IEV: drivers for the control of electronic expansion valves

Dixell presents new IEV drivers designed for the control of the unipolar and bipolar motorized expansion valves.

The IEV controller family enables optimal control of the unit from superheating, ensuring maximum machine performance in all operating conditions, and thus helping to improve energy efficiency. The driver is available as IEV22D and IEV24D models for the control of one or two expansion valves and, using a proper configuration, you can set the operation in stand-alone mode or in combination with IC200 EVO series; select the valve model and set the main operating parameters (PID control, set point value of MOP, LOP...).
1 MAIN APPLICATIONS

The IEV driver is used for air conditioning in all those applications where it is necessary to control the superheat of the refrigerant. Thanks to the two available models it can be used for chillers or heat pumps:

- single circuit with two-way valve (IEV22D);
- single circuit with mono-directional valves, one for the cooling mode and one for the heating mode (IEV24D);
- bi-circuits with two-way valves (IEV24D).

1.1 EXAMPLE: MONO-CIRCUIT APPLICATION WITH STAND-ALONE OPERATION
1.2 EXAMPLE: BI-CIRCUIT APPLICATION WITH IC200 EVO SERIES
2 MAIN FEATURES

2.1 FLEXIBILITY
The IEV valve driver can be used in a stand-alone operation or in combination with an IC200 EVO series parametric controller. The stand-alone mode allows its use in existing applications, in case of replacement of the driver or system retrofit.

The digital inputs can enable regulation and the selection of the summer or winter operation mode, allowing the driver to work even if there’s no serial connection with the controller of the chiller or of the heat pump.

If used in combination with IC200 EVO (via LAN), the system management is complete thanks to the possibility to adjust the unit and to control the superheat; in this way the total synchronism between the two devices is guaranteed, in case of ordinary operations, or of alarm or critical situations. In addition, this configuration requires a single pressure transducer, shared among unit settings (ventilation control, defrost, low pressure alarm) and superheat calculation.

2.2 USER INTERFACE
The double-digit display lets you see the superheat value and the percentage of valve opening (the user can choose the kind of data to display via appropriate parameters); it is also possible to read, via menu navigation, all the main operating data such as: evaporation temperature, superheated gas temperature, evaporation pressure, superheat set point, percentage valve opening, manual or auto-adaptive operation, in addition to all alarm messages or critical operation warnings.
In systems requiring the use of IC200 EVO, connected both to IEV and to Visograph 2.0 terminal, the data concerning the functioning of the driver can be viewed in a full and detailed way on Visograph interface.

2.3 HIGH COMPATIBILITY WITH MAJOR REFRIGERANTS

The selection of the gas used in the system is enabled via an appropriate parameter; the user can choose among the main gases for air conditioning applications; for example: **R407c**, **R410a**, **R1234ZE** and **CO₂**, gas used more and more frequently in the low environmental impact systems.

2.4 VALVE COMPATIBILITY

The IEV valve driver can handle **unipolar or bipolar valves**; a dedicated parameter allows the user to select a specific model of valve, to which its operating parameters are automatically associated. Among the pre-configured valves there are some **models from the leading manufacturers**; in case a valve is not available in pre-configuration, it is still possible to manually set the proper parameters.
2.5 SUPERCAP

The IEV valve driver can be connected to the XEC Supercap module to enable the closing of the valve in case of power failure, thus preventing the migration of liquid from the condenser to the evaporator; this would damage the compressor at its restart.

The use of the Supercap module allows to remove the solenoid valve from the liquid line.

2.6 FUNCTIONALITY

2.6.1 PID OR AUTOADAPTIVE CONTROL

Two different control types are available: manual PID or auto-adaptive.

The manual PID adjustment, which needs the setting of the PID control parameters by the user, allows to adapt and refine the adjustment according to the features of the plant, even if perturbed by variations in the operating conditions (for example pump heat with defrosting).

The auto-adaptive control does not require the setting of PID parameters as it is automatically calculated by the driver; this adjustment can be used on systems where the working conditions are stable, a situation that allows the driver to find the optimal value for the adjustment parameters.
2.6.2 PID PARAMETERS FOR SUMMER OR WINTER ADJUSTMENT
The IEV valve driver allows to adjust the parameters of the PID control, for both summer and winter settings. This distinction ensures greater control accuracy regardless of the working mode.

2.6.3 HIGH AND LOW SUPERHEATING CONTROL, MOP AND LOP
The driver, in addition to superheat control, in case of critical operation due to high superheating, low superheating, MOP or LOP, enables the controls necessary for the restoration of optimal regulation conditions.

2.6.4 ALARM RELAY
The driver has two relays for alarm signaling or, through appropriate configuration of the parameters, for the critical operating situations (MOP, LOP, high and low superheating).

2.6.5 SERIAL CONNECTION
The RS485 serial connection allows to connect the IEV driver to a PC for parameters programming through Wizmate software or to the XWEB monitoring system.

3 TECHNICAL DATA

| Housing: | self extinguishing ABS |
| Connections: | Wiring harness for power supply, inputs and outputs. Removable screw terminals for valve outputs and relays, for digital inputs, for the RS485 connection. |
| Power consumption: | max 20VA with 1 valve  
max 40VA with 2 valves |
| Data storing: | on the non-volatile memory (EEPROM) |
| Kind of action: | 1B |
| Software class: | A |
| Operating temperature: | -10+55°C |
| Storage temperature: | -30+85°C |
| Relative humidity: | 20+85% no condensing |
Drivers for the control of stepper electronic expansion valves

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IEV22D | IEV24D
---|---
Valves N° | 1 | 2
Display | double | double
Power supply | 24Vac/dc (from TF20D transformer) | 24Vac/dc (from TF40D transformer)
Configurable probe inputs | 4÷20mA/0÷5V PT1000/NTC | 4÷20mA/0÷5V PT1000/NTC
Configurable digital inputs | 4 Free contacts | 4 Free contacts
Relais outputs | 2 (24V 0.5A) | 2 (24V 0.5A)
Other outputs | TTL RS485 LAN | TTL RS485 LAN

3.1 DIMENSIONS

![Dimension Diagram]
3.2 WIRING CONNECTION

3.2.1 IEV22/24D
3.2.2  EXAMPLE OF CONNECTION WITH IC200 EVO

3.3  ACCESSORIES

**XEC:** Supercap module for the closing of the valve in case of power failure
Drivers for the control of stepper electronic expansion valves

| **DWXEV30:** wiring for IEV (3m) |
| **HOT-KEY:** programming hot-key |
| **WIZMATE PROG-TOOL-KIT:** tool that allows you to quickly and easily change the parameters of the instrument by using WIZMATE software. |
| • reading and writing of the controller parameters |
| • storage for maps |
| • exportation of maps in excel format |
| • comparison among two or more maps |
| **XJ485USB-KIT:** USB to RS485 (2-wire) converter that allows to monitor one or more controllers networked to a computer by an USB port (through software WIZMATE) |
| **TF20D:** transformer with 20 VA output, available in versions: 230/24 Vac and 110/24Vac |
| **TF40D:** transformer with 40 VA output, available in versions: 230/24Vac e 110/24Vac |
| **Probes:** a complete set of probes and transducers is available. Dixell guarantees to end user the right degree of accuracy and the more appropriate response time to each situation. |
3.4 SUPERVISION
XWEB EVO is the family for the control and supervision systems by Dixell that guarantees the ability to remotely monitor the IEV22/24D and, consequently, the machine through the analysis of superheating.

4 HOW to ORDER
IEV2 _ D –1 B C D 0

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<thead>
<tr>
<th>B</th>
<th>C</th>
<th>D</th>
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<tbody>
<tr>
<td>P</td>
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<tr>
<td>N</td>
<td>NTC</td>
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Temperature probe | Pressure probe | Measurement unit
-----|---------------|---------------
P  | 0+5V         | °C/bar
N  | 4+20mA       | °F/PSI

5 PRICES
Contact our sales department for prices.

6 AVAILABILITY and ORDERS
All models will be available with standard delivery time.