONNECTION TO XEC SUPERCAP

The XEC device and the XEV20D driver must be powered by two different transformers; failure to observe this warning can cause damage to the XEC device or to the XEV20D driver.

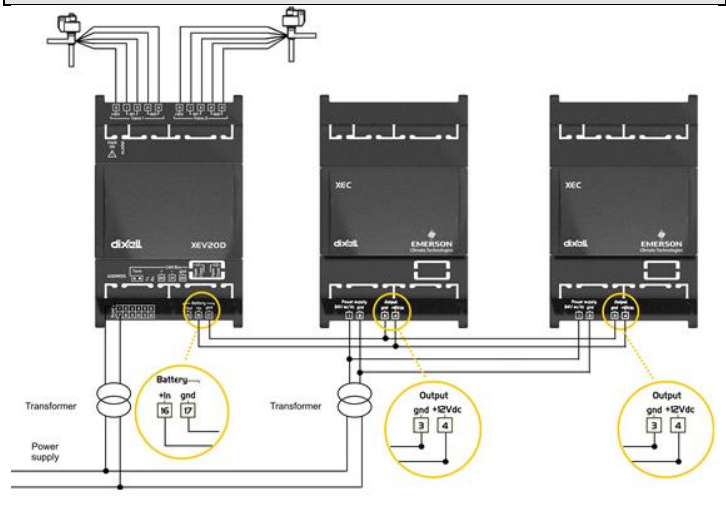
With a connection to the XEV20D driver, to control two electronic expansion valves, two XEC modules must be used.

For both XEC modules, observe the correct power supply connection sequence (connectors 1 of the XEC modules connected to the same pole of the transformer, connectors 2 of the XEC modules connected to the other pole of the transformer).

8.1 CONNECTION TO THE XEV20D DRIVER WITH JUST ONE CONNECTED VALVE

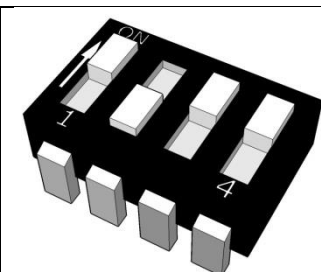
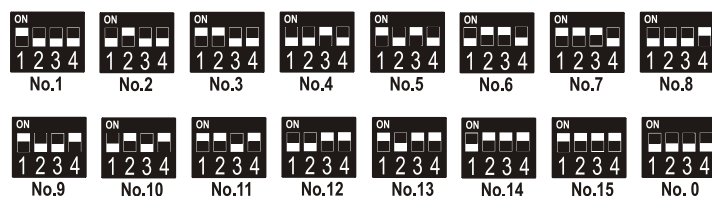


8.2 CONNECTION TO THE XEV20D DRIVER WITH TWO CONNECTED VALVES



9. SERIAL -- CAN BUS LINE

The device can communicate via CAN Bus serial only once an appropriate module address has been set. The address is set by the dip-switch, named **Address**, according to the following drawing:



The address is set in binary mode. Each selector has an increasing weight, in the figure the set address is:

$$1 \times 1 = 1$$

$$2 \times 0 = 0$$

$$4 \times 1 = 4$$

$$8 \times 1 = 8$$

$$\rightarrow 1+4+8=13$$

NOTE: To set properly the ISaGRAF® software, refer to the documentation on <https://www.ipro.academy> website.

10. MEANING OF THE LED LIGHTS

The following table illustrates LED light operation.

LED	MODE	MEANING
PWR ON	On	The instrument is powered correctly
ALARM	On	There is an alarm
TX/RX	Blinking	CAN Bus or LAN activity, communication enabled
TX/RX	On	No link
OPEN V1	Blinking	Valve 1 in opening mode
OPEN V1	On	Valve 1 fully open
CLOSE V1	Blinking	Valve 1 in closing mode
CLOSE V1	On	Valve 1 fully closed
OPEN V2	Blinking	Valve 2 in opening mode
OPEN V2	On	Valve 2 fully open
CLOSE V2	Blinking	Valve 2 in closing mode
CLOSE V2	On	Valve 2 fully closed