



IPR215D

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1. GENERAL SPECIFICATIONS

The Dixell programmable controllers are all powered at 24Vac/dc and use a high speed performance 32-bit microprocessor.

One of the features that distinguish the iPRO controllers is the vast range of connection options with external devices, Dixell as well as other brands. CANBus, RS485 Master and Slave, and an Ethernet and USB port provide maximum flexibility of integration with the outside world. ModBUS-RTU protocol, one of the most popular in the world, is used for serial communication. Up to 80 MB of flash memory are entirely available to the user, according to the model. All the Outputs and outputs are fully configurable.

1.1 APPLICATIONS

The IPRORACK series are thought to manage both compressors and fans in a condensing system such as a pack.

The compressors can be simple, multistage or with inverters.

Control is done with neutral zone or proportional band and is based on the pressure or temperature sensed in the LP suction (compressors) and HP (condenser) circuits. A special algorithm balances the run hours of the compressors to distribute the work load uniformly.

The front panel offers complete information on the system's status by displaying the suction and condenser pressure (temperatures), the status of the loads, possible alarms or maintenance conditions.

Each load has up to 3 alarm Outputs that are able to stop it when activated. To guarantee the total system's safety, there are also two Outputs for low and high pressure switches.

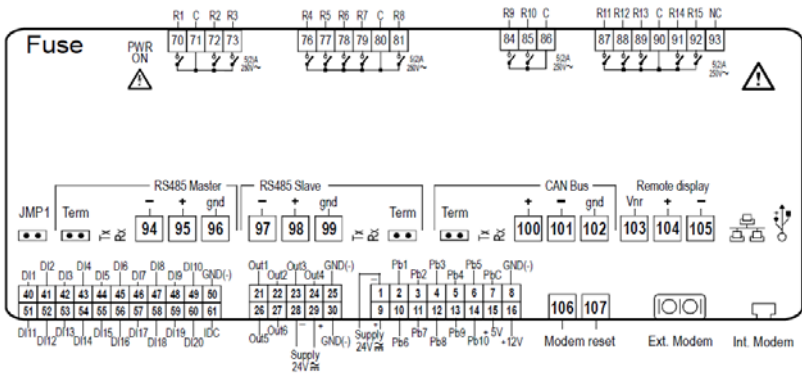
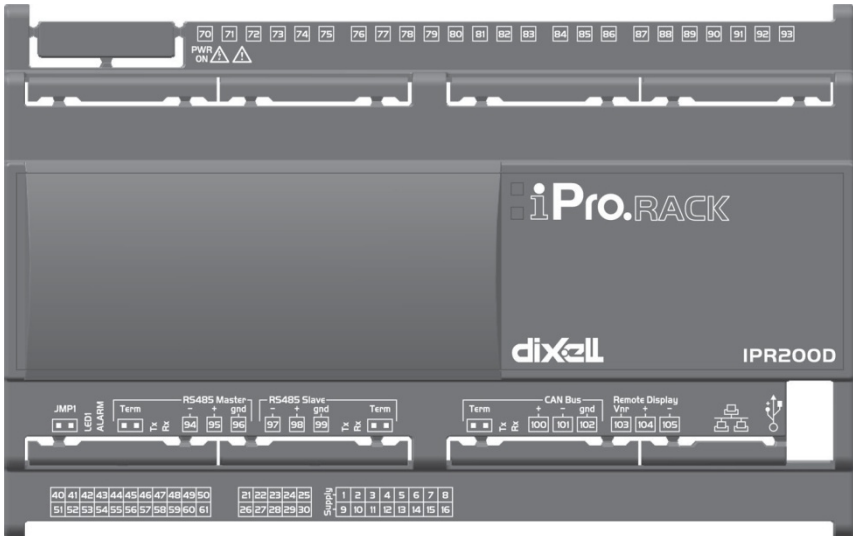
The same applications can be downloaded in the various models available (obviously adapting the number of Outputs and outputs).

1.2 HARDWARE ARCHITECTURE













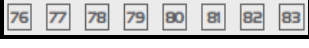
The iPRO programmable controller is structured as follows:









- 32-bit microprocessor used to run the application
- Bayonet connectors (Phoenix)
- The programme and parameters are stored in a permanent flash memory. No data is lost in case of power failure.
- Ethernet port.
- USB port.
- Connection to the dedicated remote LCD display.
- CANBus.
- RS485 Master.
- RS485 Slave.

1.3 IPR215D



1.4 Description of the connections

| Connector | Description |
|---|--|
|  | Connector for 24Vac/dc power supply Analogue inputs (Pb1 - Pb10, PbC) Additional power (+5Vdc, +12Vdc, GND) |
|  | Opto-insulated analogue outputs (Out1 - Out6, GND) 24Vac/dc power supply for the opto-insulated analogue output |
|  | Potential free opto-insulated digital inputs (DI1 - DI20, DIC) Opto-insulated 24Vac/dc digital inputs (DI1 - DI20, GND) |
|  | USB port for downloads (BIOS, ISaGRAF® application, maps of parameters, remote display applications, network configuration, website) and uploads (log files) |
|  | TCP/IP Ethernet port |
|  | Connector for remote terminal (VISOGRAPH), maximum 2 terminals per iPRO. |
|  | NOT USED |
|  | RS485 Slave connector for connection to monitoring system. Rx and Tx LED to indicate that communication is active Closed circuit terminal (Term) |
|  | RS485 Master connector for connection to Coresense Rx and Tx LED to indicate that communication is active Closed circuit terminal (Term) |
|  | Digital relay outputs (for digital outputs with potential free contacts) 3 NO relays, 1 common |
|  | Digital relay outputs (for digital outputs with live contacts) 3 NO relays, 1 common and 2 potential free (Neutral) |
|  | Digital relay outputs (for digital outputs with potential free contacts) 5 NO relays, 1 common |
|  | Digital relay outputs (for digital outputs with live contacts) 5 NO relays, 1 common and 2 potential free (Neutral) |

| Connector | Description |
|---|--|
|  | Digital relay outputs 2 NO relays, 1 common |
|  | Digital relay outputs (only for 215D versions) 5 NO relays, 1 common and 1 potential free (Neutral) |
|  | Green LED to indicate the presence of power |
|  | Jumper to activate the RESCUE MODE |
|  | Yellow status LEDs (LED1) and red LED (ALARM) See relative paragraph |
|  | NOT USED |
|  | NOT USED |
|  | NOT USED |

1.4.1 Description of the inputs and outputs

| Input No. | Type of Input | Description |
|-----------|---------------|---|
| 1 | Supply | Reference “-“/GND power (24Vac or 24Vdc) |
| 2 | Pb1 | Configurable analogue input 1 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 3 | Pb2 | Configurable analogue input 2 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 4 | Pb3 | Configurable analogue input 3 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 5 | Pb4 | Configurable analogue input 4 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 6 | Pb5 | Configurable analogue input 5 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 7 | PbC | Common analogue inputs (NTC, PTC, DI) |
| 8 | GND(-) | Additional power reference 5Vdc and 12Vdc and analogue inputs (0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V) |
| 9 | Supply | Reference “+“ power supply (24Vac or 24Vdc) |
| 10 | Pb6 | Configurable analogue input 6 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |

| Input No. | Type of Input | Description |
|-----------|---------------|--|
| 11 | Pb7 | Configurable analogue input 7 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 12 | Pb8 | Configurable analogue input 8 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 13 | Pb9 | Configurable analogue input 9 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 14 | Pb10 | Configurable analogue input 10 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 15 | +5V | Additional power +5Vdc |
| 16 | +12V | Additional power +12Vdc |
| 21 | Out1 | Opto-insulated analogue output 1 0 - 10V |
| 22 | Out2 | Opto-insulated analogue output 2 0 - 10V |
| 23 | Out3 | Opto-insulated analogue output 3 0 - 10V |
| 24 | Out4 | Opto-insulated analogue output 4 0 - 10V |
| 25 | GND(-) | Common opto-insulated analogue output |
| 26 | Out5 | Analogue output 5 0 - 10V, 4 - 20mA, Opto-insulated relay |
| 27 | Out6 | Analogue output 6 0 - 10V, 4 - 20mA, Opto-insulated relay |
| 28 | Supply | Power for opto-insulated analogue outputs at 24Vac or 24Vdc(-) |
| 29 | Supply | Power for opto-insulated analogue outputs at 24Vac or 24Vdc(+) |
| 30 | GND(-) | Common opto-insulated analogue output |
| 40 | DI1 | Opto-insulated digital input 1 |
| 41 | DI2 | Opto-insulated digital input 2 |
| 42 | DI3 | Opto-insulated digital input 3 |
| 43 | DI4 | Opto-insulated digital input 4 |
| 44 | DI5 | Opto-insulated digital input 5 |
| 45 | DI6 | Opto-insulated digital input 6 |
| 46 | DI7 | Opto-insulated digital input 7 |
| 47 | DI8 | Opto-insulated digital input 8 |
| 48 | DI9 | Opto-insulated digital input 9 |
| 49 | DI10 | Opto-insulated digital input 10 |
| 50 | GND(-) | Reference “-“ for opto-insulated digital inputs 1 to 20 (if inputs 24Vac or 24Vdc) |
| 51 | DI11 | Opto-insulated digital input 11 |
| 52 | DI12 | Opto-insulated digital input 12 |
| 53 | DI13 | Opto-insulated digital input 13 |

| Input No. | Type of Input | Description |
|-----------|---------------|---|
| 54 | DI14 | Opto-insulated digital input 14 |
| 55 | DI15 | Opto-insulated digital input 15 |
| 56 | DI16 | Opto-insulated digital input 16 |
| 57 | DI17 | Opto-insulated digital input 17 |
| 58 | DI18 | Opto-insulated digital input 18 |
| 59 | DI19 | Opto-insulated digital input 19 |
| 60 | DI20 | Opto-insulated digital input 20 |
| 61 | IDC | Common opto-insulated digital inputs 1 to 20 (if potential free inputs) |
| 70 | RL1 | Relay 1 normally open contact |
| 71 | C | Common relays 1, 2 and 3 (MAX 6A) |
| 72 | RL2 | Relay 2 normally open contact |
| 73 | RL3 | Relay 3 normally open contact |
| 74 | C | Potential free contact (MAX 6A) |
| 75 | C | Potential free contact (MAX 6A) |
| 76 | RL4 | Relay 4 normally open contact |
| 77 | RL5 | Relay 5 normally open contact |
| 78 | RL6 | Relay 6 normally open contact |
| 79 | RL7 | Relay 7 normally open contact |
| 80 | C | Common relays 4, 5, 6, 7 and 8 (MAX 6A) |
| 81 | RL8 | Relay 8 normally open contact |
| 82 | C | Potential free contact (MAX 6A) |
| 83 | C | Potential free contact (MAX 6A) |
| 84 | RL9 | Relay 9 normally open contact |
| 85 | RL10 | Relay 10 normally open contact |
| 86 | C | Common relays 9 and 10 (MAX 6A) |
| 87 | RL11 | Relay 11 normally open contact |
| 88 | RL12 | Relay 12 normally open contact |
| 89 | RL13 | Relay 13 normally open contact |
| 90 | C | Common relays 11, 12, 13, 14 and 15 (MAX 6A) |
| 91 | RL14 | Relay 14 normally open contact |
| 92 | RL15 | Relay 15 normally open contact |
| 93 | C | Potential free contact (MAX 6A) |

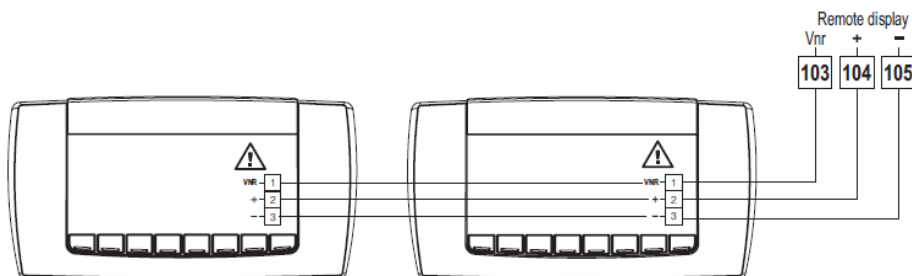
| Input No. | Type of Input | Description |
|-----------|----------------|--|
| 94 | RS485 Master | RS485 Master connection (-) |
| 95 | RS485 Master | RS485 Master connection (+) |
| 96 | RS485 Master | RS485 Master connection (insulated gnd) |
| 97 | RS485 Slave | RS485 Slave connection (-) |
| 98 | RS485 Slave | RS485 Slave connection (+) |
| 99 | RS485 Slave | RS485 Slave connection (insulated gnd) |
| 100 | CAN Bus | NOT USED |
| 101 | CAN Bus | NOT USED |
| 102 | CAN Bus | NOT USED |
| 103 | Remote Display | Connection for VISOGRAPH remote terminal (Vnr) |
| 104 | Remote Display | Connection for VISOGRAPH remote terminal (+) |
| 105 | Remote Display | Connection for VISOGRAPH remote terminal (-) |
| 106 | Modem Reset | NOT USED |
| 107 | Modem Reset | NOT USED |

1.5 Visograph Connections

The connection between the controller and the VISOGRAPH must be implemented using a BELDEN 8772 cable (3xAWG20).

Up to 2 remote displays can be connected for each controller of the IPG, IPC and IPD ranges. 1 remote display can be connected for the controllers of the IPS range.

The distance between the controller and the last display must be no more than 100 meters.

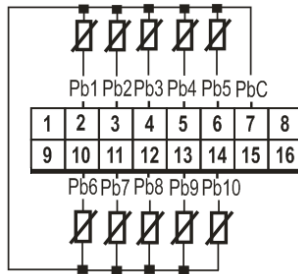


Be careful to comply with the polarity of the connections as any errors in the connection can damage the device.

1.5.1 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.



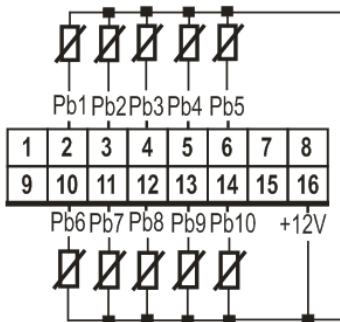
Recommendations:

- 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 of the sensors.

1.5.2 Pressure transducers and current probes (0 - 20mA, 4 - 20mA)

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.



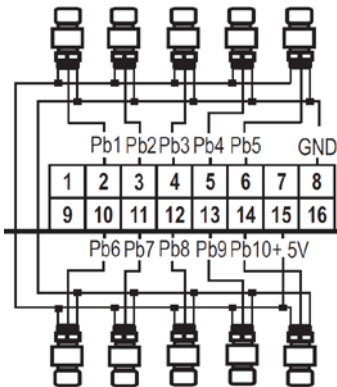
Recommendations:

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

1.5.3 Live probes and ratiometric pressure transducers (0 - 5V)

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

Each sensor must be connected through one of the inputs (from Pb1 to Pb10) and the power supply (+5V/GND) as shown in the diagram below.



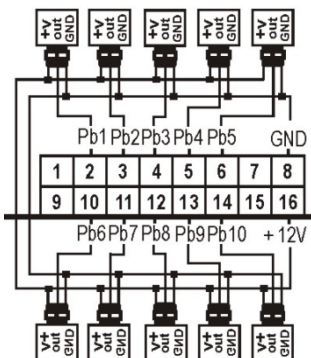
Recommendations:

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

1.5.4 Live probes (0 - 1V, 0 - 5V, 0 - 10V)

3-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/GND) as shown in the diagram below.



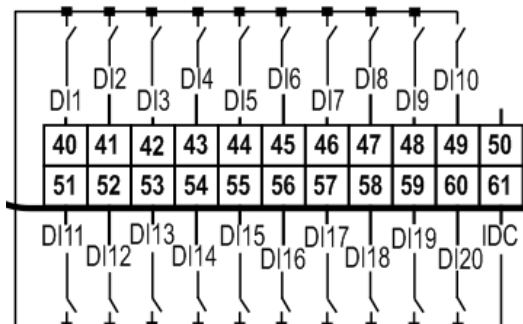
Recommendations:

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

1.6 CONNECTION OF THE DIGITAL INPUTS

The digital inputs in the programmable controllers and expansions are fully configurable. Depending on the model used, the digital inputs can be used as potential free or live (24Vac/dc) digital inputs.

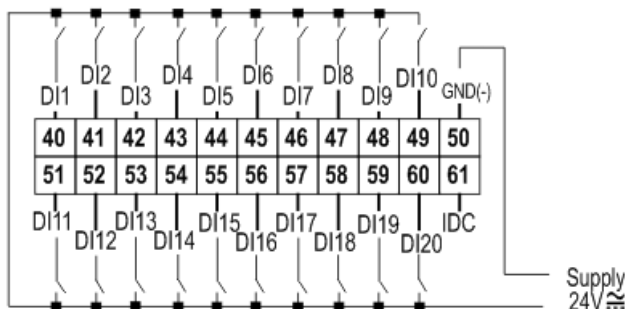
1.6.1 Potential-free digital inputs



Recommendations:

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

1.6.2 Live digital inputs (24Vac/dc)



Recommendations:

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

2. INTERFACE

2.1 VISOGRAPH

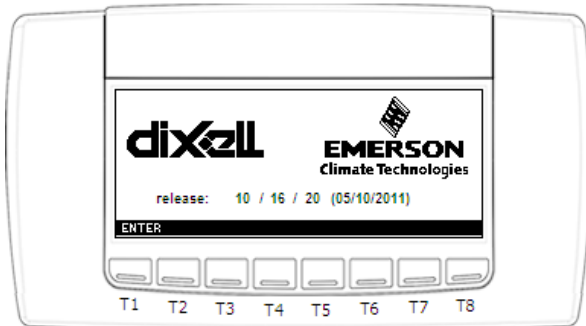
The iPRO programmable controllers allow a programmable remote LCD display (VISOGRAPH) to be connected. Through the VISOPROG processing environment, the display and buttons can be programmed as the user wishes. Text, icons and animated icons can be added to the LCD display. Functions can be associated to keys according to the operations to be implemented.



3. USER INTERFACE

3.1 What is displayed when the keyboard is connected

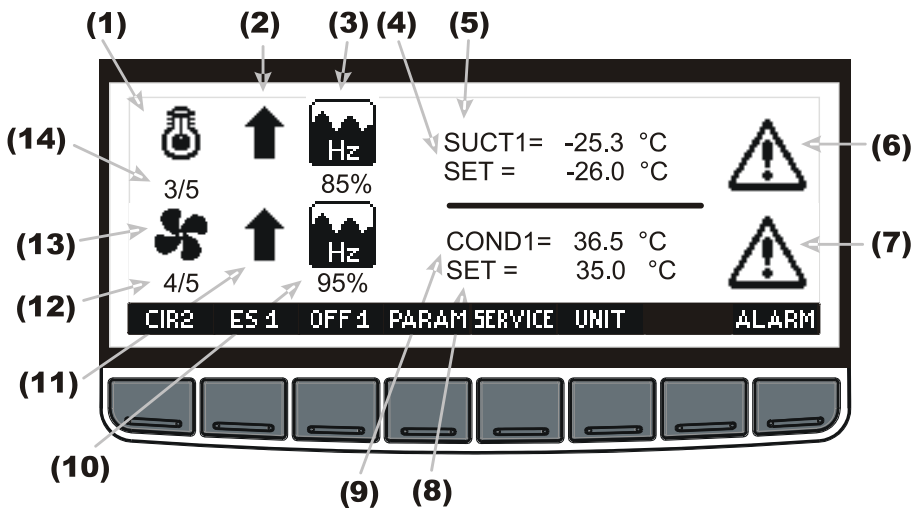
Push the ENTER key to enter the standard visualization



Where:

release: Rel Firmware iPRORack / release OS Visograph / release Program Visograph

3.2 Display visualization



(1) **Symbol of compressor:** it is present if a relay is configured as a compressor

(2) **Status of the suction section:**



The pressure (temperature) is below the regulation band and the capacity of the plant is decreasing



The pressure (temperature) is above the regulation band and the capacity of the plant is increasing

(3) **Analogue output status for frequency compressor:** it is present only if a frequency compressor is used. It displays the percentage of the analog output driving the inverter.

(4) **Suction pressure (temperature) set point::** it is present if a relay is configured as a compressor

(5) **Current value of suction pressure (temperature):** it is present if a relay is configured as a compressor

(6) **Alarm:** it is display when an alarm happens in suction section

(7) **Alarm:** it is display when an alarm happens in delivery section

(8) **Delivery pressure (temperature) set point:** it is present if a relay is configured as a fan

(9) **Current value of delivery pressure (temperature):** it is present if a relay is configured as a fan

(10) **Analog output status for inverter for fan:** it is present only if an inverter for fan is used. It displays the percentage of the analog output driving the inverter.

(11) **Status of the delivery section:**



The condenser pressure (temperature) is below the regulation band and the number of fans is decreasing



The condenser pressure (temperature) is above the regulation band and the number of fans is increasing

(12) **Number of fans activated / Total number of fans** it is present if a relay is configured as a fan

NOTE: the total number of fans is referred to the number of available fans. Fans that are in "maintenance" or that are stopped by their own digital Output aren't included.

(13) **Symbol of fan:** it is present if a relay is configured as a fan

(14) **Number of compressors and steps activated / Total number of compressors and steps.** it is present if a relay is configured as a compressor.

NOTE: the total number of compressors is referred to the number of available compressors. Compressors that are in "maintenance" or that are stopped by their own digital Output aren't included.

Keys



Alarm: to enter the alarm menu



Parameter: to enter the parameter programming

SERVICE

Service: to enter the Service menu

UNIT

Measurement unit: to switch the probe visualization and set point from pressure to temperature and vice versa

OFF 1

To switch the controller off: hold pushed for 10s to switch the controller off (it is enabled only if the parameter OT5 = yES)

ES 1

Energy saving: hold pushed for 10s to enable the energy saving cycle (the SET label starts flashing)

CIR2

Circuit 2: to pass to visualization of the variables of the second circuit, It is present if a relay is declared as compressor or fan of the second circuit

3.3 Parameters setup

Push the **PARAM** key and the programming menu is entered.

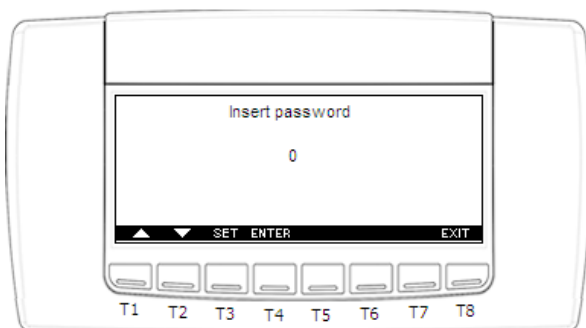
Parameters are collected in two menu:

Pr1: menu of parameters without password. Press the Pr1 key to enter.

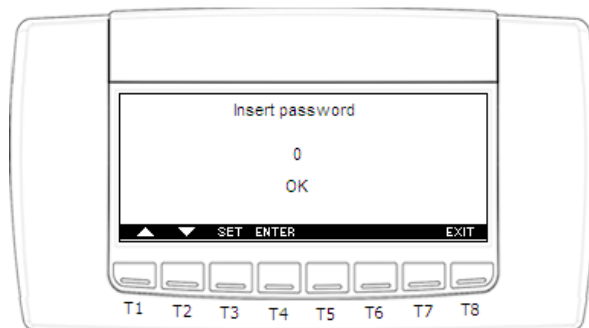
Pr2: menu of parameters with password. If the password is enabled, use the following procedure to put it.

3.3.1 Password introduction to enter Pr2

If the password is enabled, by pushing the **Pr2** key the following interface is displayed:



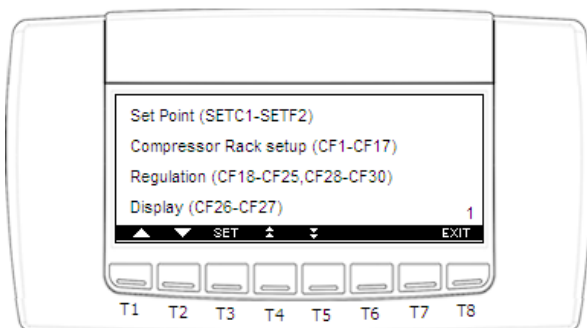
1. Push the SET key.
2. Use the UP and DOWN keys to set the password
3. Push the SET key to confirm it
4. The following message is displayed



5. Push the ENTER key to enter in Pr2 menu

3.3.2 Parameters grouping

The parameters are collected in sub-menu according to the following interface.



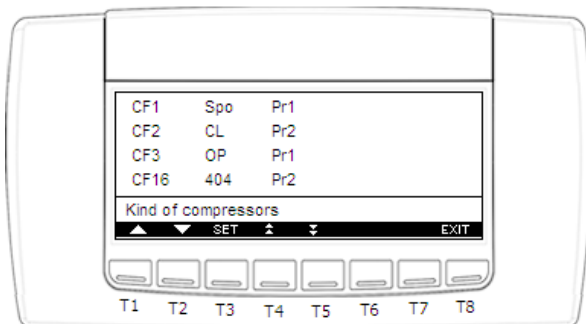
The parameters sub menu are the following:

| |
|--|
| Set Point (SETC1-SETF2) |
| Compressor Rack setup (CF1-CF3, CF16-CF17) |
| Regulation (CF18-CF25,CF28-CF30) |
| Display (CF26-CF27) |
| Analog Inputs – Probe adjustment (Ai1-Ai11) |
| Analog Inputs – Pressure probe set up (Ai12-Ai31) |
| Safety Digital Outputs (SD1-SD3) |
| Digital Inputs for liquid level (CDI1-CDI14) |
| Compressor Action (RC1-RC8) |
| Safety Compressors (SL1-SL11) |
| Fan Action (RC9-RC16) |
| Safety Fans(SL12-SL13) |
| Alarms Configuration (AC1-AC2) |
| Compressor Alarms (AL1-AL23) |
| Fan Alarms (AL24-AL40) |
| Energy Saving (HS1-HS14) |

| |
|---|
| Dynamic Setpoint Suction (DSP1- DSP8) |
| Dynamic Setpoint Condenser (DSP9-DSP14) |
| Analog Outputs 1 (AO1_1- AO1_24) |
| Analog Outputs 2 (AO2_1- AO1_24) |
| Analog Outputs 3 (AO3_1- AO3_24) |
| Analog Outputs 4 (AO4_1- AO4_24) |
| Analog Outputs 5 (AO5_1- AO5_24) |
| Analog Outputs 6 (AO6_1- AO6_24) |
| Auxiliary Outputs (AR1-AR12) |
| Superheat Alarms (ASH1- ASH16) |
| Other (OT1 – OT5) |
| Coresense configuration(CO1-CO17) |
| DIGITAL-INPUT CONFIGURATIONS (DIC1- DIC20) |
| DIGITAL-OUTPUT CONFIGURATIONS (DOC1- DOC15) |
| ANALOG-OUTPUT CONFIGURATIONS (AOC1- AOC6) |
| ANALOG-INPUTS CONFIGURATIONS (AIC1- AIC10) |

NOTE: some sub menu could be absent depending on the model.

Push the SET key to enter a menu and the parameter with their value will be displayed: see below picture.



Push the **SET** key and use the **UP** and **DOWN** keys to modify the value.

Then push the **SET** key to store the new value and move to the following parameter.

NOTE: the Pr2 or Pr1 message is present only in Pr2 menu.

It is possible to modify the level of each parameter changing Pr2 → Pr1 or vice versa.

NOTE: Pushing the **EXIT** button the initial screen shot is displayed.

4. SERVICE MENU

The service menu collect the main functions of the controller.

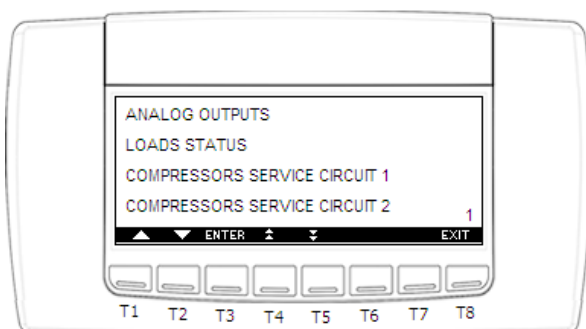
From the Service menu is possible to:

- see the values of analog outputs
- see the status of compressor relay
- operate a maintenance section
- see the status of safety and configurable digital Outputs

- see the values of the probes
- set the real time clock
- set the password and enable it for some menu
- set the instrument language.
- See the value of superheat probes.
- Configure IP/Modbus address
- Manage configure files
- See the parameters of Core Sense if Core Sense has been configured.
- Manage the log files.

4.1 How to enter the Service menu

From the main display screen push the SERVICE button and the SERVICE menu is entered.
See below picture:



The Service sub-menu are the following:

ANALOG OUTPUTS
 LOAD STATUS
 COMPRESSOR SERVICE CIRCUIT 1
 COMPRESSOR SERVICE CIRCUIT 2
 DIGITAL INPUTS
 PROBES
 SUPERHEAT (with function enabled)
 LANGUAGE
 REAL TIME CLOCK
 PASSWORD
 CONF FILE MANAGEMENT
 CORE SENSE SETUP
 CORE SENSE INFORMATION
 CONF IP/MDB ADDRESS
 LOG FILE MANAGEMENT

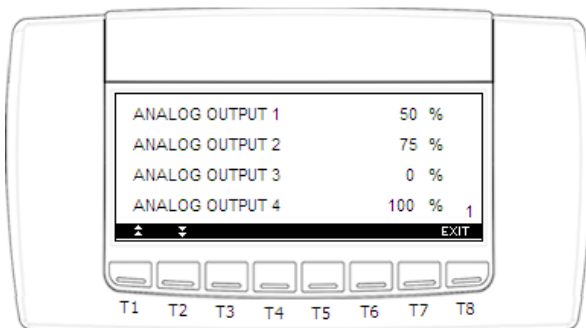
Select one of them with the UP or DOWN keys then push the SET key to enter the sub-menu

4.2 How to see the values of analog outputs

Procedure:

1. Enter the **SERVICE** menu
2. Select **ANALOG OUTPUTS** sub-menu
3. Push the **ENTER** key.

The **ANALOG OUTPUTS** sub-menu displays the status of the analog outputs of the controller, with the following layout:



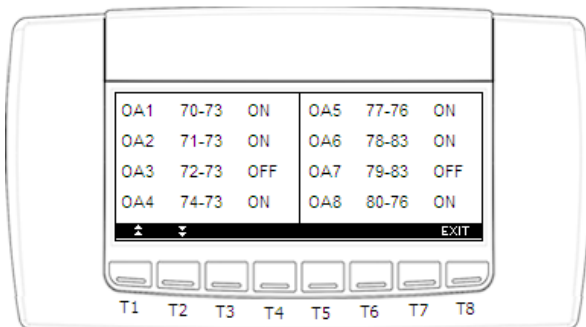
These outputs can be used to drive an external inverter or to repeat a main probe, by means of a signal 4-20mA or 0-10V.

4.3 How to see the status of the relays

Procedure:

1. Enter the **SERVICE** menu
2. Select **LOADS STATUS**
3. Push the **SET** key.

The **LOADS STATUS** sub-menu displays the status of the relays in the following format:



With this meaning:

First column: number of relay; second column: terminal blocks reference; third column: status.

4.4 COMPRESSOR SERVICE SUB- MENU – For maintenance sections

The COMPRESSOR SERVICE menu could be protected by password. See chapter 4.3.1.

By means of the **COMPRESSOR SERVICE** sub-menu is possible to perform a maintenance section, consisting on:

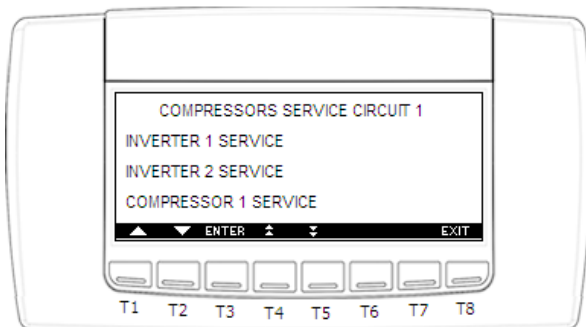
- disabled an output
- check and (eventually) erase the running hour of a load.

4.4.1 How to enter the “COMPRESSOR SERVICE” submenu.

Procedure:

1. Enter the **SERVICE** menu
2. Select **COMPRESSOR SERVICE CIRCUIT 1** sub-menu
3. Push the **SET** key.

The **COMPRESSOR SERVICE** sub-menu displays the status of the relays with the following layout:

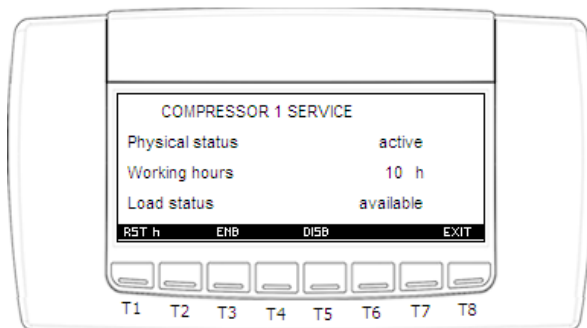


4.4.2 How to disabled/enabled an output during a maintenance section.

To disabled an output during a maintenance session means to exclude the output from the regulation:

To do it act as in the following

1. Enter the **COMPRESSOR SERVICE CIRCUIT 1** sub-menu, as described in the previous paragraph.
2. Select the load SUB-MENU by means of the UP and DOWN keys
3. Push the SET key, to enter the **COMPRESSOR 1 SERVICE** submenu



4. To enable a load for regulation or to disable it, push one of the following keys:
 - a. **ENB**: to enable the load for regulation
 - b. **DISB**: to disable the load for regulation

4.4.3 Regulation with some outputs disabled.

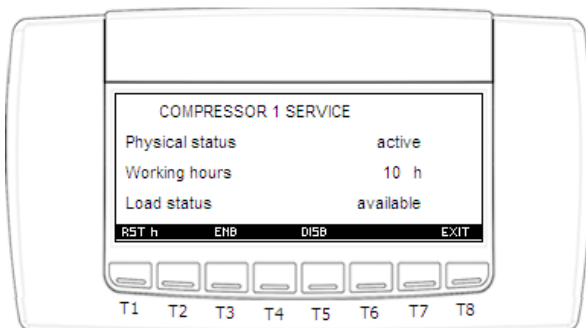
If some outputs are disabled they don't take part to the regulation, so the regulation goes on with the other outputs.

4.4.4 How to display the running hours of a load.

The controller memorises the running hours of each load.

To see how long a load has been working enter the **COMPRESSOR SERVICE CIRCUIT 1 OR 2** sub-menu and select the load **COMPRESSOR 1 SERVICE**.

The running hours are displayed with the following layout:



4.4.5 How to erase the running hours of a load

After a maintenance session, usually it is useful to erase the running hours of a load.

To do this you have to:

1. Enter the **COMPRESSOR SERVICE CIRCUIT 1** sub-menu, as described in the paragraph 5.4.1.
2. Select the load by means of the UP and DOWN keys.
3. Push the SET key,
4. Push the **RST h** to erase the running hours.

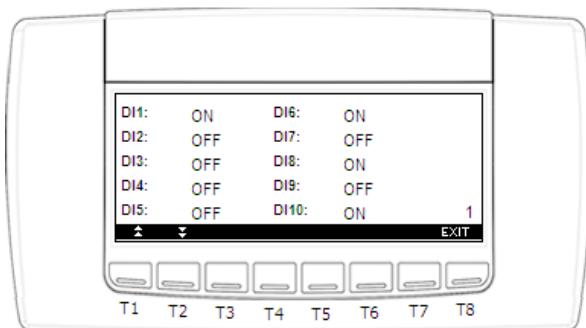
To exit: push the **EXIT** key to come back to the SERVICE menu.

4.5 How to see the status of digital Inputs

Procedure:

1. Enter the **SERVICE** menu
2. Select **DIGITAL OUTPUTS** sub-menu
3. Push the **SET** key.

The **DIGITAL OUTPUTS** sub-menu displays the status of the safety and configurable digital Outputs, with the following layout:

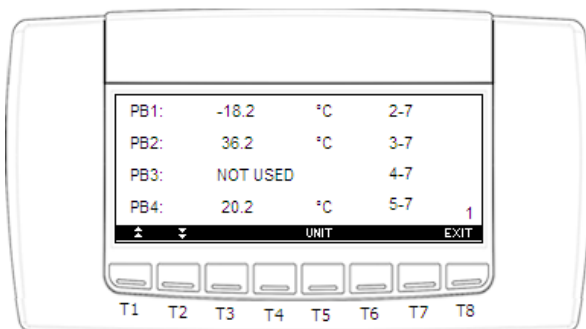


4.6 How to see the values of the probes

Procedure:

1. Enter the **SERVICE** menu
2. Select **PROBES** sub-menu
3. Push the **SET** key.

The **PROBES** sub-menu displays the probe values, with the following layout:



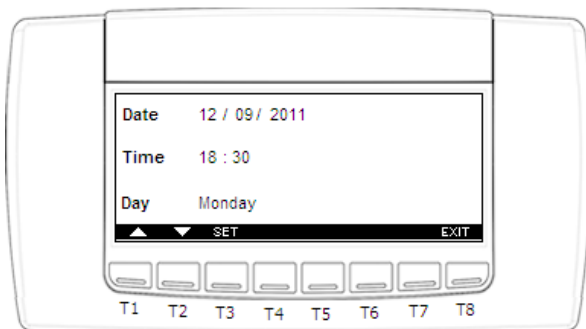
To **change** the measurement unit for the probe PB1, PB2, PB3, PB4, push **UNIT** button.

4.7 How to set time and date

Procedure:

1. Enter the **SERVICE** menu
2. Select **REAL TIME CLOCK** sub-menu
3. Push the **SET** key.
- 4.

The **REAL TIME CLOCK** sub-menu displays time and date, with the following layout:



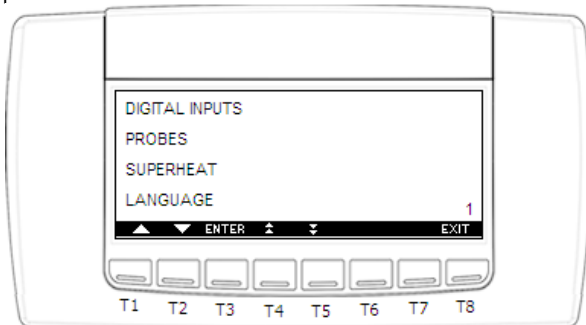
5. Set the day by means of the **UP** and **DOWN** keys.
6. Push the **SET** key, to confirm and pass to the setting of time.
7. Use the same procedure for the date.
8. Then confirm the selection by means of the SET key.

4.8 HOW TO CHECK THE SUPERHEAT VALUE

The probes can be configured to calculate superheat of the suction circuit 1 or 2.

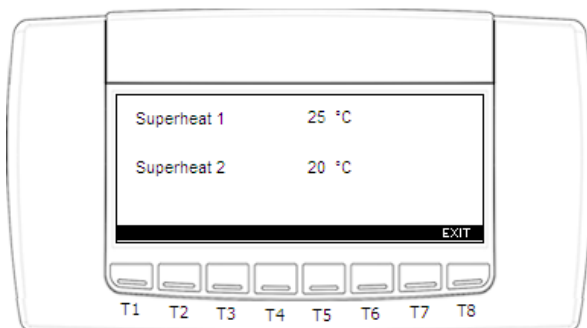
To do this, configure the probes in the conf.file, to calculate superheat for suction circuit 1 or 2.

To check the superheat value:



1. Open the **SERVICE** menu
2. Select **SUPERHEAT**
3. Press the **SET** button.

The superheat value is indicated in the **SUPERHEAT** sub-menu.

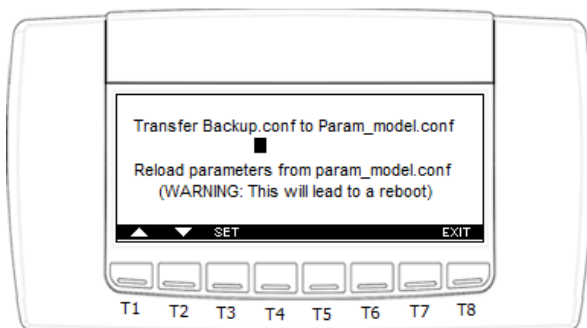


4.9 How to charge up the backup of the parameters

Procedure:

4. Enter the **SERVICE** menu
5. Select **CONF FILE MANAGEMENT** sub-menu
6. Push the **SET** key.

The **CONF FILE MANAGEMENT** sub-menu to transfer backup.conf file to Param_model.conf file, with the following layout:



When you push the **SET** key, transfer Backup.conf file to Param_model.conf file . The Iprorack will reboot and the parameters are reloaded from the Param_model.conf file.

4.10 Parameters files backup

Procedure:

1. Enter the **SERVICE** menu
2. Select "**CON FILE MANAGEMENT**" sub-menu
3. Push the **SET** key.

To **update the back up file** with the current parameter map:

1. Select the menu: **"Send parameters to Backup.conf file"**
2. Push the SET key

To **load on the iProRack the parameter memorised on the "Backup.conf"**:

1. Select the menu: **"Load parameters from Backup.conf file"**
2. Push the SET key

When you push the **SET** key, load parameters from Backup.conf file. The Iprorack will reboot and the parameters are reloaded from Backup.conf".

4.11 CONF IP/MDB ADDRESS

Inside this new sub-menu has to be possible to modify the IP address and the modbus address. Every time there is a new value it is require a reboot of Ipro. Inside the code it is necessary to use the FB IPRO_config.

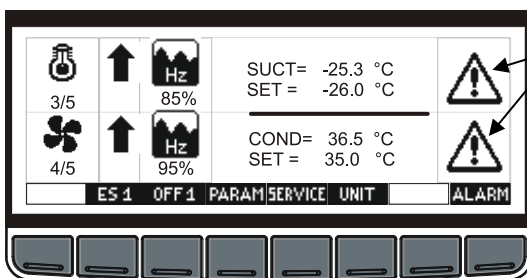
4.12 How to set the Coresense

See paragraph:16 CORESENSE INTEGRATION and 17 INFORMATION from the Coresense

5. ALARMS

The controller stores the last 100 alarms, together with the start and finish time. To see the alarms, follow the following procedure.

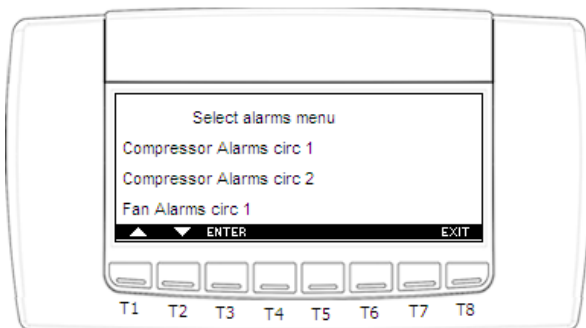
5.1 Menu Active alarms



If the alarm icon is flashing on the main display, an alarm is occurring.

Push the **ALARM** key to enter the alarm menu.

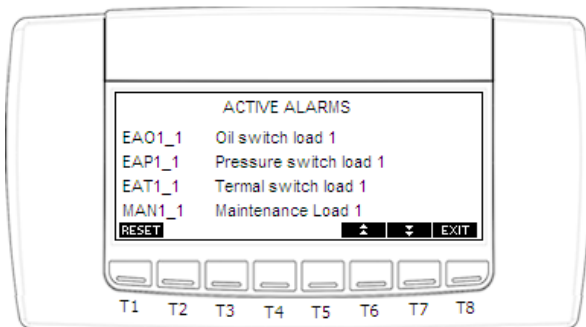
1. Push the **ALARM** key to enter the **ALARM MENU**,
2. Select the alarm menu



Alarm menu:

COMPRESSOR ALARMS CIRC 1
 COMPRESSOR ALARMS CIRC 2
 FAN ALARMS CIRC 1
 FAN ALARMS CIRC 2
 CIRCUIT 1 ALARMS
 CIRCUIT 2 ALARMS
 GENERIC ALARMS

3. Set the SECTION by means of the **UP** and **DOWN** keys.
4. Push the **ENTER** key, to confirm and enter the alarm sub-menu.



The alarm menu displays the active alarm with the following layout:

Column 1 = alarm code

Column 2 = alarm description

6. Active alarm log menu

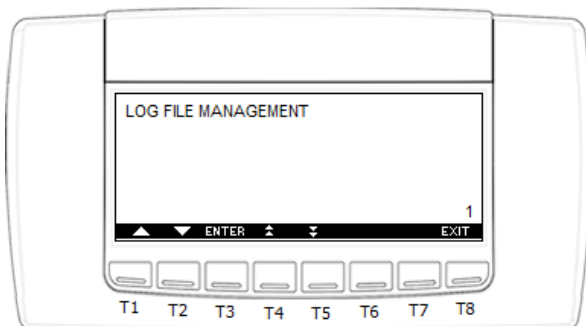
At the moment this function is not available to screen in the Visogaph.

The Iprorack stores up to 100 Alarms in a log file. For each alarm is given the start and end date. This file can be exported through the website integrated on a memory card or via the USB port.

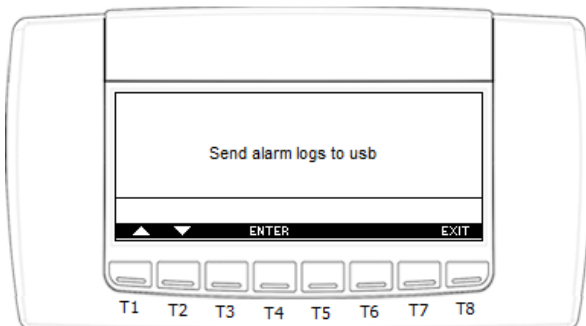
Procedure:

1. Enter the **SERVICE** menu
2. Select **LOG FILE MANAGEMENT** sub-menu
3. Push the **ENTER** key.

The **LOG FILE MANAGEMENT** sub-menu manages saving of the Alarm log file into the USB key, with the following layout:



Next stage to manage the saving:



If the USB is not ready it shows a message "Warning!USB not ready "

You can see the steps of the saving and at the end the message will be :

- Saving is ok → " Send completed successfully!"
- Saving is not ok → " Send error!"

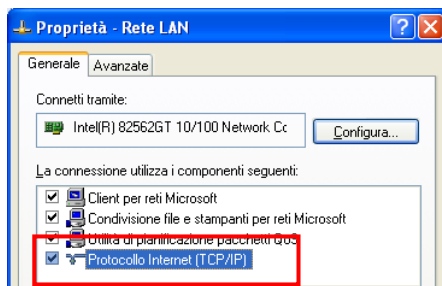
7. HOW TO CONNECT THE IPRORACK TO A PC

7.1 Direct connection (between iPRO and PC with a cable)

With this kind of connection is possible to connect directly your personal computer with the programmable controller iPRORACK. In this case, you need a standard "Crossover Cable" (cod. Dixell CAB/WEB/PC). The PC can communicate with the iPRO only if the settings in the devices are aligned; this means that the PC and the iPRO have to work in the same network.



1. Disconnect your computer from the data network of your company and connect the PC with the iPRO through the Crossover cable.
2. The personal computer has to be set in the same network of the iPRO.
 - a. In the windows environment click with the mouse on **"start"** button
3. Choose **"Control Panel"** and select **"Network and dial-up connections"**
4. Choose **"Local area connection"**
5. Choose **"Properties"** and double click on **"Internet Protocol (TCP/IP)"**.



In this window set the following parameters (as showed in the picture):

IP address: 192.168.0.200
Subnet Mask: 255.255.255.0

Proprietà - Protocollo Internet (TCP/IP)

Generale

È possibile ottenere l'assegnazione automatica delle impostazioni IP se la rete supporta tale caratteristica. In caso contrario, sarà necessario richiedere all'amministratore di rete le impostazioni IP corrette.

☐ Ottieni automaticamente un indirizzo IP

☒ Utilizza il seguente indirizzo IP:

Indirizzo IP: 192 . 168 . 0 . 200

Subnet mask: 255 . 255 . 255 . 0

Gateway predefinito: . . .

☐ Ottieni indirizzo server DNS automaticamente

☒ Utilizza i seguenti indirizzi server DNS:

Server DNS preferito: . . .

Server DNS alternativo: . . .

Avanzate...

OK Annulla

Click "OK" to confirm.

Launch the browser in your computer and write the following web site address:
http://192.168.0.250 (if your IP is different, write the correct one):

dixell Login

iPro - Configuration & Analysis

EMERSON Climate Technologies

Home

- Variables
- Configure
- Files
- Accounts
- Advanced
- Firewall

iPro by Dixell S.r.l.

DIXELL S.r.l.
 Z.I. Via dell'Industria, 27
 32010 Pieve d'Alpago (BL) - ITALY
 P.IVA/VAT: IT 00876120254

Tel. +39.0437.9833 r.a.
 Fax +39.0437.989.313
dixell@dixell.com
www.dixell.com
[User web site](#)

System status

BIOS release is **2012021600**

Application release is **not defined**

ISaGraf status: **ok**

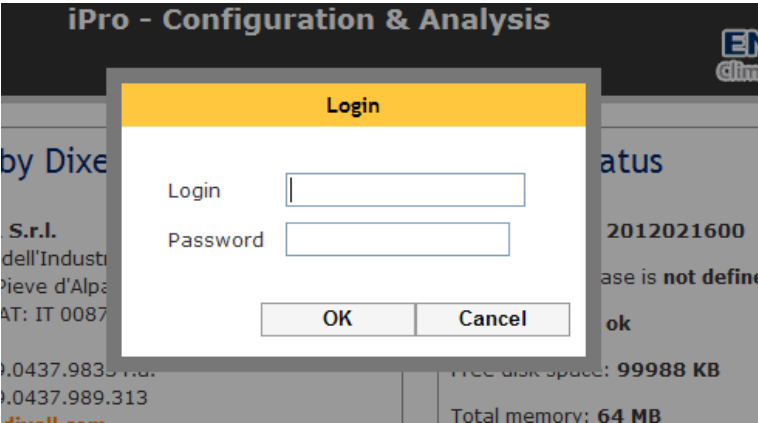
Free disk space: **99988 KB**

Total memory: **64 MB**

IP Address: **10.100.81.238**

iPro date: **2012/02/22 - 16.40**

To be able to modify the settings, it is necessary to do the login.
Click Login:



Login: admin
Password: Dixell

Click OK to confirm

If necessary it is possible to change the IP address; click the Configure button.
In this page define the TCP/IP section comply with your network.

| TCP/IP | | Port | |
|----------------|--|--------------------|-----------------------------------|
| IP address: | <input type="text" value="192.168.0.250"/> | HTTP port: | <input type="text" value="80"/> |
| Netmask: | <input type="text" value="255.255.255.0"/> | HTTPS port: | <input type="text" value="443"/> |
| Network: | <input type="text" value="192.168.0.0"/> | ModBus slave port: | <input type="text" value="502"/> |
| Gateway: | <input type="text" value="192.168.0.1"/> | Isa WB port: | <input type="text" value="1131"/> |
| DNS: | <input type="text" value="192.168.0.250"/> | Isa Binding port: | <input type="text" value="1113"/> |
| Secondary DNS: | <input type="text" value="8.8.8.8"/> | Visoprog port: | <input type="text" value="6666"/> |
| | | SSH port: | <input type="text" value="22"/> |

| ModBus over RS485 | | Other | |
|-------------------|---|------------------------|--|
| Modbus slave: | <input type="text" value="Enabled"/> | VisoGraph baud-rate: | <input type="text" value="38400"/> |
| Address: | <input type="text" value="1"/> | Timezone: | <input type="text" value="Europe/Sofia"/> |
| Parameters: | <input type="text" value="9600,N,8,1"/> | Clock synchronization: | <input type="text" value="Disabled"/> |
| | | NTP server: | <input type="text" value="193.204.114.232"/> |

Click "OK" to confirm the operation.

After this operation, it is necessary to reboot the iPRO.

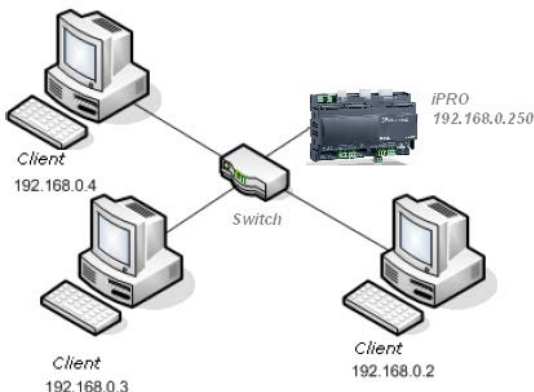
7.2 Intranet / Ethernet connection (Local Area Network)

The Intranet or Ethernet connection should be initially managed by the net administrator that will assign one free IP address to reach the iPRO. This number is an example of what you should expect with the default IP of the iPRO: 192.168.0.250.

After receiving the address from your network Administrator the iPRO must be set with this number (through the procedure described in the chapter 5.2).

Use a standard RJ45 network cable to connect the unit to your existing LAN.

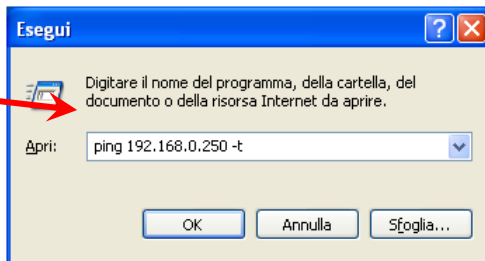
The Intranet method allows the connection to interact with iPRO from all the PC Clients.



To check if the connection has been established try in this way:

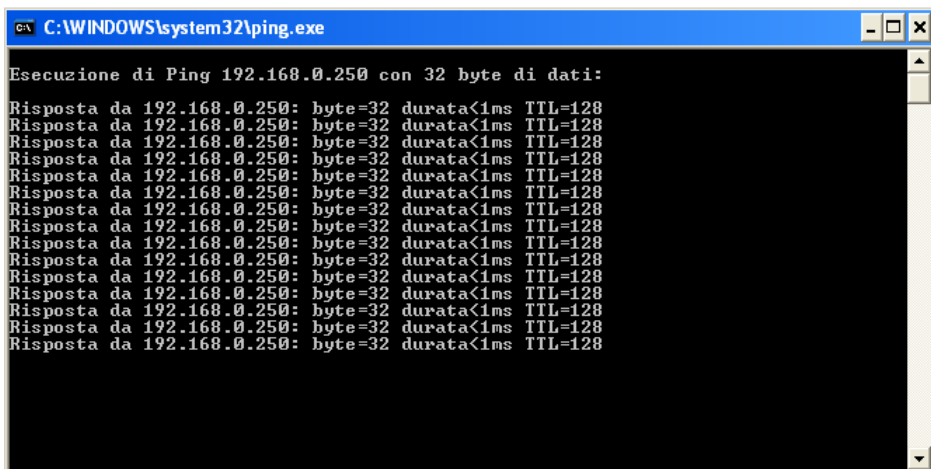
From your computer launch: start -> run

In the box write the following string:



Then click OK.

If the connection is OK, in this window you will see the following information:



```
C:\WINDOWS\system32\ping.exe

Esecuzione di Ping 192.168.0.250 con 32 byte di dati:

Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
Risposta da 192.168.0.250: byte=32 durata<1ms TTL=128
```

7.3 Port forwarding

Port forwarding allows remote computers (e.g. public machines on the Internet) to connect to a specific computer within a private LAN.

The ports that have to be opened are:

- 22
- 80
- 1131
- 6666

8. Updating the visograph from the website

If you must update the application for Vidograph is necessary to follow a two-step procedure:

- Load the file "iprorack.bin" into the device
- Navigate to the variables folder of the web page
- Write the name of the file with no extension in the variable F1FE:
 - Put "F1FE" in the field address and "iprochill" in value
- Confirm by clicking on key "Set Variable"

Variables

Change variables

Address: F1FE value: iprорack **Set Variable** **Update Variables**

| Base addr. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F00x | | | | | | | | | | | | | | | | |
| F01x | | | | | | | | | | | | | | | | |
| F02x | | | | | | | | | | | | | | | | |
| F03x | | | | | | | | | | | | | | | | |
| F04x | | | | | | | | | | | | | | | | |
| F05x | | | | | | | | | | | | | | | | |
| F06x | | | | | | | | | | | | | | | | |
| F07x | | | | | | | | | | | | | | | | |
| F08x | | | | | | | | | | | | | | | | |
| F09x | | | | | | | | | | | | | | | | |
| F0Ax | | | | | | | | | | | | | | | | |
| F0Bx | | | | | | | | | | | | | | | | |
| F0Cx | | | | | | | | | | | | | | | | |
| F0Dx | | | | | | | | | | | | | | | | |
| F0Ex | | | | | | | | | | | | | | | | |
| F0Fx | | | | | | | | | | | | | | | | |

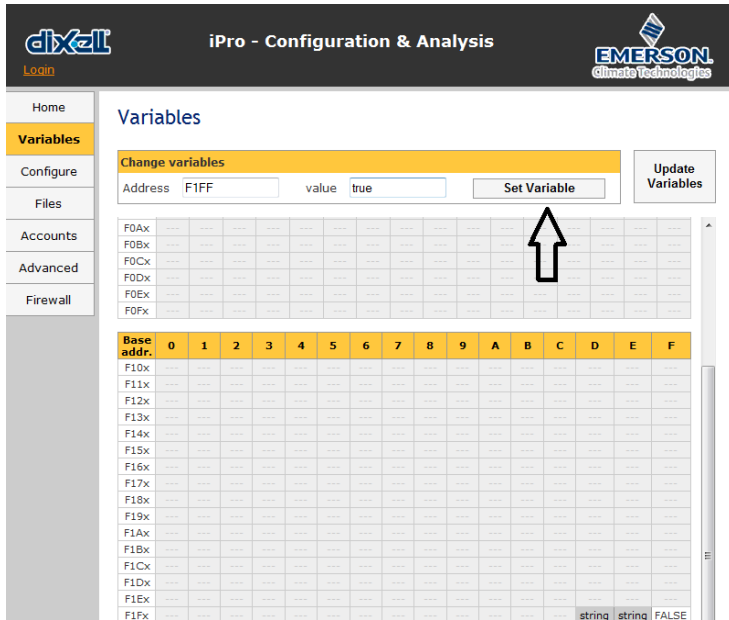
| Base addr. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F10x | | | | | | | | | | | | | | | | |
| F11x | | | | | | | | | | | | | | | | |
| F12x | | | | | | | | | | | | | | | | |
| F13x | | | | | | | | | | | | | | | | |
| F14x | | | | | | | | | | | | | | | | |
| F15x | | | | | | | | | | | | | | | | |
| F16x | | | | | | | | | | | | | | | | |
| F17x | | | | | | | | | | | | | | | | |

- Check the bottom of the page that the vlue has been loaded correctly.

String variables

| Address | Value |
|---------|---------------------------|
| F1FD | Done, waiting new command |
| F1FE | iprорack |

- Return to the top, write “true” at address “F1FF” and confirm by clickin “Set Variable”



The file will be downloaded into the visograph. Once the downloaded will be finished the visograph will reboot automatically.

9. CONFIGURATION SUB-MENU

The configuration sub menus contained in the parameter list, allow the user to configure the iporack, according to the kind of racks.

The purpose of this modification is to simplify and secure the inputs/outputs configuration of Iporack, **considering the inputs/outputs configuration as parameters.**

The modification will be planned in 3 steps, corresponding to the following chapters of this document:

- Change the part of configuration moving the *io.conf* file and integrate this information in parameters (chapter 1.1);
- Add the I/O configuration parameters in Wizmate Library (chapter 1.2);
- Change of the Visograph application adding I/O conf parameters and changing the stage model selection(chapter 1.3);

9.1 Add a new group of parameters “io_configuration”

All the I/O configurations, are stored in 4 parameter groups:

- **DIC (20 parameters);**
- **DOC (15 parameters);**
- **AOC (6 parameters);**
- **AIC (10 parameters);**

For digital I/Os, there is a **double configuration** (active with open contact or with closed contact).

9.1.1 DIGITAL-INPUTS (parameters DIC1- DIC20)

| Parameter | Description |
|-----------|--------------------------------|
| DIC 1 | Configuration Digital Input 1 |
| DIC 2 | Configuration Digital Input 2 |
| DIC 3 | Configuration Digital Input 3 |
| DIC 4 | Configuration Digital Input 4 |
| DIC 5 | Configuration Digital Input 5 |
| DIC 6 | Configuration Digital Input 6 |
| DIC 7 | Configuration Digital Input 7 |
| DIC 8 | Configuration Digital Input 8 |
| DIC 9 | Configuration Digital Input 9 |
| DIC 10 | Configuration Digital Input 10 |
| DIC 11 | Configuration Digital Input 11 |
| DIC 12 | Configuration Digital Input 12 |
| DIC 13 | Configuration Digital Input 13 |
| DIC 14 | Configuration Digital Input 14 |
| DIC 15 | Configuration Digital Input 15 |
| DIC 16 | Configuration Digital Input 16 |
| DIC 17 | Configuration Digital Input 17 |
| DIC 18 | Configuration Digital Input 18 |
| DIC 19 | Configuration Digital Input 19 |
| DIC 20 | Configuration Digital Input 20 |

DIGITAL INPUTS CONFIGURATION DI1-DI20

“c” close polarity “o” open polarity;
The next number indicates the Input function as described above.

- 0 Not used
- 1o Compressor oil pressostate 1 Circuit 1
- 1c Compressor oil pressostate 1 Circuit 1
- 2o Compressor Safety pressostate 1 Circuit 1
- 2c Compressor Safety pressostate 1 Circuit 1
- 3o Thermal Safety Compressor 1 Circuit 1
- 3c Thermal Safety Compressor 1 Circuit 1
- 4o Compressor oil pressostate 2 Circuit 1
- 4c Compressor oil pressostate 2 Circuit 1
- 5o Compressor Safety pressostate 2 Circuit 1
- 5c Compressor Safety pressostate 2 Circuit 1
- 6o Thermal Safety Compressor 2 Circuit 1
- 6c Thermal Safety Compressor 2 Circuit 1
- 7o Compressor oil pressostate 3 Circuit 1
- 7c Compressor oil pressostate 3 Circuit 1
- 8o Compressor Safety pressostate 3 Circuit 1
- 8c Compressor Safety pressostate 3 Circuit 1
- 9o Thermal Safety Compressor 3 Circuit 1
- 9c Thermal Safety Compressor 3 Circuit 1

10o Compressor oil pressostate 4 Circuit 1
10c Compressor oil pressostate 4 Circuit 1
11o Compressor Safety pressostate 4 Circuit 1
11c Compressor Safety pressostate 4 Circuit 1
12o Thermal Safety Compressor 4 Circuit 1
12c Thermal Safety Compressor 4 Circuit 1
13o Compressor oil pressostate 5 Circuit 1
13c Compressor oil pressostate 5 Circuit 1
14o Compressor Safety pressostate 5 Circuit 1
14c Compressor Safety pressostate 5 Circuit 1
15o Thermal Safety Compressor 5 Circuit 1
15c Thermal Safety Compressor 5 Circuit 1
16o Compressor oil pressostate 6 Circuit 1
16c Compressor oil pressostate 6 Circuit 1
17o Compressor Safety pressostate 6 Circuit 1
17c Compressor Safety pressostate 6 Circuit 1
18o Thermal Safety Compressor 6 Circuit 1
18c Thermal Safety Compressor 6 Circuit 1
19o Compressor oil pressostate 7 Circuit 1
19c Compressor oil pressostate 7 Circuit 1
20o Compressor Safety pressostate7 Circuit 1
20c Compressor Safety pressostate7 Circuit 1
21o Thermal Safety Compressor 7 Circuit 1
21c Thermal Safety Compressor 7 Circuit 1
22o Compressor oil pressostate 8 Circuit 1
22c Compressor oil pressostate 8 Circuit 1
23o Compressor Safety pressostate 8 Circuit 1
23c Compressor Safety pressostate 8 Circuit 1
24o Thermal Safety Compressor 8 Circuit 1
24c Thermal Safety Compressor 8 Circuit 1
25o Compressor oil pressostate 9 Circuit 1
25c Compressor oil pressostate 9 Circuit 1
26o Compressor Safety pressostate9 Circuit 1
26c Compressor Safety pressostate9 Circuit 1
27o Thermal Safety Compressor 9 Circuit 1
27c Thermal Safety Compressor 9 Circuit 1
28o Compressor oil pressostate 10 Circuit 1
28c Compressor oil pressostate 10 Circuit 1
29o Compressor Safety pressostate 10 Circuit 1
29c Compressor Safety pressostate 10 Circuit 1
30o Thermal Safety Compressor 10 Circuit 1
30c Thermal Safety Compressor 10 Circuit 1
31o Compressor oil pressostate 11 Circuit 1
31c Compressor oil pressostate 11 Circuit 1
32o Compressor Safety pressostate11 Circuit 1
32c Compressor Safety pressostate11 Circuit 1
33o Thermal Safety Compressor 11 Circuit 1
33c Thermal Safety Compressor 11 Circuit 1
34o Compressor oil pressostate 12 Circuit 1
34c Compressor oil pressostate 12 Circuit 1
35o Compressor Safety pressostate12 Circuit 1
35c Compressor Safety pressostate12 Circuit 1
36o Thermal Safety Compressor 12 Circuit 1
36c Thermal Safety Compressor 12 Circuit 1
37o Compressor oil pressostate 1 Circuit 2

37c Compressor oil pressostate 1 Circuit 2
38o Compressor Safety pressostate 1 Circuit 2
38c Compressor Safety pressostate 1 Circuit 2
39o Thermal Safety Compressor 1 Circuit 2
39c Thermal Safety Compressor 1 Circuit 2
40o Compressor oil pressostate 2 Circuit 2
40c Compressor oil pressostate 2 Circuit 2
41o Compressor Safety pressostate 2 Circuit 2
41c Compressor Safety pressostate 2 Circuit 2
42o Thermal Safety Compressor 2 Circuit 2
42c Thermal Safety Compressor 2 Circuit 2
43o Compressor oil pressostate 3 Circuit 2
43c Compressor oil pressostate 3 Circuit 2
44o Compressor Safety pressostate3 Circuit 2
44c Compressor Safety pressostate3 Circuit 2
45o Thermal Safety Compressor 3 Circuit 2
45c Thermal Safety Compressor 3 Circuit 2
46o Compressor oil pressostate 4 Circuit 2
46c Compressor oil pressostate 4 Circuit 2
47o Compressor Safety pressostate 4 Circuit 2
47c Compressor Safety pressostate 4 Circuit 2
48o Thermal Safety Compressor 4 Circuit 2
48c Thermal Safety Compressor 4 Circuit 2
49o Compressor oil pressostate 5 Circuit 2
49c Compressor oil pressostate 5 Circuit 2
50o Compressor Safety pressostate 5 Circuit 2
50c Compressor Safety pressostate 5 Circuit 2
51o Thermal Safety Compressor 5 Circuit 2
51c Thermal Safety Compressor 5 Circuit 2
52o Compressor oil pressostate 6 Circuit 2
52c Compressor oil pressostate 6 Circuit 2
53o Compressor Safety pressostate6 Circuit 2
53c Compressor Safety pressostate6 Circuit 2
54o Thermal Safety Compressor 6 Circuit 2
54c Thermal Safety Compressor 6 Circuit 2
55o Compressor oil pressostate 7 Circuit 2
55c Compressor oil pressostate 7 Circuit 2
56o Compressor Safety pressostate 7 Circuit 2
56c Compressor Safety pressostate 7 Circuit 2
57o Thermal Safety Compressor 7 Circuit 2
57c Thermal Safety Compressor 7 Circuit 2
58o Compressor oil pressostate 8 Circuit 2
58c Compressor oil pressostate 8 Circuit 2
59o Compressor Safety pressostate8 Circuit 2
59c Compressor Safety pressostate8 Circuit 2
60o Thermal Safety Compressor 8 Circuit 2
60c Thermal Safety Compressor 8 Circuit 2
61o Compressor oil pressostate 9 Circuit 2
61c Compressor oil pressostate 9 Circuit 2
62o Compressor Safety pressostate 9 Circuit 2
62c Compressor Safety pressostate 9 Circuit 2
63o Thermal Safety Compressor 9 Circuit 2
63c Thermal Safety Compressor 9 Circuit 2
64o Compressor oil pressostate 10 Circuit 2
64c Compressor oil pressostate 10 Circuit 2

65o Compressor Safety pressostate 10 Circuit 2
 65c Compressor Safety pressostate 10 Circuit 2
 66o Thermal Safety Compressor 10 Circuit 2
 66c Thermal Safety Compressor 10 Circuit 2
 67o Compressor oil pressostate 11 Circuit 2
 67c Compressor oil pressostate 11 Circuit 2
 68o Compressor Safety pressostate 11 Circuit 2
 68c Compressor Safety pressostate 11 Circuit 2
 69o Thermal Safety Compressor 11 Circuit 2
 69c Thermal Safety Compressor 11 Circuit 2
 70o Compressor oil pressostate 12 Circuit 2
 70c Compressor oil pressostate 12 Circuit 2
 71o Compressor Safety pressostate 12 Circuit 2
 71c Compressor Safety pressostate 12 Circuit 2
 72o Thermal Safety Compressor 12 Circuit 2
 72c Thermal Safety Compressor 12 Circuit 2
 73o Fan safety1 Circuit 1
 73c Fan safety1 Circuit 1
 74o Fan safety2 Circuit 1
 74c Fan safety2 Circuit 1
 75o Fan safety3 Circuit 1
 75c Fan safety3 Circuit 1
 76o Fan safety4 Circuit 1
 76c Fan safety4 Circuit 1
 77o Fan safety5 Circuit 1
 77c Fan safety5 Circuit 1
 78o Fan safety6 Circuit 1
 78c Fan safety6 Circuit 1
 79o Fan safety7 Circuit 1
 79c Fan safety7 Circuit 1
 80o Fan safety8 Circuit 1
 80c Fan safety8 Circuit 1
 81o Fan safety9 Circuit 1
 81c Fan safety9 Circuit 1
 82o Fan safety10 Circuit 1
 82c Fan safety10 Circuit 1
 83o Fan safety11 Circuit 1
 83c Fan safety11 Circuit 1
 84o Fan safety12 Circuit 1
 84c Fan safety12 Circuit 1
 85o Fan safety1 Circuit 2
 85c Fan safety1 Circuit 2
 86o Fan safety2 Circuit 2
 86c Fan safety2 Circuit 2
 87o Fan safety3 Circuit 2
 87c Fan safety3 Circuit 2
 88o Fan safety4 Circuit 2
 88c Fan safety4 Circuit 2
 89o Fan safety5 Circuit 2
 89c Fan safety5 Circuit 2
 90o Fan safety6 Circuit 2
 92 Fan safety6 Circuit 2
 91o Fan safety7 Circuit 2
 91c Fan safety7 Circuit 2
 92o Fan safety8 Circuit 2

92c Fan safety8 Circuit 2
93o Fan safety9 Circuit 2
93c Fan safety9 Circuit 2
94o Fan safety10 Circuit 2
94c Fan safety10 Circuit 2
95o Fan safety11 Circuit 2
95c Fan safety11 Circuit 2
96o Fan safety12 Circuit 2
96c Fan safety12 Circuit 2
97o Not Used
97c Not Used
98o Not Used
98c Not Used
99o High pressure Circuit 1
99c High pressure Circuit 1
100o High pressure Circuit 2
100c High pressure Circuit 2
101o Low pressure Circuit 1
101c Low pressure Circuit 1
102o Low pressure Circuit 2
102c Low pressure Circuit 2
103o Not Used
103c Not Used
104o Not Used
104c Not Used
105o Energy saving Circuit 1
105c Energy saving Circuit 1
106o Energy saving Circuit 2
106c Energy saving Circuit 2
107o ON/OFF Circuit 1
107c ON/OFF Circuit 1
108o ON/OFF Circuit 2
108c ON/OFF Circuit 2
109o Liquid level Circuit 1
109c Liquid level Circuit 1
110o Liquid level Circuit 2
110c Liquid level Circuit 2
111o Disable CRO Circuit 1
111c Disable CRO Circuit 1
112o Disable CRO Circuit 2
112c Disable CRO Circuit 2
113o Disable Dynamic Setpoint Circuit 1
113c Disable Dynamic Setpoint Circuit 1
114o Disable Dynamic Setpoint Circuit 2
114c Disable Dynamic Setpoint Circuit 2
115o Compressor oil Inverter suction Circuit 1
115c Compressor oil Inverter suction Circuit 1
116o Safety Inverter Suction Circuit 1
116c Safety Inverter Suction Circuit 1
117o Thermal Safety Inverter suction Circuit 1
117c Thermal Safety Inverter suction Circuit 1
118o Compressor oil Inverter suction Circuit 2
118c Compressor oil Inverter suction Circuit 2
119o Safety Inverter Suction Circuit 2
119c Safety Inverter Suction Circuit 2

120o Thermal Safety Inverter suction Circuit 2
 120c Thermal Safety Inverter suction Circuit 2
 121o Safety Inverter condenser Circuit 1
 121c Safety Inverter condenser Circuit 1
 122o Safety Inverter condenser Circuit 2
 122c Safety Inverter condenser Circuit 2
 123o Safety Input Coresense 1
 123c Safety Input Coresense 1
 124o Safety Input Coresense 2
 124c Safety Input Coresense 2
 125o Safety Input Coresense 3
 125c Safety Input Coresense 3
 126o Safety Input Coresense 4
 126c Safety Input Coresense 4
 127o Safety Input Coresense 5
 127c Safety Input Coresense 5
 128o Safety Input Coresense 6
 128c Safety Input Coresense 6
 129o Safety Input Coresense 7
 129c Safety Input Coresense 7
 130o Safety Input Coresense 8
 130c Safety Input Coresense 8
 131o Safety Input Coresense 9
 131c Safety Input Coresense 9
 132o Safety Input Coresense 10
 132c Safety Input Coresense 10
 133o Safety Input Coresense 11
 133c Safety Input Coresense 11
 134o Safety Input Coresense 12
 134c Safety Input Coresense 12
 135o Safety Input Coresense 13
 135c Safety Input Coresense 13
 136o Safety Input Coresense 14
 136c Safety Input Coresense 14
 137o Safety Input Coresense 15
 137c Safety Input Coresense 15

9.1.2 DIGITAL-OUTPUTS (parameters DOC1- DOC15)

| Parameter | Description |
|---------------|---------------------------------|
| DOC 1 | Configuration Digital Output 1 |
| DOC 2 | Configuration Digital Output 2 |
| DOC 3 | Configuration Digital Output 3 |
| DOC 4 | Configuration Digital Output 4 |
| DOC 5 | Configuration Digital Output 5 |
| DOC 6 | Configuration Digital Output 6 |
| DOC 7 | Configuration Digital Output 7 |
| DOC 8 | Configuration Digital Output 8 |
| DOC 9 | Configuration Digital Output 9 |
| DOC 10 | Configuration Digital Output 10 |
| DOC 11 | Configuration Digital Output 11 |
| DOC 12 | Configuration Digital Output 12 |
| DOC 13 | Configuration Digital Output 13 |

| | |
|---------------|---------------------------------|
| DOC 14 | Configuration Digital Output 14 |
| DOC 15 | Configuration Digital Output 15 |

- 0 Not used
- 1o Inverter 1 Suction Circuit 1
- 1c Inverter 1 Suction Circuit 1**
- 2o Inverter 2 Suction Circuit 1
- 2c Inverter 2 Suction Circuit 1**
- 3o Inverter 1 Suction Circuit 2
- 3c Inverter 1 Suction Circuit 2**
- 4o Inverter 2 Suction Circuit 2
- 4c Inverter 2 Suction Circuit 2**
- 5o Inverter Condenser Circuit 1
- 5c Inverter Condenser Circuit 1**
- 6o Inverter Condenser Circuit 2
- 6c Inverter Condenser Circuit 2**
- 7o Compressor 1 Circuit 1
- 7c Compressor 1 Circuit 1**
- 8o Step n° 1 Compressor 1 Circuit 1
- 8c Step n° 1 Compressor 1 Circuit 1
- 9o Step n° 2 Compressor 1 Circuit 1
- 9c Step n° 2 Compressor 1 Circuit 1
- 10o Step n° 3 Compressor 1 Circuit 1
- 10c Step n° 3 Compressor 1 Circuit 1
- 11o Compressor 2 Circuit 1
- 11c Compressor 2 Circuit 1**
- 12o Step n° 1 Compressor 2 Circuit 1
- 12c Step n° 1 Compressor 2 Circuit 1
- 13o Step n° 2 Compressor 2 Circuit 1
- 13c Step n° 2 Compressor 2 Circuit 1
- 14o Step n° 3 Compressor 2 Circuit 1
- 14c Step n° 3 Compressor 2 Circuit 1
- 15o Compressor 3 Circuit 1
- 15c Compressor 3 Circuit 1**
- 16o Step n° 1 Compressor 3 Circuit 1
- 16c Step n° 1 Compressor 3 Circuit 1
- 17o Step n° 2 Compressor 3 Circuit 1
- 17c Step n° 2 Compressor 3 Circuit 1
- 18o Step n° 3 Compressor 3 Circuit 1
- 18c Step n° 3 Compressor 3 Circuit 1
- 19o Compressor 4 Circuit 1
- 19c Compressor 4 Circuit 1**
- 20o Step n° 1 Compressor 4 Circuit 1
- 20c Step n° 1 Compressor 4 Circuit 1
- 21o Step n° 2 Compressor 4 Circuit 1
- 21c Step n° 2 Compressor 4 Circuit 1
- 22o Step n° 3 Compressor 4 Circuit 1
- 22c Step n° 3 Compressor 4 Circuit 1
- 23o Compressor 1 Circuit 2
- 23c Compressor 1 Circuit 2**
- 24o Step n° 1 Compressor 1 Circuit 2
- 24c Step n° 1 Compressor 1 Circuit 2
- 25o Step n° 2 Compressor 1 Circuit 2
- 25c Step n° 2 Compressor 1 Circuit 2
- 26o Step n° 3 Compressor 1 Circuit 2

26c Step n° 3 Compressor 1 Circuit 2
27o Compressor 2 Circuit 2
27c Compressor 2 Circuit 2
28o Step n° 1 Compressor 2 Circuit 2
28c Step n° 1 Compressor 2 Circuit 2
29o Step n° 2 Compressor 2 Circuit 2
29c Step n° 2 Compressor 2 Circuit 2
30o Step n° 3 Compressor 2 Circuit 2
30c Step n° 3 Compressor 2 Circuit 2
31o Compressor 3 Circuit 2
31c Compressor 3 Circuit 2
32o Step n° 1 Compressor 3 Circuit 2
32c Step n° 1 Compressor 3 Circuit 2
33o Step n° 2 Compressor 3 Circuit 2
33c Step n° 2 Compressor 3 Circuit 2
34o Step n° 3 Compressor 3 Circuit 2
34c Step n° 3 Compressor 3 Circuit 2
35o Compressor 4 Circuit 2
35c Compressor 4 Circuit 2
36o Step n° 1 Compressor 4 Circuit 2
36c Step n° 1 Compressor 4 Circuit 2
37o Step n° 2 Compressor 4 Circuit 2
37c Step n° 2 Compressor 4 Circuit 2
38o Step n° 3 Compressor 4 Circuit 2
38c Step n° 3 Compressor 4 Circuit 2
39o Compressor 5 Circuit 1
39c Compressor 5 Circuit 1
40o Compressor 6 Circuit 1
40c Compressor 6 Circuit 1
41o Compressor 7 Circuit 1
41c Compressor 7 Circuit 1
42o Compressor 8 Circuit 1
42c Compressor 8 Circuit 1
43o Compressor 9 Circuit 1
43c Compressor 9 Circuit 1
44o Compressor 10 Circuit 1
44c Compressor 10 Circuit 1
45o Compressor 11 Circuit 1
45c Compressor 11 Circuit 1
46o Compressor 12 Circuit 1
46c Compressor 12 Circuit 1
47o Compressor 5 Circuit 2
47c Compressor 5 Circuit 2
48o Compressor 6 Circuit 2
48c Compressor 6 Circuit 2
49o Compressor 7 Circuit 2
49c Compressor 7 Circuit 2
50o Compressor 8 Circuit 2
50c Compressor 8 Circuit 2
51o Compressor 9 Circuit 2
51c Compressor 9 Circuit 2
52o Compressor 10 Circuit 2
52c Compressor 10 Circuit 2
53o Compressor 11 Circuit 2
53c Compressor 11 Circuit 2

54o Compressor 12 Circuit 2
54c Compressor 12 Circuit 2
55o Fan 1 Circuit 1
55c Fan 1 Circuit 1
56o Fan 2 Circuit 1
56c Fan 2 Circuit 1
57o Fan 3 Circuit 1
57c Fan 3 Circuit 1
58o Fan 4 Circuit 1
58c Fan 4 Circuit 1
59o Fan 5 Circuit 1
59c Fan 5 Circuit 1
60o Fan 6 Circuit 1
60c Fan 6 Circuit 1
61o Fan 7 Circuit 1
61c Fan 7 Circuit 1
62o Fan 8 Circuit 1
62c Fan 8 Circuit 1
63o Fan 9 Circuit 1
63c Fan 9 Circuit 1
64o Fan 10 Circuit 1
64c Fan 10 Circuit 1
65o Fan 11 Circuit 1
65c Fan 11 Circuit 1
66o Fan 12 Circuit 1
66c Fan 12 Circuit 1
67o Fan 1 Circuit 2
67c Fan 1 Circuit 2
68o Fan 2 Circuit 2
68c Fan 2 Circuit 2
69o Fan 3 Circuit 2
69c Fan 3 Circuit 2
70o Fan 4 Circuit 2
70c Fan 4 Circuit 2
71o Fan 5 Circuit 2
71c Fan 5 Circuit 2
72o Fan 6 Circuit 2
72c Fan 6 Circuit 2
73o Fan 7 Circuit 2
73c Fan 7 Circuit 2
74o Fan 8 Circuit 2
74c Fan 8 Circuit 2
75o Fan 9 Circuit 2
75c Fan 9 Circuit 2
76o Fan 10 Circuit 2
76c Fan 10 Circuit 2
77o Fan 11 Circuit 2
77c Fan 11 Circuit 2
78o Fan 12 Circuit 2
78c Fan 12 Circuit 2
79o Alarm
79c Alarm
80o Alarm type 1
80c Alarm type 1
81o Alarm type 2

- 81c Alarm type 2
- 82o Ausiliary output 1
- 82c Ausiliary output 1
- 83o Ausiliary output 2
- 83c Ausiliary output 2
- 84o Ausiliary output 3
- 84c Ausiliary output 3
- 85o Ausiliary output 4
- 85c Ausiliary output 4
- 86o OnF
- 86c OnF
- 87o Inverter free circuit 1
- 87c Inverter free circuit 1
- 88o Inverter free circuit 2
- 88c Inverter free circuit 2
- 89o Valve circuit 1
- 89c Valve circuit 1
- 90o Valve circuit 2
- 92 Valve circuit 2
- 91 Valve 6D circuit 1**
- 92 Valve 6D circuit 2**

9.1.3 ANALOG-OUTPUTS (parameters AOC1- AOC6)

| Parameter | Description |
|--------------|-------------------------------|
| AOC 1 | Configuration Analog Output 1 |
| AOC 2 | Configuration Analog Output 2 |
| AOC 3 | Configuration Analog Output 3 |
| AOC 4 | Configuration Analog Output 4 |
| AOC 5 | Configuration Analog Output 5 |
| AOC 6 | Configuration Analog Output 6 |

Output 0÷10V OUT1 / OUT4 (parameters AOC1- AOC4)

- 0 Not used
- 1 Proportional 0-10 V output
- 2 0-10V output inverter 1 Suction Circuit 1
- 3 0-10V output inverter 2 Suction Circuit 1
- 4 0-10V output inverter 1 Suction Circuit 2
- 5 0-10V output inverter 2 Suction Circuit 2
- 6 0-10V output inverter condenser Circuit 1
- 7 0-10V output inverter condenser Circuit 2
- 8 0-10V output inverter condenser free Circuit 1
- 9 0-10V output inverter condenser free Circuit 2

Configurable Output 4÷20mA - 0÷10V OUT5 / OUT6 (parameters AOC5-AOC6)

- 0 Not used
- 1 Proportional 0-10 V output
- 2 0-10V output inverter 1 Suction Circuit 1
- 3 0-10V output inverter 2 Suction Circuit 1
- 4 0-10V output inverter 1 Suction Circuit 2
- 5 0-10V output inverter 2 Suction Circuit 2

- 6 0-10V output inverter condenser Circuit 1
- 7 0-10V output inverter condenser Circuit 2
- 8 0-10V output inverter condenser free Circuit 1
- 9 0-10V output inverter condenser free Circuit 2
- 10 Proportional 4-20mA output free
- 11 4-20mA output inverter 1 Suction Circuit 1
- 12 4-20mA output inverter 2 Suction Circuit 1
- 13 4-20mA output inverter 1 Suction Circuit 2
- 14 4-20mA output inverter 2 Suction Circuit 2
- 15 4-20mA output inverter condenser Circuit 1
- 16 4-20mA output inverter condenser Circuit 2
- 17 4-20mA output inverter condenser free Circuit 1
- 18 4-20mA output inverter condenser free Circuit 2

9.1.4 ANALOG-INPUTS (parameters AIC1- AIC10)

| Parameter | Description | min | max |
|---------------|-------------------------------|-----|-----|
| AIC 1 | Configuration Analog Input 1 | 0 | 36 |
| AIC 2 | Configuration Analog Input 2 | 0 | 36 |
| AIC 3 | Configuration Analog Input 3 | 0 | 36 |
| AIC 4 | Configuration Analog Input 4 | 0 | 36 |
| AIC 5 | Configuration Analog Input 5 | 0 | 36 |
| AIC 6 | Configuration Analog Input 6 | 0 | 36 |
| AIC 7 | Configuration Analog Input 7 | 0 | 36 |
| AIC 8 | Configuration Analog Input 8 | 0 | 36 |
| AIC 9 | Configuration Analog Input 9 | 0 | 36 |
| AIC 10 | Configuration Analog Input 10 | 0 | 36 |

- 0 Not used
- 1 NTC Temperature probe Suction Circuit1
- 2 NTC Temperature probe Suction Circuit2
- 3 NTC Temperature probe Condenser Circuit1
- 4 NTC Temperature probe Condenser Circuit2
- 5 NTC Temperature probe Thermostat Aux1
- 6 NTC Temperature probe Thermostat Aux2
- 7 NTC Temperature probe Thermostat Aux3
- 8 NTC Temperature probe Thermostat Aux4
- 9 NTC Temperature probe Dynamic set condenser 1
- 10 NTC Temperature probe Dynamic set condenser 2
- 11 NTC Temperature probe Dynamic set suction 1
- 12 NTC Temperature probe Dynamic set suction 2
- 13 NTC Temperature probe Superheat 1
- 14 NTC Temperature probe Superheat 2
- 15 PTC Temperature probe Suction Circuit1
- 16 PTC Temperature probe Suction Circuit2
- 17 PTC Temperature probe Condenser Circuit1
- 18 PTC Temperature probe Condenser Circuit2
- 19 PTC Temperature probe Thermostat Aux1
- 20 PTC Temperature probe Thermostat Aux2
- 21 PTC Temperature probe Thermostat Aux3
- 22 PTC Temperature probe Thermostat Aux4
- 23 PTC Temperature probe Dynamic set condenser 1

24 PTC Temperature probe Dynamic set condenser 2
 25 PTC Temperature probe Dynamic set suction 1
 26 PTC Temperature probe Dynamic set suction 2
 27 PTC Temperature probe Superheat 1
 28 PTC Temperature probe Superheat 2
 29 4-20mA Pressure Probe Suction Circuit1
 30 4-20mA Pressure Probe Suction Circuit2
 31 4-20mA Pressure Probe Condenser Circuit1
 32 4-20mA Pressure Probe Condenser Circuit2
 33 0-5 V Pressure Probe Suction Circuit1
 34 0-5 V Pressure Probe Suction Circuit2
 35 0-5 V Pressure Probe Condenser Circuit1
 36 0-5 V Pressure Probe Condenser Circuit2

10. PARAMETERS

10.1.1 Set Point (SETC1-SETF2)

SETC1 compressor circuit 1 Set Point

SETC2 compressor circuit 2 Set Point

SETF1 condenser circuit 1 Set Point

SETF2 condenser circuit 2 Set Point

10.1.2 Compressor Rack setup (CF1-CF17)

CF1 Kind of compressors: to set the kind of compressors.

SPo = compressors with the same capacity.

BitZ = screw compressors like Bitzer, Hanbell, Refcomp etc operation.

Frtz = screw compressors like Frascold operation.

CF2 Valve Input polarity - circuit 1: valve polarity: polarity of the Inputs for capacity valves. It determines the state of the relays associated with the capacity valves:

oP=valve enabled with open contact;

cL= valve enabled with closed contact.

CF3 Valve Input polarity - circuit 2: valve polarity: polarity of the Inputs for capacity valves. It determines the state of the relays associated with the capacity valves:

oP=valve enabled with open contact;

cL= valve enabled with closed contact.

CF4- CF9 Power of compressor 1-6 circuit 1

CF10- CF15 Power of compressor 1-6 circuit 2

CF16 Kind of gas CIRCUIT 1: set the kind of gas used in the plant

r22 = R22; **r404**= R404A ;**507**= R507; **134**=134; **r717**=r717 (ammonia); **co2** = CO2; **410** = r410.

CF17 Kind of gas CIRCUIT 2: set the kind of gas used in the plant

r22 = R22; **r404**= R404A ; **507**= R507; **134**=134; **r717**=r717 (ammonia); **co2** = CO2; **410** = r410.

C35 Activation time during the switching on of first step (valve of 25%) for Bitzer screw compressors: (0÷255s): it sets for how long the valve is used during the startup phase.

- C36 First step enabled during the regulation (switching off phase):** it sets if the first step can be used also during normal regulation.
NO = first step used only during the start phase
YES = first step used also during normal regulation

10.1.3 Regulation (CF18-CF25 CF28-CF30)

- CF18 Type of regulation for compressor circuit 1:** **db** = neutral zone, **Pb** = proportional band.
- CF19 Type of regulation for compressor circuit 2:** **db** = neutral zone, **Pb** = proportional band.
- CF22 Compressor rotation circuit 1:**
YES = rotation: the algorithm distributes the working time between loads to ensure even run times.
no = fixed sequence: the compressors are enabled and disabled in fixed sequence: first, second etc.
- CF23 Compressor rotation circuit 2:**
YES = rotation: the algorithm distributes the working time between loads to ensure even run times.
no = fixed sequence: the compressors are enabled and disabled in fixed sequence: first, second etc.
- CF24 Fan rotation circuit 1:**
YES = rotation: the algorithm distributes the working time between loads to ensure even run times.
no = fixed sequence: the fans are enabled and disabled in fixed sequence: first, second etc.
- CF25 Fan rotation circuit 2:**
YES = rotation: the algorithm distributes the working time between loads to ensure even run times.
no = fixed sequence: the fans are enabled and disabled in fixed sequence: first, second etc.
- CF28 Activation time during the switching on of first step (valve of 25%) for Bitzer screw compressors:** (0÷255s): it sets for how long the valve is used during the startup phase.
- CF29 First step enabled during the regulation (switching off phase):** it sets if the first step can be used also during normal regulation.
NO = first step used only during the start phase
YES = first step used also during normal regulation
- CF30 Delay between the activation of the valve of the first step and compressor activation**

10.1.4 Display (CF26- CF27)

- CF26 displaying measurement unit:** it sets the measurement unit used for the display and for parameters that are connected to temperature/pressure. In parenthesis other measurement unit.
CDEC: °C with decimal point (bar);
CINT: °C with decimal point (bar);
F: °F (PSI);
BAR: bar (°C);
PSI: PSI (°F);
KPA: KPA (°C)
CKPA: °C (KPA)
NOTE2: parameters with probe calibration, are reset during the measurement unit change.
- CF27 Pressure display:** it indicates if the range of the probes are related to relative or absolute pressure.
rEL = relative pressure; **AbS:** absolute pressure
NOTE: the temperature is updated changing this value.

10.1.5 Analog Inputs – Probe adjustment (Ai1-Ai11)

- Ai1-10 Probe 1-10 calibration:**
 with **CF26 = CDEC or CINT:** -12.0 ÷ 12.0 °C
 with **CF26= bar:** -1.20 ÷ 1.20 bar;
 with **CF26 = F or PSI:** -120 ÷ 120 °F o PSI
 with **CF26 = KPA:** -1200 ÷ 1200 KPA;

- AI11 Alarm activated in case of regulation faulty probe:**
nu = none relay; **AIr**: all the C(i) Inputs set as ALr; **ALr1**: all the C(i) Inputs set as ALr1, **ALr2**: all the C(i) Inputs set as ALr2

10.1.6 Analog Inputs – Pressure probe set up (Ai12-Ai31)

- AI12 Probe 1 read out at 4mA/0,5V** (-1.00-Ai13 bar, -14.5÷Ai13 PSI, -100÷Ai13KPA)
AI13 Probe 1 read out at 20mA/4,5V (Ai12÷160 bar, Ai12÷ 2320, Ai12÷16000 KPA)
AI14 Probe 2 read out at 4mA/0,5V (-1.00-Ai15 bar, -14.5÷Ai15 PSI, -100÷Ai15KPA)
AI15 Probe 2 read out at 20mA/4,5V (Ai14÷160 bar, Ai14÷ 2320, Ai14÷16000 KPA)
AI16 Probe 3 read out at 4mA/0,5V (-1.00-Ai17 bar, -14.5÷Ai17 PSI, -100÷Ai17KPA)
AI17 Probe 3 read out at 20mA/4,5V (Ai16÷160 bar, Ai16÷ 2320, Ai16÷16000 KPA)
AI18 Probe 4 read out at 4mA/0,5V (-1.00-Ai19 bar, -14.5÷Ai19 PSI, -100÷Ai19KPA)
AI19 Probe 4 read out at 20mA/4,5V (Ai18÷160 bar, Ai18÷ 2320, Ai18÷16000 KPA)
AI20 Probe 5 read out at 4mA/0,5V (-1.00-Ai21 bar, -14.5÷Ai21 PSI, -100÷Ai21KPA)
AI21 Probe 5 read out at 20mA/4,5V (Ai20÷160 bar, Ai20÷ 2320, Ai20÷16000 KPA)
AI22 Probe 6 read out at 4mA/0,5V (-1.00-Ai23 bar, -14.5÷Ai23 PSI, -100÷Ai23KPA)
AI23 Probe 6 read out at 20mA/4,5V (Ai22÷160 bar, Ai22÷ 2320, Ai22÷16000 KPA)
AI24 Probe 7 read out at 4mA/0,5V (-1.00-Ai25 bar, -14.5÷Ai25 PSI, -100÷Ai25KPA)
AI25 Probe 7 read out at 20mA/4,5V (Ai24÷160 bar, Ai24÷ 2320, Ai24÷16000 KPA)
AI26 Probe 8 read out at 4mA/0,5V (-1.00-Ai27 bar, -14.5÷Ai27 PSI, -100÷Ai27KPA)
AI27 Probe 8 read out at 20mA/4,5V (Ai26÷160 bar, Ai26÷ 2320, Ai26÷16000 KPA)
AI28 Probe 9 read out at 4mA/0,5V (-1.00-Ai29 bar, -14.5÷Ai29 PSI, -100÷Ai29KPA)
AI29 Probe 9 read out at 20mA/4,5V (Ai28÷160 bar, Ai28÷ 2320, Ai28÷16000 KPA)
AI30 Probe 10 read out at 4mA/0,5V (-1.00-Ai31 bar, -14.5÷Ai31 PSI, -100÷Ai31KPA)
AI31 Probe 10 read out at 20mA/4,5V (Ai30÷160 bar, Ai30÷ 2320, Ai30÷16000 KPA)

10.1.7 Safety digital Inputs (SD1- SD3)

- SDI1 Manual reset of compressor alarms.**
no = automatic recover of alarm: the regulation will restart when the correspondent digital Input is disabled
yES = manual recover for the compressors alarms
- SDI2 Manual reset of fan alarms.**
no = automatic recover of alarm: the fan will restarts when the correspondent digital Input is disabled
yES = manual recover for the alarms of fan
- SDI3 Relay activated in case of compressor or fan alarms:**
nu = no relay activation, only visual signalling; **AIr**: all the C(i) Inputs set as ALr; **ALr1**: all the C(i) Inputs set as ALr1, **ALr2**: all the C(i) Inputs set as ALr2

10.1.8 Digital Inputs for liquid level (CDI1-CDI4)

- CDI1 Delay of LL digital Input - circuit 1** (0 ÷ 255 min)
- CDI2 Delay of LL digital Input - circuit 1** (0 ÷ 255 min)
- CDI3 Relay activated in case of liquid level alarm – circuit 1**
nu = no relay activation, only visual signalling; **AIr**: all the C(i) Inputs set as ALr; **ALr1**: all the C(i) Inputs set as ALr1, **ALr2**: all the C(i) Inputs set as ALr2
- CDI4 Relay activated in case of liquid level alarm – circuit 2**
nu = no relay activation, only visual signalling; **AIr**: all the C(i) Inputs set as ALr; **ALr1**: all the C(i) Inputs set as ALr1, **ALr2**: all the C(i) Inputs set as ALr2

10.1.9 Compressor Action (RC1-RC8)

- RC1 Regulation band width for compressors- circuit 1** (0.10÷10.00 bar; 0.1÷25.0 °C, 1÷80PSI, 1÷50°F; 10÷1000 KPa) The band is symmetrical compared to the target set point, with extremes: $\text{SETC1}+(\text{RC1})/2 \dots \text{SETC1}-(\text{RC1})/2$. The measurement unit depends on the **CF26** par.
NOTE: If the circuit 1 has 1 relay set as a frequency compressor, the AO1_17 parameter is used instead of the RC1 parameter: regulation band width that is added to the set point 1.
- RC2 Minimum compressor set point - circuit 1** ($-1 \div \text{SETC1}$ bar; $-70.0 \div \text{SETC1}$ °C; $-15.0 \div \text{SETC1}$ Psi; $-94.0 \div \text{SETC1}$ °F; $-100 \div \text{SETC1}$ Kpa).
The measurement unit depends on **CF26** parameter. It sets the minimum value that can be used for the compressor set point, to prevent the end user from setting incorrect values.
- RC3 Maximum compressor set point - circuit 1** ($\text{SETC1} \div 100.00$ bar; $\text{SETC1} \div 150.0$ °C; $\text{SETC1} \div 1450$ Psi; $\text{SETC1} \div 302$ °F; $\text{SETC1} \div 10000$ Kpa).
The measurement unit depends on **CF26** parameter. It sets the maximum acceptable value for compressor set point.
- RC4 Compressor energy saving value - circuit 1** ($-20.00 \div 20.00$ bar; $-50.0 \div 50.0$ °C; $-300 \div 300$ Psi; $-90 \div 90$ °F; $-2000 \div 2000$ Kpa) this value is add to the compressor set point when the energy saving is enabled.
- RC5 Regulation band width for compressors- circuit 2** (0.10÷10.00 bar; 0.1÷25.0 °C, 1÷80PSI, 1÷50°F; 10÷1000 KPa) The band is symmetrical compared to the target set point, with extremes: $\text{SETC1}+(\text{RC1})/2 \dots \text{SETC1}-(\text{RC1})/2$. The measurement unit depends on the **CF26** par.
NOTE: If the circuit 2 has 1 relay set as a frequency compressor, the AO1_17 parameter is used instead of the RC5 parameter: regulation band width that is added to the set point 2.
- RC6 Minimum compressor set point - circuit 2** ($-1 \div \text{SETC2}$ bar; $-70.0 \div \text{SETC2}$ °C; $-15.0 \div \text{SETC2}$ Psi; $-94.0 \div \text{SETC2}$ °F; $-100 \div \text{SETC2}$ Kpa).
The measurement unit depends on **CF26** parameter. It sets the minimum value that can be used for the compressor set point, to prevent the end user from setting incorrect values.
- RC7 Maximum compressor set point - circuit 2** ($\text{SETC2} \div 100.00$ bar; $\text{SETC2} \div 150.0$ °C; $\text{SETC2} \div 1450$ Psi; $\text{SETC2} \div 302$ °F; $\text{SETC2} \div 10000$ Kpa).
The measurement unit depends on **CF26** parameter. It sets the maximum acceptable value for compressor set point.
- RC8 Compressor energy saving value - circuit 2** ($-20.00 \div 20.00$ bar; $-50.0 \div 50.0$ °C; $-300 \div 300$ Psi; $-90 \div 90$ °F; $-2000 \div 2000$ Kpa) this value is add to the compressor set point when the energy saving is enabled.

10.1.10 Fan Action (RC9-RC16)

- RC9 Regulation band width for fans – circuit 1:** (0.10÷10.00 bar; 0.1÷30.0 °C, 1÷80 Psi, 1÷50°F; 10÷1000 Kpa)
Set the CF26 par. and the target set point for fans before setting this parameter.
The band is symmetrical compared to the fan target set point, with extremes: $\text{SETF1}-(\text{RC9})/2 \dots \text{SETF1}+(\text{RC9})/2$. The measurement unit depends on the **CF26** par.
- RC10 Minimum fan set point – circuit 1:** ($-1 \div \text{SETF1}$ bar ; $-50.0 \div \text{SETF1}$ °C; $-15.0 \div \text{SETF1}$ Psi ; $-94 \div \text{SETF1}$ °F; $-100 \div \text{SETF1}$ Kpa). The measurement unit depends on C45 parameter. It sets the minimum value that can be used for the fan set point, to prevent the end user from setting incorrect values.
- RC11 Maximum fan set point - circuit 1 :** ($\text{SETF1} \div 100.00$ bar; $\text{SETF1} \div 150.0$ °C; $\text{SETF1} \div 1450$ Psi; $\text{SETF1} \div 302$ °F; $\text{SETF1} \div 10000$ Kpa)
The measurement unit depends on **CF26** parameter. It sets the maximum acceptable value for fan set point.
- RC12 Fan energy saving value - circuit 1** ($-20.00 \div 20.00$ bar; $-50.0 \div 50.0$ °C; $-300 \div 300$ Psi; $-90 \div 90$ °F; $-2000 \div 2000$ Kpa) this value is add to the fan set point when the energy saving is enabled.

- RC13 Regulation band width for fans – circuit 2:** (0.10÷10.00 bar; 0.1÷30.0 °C, 1÷80 Psi, 1÷50°F; 10÷1000 Kpa)
Set the CF26 par. and the target set point for fans before setting this parameter.
 The band is symmetrical compared to the fan target set point, with extremes: SETF2-(RC13)/2 ... SETF2+(RC13)/2. The measurement unit depends on the **CF26** par.
- RC14 Minimum fan set point – circuit 2:** (-1 ÷ SETF1 bar ; -50.0 ÷ SETF1 °C; -15.0 ÷ SETF1 Psi ; -94 ÷ SETF1 °F; -100 ÷ SETF1 Kpa). The measurement unit depends on C45 parameter. It sets the minimum value that can be used for the fan set point, to prevent the end user from setting incorrect values.
- RC15 Maximum fan set point – circuit 2:** (SETF1÷100.00 bar; SETF1÷150.0 °C; SETF1÷1450 Psi; SETF1÷302 °F; SETF1÷10000 Kpa)
 The measurement unit depends on **CF26** parameter. It sets the maximum acceptable value for fan set point.
- RC16 Fan energy saving value - circuit 2** (-20.00÷20.00 bar; -50.0÷50.0 °C; -300÷300 Psi; -90÷90 °F; -2000÷2000 Kpa) this value is add to the fan set point when the energy saving is enabled.

10.1.11 Safety Compressors (SL1- SL11)

- SL1 Minimum time between 2 following switching ON of the same compressor** (0÷255 min).
- SL2 Minimum time between the switching off of a compressor and the following switching on.** (0÷255min). **Note:** usually SL1 must be greater than SL2.
- SL3 Time delay between the insertion of two different compressors** (0 ÷ 5990 sec)
- SL4 Time delay between switching off of two different compressors** ((0 ÷ 5990 sec)
- SL5 Minimum time load on** ((0 ÷ 5990 sec)
- SL6 Maximum time load on** (0 ÷ 24 h; with 0 this function is disabled.) If a compressor keeps staying on for the SL6 time, it is switched off and it can restart after the SL2 standard time or after the SL7 time with frequency compressor.
- SL7 Minimum time a frequency compressor stays off after SL6 time** (0÷255 min)
- SL8 SL3 delay enabled also for the first call.** If enabled, the step triggering is delayed for a “SL3” time, respect to the call.
no = “SL3” not enabled;
yES=“SL3” enabled
- SL9 SL4 delay enabled also for the first off.** If enabled, the step triggering is delayed for a “SL4” time, respect to the call.
no = “SL4” not enabled;
yES=“SL4” enabled
- SL10 Input delay at power on** (0 ÷ 255 sec)
- SL11 Booster function enabled:**
no = compressors of 2 circuits work independently
yES = if at least one compressor of the circuit 1 (BT) is ON, also one compressor of the circuit 2 (TN) is enabled, independently from the pressure of the circuit 2. This ensures that the gas coming from the circuit 1 is suct by the compressors of the circuit 2.

10.1.12 Safety Fans (SL12- SL13)

- SL12 Time delay between the insertion of two different fans** (1 ÷ 255 sec)
- SL13 Time delay between switching off of two different fans** (1 ÷ 255 sec)

10.1.13 Configuring the temperature/pressure alarms (AC1-AC2)

AC1 Relative/absolute compressor alarms

REL = pressure/temperature alarms associated with the setpoint. In this case, the alarm threshold is added/deducted from the respective setpoint.

E.g. suction high temperature alarm 1. The alarm threshold is SETC1+ AL4.

ABS = alarms with absolute pressure/temperature values. In this case, the alarm threshold is determined by the alarm parameter value.

E.g. high temperature alarm for suction 1. The alarm threshold is AL4

AC2 Relative/absolute fan alarms

REL = pressure/temperature alarms associated with the setpoint. In this case, the alarm threshold is added/deducted from the respective setpoint.

E.g. condensation high temperature alarm 1. The alarm threshold is SETF1+ AF2

ABS = alarms with absolute pressure/temperature values. In this case, the alarm threshold is determined by the alarm parameter value.

E.g. condensation high temperature alarm 1. The alarm threshold is AF2

10.1.14 Compressor Alarms (AL1-AL23)

AL1 Suction Probe 1 alarm exclusion at power on (0 ÷ 255 min) it is the period starting from instrument switch on, before an alarm probe is signalled. During this time if the pressure is out of range all the compressor are switched on.

AL2 Suction Probe 2 alarm exclusion at power on (0 ÷ 255 min) it is the period starting from instrument switch on, before an alarm probe is signalled. During this time if the pressure is out of range, all the compressor are switched on.

AL3 Low pressure (temperature) alarm for compressors – circuit 1: (0.10 ÷ 30.00bar; 0.0 ÷ 100.0°C; 1÷430 PSI; 1÷200.0°F; 10 ÷ 3000KPa)

With AC1 = ABS: -1.00 to AL4 bar; -50 to AL4°C; -14 to AL4 Psi; -58 to AL4°F; -100 to AL4 Kpa)

The measurement unit depends on CF26 parameter.

With AC1 = REL If the pressure (temperature) falls below the “SETC1-AL3” value, the “Low alarm – Suction 1” is activated at the end of the AL5 period of time.

With AC1 = ABS If the pressure (temperature) falls below the “AL3” value, the “Low alarm – Suction 1” is activated at the end of the AL5 period of time.

AL4 High pressure (temperature) alarm for compressors – circuit 1: (With AC1 = REL 0.10 to 30.00 bar; 0.0 to 100.0 °C; 1 to 430 PSI; 1 to 200.0 °F; 10 to 3000 KPa

With AC1 = ABS: AL3 to 100.00 bar; AL3 to 150 °C; -AL3 to 1450 Psi; AL3 to 230 °F; AL3 to 10000 Kpa). The measurement unit depends on CF26 parameter.

With AC1 = REL If the pressure (temperature) exceeds the “SETC1+AL4” value, the “High alarm – Suction 1” is activated at the end of the AL5 period of time.

With AC1 = ABS If the pressure (temperature) exceeds the “AL4” value, the “High alarm – Suction 1” is activated at the end of the AL5 period of time.

AL5 Low and High compressor pressure (temperature) alarms delay – circuit 1 (0÷255 min) time interval between the detection of a pressure (temperature) alarm condition and alarm signalling.

AL6 Low pressure (temperature) alarm for compressors – circuit 2:

(With AC1 = REL: 0.10 to 30.00 bar; 0.0 to 100.0 °C; 1 to 430 Psi; 1 to 200.0 °F; 10 to 3000 Kpa

With AC1 = ABS: -1.00 to AL7 bar; -50 to AL7 °C; -14 to AL7 Psi; -58 to AL7 °F; -100 to AL7 Kpa)

The measurement unit depends on CF26 parameter.

With AC1 = REL If the pressure (temperature) falls below the “SETC2-AL6” value, the “Low alarm – Suction 2” is activated at the end of the AC8 period of time.

With AC1 = ABS If the pressure (temperature) falls below the “AL6” value, the “Low alarm – Suction 2” is activated at the end of the AL8 period of time.

AL7 High pressure (temperature) alarm for compressors – circuit 2: (With AC1 = REL 0.10 to 30.00 bar; 0.0 to 100.0 °C; 1 to 430 Psi; 1 to 200.0 °F; 10 to 3000 Kpa

With AC1 = ABS: AL6 to 100.00 bar; AL6 to 150 °C; -AL6 to 1450 Psi; AL6 to 230 °F; AL6 to 10000 Kpa). The measurement unit depends on CF26 parameter.

With AC1 = REL If the pressure (temperature) exceeds the "SETC2+AL7" value, the "High alarm – Suction 2" is activated at the end of the AL8 period of time.

With AC1 = ABS If the pressure (temperature) exceeds the "AL7" value, the "High alarm – Suction 2" is activated at the end of the AL8 period of time.

- AL8 Low and High compressor pressure (temperature) alarms delay – circuit 2** (0÷255 min) interval time between the detection of a pressure (temperature) alarm condition and alarm signalling.
- AL9 Relay activated in case of pressure (temperature) alarm**
nu = no relay activation, only visual signalling; **ALr**: all the C(i) Inputs set as ALr; **ALr1**: all the C(i) Inputs set as ALr1, **ALr2**: all the C(i) Inputs set as ALr2
- AL10 Service request:** (0÷25000h with 0 the function is disabled) number of running hours after that maintenance warning is generated
- AL11 Relay activated in case of service request alarm**
nu = no relay activation, only visual signalling; **ALr**: all the C(i) Inputs set as ALr; **ALr1**: all the C(i) Inputs set as ALr1, **ALr2**: all the C(i) Inputs set as ALr2
- AL12 Low pressure-switch intervention numbers – circuit 1: (0÷15).** Every time the pressure-switch is activated all the compressors of the circuit 1 are turned off. If the low pressure-switch is activated AL12 times in the AL13 interval, the compressors of the first circuit are switched off and only the manually unlocking is possible.
- AL13 Pressure-switch interventions time (0÷255 min) – circuit 1** Interval, linked to the AL12 parameter, for counting interventions of the low pressure-switch.
- AL14 Number of steps engaged with suction probe 1 faulty** (0 ÷ 15)
- AL16 Low pressure-switch intervention numbers – circuit 2: (0÷15).** Every time the pressure-switch is activated all the compressors of the circuit 2 are turned off. If the low pressure-switch is activated AL16 times in the AL17 interval, the compressors of the second circuit are switched off and only the manually unlocking is possible.
- AL17 Pressure-switch interventions time (0÷255 min) – circuit 2** Interval, linked to the AL16 parameter, for counting interventions of the low pressure-switch.
- AL18 Number of steps engaged with suction probe 2 faulty** (0 ÷ 15)
- AL20 Electronic pressure switch activation for circuit 1**
NO = electronic pressure switch not enabled
YES = electronic pressure switch enabled
- AL21 Pressure/temperature threshold of compressor set for circuit 1**
(-1 ÷ SETC1 Bar ; -70.0 ÷ SETC1 °C; -15 ÷ SETC1 Psi; -94 ÷ SETC1 °F; -100 ÷ SETC1 Kpa;)
- AL22 Enabling the electronic pressure switch for circuit 2**
NO = electronic pressure switch not enabled
YES = electronic pressure switch enabled
- AL23 Pressure/temperature threshold of compressor set for circuit 2**
(-1 ÷ SETC2 Bar ; -70.0 ÷ SETC2 °C; -15 ÷ SETC2 Psi; -94 ÷ SETC2 °F; -100 ÷ SETC2 Kpa;)

10.1.15 Fan Alarms (AL24-AL40)

- AL24 Low pressure (temperature) alarm for fans – circuit 1: (With AC2 = REL: 0.10 ÷ 30.00 bar; 0.0 ÷ 100.0 °C; 1÷430 Psi; 1÷200.0 °F; 10 ÷ 3000 Kpa)**
With AC2 = ABS: -1.00 to AL25 bar; -50 to AL25 °C; -14 to AL25 Psi; -58 to AL25 °F; -100 to AL25 Kpa) The measurement unit depends on CF26 parameter.
With AC2 = REL If the pressure (temperature) falls below the "SETF1-AL24" value, the "Low alarm – Condensation 1" is activated at the end of the AL26 period of time.

With AC2 = ABS If the pressure (temperature) falls below the "AL24" value, the "Low alarm – Condensation 1" is activated at the end of the AL26 period of time".

AL25 High pressure (temperature) alarm for fans– circuit 1: (With AC2 = REL 0.10 to 30.00bar; 0.0 to 100.0 °C; 1 to 430 PSI; 1 to 200.0°F; 10 to 3000KPA
With AC2 = ABS: AL24 to 100.00bar; AL24 to150°C; AL24 to1450 PSI; AL24 to 230°F; AL24 to10000 KPA).

The measurement unit depends on CF26 parameter.

With AC2 = REL If the pressure (temperature) exceeds the "SETF1+AL25" value, the "High alarm – Condensation 1" is activated at the end of the AL26 period of time

With AC2 = ABS If the pressure (temperature) exceeds the "AF2" value, the "High alarm – Condensation 1" is activated at the end of the AL26 period of time

AL26 Low and High fan pressure (temperature) alarms delay – circuit 1 (0÷255 min) time interval between the detection of a pressure (temperature) alarm condition and alarm signalling.

AL27 Compressors off with pressure (temperature) alarm for fans– circuit 1

no = compressors are not influenced by this alarm

yES = compressors are turned off in case of high pressure (temperature) alarm of fans

AL28 Interval between 2 compressors turning off in case of high pressure (temperature) alarm for fans – circuit 1 (0 ÷ 255 min)

AL29 High pressure-switch intervention numbers – circuit 1: (0÷15). Every time the pressure-switch is activated all the compressors of the circuit 1 are turned off and the fan turned on. If the high pressure-switch is activated AL29 times in the AL30 interval, the compressors of the first circuit are switched off and the fans on, only the manually unlocking is possible.

AL30 High pressure-switch interventions time (0÷255 min) – circuit 1 Interval, linked to the AL29 parameter, for counting interventions of the high pressure-switch.

AL31 Fans on with delivery probe faulty – circuit 1 (0 ÷ 15)

AL32 Low pressure (temperature) alarm for fans – circuit 2:

(With AC2 = REL: 0.10 ÷ 30.00 bar; 0.0 ÷ 100.0 °C; 1÷430 Psi; 1÷200.0 °F; 10 ÷ 3000 Kpa

With AC2 = ABS: -1.00 to AL33 bar; -50 to AL33 °C; -14 to AL33 PSI; -58 to AL33 °F; -100 to AL33 KPA) The measurement unit depends on CF26 parameter.

With AC2 = REL If the pressure (temperature) falls below the "SETF2-AL32" value, the "Low alarm – Condensation 2" is activated at the end of the AL34 period of time.

With AC2 = ABS If the pressure (temperature) falls below the "AL32" value, the "Low alarm – Condensation 2" is activated at the end of the AL34 period of time.

AL33 High pressure (temperature) alarm for fans– circuit 2:

(With AC2 = REL 0.10 to 30.00bar; 0.0 to 100.0°C; 1 to 430 PSI; 1 to 200.0°F; 10 to 3000KPA

With AC2 = ABS AL32 to 100.00bar; AL32 to150°C; AL32 to1450 PSI; AL32 to 230°F; AL32 to 10000 KPA).

The measurement unit depends on CF26 parameter.

With AC2 = REL If the pressure (temperature) exceeds the "SETF2+AL33" value, the "Low alarm – Condensation 2" is activated at the end of the AL34 period of time.

With AC2 = ABS If the pressure (temperature) exceeds the "AL33" value, the "Low alarm – Condensation 2" is activated at the end of the AL34 period of time.

AL34 Low and High fan pressure (temperature) alarms delay – circuit 2 (0÷255 min) time interval between the detection of a pressure (temperature) alarm condition and alarm signalling.

AL35 Compressors off with pressure (temperature) alarm for fans– circuit 2

no = compressors are not influenced by this alarm

yES = compressors are turned off in case of high pressure (temperature) alarm of fans

AL36 Interval between 2 compressors turning off in case of high pressure (temperature) alarm for fans – circuit 2 (0 ÷ 255 min)

AL37 High pressure-switch intervention numbers – circuit 2: (0÷15). Every time the pressure-switch is activated all the compressors of the circuit 1 are turned off and the fan turned on. If the high

pressure-switch is activated AL37 times in the AL38 interval, the compressors of the first circuit are switched off and the fans on, only the manually unlocking is possible.

AL38 High pressure-switch interventions time (0÷255 min) – circuit 2 Interval, linked to the AL37 parameter, for counting interventions of the high pressure-switch.

AL39 Fans on with delivery probe faulty – circuit 2 (0 ÷ 15)

AF40 Relay activated in case of pressure (temperature) alarms of fans
nu = no relay activation, only visual signalling; **Alr**: all the C(i) Inputs set as ALr; **ALr1**: all the C(i) Inputs set as ALr1, **ALr2**: all the C(i) Inputs set as ALr2

10.1.16 Dynamic Setpoint Suction (Dsp1- Dsp8)

DSP1 Dynamic compressor set point function enabled - circuit 1

no = standard regulation

yes = the SETC1 varies according to the setting of DSP2, DSP3, DSP4.

Warning the dynamic set point requires a dedicated probe, so it is necessary one of the probes is set for this function.

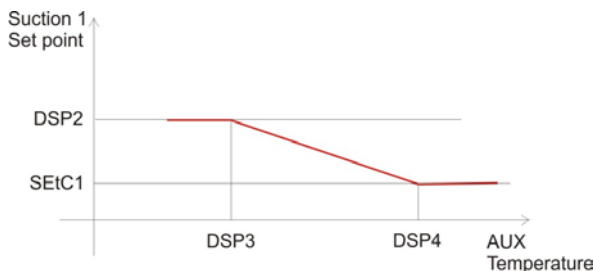
NOTE: if more than one probe is used for the optimization of the suction set point, only the last probe defined is considered.(ex: if the analog input 1 is configured as optimization of suction set point and also the analog input 2 ;the probe is used is the probe 2)

DSP2 Maximum compressor set point - circuit 1 (SETC1÷RC3) It sets the maximum value of compressor set point used in the dynamic set point function. The measurement unit depends on CF26 parameter.

DSP 3 External temperature for maximum set point DSP2- circuit 1 (-40÷DSP4 °C /-40÷DSP4°F) It is the temperature detected by the external probe, at which the maximum set point is reached.

DSP 4 External temperature for standard set point– circuit 1 (DSP3÷150°C DSP 3÷302°F)

- | | | | |
|----|-------------------------------|-----|-----------------------------|
| 1. | with EXT temper. < DSP3 | ==> | "Real SETC1" = DSP2 |
| 2. | with EXT temper. > DSP4 | ==> | "Real SETC1" = SETC1 |
| 3. | with DSP3 < EXT temper < DSP4 | ==> | SETC1 < "Real SETC1" < DSP2 |



DSP5 Dynamic compressor set point function enabled - circuit 2

no = standard regulation

yes = the SETC2 varies according to the setting of DSP6, DSP7, DSP8.

WARNING the dynamic set point requires a dedicated probe, it is one probe must be set up for this function

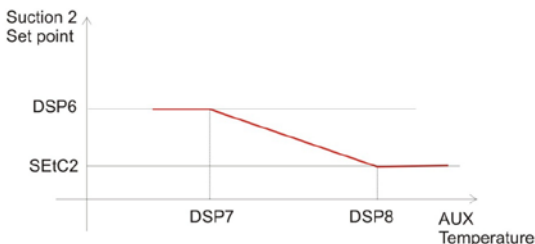
NOTE: if more than one probe is used for the optimization of the suction set point, only the last probe defined is considered.(ex: if the analog input 1 is configured as optimization of suction set point and also the analog input 2 ;the probe is used is the probe 2)

DSP 6 Maximum compressor set point - circuit 2 (SETC2÷RC7) It sets the maximum value of compressor set point used in the dynamic set point function. The measurement unit depends on CF46 parameter.

DSP 7 External temperature for maximum set point O6 - circuit 2 (-40÷DSP8 °C /-40÷DSP8°F) It is the temperature detected by the external probe, at which the maximum set point is reached.

DSP 8 External temperature for standard set point– circuit 2 (DSP7÷150°C DSP 7÷302°F)

- | | | |
|----------------------------------|-----|-----------------------------|
| 1. with EXT temper. < DSP7 | ==> | "Real SETC2" = DSP6 |
| 2. with EXT temper. > DSP8 | ==> | "Real SETC2" = SETC2 |
| 3. with DSP7 < EXT temper < DSP8 | ==> | SETC2 < "Real SETC2" < DSP6 |



10.1.17 Dynamic Setpoint Condenser (DSP9- DSP14)

DSP9 Dynamic set enabled for condenser- circuit 1

no = standard regulation

yES = the SETF1 varies according to the setting of DSP10, DSP11.

WARNING the dynamic set point requires a dedicated probe, one probe must be set up for this function it is

DSP10 Minimum condenser set point - circuit 1 (RC10÷SETF1)

DSP11 Differential for condenser dynamic set point –circuit 1 (-50.0÷50.0°C; -90÷90°F). The way of working of this algorithm is explained in the following exemplum.

Example

The ext temperature > SETF1-DSP11

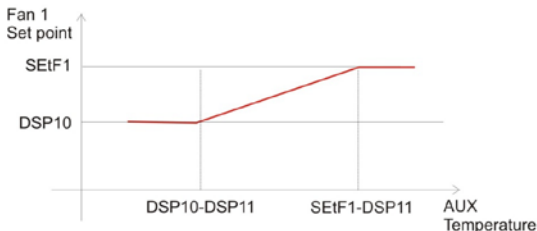
==> "real SetF1" = SETF1

The ext temperature < DSP10-DSP11

==> "real SetF1" = DSP10

DSP10- DSP11 < ext temperature < SETF1- DSP11

==> DSP10 < "real SetF1" < SETF1



NOTE: if CF26 = bar or PSI or KPA, DSP11 is bar or PSI, the IProRack makes the changes required

DSP12 Dynamic set enabled for condenser- circuit 2

no = standard regulation

yES = the SETF2 varies according to the setting of DSP13, DSP14.

WARNING the dynamic set point requires a dedicated probe, one probe must be set up for this function it is

DSP13 Minimum condenser set point - circuit 2 (RC14÷SETF2)

DSP14 Differential for condenser dynamic set point –circuit 2 (-50.0÷50.0°C; -90÷90°F). The way of working of this algorithm is explained in the following example.

Example

The ext temperature > SETF2-DSP14

==>

"real SetF2" = SETF2

The ext temperature < DSP13-DSP14

==>

"real SetF1"= DSP13

DSP13-DSP14 < ext temperature < SETF2-DSP14

==>

DSP13 < "real SetF2" < SetF2

10.1.18 Analog Output 1 (AO1 1- AO1 24)

AO1_1 Reference probe for analogue Output 1 , it is used only when the analog Output is configured as "inverter free"

Pb1 = (term. 2-7 (if the probe is configured as NTC PTC))

Pb2 = (term. 3-7 (if the probe is configured as NTC PTC))

Pb3 = (term. 4-7 (if the probe is configured as NTC PTC))

Pb4 = (term. 5-7 (if the probe is configured as NTC PTC))

Pb5 = (term. 6-7 (if the probe is configured as NTC PTC))

Pb6 = (term. 10-7 (if the probe is configured as NTC PTC))

Pb7 = (term. 11-7 (if the probe is configured as NTC PTC))

Pb8 = (term. 12-7 (if the probe is configured as NTC PTC))

Pb9 = (term. 13-7 (if the probe is configured as NTC PTC))

Pb10 = (term. 14-7 (if the probe is configured as NTC PTC))

AO1_2 Adjustment of read out for the analog Output 1 (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). is used only when the analog Output is configured as "inverter free"

AO1_3 Adjustment of read out for the analog Output 1 at 20mA/10V (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). It is used only when the analog Output is configured as inverter FREE

AO1_4 Minimum value for analogue Output 1 (0 ÷ 99%)

AO1_5 Analog Output 1 value after compressor start (AO1_4 ÷ 100 %) It is the value of the analogue Output after a compressor has started, when the pressure/temperature is above the regulation band. – *Used during inverter regulation*

AO1_6 Analog Output 1 value after a compressor is switched off (AO1_4 ÷ 100 %) It is the value of the analogue Output when a compressor has been switched off and the the pressure/temperature is below the regulation band. – *Used during inverter regulation*

AO1_7 Exclusion band start value for analog Output 1 (AO1_4 ÷ 100 %): it excludes a range of frequencies that could create problems to the compressor. – *Used during inverter regulation*

AO1_8 Exclusion band end value for analog Output 1 (AO1_7 ÷ 100 %) – *Used during inverter regulation*

AO1_9 Safety value for analog Output 1 (0 ÷ 100 %): it is used in case of probe's fault.

AO1_10 Delay between the entrance in the regulation band and the regulation activation (0 ÷ 255sec): it is the delay between the entrance in the regulation band of pressure/temperature and the

regulation start. it is used to avoid false inverter starts due to pressure variations. – *Used during inverter regulation.*

AO1_11 Analog Output 1 rise time: ($0 \div 255$ sec). It is the time necessary to the analog Output to pass from the AO1_4 to 100%, when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*

AO1_12 Analog Output 1 permanency at 100% before load activation ($0 \div 255$ sec): the analog Output remains at 100% value for this time before a load is activated. – *Used during inverter regulation*

AO1_13 Delay between pressure (temperature) goes down the set point and start of analog Output 1 decreasing ($0 \div 255$ sec). – *Used during inverter regulation*

AO1_14 Analog Output 1 decreasing time ($0 \div 255$ sec) It is the time taken from the analog Output to pass from the 100% to the AO1_4 value. It is used during the switching off phase, when the pressure is lower than the set point.

AO1_15 Analog Output 1 permanency at AO1_4 before a load is switched off ($0 \div 255$ sec) When the pressure (temperature) is below the set point, the analog Output remains at AO1_4 value for the AO1_15 before a load is switched off.

AO1_16 Analog Output 1 decreasing time when a load is switched on ($0 \div 255$ sec) It is the time necessary to the analog Output to pass from 100% to AO1_5 when a load is switched on.

AO1_17 Regulation band ($0.10 \div 25.00$ bar; $0.0 \div 25.0$ °C; $1 \div 250$ PSI; $1 \div 250$ °F; $10 \div 2500$ KPA). It is the band with the proportional action. It replaces RC1 for the inverter regulation. It is added to the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the 100% when the pressure/temperature is equal or higher than set + AO1_17.

AO1_18 Integral time ($0 \div 999$ s; with 0 integral action excluded). It sets the pound of the proportional action. The higher is AO1_18, the lower is the integral action support.

AO1_19 Band offset ($-12.0 \div 12.0$ °C $-12.00 \div 12.00$ BAR, $-120 \div 120$ °F, $-120 \div 120$ PSI; $-1200 \div 1200$ KPA). It is used to move the regulation band across to the set point.

AO1_20 Integral action limitation ($0.0 \div 99.0$ °C; $0 \div 180$ °F; $0.00 \div 50,00$ bar; $0 \div 725$ PSI; $0 \div 5000$ kPA) to stop the increasing of integral action when the pressure reaches the SET + AO1_20 value.

AO1_22 Minimum inverter capacity with poor lubrication ($0 \div 99$ %; with 0 function excluded) If the frequency compressor works for the AO1_23 time with a frequency (in percentage) equal or lower than AO1_22, it is forced to work at 100% for the AO1_24 time in order to restore the right lubrication.

AO1_23 Maximum time at a frequency lower than AO1_22 before working at 100% ($1 \div 255$ min)

AO1_24 Time of inverter functioning at 100% to restore the right lubrication ($1 \div 255$ min)

10.1.19 Analog Output 2 (AO2 1- AO2 24)

AO2_1 Reference probe for analogue Output 2, it is used only when the analog Output is configured as FREE

Pb1 = (term. 2-7 (if the probe is configured as NTC PTC))

Pb2 = (term. 3-7 (if the probe is configured as NTC PTC))

Pb3 = (term. 4-7 (if the probe is configured as NTC PTC))

Pb4 = (term. 5-7 (if the probe is configured as NTC PTC))

Pb5 = (term. 6-7 (if the probe is configured as NTC PTC))

Pb6 = (term. 10-7 (if the probe is configured as NTC PTC))

Pb7 = (term. 11-7 (if the probe is configured as NTC PTC))

Pb8 = (term. 12-7 (if the probe is configured as NTC PTC))

Pb9 = (term. 13-7 (if the probe is configured as NTC PTC))

Pb10 = (term. 14-7 (if the probe is configured as NTC PTC))

- AO2_2 Adjustment of read out for the analog Output 2** (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). It is used only when the analog Output is configured as FREE
- AO2_3 Adjustment of read out for the analog Output 2 at 20mA/10V** (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). It is used only when the analog Output is configured as FREE
- AO2_4 Minimum value for analogue Output 2** ($0 \div 99\%$)
- AO2_5 Analog Output 2 value after compressor start** ($AO2_4 \div 100\%$) It is the value of the analogue Output after a compressor has started, when the pressure/temperature is above the regulation band.
– *Used during inverter regulation*
- AO2_6 Analog Output 2 value after a compressor is switched off** ($AO2_4 \div 100\%$) It is the value of the analogue Output when a compressor has been switched off and the the pressure/temperature is below the regulation band. – *Used during inverter regulation*
- AO2_7 Exclusion band start value for analog Output 2** ($AO2_4 \div 100\%$): it excludes a range of frequencies that could create problems to the compressor. – *Used during inverter regulation*
- AO2_8 Exclusion band end value for analog Output 2** ($AO2_7 \div 100\%$) – *Used during inverter regulation*
- AO2_9 Safety value for analog Output 2** ($0 \div 100\%$): it is used in case of probe's fault.
- AO2_10 Delay between the entrance in the regulation band and the regulation activation** ($0 \div 255\text{sec}$): it is the delay between the entrance in the regulation band of pressure/temperature and the regulation start. It is used to avoid false inverter starts due to pressure variations. – *Used during inverter regulation.*
- AO2_11 Analog Output 2 rise time:** ($0 \div 255\text{ sec}$). It is the time necessary to the analog Output to pass from the AO2_4 to 100%, when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*
- AO2_12 Analog Output 2 permanency at 100% before load activation** ($0 \div 255\text{ sec}$): the analog Output remains at 100% value for this time before a load is activated. – *Used during inverter regulation*
- AO2_13 Delay between pressure (temperature) goes down the set point and start of analog Output 2 decreasing** ($0 \div 255\text{sec}$). – *Used during inverter regulation*
- AO2_14 Analog Output 2 decreasing time** ($0 \div 255\text{sec}$) It is the time taken from the analog Output to pass from the 100% to the AO2_4 value. It is used during the switching off phase, when the pressure is lower than the set point.
- AO2_15 Analog Output 2 permanency at AO2_4 before a load is switched off** ($0 \div 255\text{sec}$) When the pressure (temperature) is below the set point, the analog Output remains at AO2_4 value for the AO2_15 before a load is switched off.
- AO2_16 Analog Output 2 decreasing time when a load is switched on** ($0 \div 255\text{sec}$) It is the time necessary to the analog Output to pass from 100% to AO2_5 when a load is switched on.
- AO2_17 Regulation band** ($0.10 \div 25.00\text{bar}$; $0.0 \div 25.0^\circ\text{C}$; $1 \div 250\text{ PSI}$; $1 \div 250^\circ\text{F}$; $10 \div 2500\text{ KPA}$). It is the band with the proportional action. It replaces the band for the inverter regulation. It is added to the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the 100% when the pressure/temperature is equal or higher than set + AO2_17.
- AO2_18 Integral time** ($0 \div 999\text{s}$; with 0 integral action excluded). It sets the pound of the proportional action. The higher is AO2_18 , the lower is the integral action support.
- AO2_19 Band offset** ($-12.0 \div 12.0^\circ\text{C}$ $-12.00 \div 12.00\text{ BAR}$, $-120 \div 120^\circ\text{F}$, $-120 \div 120\text{PSI}$; $-1200 \div 1200\text{KPA}$). it is used to move the regulation band across to the set point.

AO2_20 Integral action limitation (0.0÷99.0 °C; 0÷180°F; 0.00÷50.00bar; 0÷725PSI; 0÷5000kPA) to stop the increasing of integral action when the pressure reaches the SET + AO2_20 value.

AO2_22 Minimum inverter capacity with poor lubrication (0÷99%; with 0 function excluded) If the frequency compressor works for the AO2_23 time with a frequency (in percentage) equal or lower than AO2_22, it is forced to work at 100% for the AO2_24 time in order to restore the right lubrication.

AO2_23 Maximum time at a frequency lower than AO2_22 before working at 100% (1÷255min)

AO2_24 Time of inverter functioning at 100% to restore the right lubrication (1÷255min)

10.1.20 Analog Output 3 (AO3_1- AO3_24)

AO3_1 Reference probe for analogue Output 3, it is used only when the analog Output is configured as FREE

Pb1 = (term. 2-7 (if the probe is configured as NTC PTC))
Pb2 = (term. 3-7 (if the probe is configured as NTC PTC))
Pb3 = (term. 4-7 (if the probe is configured as NTC PTC))
Pb4 = (term. 5-7 (if the probe is configured as NTC PTC))
Pb5 = (term. 6-7 (if the probe is configured as NTC PTC))
Pb6 = (term. 10-7 (if the probe is configured as NTC PTC))
Pb7 = (term. 11-7 (if the probe is configured as NTC PTC))
Pb8 = (term. 12-7 (if the probe is configured as NTC PTC))
Pb9 = (term. 13-7 (if the probe is configured as NTC PTC))
Pb10 = (term. 14-7 (if the probe is configured as NTC PTC))

AO3_2 Adjustment of read out for the analog Output 3 (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). It is used only when the analog Output is configured as FREE

AO3_3 Adjustment of read out for the analog Output 3 at 20mA/10V (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). It is used only when the analog Output is configured as FREE

AO3_4 Minimum value for analogue Output 3 (0 ÷ 99%)

AO3_5 Analog Output 3 value after compressor start (AO3_4 ÷ 100 %) It is the value of the analogue Output after a compressor has started, when the pressure/temperature is above the regulation band. – *Used during inverter regulation*

AO3_6 Analog Output 3 value after a compressor is switched off (AO3_4 ÷ 100 %) It is the value of the analogue Output when a compressor has been switched off and the the pressure/temperature is below the regulation band. – *Used during inverter regulation*

AO3_7 Exclusion band start value for analog Output 3 (AO3_4 ÷ 100 %): it excludes a range of frequencies that could create problems to the compressor. – *Used during inverter regulation*

AO3_8 Exclusion band end value for analog Output 3 (AO3_7 ÷ 100 %) – *Used during inverter regulation*

AO3_9 Safety value for analog Output 3 (0 ÷ 100 %): it is used in case of probe's fault.

AO3_10 Delay between the entrance in the regulation band and the regulation activation (0 ÷ 255sec): it is the delay between the entrance in the regulation band of pressure/temperature and the regulation start. It is used to avoid false inverter starts due to pressure variations. – *Used during inverter regulation.*

AO3_11 Analog Output 3 rise time: (0 ÷ 255 sec). It is the time necessary to the analog Output to pass from the AO3_4 to 100%, when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*

AO3_12 Analog Output 3 permanency at 100% before load activation (0 ÷ 255 sec): the analog Output remains at 100% value for this time before a load is activated. – *Used during inverter regulation*

AO3_13 Delay between pressure (temperature) goes down the set point and start of analog Output 3 decreasing (0÷255sec). – *Used during inverter regulation*

AO3_14 Analog Output 3 decreasing time (0 ÷ 255sec) It is the time taken from the analog Output to pass from the 100% to the AO3_4 value. It is used during the switching off phase, when the pressure is lower than the set point.

AO3_15 Analog Output 3 permanency at AO3_4 before a load is switched off (0 ÷ 255sec) When the pressure (temperature) is below the set point, the analog Output remains at AO3_4 value for the AO3_15 before a load is switched off.

AO3_16 Analog Output 3 decreasing time when a load is switched on (0 ÷ 255sec) It is the time necessary to the analog Output to pass from 100% to AO3_5 when a load is switched on.

AO3_17 Regulation band (0.10÷25.00bar; 0.0÷25.0°C; 1÷250 PSI; 1÷250°F; 10÷2500 KPA). It is the band with the proportional action. It replaces the band for the inverter regulation. It is added to the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the 100% when the pressure/temperature is equal or higher than set + AO3_17.

AO3_18 Integral time (0÷999s; with 0 integral action excluded). It sets the pound of the proportional action. The higher is AO3_18 , the lower is the integral action support.

AO3_19 Band offset (-12.0÷12.0°C -12.00 ÷ 12.00 BAR, -120÷120°F, -120÷120PSI; -1200÷1200KPA). it is used to move the regulation band across to the set point.

AO3_20 Integral action limitation (0.0÷99.0 °C; 0÷180°F; 0.00÷50.00bar; 0÷725PSI; 0÷5000kPA) to stop the increasing of integral action when the pressure reaches the SET + AO3_20 value.

AO3_22 Minimum inverter capacity with poor lubrication (0÷99%; with 0 function excluded) If the frequency compressor works for the AO3_23 time with a frequency (in percentage) equal or lower than AO3_22, it is forced to work at 100% for the AO3_24 time in order to restore the right lubrication.

AO3_23 Maximum time at a frequency lower than AO3_22 before working at 100% (1÷255min)

AO3_24 Time of inverter functioning at 100% to restore the right lubrication (1÷255min)

10.1.21 Analog Output 4 (AO4 1- AO4 24)

AO4_1 Reference probe for analogue Output 4, it is used only when the analog Output is configured as FREE

Pb1 = (term. 2-7 (if the probe is configured as NTC PTC))

Pb2 = (term. 3-7 (if the probe is configured as NTC PTC))

Pb3 = (term. 4-7 (if the probe is configured as NTC PTC))

Pb4 = (term. 5-7 (if the probe is configured as NTC PTC))

Pb5 = (term. 6-7 (if the probe is configured as NTC PTC))

Pb6 = (term. 10-7 (if the probe is configured as NTC PTC))

Pb7 = (term. 11-7 (if the probe is configured as NTC PTC))

Pb8 = (term. 12-7 (if the probe is configured as NTC PTC))

Pb9 = (term. 13-7 (if the probe is configured as NTC PTC))

Pb10 = (term. 14-7 (if the probe is configured as NTC PTC))

AO4_2 Adjustment of read out for the analog Output 4 (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). It is used only when the analog Output is configured as FREE

- AO4_3 Adjustment of read out for the analog Output 4 at 20mA/10V** (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). It is used only when the analog Output is configured as FREE
- AO4_4 Minimum value for analogue Output 4** ($0 \div 99\%$)
- AO4_5 Analog Output 4 value after compressor start** ($AO4_4 \div 100\%$) It is the value of the analogue Output after a compressor has started, when the pressure/temperature is above the regulation band. – *Used during inverter regulation*
- AO4_6 Analog Output 4 value after a compressor is switched off** ($AO4_4 \div 100\%$) It is the value of the analogue Output when a compressor has been switched off and the the pressure/temperature is below the regulation band. – *Used during inverter regulation*
- AO4_7 Exclusion band start value for analog Output 4** ($AO4_4 \div 100\%$): it excludes a range of frequencies that could create problems to the compressor. – *Used during inverter regulation*
- AO4_8 Exclusion band end value for analog Output 4** ($AO4_7 \div 100\%$) – *Used during inverter regulation*
- AO4_9 Safety value for analog Output 4** ($0 \div 100\%$): it is used in case of probe's fault.
- AO4_10 Delay between the entrance in the regulation band and the regulation activation** ($0 \div 255\text{sec}$): it is the delay between the entrance in the regulation band of pressure/temperature and the regulation start. Used to avoid false inverter starts dued to pressure variations. – *Used during inverter regulation.*
- AO4_11 Analog Output 4 rise time:** ($0 \div 255\text{ sec}$). It is the time necessary to the analog Output to pass from the AO4_4 to 100%, when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*
- AO4_12 Analog Output 4 permanency at 100% before load activation** ($0 \div 255\text{ sec}$): the analog Output remains at 100% value for this time before a load is activated. – *Used during inverter regulation*
- AO4_13 Delay between pressure (temperature) goes down the set point and start of analog Output 4 decreasing** ($0 \div 255\text{sec}$). – *Used during inverter regulation*
- AO4_14 Analog Output 4 decreasing time** ($0 \div 255\text{sec}$) It is the time taken from the analog Output to pass from the 100% to the AO4_4 value. It is used during the switching off phase, when the pressure is lower than the set point.
- AO4_15 Analog Output 4 permanency at AO4_4 before a load is switched off** ($0 \div 255\text{sec}$) When the pressure (temperature) is below the set point, the analog Output remains at AO4_4 value for the AO4_15 before a load is switched off.
- AO4_16 Analog Output 4 decreasing time when a load is switched on** ($0 \div 255\text{sec}$) It is the time necessary to the analog Output to pass from 100% to AO4_5 when a load is switched on.
- AO4_17 Regulation band** ($0.10 \div 25.00\text{bar}$; $0.0 \div 25.0^\circ\text{C}$; $1 \div 250\text{ PSI}$; $1 \div 250^\circ\text{F}$; $10 \div 2500\text{ KPA}$). It is the band with the proportional action. It replaces the band for the inverter regulation. It is added to the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the 100% when the pressure/temperature is equal or higher than set + AO4_17.
- AO4_18 Integral time** ($0 \div 999\text{s}$; with 0 integral action excluded). It sets the pound of the proportional action. The higher is AO4_18 , the lower is the integral action support.
- AO4_19 Band offset** ($-12.0 \div 12.0^\circ\text{C}$ $-12.00 \div 12.00\text{ BAR}$, $-120 \div 120^\circ\text{F}$, $-120 \div 120\text{PSI}$; $-1200 \div 1200\text{KPA}$). It is used to move the regulation band across to the set point.
- AO4_20 Integral action limitation** ($0.0 \div 99.0\text{ }^\circ\text{C}$; $0 \div 180^\circ\text{F}$; $0.00 \div 50.00\text{bar}$; $0 \div 725\text{PSI}$; $0 \div 5000\text{kPA}$) to stop the increasing of integral action when the pressure reaches the SET + AO4_20 value.

AO4_22 Minimum inverter capacity with poor lubrication (0÷99%; with 0 function excluded) If the frequency compressor works for the AO4_23 time with a frequency (in percentage) equal or lower than AO4_22, it is forced to work at 100% for the AO4_24 time in order to restore the right lubrication.

AO4_23 Maximum time at a frequency lower than AO4_22 before working at 100% (1÷255min)

AO4_24 Time of inverter functioning at 100% to restore the right lubrication (1÷255min)

10.1.22 Analog Output 5 (AO5_1- AO5_24)

AO5_1 Reference probe for analogue Output 5, it is used only when the analog Output is configured as FREE

Pb1 = (term. 2-7 (if the probe is configured as NTC PTC))

Pb2 = (term. 3-7 (if the probe is configured as NTC PTC))

Pb3 = (term. 5-7 (if the probe is configured as NTC PTC))

Pb5 = (term. 5-7 (if the probe is configured as NTC PTC))

Pb5 = (term. 6-7 (if the probe is configured as NTC PTC))

Pb6 = (term. 10-7 (if the probe is configured as NTC PTC))

Pb7 = (term. 11-7 (if the probe is configured as NTC PTC))

Pb8 = (term. 12-7 (if the probe is configured as NTC PTC))

Pb9 = (term. 13-7 (if the probe is configured as NTC PTC))

Pb10 = (term. 15-7 (if the probe is configured as NTC PTC))

AO5_2 Adjustment of read out for the analog Output 5 (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). It is used only when the analog Output is configured as FREE

AO5_3 Adjustment of read out for the analog Output 5 at 20mA/10V (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). It is used only when the analog Output is configured as FREE

AO5_4 Minimum value for analogue Output 5 (0 ÷ 99%)

AO5_5 Analog Output 5 value after compressor start (AO5_5 ÷ 100 %) It is the value of the analogue Output after a compressor has started, when the pressure/temperature is above the regulation band. – *Used during inverter regulation*

AO5_6 Analog Output 5 value after a compressor is switched off (AO5_5 ÷ 100 %) It is the value of the analogue Output when a compressor has been switched off and the the pressure/temperature is below the regulation band. – *Used during inverter regulation*

AO5_7 Exclusion band start value for analog Output 5 (AO5_5 ÷ 100 %): it excludes a range of frequencies that could create problems to the compressor. – *Used during inverter regulation*

AO5_8 Exclusion band end value for analog Output 5 (AO5_7 ÷ 100 %) – *Used during inverter regulation*

AO5_9 Safety value for analog Output 5 (0 ÷ 100 %): it is used in case of probe's fault.

AO5_10 Delay between the entrance in the regulation band and the regulation activation (0 ÷ 255sec): it is the delay between the entrance in the regulation band of pressure/temperature and the regulation start. Used to avoid false inverter starts dued to pressure variations. – *Used during inverter regulation.*

AO5_11 Analog Output 5 rise time: (0 ÷ 255 sec). It is the time necessary to the analog Output to pass from the AO5_5 to 100%, when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*

AO5_12 Analog Output 5 permanency at 100% before load activation (0 ÷ 255 sec): the analog Output remains at 100% value for this time before a load is activated. – *Used during inverter regulation*

AO5_13 Delay between pressure (temperature) goes down the set point and start of analog Output 5 decreasing (0÷255sec). – *Used during inverter regulation*

AO5_15 Analog Output 5 decreasing time (0 ÷ 255sec) It is the time taken from the analog Output to pass from the 100% to the AO5_5 value. It is used during the switching off phase, when the pressure is lower than the set point.

AO5_15 Analog Output 5 permanency at AO5_5 before a load is switched off (0 ÷ 255sec) When the pressure (temperature) is below the set point, the analog Output remains at AO5_5 value for the AO5_15 before a load is switched off.

AO5_16 Analog Output 5 decreasing time when a load is switched on (0 ÷ 255sec) It is the time necessary to the analog Output to pass from 100% to AO5_5 when a load is switched on.

AO5_17 Regulation band (0.10÷25.00bar; 0.0÷25.0°C; 1÷250 PSI; 1÷250°F; 10÷2500 KPA). It is the band with the proportional action. It replaces the band for the inverter regulation. It is added to the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the 100% when the pressure/temperature is equal or higher than set + AO5_17.

AO5_18 Integral time (0÷999s; with 0 integral action excluded). It sets the pound of the proportional action. The higher is AO5_18 , the lower is the integral action support.

AO5_19 Band offset (-12.0÷12.0°C -12.00 ÷ 12.00 BAR, -120÷120°F, -120÷120PSI; -1200÷1200KPA). It is used to move the regulation band across to the set point.

AO5_20 Integral action limitation (0.0÷99.0 °C; 0÷180°F; 0.00÷50.00bar; 0÷725PSI; 0÷5000kPA) to stop the increasing of integral action when the pressure reaches the SET + AO5_20 value.

AO5_22 Minimum inverter capacity with poor lubrication (0÷99%; with 0 function excluded) If the frequency compressor works for the AO5_23 time with a frequency (in percentage) equal or lower than AO5_22, it is forced to work at 100% for the AO5_24 time in order to restore the right lubrication.

AO5_23 Maximum time at a frequency lower than AO5_22 before working at 100% (1÷255min)

AO5_24 Time of inverter functioning at 100% to restore the right lubrication (1÷255min)

10.1.23 Analog Output 6 (AO6 1- AO6 24)

AO6_1 Reference probe for analogue Output 6, it is used only when the analog Output is configured as FREE

Pb1 = (term. 2-7 (if the probe is configured as NTC PTC))

Pb2 = (term. 3-7 (if the probe is configured as NTC PTC))

Pb3 = (term. 5-7 (if the probe is configured as NTC PTC))

Pb5 = (term. 5-7 (if the probe is configured as NTC PTC))

Pb5 = (term. 6-7 (if the probe is configured as NTC PTC))

Pb6 = (term. 10-7 (if the probe is configured as NTC PTC))

Pb7 = (term. 11-7 (if the probe is configured as NTC PTC))

Pb8 = (term. 12-7 (if the probe is configured as NTC PTC))

Pb9 = (term. 13-7 (if the probe is configured as NTC PTC))

Pb10 = (term. 15-7 (if the probe is configured as NTC PTC))

AO6_2 Adjustment of read out for the analog Output 6 (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). It is used only when the analog Output is configured as FREE

AO6_3 Adjustment of read out for the analog Output 6 at 20mA/10V (-1.00÷100.00 bar; -15÷750PSI; -50÷150°C; -58÷302°F; -100÷10000 KPA). It is used only when the analog Output is configured as FREE

AO6_4 Minimum value for analogue Output 6 ($0 \div 99\%$)

AO6_5 Analog Output 6 value after compressor start ($AO6_5 \div 100\%$) It is the value of the analogue Output after a compressor has started, when the pressure/temperature is above the regulation band. – *Used during inverter regulation*

AO6_6 Analog Output 6 value after a compressor is switched off ($AO6_5 \div 100\%$) It is the value of the analogue Output when a compressor has been switched off and the the pressure/temperature is below the regulation band. – *Used during inverter regulation*

AO6_7 Exclusion band start value for analog Output 6 ($AO6_5 \div 100\%$): it excludes a range of frequencies that could create problems to the compressor. – *Used during inverter regulation*

AO6_8 Exclusion band end value for analog Output 6 ($AO6_7 \div 100\%$) – *Used during inverter regulation*

AO6_9 Safety value for analog Output 6 ($0 \div 100\%$): it is used in case of probe's fault.

AO6_10 Delay between the entrance in the regulation band and the regulation activation ($0 \div 255\text{sec}$): it is the delay between the entrance in the regulation band of pressure/temperature and the regulation start. Used to avoid false inverter starts dued to pressure variations. – *Used during inverter regulation.*

AO6_11 Analog Output 6 rise time: ($0 \div 255\text{ sec}$). It is the time necessary to the analog Output to pass from the $AO6_5$ to 100%, when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*

AO6_12 Analog Output 6 permanency at 100% before load activation ($0 \div 255\text{ sec}$): the analog Output remains at 100% value for this time before a load is activated. – *Used during inverter regulation*

AO6_13 Delay between pressure (temperature) goes down the set point and start of analog Output 6 decreasing ($0\div255\text{sec}$). – *Used during inverter regulation*

AO6_15 Analog Output 6 decreasing time ($0 \div 255\text{sec}$) It is the time taken from the analog Output to pass from the 100% to the $AO6_5$ value. It is used during the switching off phase, when the pressure is lower than the set point.

AO6_15 Analog Output 6 permanency at $AO6_5$ before a load is switched off ($0 \div 255\text{sec}$) When the pressure (temperature) is below the set point, the analog Output remains at $AO6_5$ value for the $AO6_15$ before a load is switched off.

AO6_16 Analog Output 6 decreasing time when a load is switched on ($0 \div 255\text{sec}$) It is the time necessary to the analog Output to pass from 100% to $AO6_5$ when a load is switched on.

AO6_17 Regulation band ($0.10\div25.00\text{bar}$; $0.0\div25.0^\circ\text{C}$; $1\div250\text{ PSI}$; $1\div250^\circ\text{F}$; $10\div2500\text{ KPA}$). It is the band with the proportional action. It replaces the band for the inverter regulation. It is added to the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the 100% when the pressure/temperature is equal or higher than $\text{set} + AO6_17$.

AO6_18 Integral time ($0\div999\text{s}$; with 0 integral action excluded). It sets the pound of the proportional action. The higher is $AO6_18$, the lower is the integral action support.

AO6_19 Band offset ($-12.0\div12.0^\circ\text{C}$ $-12.00 \div 12.00\text{ BAR}$, $-120\div120^\circ\text{F}$, $-120\div120\text{PSI}$; $-1200\div1200\text{KPA}$). It is used to move the regulation band across to the set point.

AO6_20 Integral action limitation ($0.0\div99.0\text{ }^\circ\text{C}$; $0\div180^\circ\text{F}$; $0.00\div50,00\text{bar}$; $0\div725\text{PSI}$; $0\div5000\text{kPA}$) to stop the increasing of integral action when the pressure reaches the $\text{SET} + AO6_20$ value.

AO6_22 Minimum inverter capacity with poor lubrication ($0\div99\%$; with 0 function excluded) If the frequency compressor works for the $AO6_23$ time with a frequency (in percentage) equal or lower than $AO6_22$, it is forced to work at 100% for the $AO6_24$ time in order to restore the right lubrication.

AO6_23 Maximum time at a frequency lower than AO6_22 before working at 100% (1÷255min)

AO6_24 Time of inverter functioning at 100% to restore the right lubrication (1÷255min)

10.1.24 Auxiliary Output (AR1-AR12)

- AR1 Set point for auxiliary relay 1 (-40÷110°C/-40÷230°F)** it is used for all the relays configured as auxiliary 1
- AR2 Differential for aux relay 1 (0,1÷25,0°C/1÷50°F)** Intervention differential for relay AUX1.
Cooling (AR3 = CL): Cut IN is AR1+ AR2. Cut OUT is when the temperature reaches the set point AR1.
Heating (AR3=Ht): Cut IN is AR1- AR2. Cut OUT is when the temperature reaches the set point. AR1
- AR3 Kind of action for aux. 1**
CL = cooling
Ht = heating
- AR4 Set point for auxiliary relay 2 (-40÷110°C/-40÷230°F)** it is used for all the relays configured as Auxiliary 2.
- AR5 Differential for aux relay 2 (0,1÷25,0°C/1÷50°F)** Intervention differential for relay AUX2.
Cooling (AR6 = CL): Cut IN is AR5+ AR5. Cut OUT is when the temperature reaches the set point AR5.
Heating (AR36 = Ht): Cut IN is AR5- AR5. Cut OUT is when the temperature reaches the set point. AR5
- AR6 Kind of action for aux. 2**
CL = cooling
Ht = heating
- AR7 Set point for auxiliary relay 3 (-40÷110°C/-40÷230°F)** it is used for all the relays configured as Auxiliary 3.
- AR8 Differential for aux relay 3 (0,1÷25,0°C/1÷50°F)** Intervention differential for relay AUX3.
Cooling (AR3 = CL): Cut IN is AR7+ AR8. Cut OUT is when the temperature reaches the set point AR7.
Heating (AR8=Ht): Cut IN is AR7- AR8. Cut OUT is when the temperature reaches the set point. AR7-
- AR9 Kind of action for aux. 3**
CL = cooling
Ht = heating
- AR10 Set point for auxiliary relay 4 (-40÷110°C/-40÷230°F)** it is used for all the relays configured as Auxiliary 4.
- AR11 Differential for aux relay 4 (0,1÷25,0°C/1÷50°F)** Intervention differential for relay AUX5.
Cooling (AR12 = CL): Cut IN is AR10+ AR11. Cut OUT is when the temperature reaches the set point AR10.
Heating (AR12=Ht): Cut IN is AR10- AR11. Cut OUT is when the temperature reaches the set point. AR10
- AR12 Kind of action for aux. 4**
CL = cooling
Ht = heating

10.1.25 Superheat

- ASH1 Differential for superheat pre-alarm 1 and 2** (0.1 to 15.0°C/ 1 to 30°F)
- ASH2 Lower limit of suction superheat alarm 1** (0.1 to 15.0°C/ 1 to 30°F)
- ASH3 Delay for signalling suction superheat alarm 1** (1 to 60 min;)
- ASH4 Switching off compressors for alarm ASH1** (No, Yes)
- ASH5 Differential for restarting suction superheat alarm control 1**
(0.1 to 15.0°C/ 1 to 30°F)
- ASH6 Delay for restarting control after superheat > ASH1+ASH5** (1 to 60 min)
- ASH7 Superheat value 1 at which to enable valve 1 for injecting hot gas (hot action)** (0.1 to 15.0°C/ 1 to 30°F)
- ASH8 Differential for ASH7** (0.1 to 15.0°C/ 1 to 30°F)
- ASH9 Bottom limit of suction superheat alarm 2** (0.1 to 15.0°C/ 1 to 30°F)
- ASH10 Delay for signalling suction superheat alarm 2** (0.1 to 60.0 min; res. 10s// this can also be calculated in seconds, providing 60 s is given as 1 min).
- ASH11 Switching off compressors for alarm ASH8** (No, Yes)
- ASH12 Differential for restarting suction superheat alarm control 2** (0.1 to 15.0°C/ 1 to 30°F)
- ASH13 Delay for restarting control after superheat > ASH8+ASH11** (0.1 to 60.0 min; res. 10s)
- ASH14 Superheat value 2 at which to enable valve 2 for injecting hot gas (hot action)** (0.1 to 15.0°C/ 1 to 30°F)
- ASH15 Differential for ASH13** (0.1 to 15.0°C/ 1 to 30°F)
- ASH16 Alarm relay selection for superheat 1 and 2 alarms** (nu(0) - ALr(1) - ALr1(2) - ALr2(3))

10.1.26 Other (OT1-OT5)

- OT1 Alarm relay off by keyboard** It is referred to the relay with terminals 85-85-86
no = alarm relay remains on for all the duration of the alarm
yES = the alarm relay is switched off by pushing a key
- OT2 Alarm relay 1 off by keyboard** It is referred to the relays configured as ALr1
no = alarm relay remains on for all the duration of the alarm
yES = the alarm relay is switched off by pushing a key
- OT3 Alarm relay 2 off by keyboard** It is referred to the relays configured as ALr2
no = alarm relay remains on for all the duration of the alarm
yES = the alarm relay is switched off by pushing a key
- OT4 Serial address** 1 ÷ 247
- OT5 Off function enabling**
no = it is not possible to switch the controller off by keyboard
YES = it is possible to switch the controller off by keyboard

10.1.27 Coresense configuration (CO1-CO17)

- CO1 Address coresense 1.** Serial address of the coresense connected to the digital output 1 (70-73 connection) (1-15; “nu” means not used)

- CO2 Address coresense 2.** Serial address of the coresense connected to the digital output 2 (71-73 connection) (1-15; "nu" means not used)
- CO3 Address coresense 3.** Serial address of the coresense connected to the digital output 3 (72-73 connection) (1-15; "nu" means not used)
- O4 Address coresense 4.** Serial address of the coresense connected to the digital output 4 (74-73 connection) (1-15; "nu" means not used)
- CO5 Address coresense 5.** Serial address of the coresense connected to the digital output 5 (77-76 connection) (1-15; "nu" means not used)
- CO6 Address coresense 6.** Serial address of the coresense connected to the digital output 6 (78-83 connection) (1-15; "nu" means not used)
- CO7 Address coresense 7.** Serial address of the coresense connected to the digital output 7 (79-83 connection) (1-15; "nu" means not used)
- CO8 Address coresense 8.** Serial address of the coresense connected to the digital output 8 (80-76 connection) (1-15; "nu" means not used)
- CO9 Address coresense 9.** Serial address of the coresense connected to the digital output 9 (81-76 connection) (1-15; "nu" means not used)
- CO10 Address coresense 10.** Serial address of the coresense connected to the digital output 10 (82-83 connection) (1-15; "nu" means not used)
- CO11 Address coresense 11.** Serial address of the coresense connected to the digital output 11 (84-90 connection) (1-15; "nu" means not used)
- CO12 Address coresense 12.** Serial address of the coresense connected to the digital output 12 (85-88 connection) (1-15; "nu" means not used)
- CO13 Address coresense 13.** Serial address of the coresense connected to the digital output 13 (86-88 connection) (1-15; "nu" means not used)
- CO14 Address coresense 14.** Serial address of the coresense connected to the digital output 14 (91-90 connection) (1-15; "nu" means not used)
- CO15 Address coresense 15.** Serial address of the coresense connected to the digital output 15 (93-88 connection) (1-15; "nu" means not used)
- CO16 Core sense baud rate selection.** Baud rate selection **0- 19200; 1-9600**
- CO17 Core sense parity selection.** Parity selection **0- No parity; 1-Even parity**

NOTE:

The Iprorack recognized this parameters group CO only at the power-on.
 Every time it is necessary to modify these parameters PLEASE REBOOT THE IproRack.
 The parameters CO1-CO15 can be configured only if the load that is connected to the relative digital output is a compressor type. If for example the digital output 1 is configured as FAN automatically after the reboot the parameter CO1 returns to a value NU (16)

10.1.28 DIGITAL-INPUT CONFIGURATIONS (DIC1-DIC20)

DIC 1 Configuration Digital Input 1 (0÷137c)

DIC 2 Configuration Digital Input 2 (0÷137c)

DIC 3 Configuration Digital Input 3 (0÷137c)
DIC 4 Configuration Digital Input 4 (0÷137c)
DIC 5 Configuration Digital Input 5 (0÷137c)
DIC 6 Configuration Digital Input 6 (0÷137c)
DIC 7 Configuration Digital Input 7 (0÷137c)
DIC 8 Configuration Digital Input 8 (0÷137c)
DIC9 Configuration Digital Input 9 (0÷137c)
DIC 10 Configuration Digital Input 10 (0÷137c)
DIC 11 Configuration Digital Input 11 (0÷137c)
DIC 12 Configuration Digital Input 12 (0÷137c)
DIC 13 Configuration Digital Input 13 (0÷137c)
DIC 14 Configuration Digital Input 14 (0÷137c)
DIC 15 Configuration Digital Input 15 (0÷137c)
DIC 16 Configuration Digital Input 16 (0÷137c)
DIC 17 Configuration Digital Input 17 (0÷137c)
DIC 18 Configuration Digital Input 18 (0÷137c)
DIC19 Configuration Digital Input 19 (0÷137c)
DIC 20 Configuration Digital Input 20 (0÷137c)

10.1.29 DIGITAL-OUTPUT CONFIGURATIONS (parameters DOC1-DOC15)

DOC 1 Configuration Digital Output 1 (0÷92)
DOC 2 Configuration Digital Output 2 (0÷92)
DOC 3 Configuration Digital Output 3 (0÷92)
DOC 4 Configuration Digital Output 4 (0÷92)
DOC 5 Configuration Digital Output 5 (0÷92)
DOC 6 Configuration Digital Output 6 (0÷92)
DOC 7 Configuration Digital Output 7 (0÷92)
DOC 8 Configuration Digital Output 8 (0÷92)
DOC 9 Configuration Digital Output 9 (0÷92)
DOC 10 Configuration Digital Output 10 (0÷92)
DOC 11 Configuration Digital Output 11 (0÷92)
DOC 12 Configuration Digital Output 12 (0÷92)
DOC 13 Configuration Digital Output 13 (0÷92)
DOC 14 Configuration Digital Output 14 (0÷92)
DOC 15 Configuration Digital Output 15 (0÷92)

10.1.30 ANALOG-OUTPUT CONFIGURATIONS (parameters AOC1-AOC6)

AOC 1 Configuration Analog Output 1 (0÷ 9)
AOC 2 Configuration Analog Output 2 (0÷ 9)
AOC 3 Configuration Analog Output 3 (0÷ 9)
AOC 4 Configuration Analog Output 4 (0÷ 9)
AOC 5 Configuration Analog Output 5 (0÷ 18)
AOC 6 Configuration Analog Output 6 (0÷ 18)

10.1.31 ANALOG-INPUT CONFIGURATIONS (parameters AIC1-AIC10)

AIC 1 Configuration Analog Input 1 (0÷36)

AIC 2 Configuration Analog Input 2 (0÷36)
AIC 3 Configuration Analog Input 3 (0÷36)
AIC 4 Configuration Analog Input 4 (0÷36)
AIC 5 Configuration Analog Input 5 (0÷36)
AIC 6 Configuration Analog Input 6 (0÷36)
AIC 7 Configuration Analog Input 7 (0÷36)
AIC 8 Configuration Analog Input 8 (0÷36)
AIC 9 Configuration Analog Input 9 (0÷36)
AIC 10 Configuration Analog Input 10 (0÷36)

11. REGULATION

11.1 Neutral zone adjustment – only for compressors

This regulation is available only for compressors. It is used if the parameter CF18 = db (CF19 = db for circuit 2). The following observations are available only for adjustment **without inverter**. In this case the neutral zone (RC1) is symmetrical compared to the target set point, with extremes: set+RC1/2 ... set- RC1/2. If the pressure (temperature) is inside this zone the controller maintains the same number of loads switched on and off, without changing anything. When the pressure (temperature) goes out from the zone, regulation starts. If the pressure is greater than SET+RC1/2, the loads are switching on with timing given by SL3 parameter. A load is turned on only if the safety times are over:

SL1 Minimum time between 2 following switching **ON** of the same compressor (0÷255 min).

SL2 Minimum time between the switching off of a compressor and the following switching on. (0÷255min).

Note: usually SL1 is greater than SL2

SL5 Minimum time load on (0 5990sec)

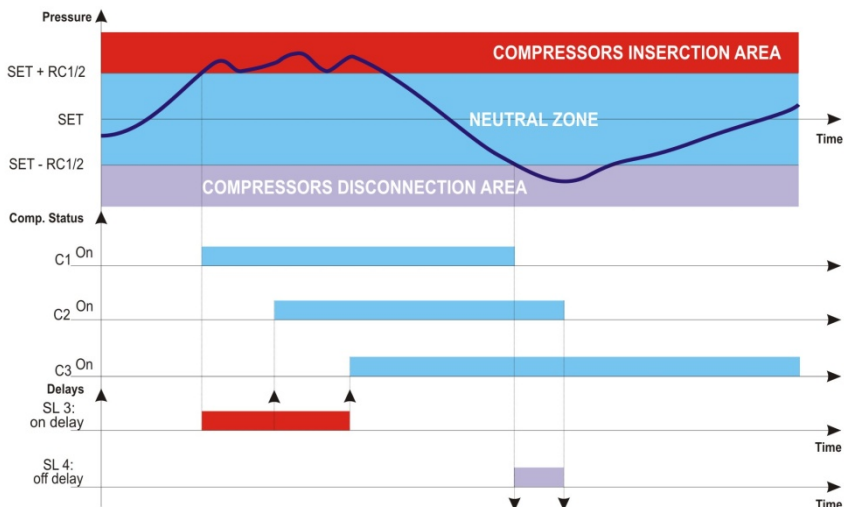
Regulation stops when the pressure (temperature) comes back into the neutral zone.

In the following a simplify example that explains the regulation in neutral zone for compressor homogeneous with 1 step for each compressors. The safety times **SL1**, **SL2**, **SL5** are not considered. In the real regulation the load is entered or turned off only if these times are over.

Ex. Dead band control, compressors with same capacities, 1 step for each compressor.

In this example:

| | |
|-------------------|--|
| C1 C2 C3 | number of compressors first circuit (defined in the conf file). |
| CF18 = db | dead band regulation |
| CF22 = yES | rotation |
| SL8 = no | “SL3” delay not enabled at first calling after an equilibrium condition. |
| SL9 = no | “SL4” delay not enabled at first calling after an equilibrium condition. |



11.2 Proportional band adjustment – for compressors and fans

This regulation is available for compressors and fans. It is used by compressors if the parameter CF18 = Pb (CF19 = Pb for circuit 2). The following observations are available only for adjustment without inverter. Compressors and fans work in the same way.

Example regulation for compressors:

In this case the regulation band (RC1) is divided into as many parts as there are stages according to the following formula:

steps = Tot loads circuit 1 (number of compr. or steps).

The numbers of stages switched ON is proportional to the value of the Input signal: when this distances itself from the target set point and enters the various bands, the compressors are switched ON, to be then turned OFF when the signal brings near the set point.

In this way if the pressure is greater than regulation band, all the compressors are on, if the pressure (temperature) is lower than the regulation band all the compressors are off.

Naturally also for this regulations all the delays (SL3 and SL4) safety times (**SL1**, **SL2**, **SL5**) are taken in account.

Regulation according to the running hours

The algorithm switches on and off the loads according to the running hours of each load. In this way the running hours are balanced.

Example

C1 C2 C3 C4 C5

CF19 = Pb

CF22 = yES

SL8 = no “

SL9 = no “

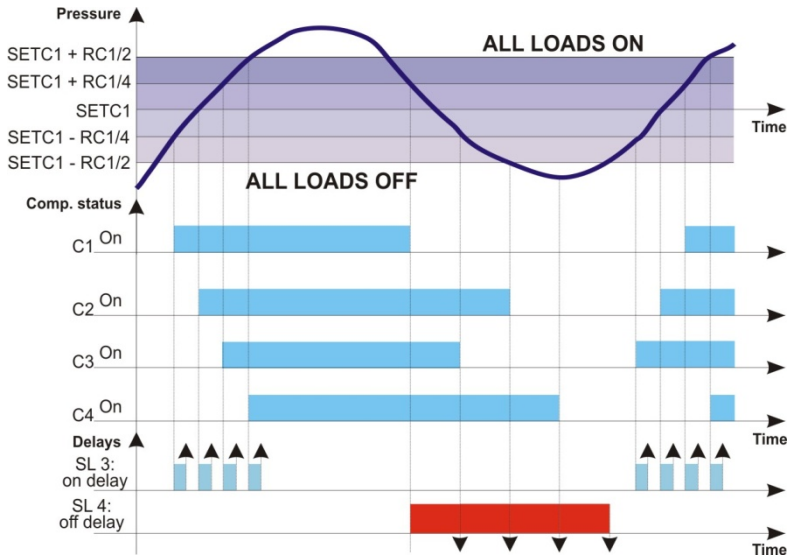
Tot loads = 5 compressors

proportional band regulation

rotation

SL3” delay not enabled at first calling after a regulation zone.

SL4” delay not enabled at first calling after a regulation zone.



12. Digital 6d Compressor management

Regulation with Stream Digital 6D compressor.

This compressor requires 2 resources:

- Inverter
- Step after inverter (operating with inverted logic: relay open, resource working, relay closed resource not working)

Increasing capacity:

Inverter after reaching 100% of the capacity will activate:

- the 6D step.
- Then all the other available loads.

To the other loads can be activated with rotation or fix sequence according to the setting.

Decreasing capacity:

The inverter will run at minimum speed, then:

- Switch off all the other loads, following the standard logic.
- Then Switch off the 6D step

Then it will be switched off.

Instance

Rack with one 6D Stream Digital + 2 additional streams 6D not digital will be configured as:

DOC1 = 1C (Inverter 1 Suction Circuit 1)

DOC2 = 91 (Valve of Stream Digital 6D)

DOC3 = 7C (Compressor 1 Circuit1)

DOC4 = 8o (Step n° 1 Compressor 1 Circuit 1)

DOC5= 11C (Compressor 2 Circuit1)

DOC6 = 12o (Step n° 1 Compressor 2 Circuit 1)

VALVE ACTIVATION WITH INCREASING CAPACITY

| Step | DOC1 = 1C | DOC2 = 91 | DOC3 = 7C | DOC4 = 8o | DOC5= 11C | DOC6 = 12o |
|------|--------------|--------------|--------------|-----------|-----------|------------|
| 0 | OFF | OFF | OFF | OFF | OFF | OFF |
| 1 | ON | ON | OFF | OFF | OFF | OFF |
| 2 | ON | OFF | OFF | OFF | OFF | OFF |
| 3 | ON | OFF | ON | ON | OFF | OFF |
| 4 | ON | OFF | ON | OFF | OFF | OFF |
| 5 | ON | OFF | ON | OFF | ON | ON |
| 6 | ON | OFF | ON | OFF | ON | OFF |

VALVE ACTIVATION WITH DECREASING CAPACITY

| Step | DOC1 = 1C | DOC2 = 91 | DOC3 = 7C | DOC4 = 8o | DOC5= 11C | DOC6 = 12o |
|------|--------------|--------------|--------------|-----------|-----------|------------|
| 0 | ON | OFF | ON | OFF | ON | OFF |
| 1 | ON | OFF | ON | OFF | ON | ON |
| 2 | ON | OFF | ON | OFF | OFF | OFF |
| 3 | ON | OFF | ON | ON | OFF | OFF |
| 4 | ON | OFF | OFF | OFF | OFF | OFF |
| 5 | ON | ON | OFF | OFF | OFF | OFF |
| 6 | OFF | OFF | OFF | OFF | OFF | OFF |

NOTE: To manage this modification will be necessary to modify the FB “Inverter”, considering that now the inverter besides the analog output has also a valve to manage.

It will be necessary to add another output → drive the ON/OFF of the valve and modify when the output “CONSENSO” is equal true.

13. SCREW COMPRESSORS

Loads activation is managed by the neutral zone. They follow general rules of step compressors:

The relay group is activated depending on the kind of screw compressors that has been selected on the CF1 parameter.

13.1 Regulation with screw compressors like Bitzer/ Hanbell/ Refcomp etc

Screw compressors like Bitzer use up to 3 valves for the power regulation.

The first valve is used during the starting phase for the CF28 max time, after this time, the step 2 is automatically activated.

Through the CF29 parameter it is possible to decide if the step 1 can be subsequently used during the standard thermoregulation.

Through the CF30 parameter it is possible to decide the delay between the activation valve and start of the compressor. (This parameter is enabled only for Bitzer)

13.1.1 Relay activation

ES. Compressor with 4 steps:

C1 = Scrw1; C2 = Step; C3 = Step; C4 = Step; CF1 = Btz

0. C1 RL01=Compressor 1 Circuit 1
1. Step RL02=Step 1 Compressor 1 Circuit 1
2. Step RL03=Step 2 Compressor 1 Circuit 1
3. Step RL04=Step 3 Compressor 1 Circuit 1

a. Activation with valves ON due to voltage presence (CF2=cL).

| | C1 = Screw1 | C2 = stp | C3 = stp | C4 = stp |
|---------------|-------------|----------|----------|----------|
| Step 1 (25%) | ON | ON | OFF | OFF |
| Step 2 (50%) | ON | OFF | ON | OFF |
| Step 3 (75%) | ON | OFF | OFF | ON |
| Step 4 (100%) | ON | OFF | OFF | OFF |

b. Activation with valves ON due to voltage absence (CF2=oP).

| | C1 = Screw1 | C2 = stp | C3 = stp | C4 = stp |
|---------------|-------------|----------|----------|----------|
| Step 1 (25%) | ON | OFF | ON | ON |
| Step 2 (50%) | ON | ON | OFF | ON |
| Step 3 (75%) | ON | ON | ON | OFF |
| Step 4 (100%) | ON | ON | ON | ON |

13.2 Regulation with screw compressors like Frascold

Screw compressors like Frascold use up to 3 valves for the power regulation.

The first valve is used during the starting phase for the CF28 max time, after this time, the step 2 is automatically activated.

Through the CF29 parameter it is possible to decide if the step 1 can be subsequently used during the standard thermoregulation.

13.2.1 Relay activation

ES. Compressor with 4 steps:

C1 = Scrw1; C2 = Step; C3 = Step; C4 = Step; CF1 = FRSC

0. C1 RL01=Compressor 1 Circuit 1
1. Step RL02=Step 1 Compressor 1 Circuit 1
2. Step RL03=Step 2 Compressor 1 Circuit 1
3. Step RL04=Step 3 Compressor 1 Circuit 1

a. Activation with valves ON due to voltage presence. (CF2=cL)

| | C1 = Screw1 | C2 = stp | C3 = stp | C4 = stp |
|---------------|-------------|----------|----------|----------|
| Step 1 (25%) | ON | OFF | OFF | OFF |
| Step 2 (50%) | ON | ON | ON | OFF |
| Step 3 (75%) | ON | ON | OFF | ON |
| Step 4 (100%) | ON | ON | OFF | OFF |

b. Activation with valves ON due to voltage absence. (CF2=oP)

| | oAi = Screw1 | oAi+1 = stp | oAi+2 = stp | oAi+3 = stp |
|----------------------|---------------------|--------------------|--------------------|--------------------|
| Step 1 (25%) | ON | ON | ON | ON |
| Step 2 (50%) | ON | OFF | OFF | ON |
| Step 3 (75%) | ON | OFF | ON | OFF |
| Step 4 (100%) | ON | OFF | ON | ON |

14. ANALOG INPUTS FOR INVERTER

14.1 Compressor management

The analog Inputs can be used in a rack with frequency compressor, driven by an inverter. The regulation of the compressors in this case is changed as described in the following graph: The following examples show the behaviour of the analog Input with proportional regulation.

EX. 2 compressors, 1 frequency compressor.

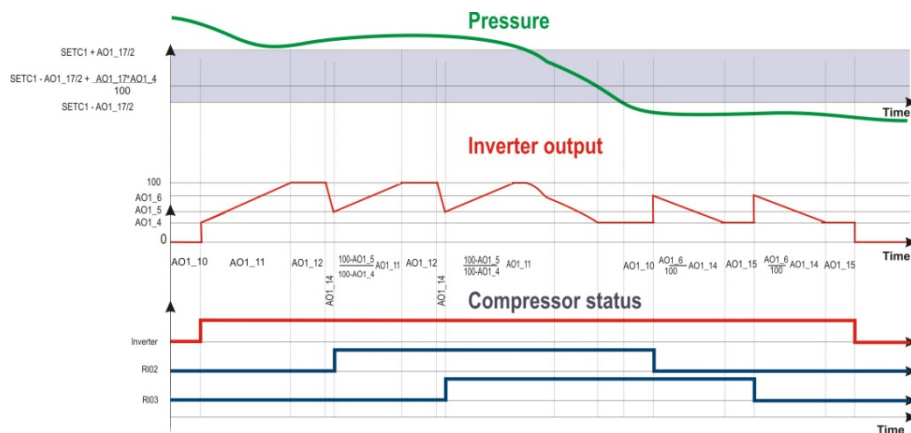
IO_configuration:

DO1 = 1 " Inverter 1 Suction Circuit 1"
DO2 = 7 " Compressor 1 Circuit 1"
DO3 = 11 " Compressor 1 Circuit 2"

AO1 = 2 " 0-10V Input inverter 1 Suction Circuit 1 "

Parameters:

CF18 = db
AO1_6 < 100
AO1_5 < 100



where:

AO1_4 Minimum value for analog out.1
AO1_5 Analog Input1 value after compressor on
AO1_6 Analog Input1 value after compressor off

0 ÷ 99 %
1Q6 ÷ 100 %
1Q6 ÷ 100 %

| | | |
|---------------|---|---------------|
| AO1_10 | Regulation delay after entering the regulation band | 0 ÷ 255 (sec) |
| AO1_11 | Analog Input 1 rise time from AO1_4 to 100% when the pressure is above the regulation band and a load is switched on. | 0 ÷ 255 (sec) |
| 1Q15 | Analog Input 1 permanency at 100% before load activation | 0 ÷ 255 (sec) |
| 1Q15 | Delay between pressure (temperature) goes down the set point and start of analog Input 1 decreasing | 0 ÷ 255 (sec) |
| AO1_16 | Analog Input 1 decreasing time from 100% to the AO1_4 value | 0 ÷ 255 (sec) |
| AO1_15 | Analog Input1 permanency at AO1_4 before a load is switched off | 0 ÷ 255 (sec) |
| AO1_14 | Analog Input1 decreasing time, from 100% to AO1_5 when a load is switched on | 0 ÷ 255 (sec) |

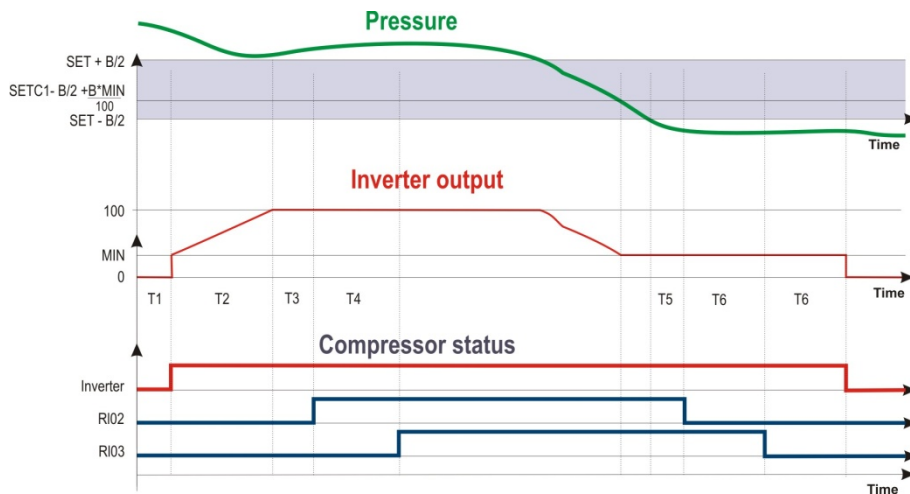
EX: 2 compressors, 1 frequency compressor.

IO_configuration:

| | |
|----------|--|
| DO1 = 1 | “ Inverter 1 Suction Circuit 1” |
| DO2 = 7 | “ Compressor 1 Circuit 1” |
| DO3 = 11 | “ Compressor 1 Circuit 2” |
| AO1 = 2 | “ 0-10V Input inverter 1 Suction Circuit 1 “ |

Parameters:

CF18 = db
 AO1_6 = 100
 AO1_5 = 100



Where:

| | | |
|--------------|---|---------------|
| B → | AO1_17 Regulation band | |
| MIN → | AO1_4 Minimum value for analog out.1 | 0 ÷ 99 % |
| T1 → | AO1_10 Regulation delay after entering the regulation band | 0 ÷ 255 (sec) |
| T3 → | AO1_12 Analog Input 1 permanency at 100% before load activation | 0 ÷ 255 (sec) |
| | Delay between pressure (temperature) goes down the set point and start of analog Input 1 decreasing | 0 ÷ 255 (sec) |

T4 → SL3 2 different load start delay
T6 → SL4 2 different load off delay

0 ÷ 5990 sec
0 ÷ 5990 sec

14.2 Fans management with inverter– 1 fans group with inverter mode, others ON in on/off mode

With this configuration, one analog Input can be used to drive the inverter (AO1=6 “0-10V Input inverter condenser Circuit 1”). Set one relays as inverter condenser (DO1=5 “Inverter condenser Circuit 1”), and other relays as fans (DO1=55 “Fan1 Circuit 1”).

EX: 4 fans, 1 with inverter. Analog Input 1 drives the inverter

IO_configuration:

DO1 = 5 “ Inverter Condenser Circuit 1”
DO2 = 55 “ Fan 1 Circuit 1”
DO3 = 56 “ Fan 2 Circuit 1”
DO4 = 57 “ Fan 3 Circuit 1”

AO1 = 6 “0-10V Input inverter condenser Circuit 1 “

Parameters:

AO1_6 < 100
AO1_5 < 100

| | | |
|--------------|--|---------------|
| AO1_4 | Minimum value for analog Input 1 | 0÷99 % |
| AO1_5 | Analog Input 1 value after fan activation | AO1_4÷100 % |
| AO1_6 | Analog Input 1 value after fan deactivation | AO1_4÷100 % |
| T1 | Regulation delay of analog Input 1 when the pressure is in the regulation band | 0 ÷ 255 (sec) |
| T2 | Analog Input 1 rise time from AO1_4 to 100% when the pressure is outside the regulation band | 0 ÷ 255 (sec) |
| T3 | Analog Input 1 permanency at 100% before load activation | 0 ÷ 255 (sec) |
| T7 | Analog Input 1 decreasing time from 100% to AO1_4 | 0 ÷ 255 (sec) |
| T6 | Analog Input 1 permanency at Ao1_4 before a fan is switched off with pressure below the set | 0 ÷ 255 (sec) |
| T5 | $((100-AO1_5) / (100-AO1_4)) * T2$ | 0 ÷ 255 (sec) |

14.3 Management of all fans with inverter – proportional inverter

In this case all fans of the condensing group are driven by one inverter.
The power used by the inverter is proportional to the delivery pressure value.

IO_configuration: Set one relay as inverter free and set one analog Input to drive it.

DO1 = 87 “ Inverter free circuit 1 ”
AO1 = 8 “ Input inverter condenser free Circuit 1 “

Parameters: The reference probe is the probe set on parameter

AO1_1 = PB1

The analog output is managed in proportional mode according to the pressure/temperature between the SETF1 and the SETF1 + AO1_17.

Below the SETF1 the output is OFF, above the SETF1 + AO1_17 the analog output works at 100%.

If the delivery pressure/temperature is higher than the $SETF1 + AO1_{17} \cdot AO1_4 / 100$ value, the relay set as inverter is ON; if the delivery pressure is lower than the SETF1 value the relay is OFF.

14.3.1 Use of fans thermal protection

With this configuration it is possible to use Ipro digital Inputs to monitor the fans functioning. It is necessary to set as much relay as used fans. Connect the thermal protection of every fans to its digital Input of the relay set as fan.

DON'T USE relays set as fans.

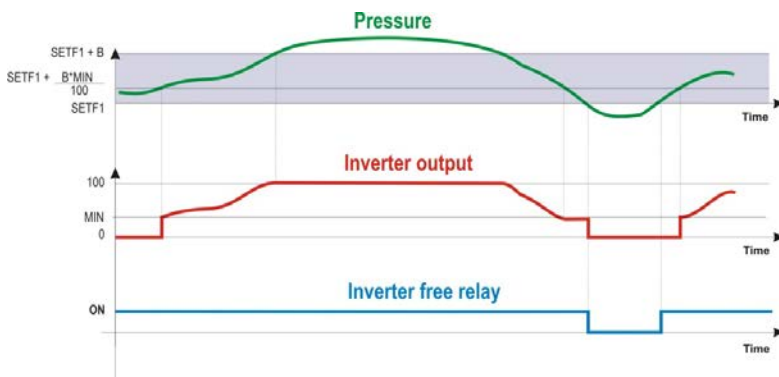
IO_configuration: 5 fans, driven by one inverter.

| | |
|----------|-----------------------------|
| DO1 = 87 | " Inverter free circuit 1 " |
| DO2 = 55 | " Fan 1 Circuit 1 " |
| DO3 = 56 | " Fan 2 Circuit 1 " |
| DO4 = 57 | " Fan 3 Circuit 1 " |
| DO5 = 58 | " Fan 4 Circuit 1 " |

AO1 = 8 " Input inverter condenser free Circuit 1 "

Parameters: The reference probe is the probe set on parameter

AO1_1 = PB1



AGGIORNARE GRAFICO CON ANDAMENTO CORRETTO INVERTER

B → AO1_17 Regulation band
 MIN → AO1_4 Minimum value for analog out. 1

0 ÷ 99 %

With this configuration, connect the thermal protection of:
 In this way any fans problem is sent to the controller (even if doesn't affect the regulation)

14.4 Liquid injection valve activation for raising superheat – subcritical Co2 application

14.4.1 Configuration

IO_configuration:

1 relay as injection valve:

DO1 = 89 “Valv 1”

1 auxiliary probe for calculating superheat:

AI1 = 13 “NTC Temperature probe Superheat 1”

14.4.2 Adjustment

The relay configured as Valv1 works as a thermostat with inverse action (hot), using the superheat value as the control variable.

$SH1 = (\text{Probe temp. set as SH1}) - (\text{Temp. of suction 1})$

with $SH1 \leq ASH7 - ASH8$

→

Valv1 on

with $SH1 \geq ASH7$

→

Valv1 off

with $ASH7 < SH1 < ASH7 - ASH8$

→

maintains the status.

14.4.3 Particular cases

- a. If no aux probe is configured for calculating the SH1 and a relay is set as Valv1, the “error no probe for SH1” is generated and the Valv1 relay will never be enabled.
- b. If the AUX probe configured for calculating the SH1 is in error mode, the probe alarm is generated and the Valv1 relay is not enabled.

14.5 Temperature/pressure value to turn off the compressors (electronic pressure switch).

The AL21 and AL23 parameters determine the low pressure/temperature thresholds for the compressor set of circuit 1 and 2 respectively, for when the pressure/temperature is too low (electronic pressure switch).

If the suction pressure of circuit 1 or 2 falls below the value, the low pressure alarm is generated and the compressors can be turned off.

14.5.1 Conduct

The compressors of circuit 1 or 2 are stopped when the set threshold is reached (as if the minimum pressure switch were activated).

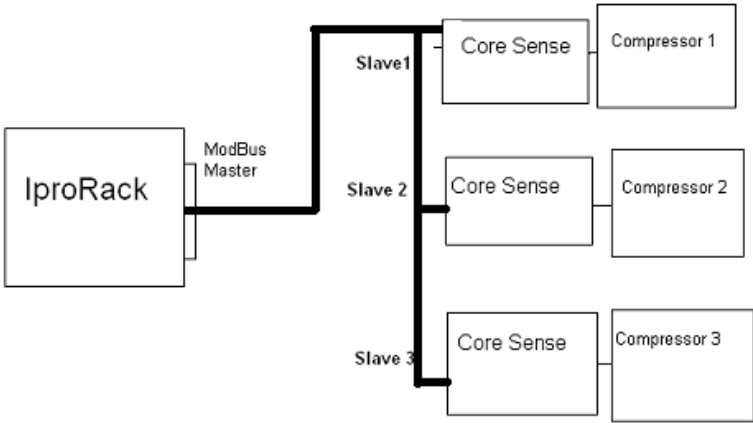
The low pressure alarm is generated and the alarm relay set in parameter AL9 is activated.

15. CORESENSE INTEGRATION – compatibility guarantee only for vers. F35 or later of Coresense

Description:
The coreSense devices are embedded on the Copeland compressors. These devices get out the information of the compressor. The Iprorack has to read (regarding the communication the Iprorack is a MASTER) out from the Copeland Compressor Core Sense device (regarding the communication the coresense is a SLAVE) this information, using the serial line and manage them.

15.1 CONNECTION.

CONNECTION DIAGRAM



The communication between the Iprorack and the corse sense device is Modbus.

15.1.1 Description of the connections

Connect the Coresenses to the

| Connector | Description |
|-----------|--|
| | RS485 Master connector Rx and Tx LED to indicate that communication is active Closed circuit terminal (Term) |

15.1.2 How to configure the CORESENSE communication

| | | | |
|-------------|---------------------------|---------------------------|-----------------------|
| CO1 | CO-ADDRESS DIGITAL OUT 1 | Address core sense out 1 | 1 – 15; NU = not used |
| CO2 | CO-ADDRESS DIGITAL OUT 2 | Address core sense out 2 | 1 – 15; NU = not used |
| CO3 | CO-ADDRESS DIGITAL OUT 3 | Address core sense out 3 | 1 – 15; NU = not used |
| CO4 | CO-ADDRESS DIGITAL OUT 4 | Address core sense out 4 | 1 – 15; NU = not used |
| CO5 | CO-ADDRESS DIGITAL OUT 5 | Address core sense out 5 | 1 – 15; NU = not used |
| CO6 | CO-ADDRESS DIGITAL OUT 6 | Address core sense out 6 | 1 – 15; NU = not used |
| CO7 | CO-ADDRESS DIGITAL OUT 7 | Address core sense out 7 | 1 – 15; NU = not used |
| CO8 | CO-ADDRESS DIGITAL OUT 8 | Address core sense out 8 | 1 – 15; NU = not used |
| CO9 | CO-ADDRESS DIGITAL OUT 9 | Address core sense out 9 | 1 – 15; NU = not used |
| CO10 | CO-ADDRESS DIGITAL OUT 10 | Address core sense out 10 | 1 – 15; NU = not used |
| CO11 | CO-ADDRESS DIGITAL OUT 11 | Address core sense out 11 | 1 – 15; NU = not used |
| CO12 | CO-ADDRESS DIGITAL OUT 12 | Address core sense out 12 | 1 – 15; NU = not used |
| CO13 | CO-ADDRESS DIGITAL OUT 13 | Address core sense out 13 | 1 – 15; NU = not used |
| CO14 | CO-ADDRESS DIGITAL OUT 14 | Address core sense out 14 | 1 – 15; NU = not used |
| CO15 | CO-ADDRESS DIGITAL OUT 15 | Address core sense out 15 | 1 – 15; NU = not used |
| CO16 | CO-BAUD RATE | BAUD RATE | 19200-9600(0-1) |
| CO17 | CO-PARITY SELECTION | PARITY SELECTION | NO-YES (0-1) |

ONLY AT THE POWER ON: The Iprorack checks the configuration of the coresense parameters configuration.

Example to configure a circuit 1 with 3 compressors:

- 1) parameters DOC1= 7c – Compressor 1 circuit 1 close polarity
- 2) parameters DOC3= 11c – Compressor 2 circuit 1 close polarity
- 3) parameters DOC7= 15c – Compressor 3 circuit 1 close polarity

It is necessary to configure the correct address parameter (parameters COxx) in according to the address assigned to the coresense mounted on the compressor (by the dip switch mounted on the coresense)

- Parameter to select the Coresense address mounted on the compressor 1 – connected to the digital output 1 (70-73), is the parameter CO1
- Parameter to select the Coresense address mounted on the compressor 2 – connected to the digital output 3 (72-73), is the parameter CO3
- Parameter to select the Coresense address mounted on the compressor 3 – connected to the digital output 7 (79-83), is the parameter CO7.

16. INFORMATION from the Coresense

From the Coresense device there is different type of information:

- **ASSET INFORMATION**
- **OPERATING PARAMETERS**
- **SETTING PARAMETERS**
- **ALARMS**

1) **ASSET INFORMATION**

- Compressor Model Number.
- Compressor Serial Number.
- Sensor Module Firmware Revision Number.

2) **OPERATING PARAMETERS**

- Current.
- Locked Rotor Peak Current.
- R Phase Compressor Voltage.
- Y Phase Compressor Voltage.
- B Phase Compressor Voltage.
- Total number of LOP run hours.
- Total number of alarm hours.
- Total number of short cycles.
- Voltage.
- Power Consumption.
- Discharge temperature Values.
- Number of Compressor Running Hours.
- Number of Compressor Switching Cycles.

3) **SETTING PARAMETERS : possibility to set these parameters**

- Discharge temp trip value.
- Discharge temp trip Reset.
- Nominal voltage power supply.
- Voltage imbalance value.
- Anti-short-time
- Compressor Nominal Frequency
- P470 HW Configuration
- Reset Core Sense

4) **ALARMS**

16.1 How to see coresense data

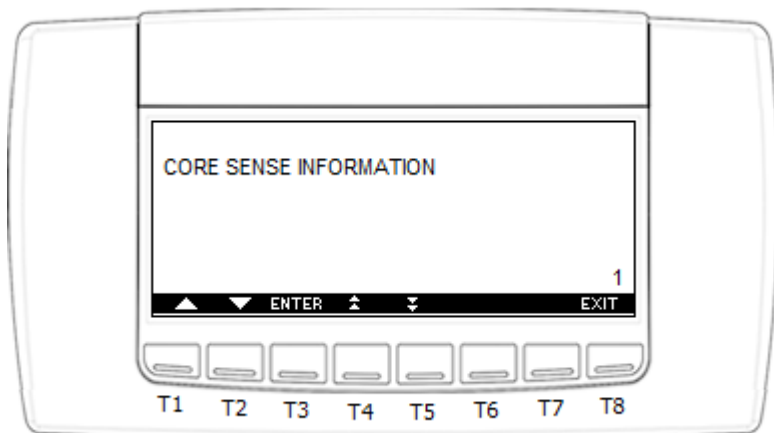
All the data from the coresense are showed in a Visograph service sub-menu:

16.1.1 ASSET INFORMATION and OPERATING PARAMETERS

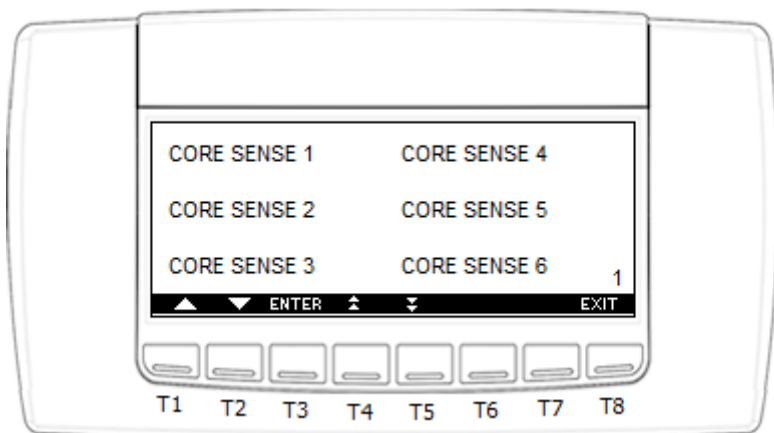
The asset information and operating parameters are managed inside a service sub-menu.

Entry in a service menu (see the paragraph 5.1):

- Select the CORE SENSE INFORMATION sub-menu.
- Push Enter.



- Select the core sense that you want to see.

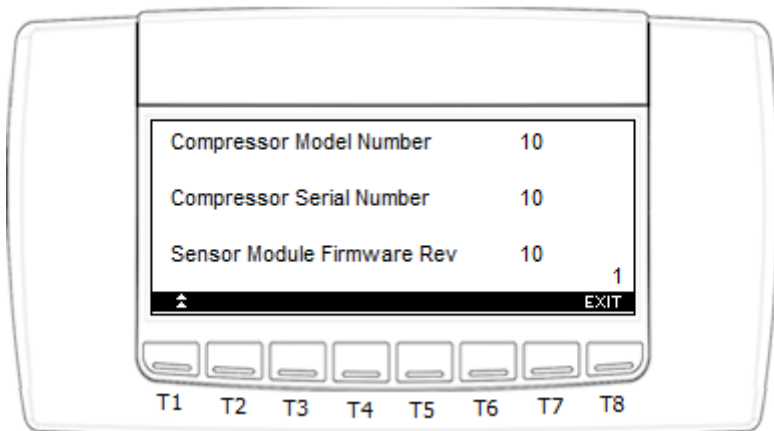


- Select for example the core sense 1.

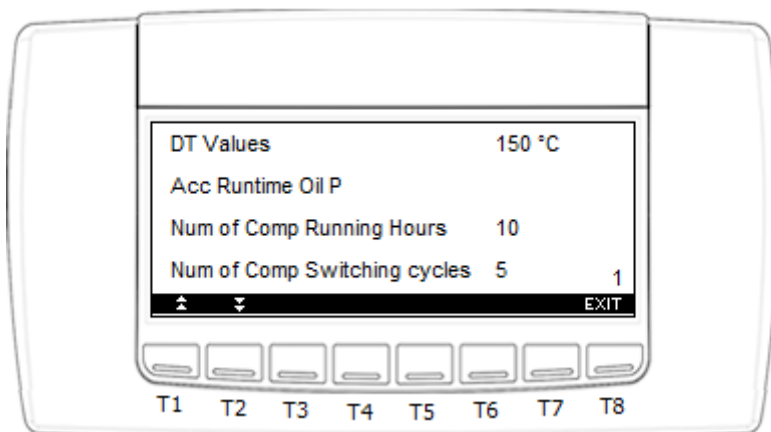
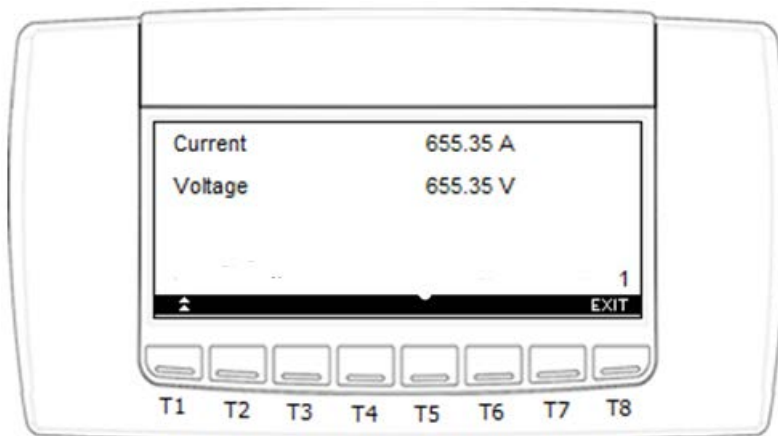
CORE SENSE MENU

Inside this menu there are:

SETTING PARAMETERS



OPERATING PARAMETERS

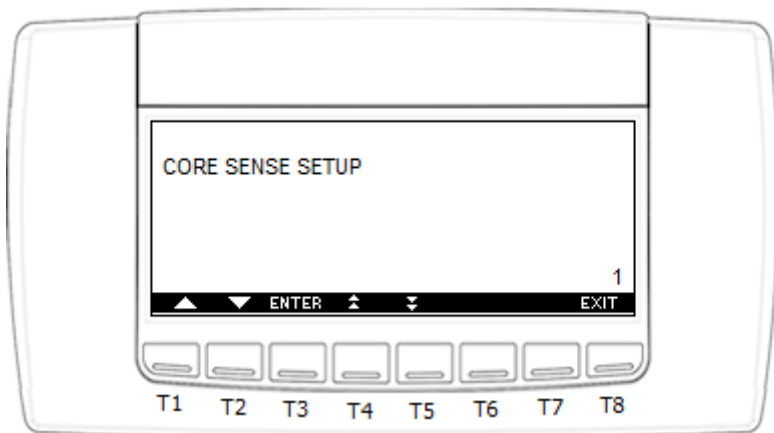


16.1.2 SETTING PARAMETERS

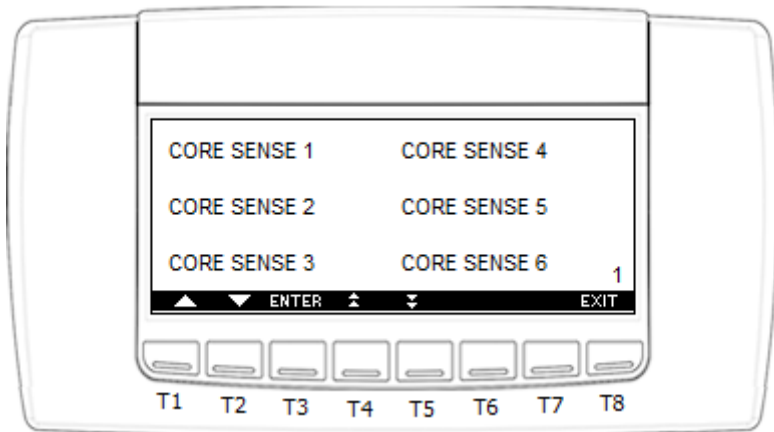
To set the coresense parameters:

Entry in a service menu (see the paragraph 5.1):

- Select the CORE SENSE SETUP sub-menù.
- Push Enter.

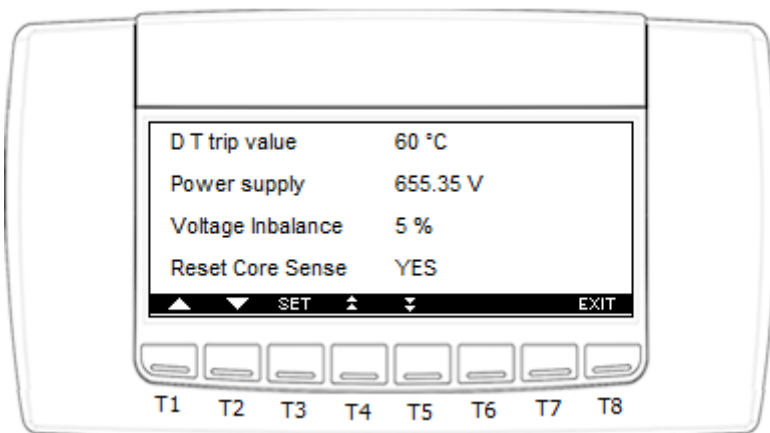


- **Select the core sense that you want to modify.**



- **Select for example the core sense 1.**

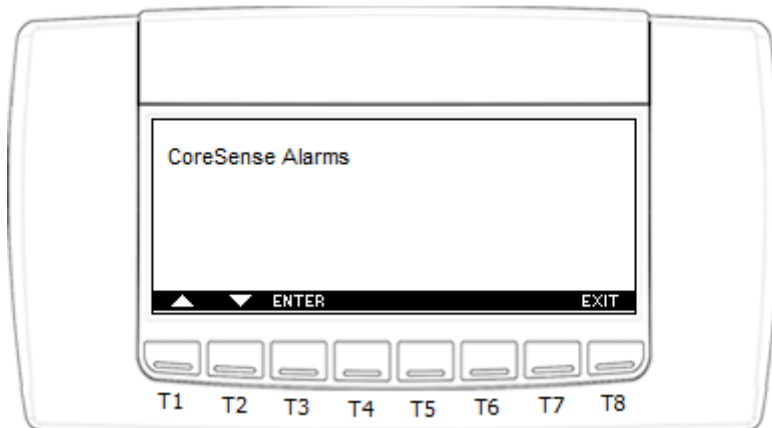
Inside this menu there is this information:



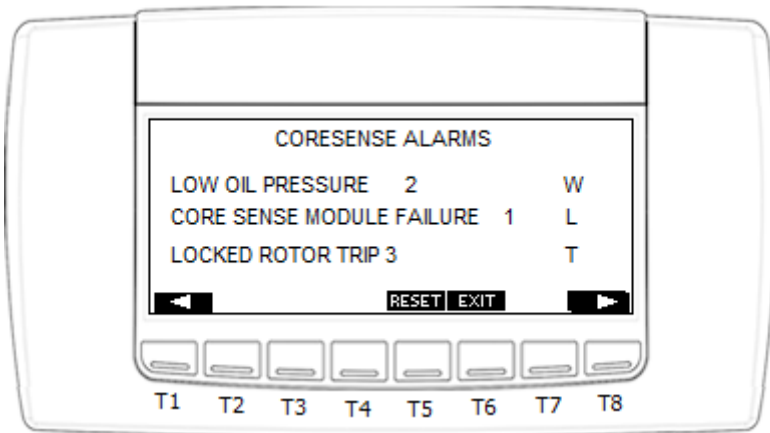
- 1) DT trip Value → it is a parameter to set.
- 2) Power supply → it is a parameter to set.
- 3) Voltage Inbalance → it is a parameter to set.
- 4) Reset Core Sense → to send to the core sense a reset command.

16.1.3 HOW TO SEE THE CORESENSE ALARMS

- Entry in a menu alarm;
- Select the Coresense Alarms sub-menù;
- Push Enter;



- In this alarm menu are showed the alarms of all coresense.



- With the RESET button it is possible to reset the alarms.

16.2 Alarm management

The Iprorack reads from the coresense the following alarms:

There are 3 type of the alarms:

- 1) **LOCKOUT ALARMS**→ The lockout alarms are showed in the visograph alarm stage and after the description of the alarm is showed a label **L** to indicate the type of this alarm.
 - Alarm management: **Compressor switch off.**
 - Status: It is required a **manual reset** (on the core sense) or a **remote reset** to restore the compressor.
 - Remote reset: To consider this Alarm like a manual alarm in the IProrack. (the remote reset means to send a reset command to the coresense).
- 2) **TRIP**→ → The trip alarms are showed in the visograph alarm stage and after the description of the alarm is showed a label **T** to indicate the type of this alarm.
 - Alarm management: **Compressor switch off.**
 - Status: The compressor is unavailable until it is true the condition of the alarm.
 - Auto reset: To consider this Alarm like an automatic alarm in the IProrack. (see as to manage the automatic Alarms). When the alarm returns OFF the compressor are restored.
- 3) **WARNING**→ The warning alarms are showed in the visograph alarm stage and after the description of the alarm is showed a label **W** to indicate the type of this alarm. This kind of Alarm is only a WARNING.
 - Alarm management: The compressor will go on working
 - Status : The compressor will go on working
 - Auto reset.

SUMMARY TABLE

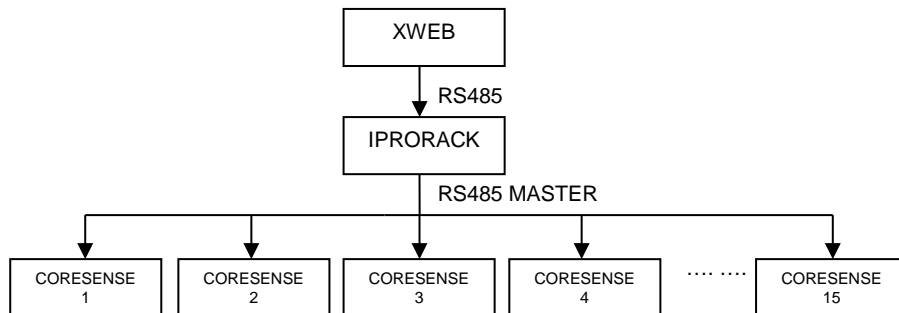
| Type | ACTION | RESET |
|---------|--|---|
| LOCKOUT | COMPRESSOR SWITCH OFF BUZZER ON LOG OF THE ALARM | REMOTE RESET (COMMAND) MANUAL RESET (CORE SENSE) the compressor will return available after the reset. |
| TRIP | COMPRESSOR SWITCH OFF BUZZER ON LOG OF THE ALARM | AUTOMATIC RESET : the compressor will return available until the alarm will be off |
| WARNING | COMPRESSOR WILL GO ON WORKING | AUTOMATIC RESET |

16.2.1 List of the Alarms

| Type | Visograph Description | Code of Alarm |
|---------|-------------------------------|---------------------------------------|
| Lockout | Insufficient Oil Pressure L | 37 - Low Oil Pressure Lockout |
| Lockout | Missing Phase L | 42 - Phase Loss Lockout |
| Lockout | Locked Rotor L | 41 - Locked Rotor Lockout |
| Lockout | High Discharge Temp L | 39 - Discharge Temperature Lockout |
| Lockout | Low Voltage L | 54 - Low Voltage Lockout |
| Lockout | Module Failure L | 43 - P470 Module Failure Lockout |
| Trip | Low Voltage T | 21 - Compressor Low Voltage Trip |
| Trip | Locked rotor T | 31 - Locked rotor Trip |
| Trip | Missing Phase T | 28 - Phase Loss Trip |
| Trip | Voltage Imbalance T | 24 - Voltage Imbalance Trip |
| Trip | High Discharge Temp T | 19 - Discharge Temp Trip |
| Trip | Motor Temp. T | 32 - Motor Temperature Trip |
| Warning | Communication Error (to SM) W | 16 - Communication Error to SM |
| Warning | Current sensor fault W | 12 - Connection lost between sensor |
| Warning | Comunication Error to Ipro W | 18 - Comunication Error to E2 |
| Warning | No.run & Fault Temp Probe W | 7 - Normal Running & Fault Temp Probe |
| Warning | Hw Conf. Mismatch W | 17 - E2/P470 Configuration Mismatch |
| Normal | Normal Off | 44 - Normal OFF |
| Normal | Normal On | 45 - Normal Running |


17. CONNECTION BETWEEN XWEB– IPRORACK – CORENSENSE

The iProRack can be connected to the X-WEB, so the data coming from Coresenses can be seen and managed also by the X-WEB.




The network is this:

- 1) Connect the Xweb RS485 line to the SLAVE serial line of iProrack

| | |
|---|--|
|  | RS485 Slave connector Rx and Tx LED to indicate that communication is active Closed circuit terminal (Term) |
|---|--|

- 2) Connect the Coresense's RS485 line to the MASTER serial line of iProrack.

| | |
|---|---|
|  | RS485 Master connector Rx and Tx LED to indicate that communication is active Closed circuit terminal (Term) |
|---|---|

- 3) **Address setup among iProRack and Coresenses:**

The Coresenses will be seen by the X-WEB at the address immediately following the iProRack address

If Iprorack has address "n", Coresenses will have the consecutive addresses to Iprorack address: **n+ coresense Address.**

Example: Iprorack + 5 coresense

- Iprorack serial Address = 30
- CoreSense serial addresses = 1 , 3 , 7 , 9. (set by dipswitch)
- The setup of Xweb regarding the coresense is:

| Physical modbus addresses | Addresses in Xweb setup |
|---------------------------|---|
| Iprorack = 30 | Iprorack = 30 |
| Coresense 1 = 1 | Coresense 1 = 31 (Iprorack add. + Coresense 1 add.) |
| Coresense 2 = 3 | Coresense 2 = 33 (Iprorack add. + Coresense 2 add.) |
| Coresense 3 = 7 | Coresense 3 = 37 (Iprorack add. + Coresense 3 add.) |
| Coresense 4 = 9 | Coresense 4 = 39 (Iprorack add. + Coresense 4 add.) |

18. ALARM LIST

Usually alarm conditions are signalled by means of:

1. Activation of alarm relays
2. Buzzer activation
3. Message on proper display
4. Log of alarms, hour, data and duration at the moment only inside the log file

18.1 Alarm conditions – summary table

| Code | Description | Cause | Action | Reset |
|-------------------------|---|--|--|---|
| ALARMS CIRCUIT 1 | | | | |
| LP1 | Low pressure-switch alarm for circuit 1 | Low pressure switch Input 1 (the Input is that configured as DI1=101 Low pressure suction 1) | All compressors of circuit 1 are turned off. Fans unchanged. | <p>Automatically if the number of activation are less than AL12 in the AL13 time when the Input is disable.</p> <ul style="list-style-type: none"> - The compressors restart working according to the working algorithm. <p>Manually (if AL12 activation happened in the AL13 time When the Input is disable:</p> <ul style="list-style-type: none"> - Turn off and on the instrument.. - The compressors restart working according to the working algorithm. |
| HP1 | High pressure switch for circuit 1 alarm | High pressure switch Input 1 (the Input is that configured as AI1=97 High pressure suction 1) | <ul style="list-style-type: none"> • All compressors of circuit 1 are turned off. • All fans are of circuit 1 turned on. | <p>Automatically if the number of activation are less than AL29 in AL30 time when the Input is disable.</p> <ul style="list-style-type: none"> - Compressors and fans restart working according to the working algorithm. <p>Manually if AL29 activation happened in the AL30 time When the Input is disable:</p> <ol style="list-style-type: none"> 1. Turn off and on the instrument.. 2. Compressors and fans restart working according to the working algorithm. |
| LAC1 | Minimum pressure (temperature) alarm compressors for circuit 1 | Suction pressure or temperature lower than SETC1-AL3 value | only signalling | Automatically: as soon as the pressure or temperature reaches the SETC1-AL3 + differential value. (differential = 0.3bar or 1°C) |
| LAF1 | Minimum pressure (temperature) alarm fans section for circuit 1 | Condensing pressure or temperature lower than SETF1-AL24 value | only signalling | Automatically: as soon as the pressure or temperature reaches the SETF1-AL24 + differential)value. (differential = 0.3bar or 1°C) |
| HAC1 | Maximum pressure (temperature) alarm compressors for circuit 1 | Suction pressure or temperature higher than SETC1+AL4 value | only signalling | Automatically: as soon as the pressure or temperature reaches the SETC1-AL4 - differential value. (differential = 0.3bar or 1°C) |
| HAF1 | Maximum pressure (temperature) alarm fans section for circuit 1 | Condensing pressure or temperature higher than SETF1+AL25 value | It depends on parameter AL28 | Automatically: as soon as the pressure or temperature reaches the SETF1+AL25 - differential value. (differential = 0.3bar or 1°C) |

| Code | Description | Cause | Action | Reset |
|-------------------------|---|---|---|---|
| LL1 | Liquid level alarm for circuit 1 | Proper digital Input enabled (the Input is that configured as AI1=109 Liquid level circuit 1) | only signalling | Automatically as soon as the Input is disabled |
| PrSH1 | Pre-alarm for superheat circuit 1 | Superheat 1 is less than ASH0 + ASH1 | Signal only | Automatic: when superheat exceeds ASH0 + ASH1 +1 °C |
| ALSH1 | Alarm for superheat circuit 1 | Superheat 1 is less than ASH1 | Depends on ASH3 | Automatic: when superheat exceeds ASH5 + ASH1 |
| LPC1 | Electronic pressure switch for low temperature/ pressure of circuit 1 | Pressure/temperature < AL21 | disables the compressors | Automatic: when the pressure/temperature exceeds AL21 |
| PR1 | Suction probe circuit 1 failure alarm | Suction Probe failure or out of range (the probe is that configured as ex AI1=1 NTC probe regulation suction circuit 1) | The compressors are activated according to the AL15 parameters. | Automatically as soon as the probe restarts working. |
| PR3 | Condensing probe circuit 1 failure alarm | Condensing Probe failure or out of range (the probe is that configured as ex AI1=3 NTC probe regulation condensing circuit 1) | The fans are activated according to the AL31 parameters. | Automatically as soon as the probe restarts working. |
| A02F | Fan safeties alarm | Safeties fan Input activation. | The corresponding Input is disabled | Automatically as soon as the Input is disabled. |
| ALARMS CIRCUIT 2 | | | | |
| LP2 | Low pressure-switch alarm for circuit 2 | Low pressure switch Input (the Input is that configured as DI1=102 Low pressure suction 2) | All compressors of circuit 2 are turned off. Fans unchanged. | Automatically if the number of activation are less than AL16 in the AL17 time when the Input is disable. <ul style="list-style-type: none"> - The compressors restart working according to the working algorithm. Manually (if AL16 activation happened in the AL17 time When the Input is disable: <ul style="list-style-type: none"> - Turn off and on the instrument.. - The compressors restart working according to the working algorithm. |

| Code | Description | Cause | Action | Reset |
|-------|---|---|--|---|
| HP2 | High pressure switch fro circuit 2 alarm | High pressure switch Input (the Input is that configured as DI1=98 High pressure suction 2) | <ul style="list-style-type: none"> - All compressors of circuit 2 are turned off. - All fans are of circuit 2 turned on. | <p>Automatically if the number of activation are less than AL29 in AL30 time when the Input is disable.</p> <ul style="list-style-type: none"> - Compressors and fans restart working according to the working algorithm. <p>Manually if AL29 activation happened in the AL30 time When the Input is disable:</p> <ol style="list-style-type: none"> 3. Turn off and on the instrument.. 4. Compressors and fans restart working according to the working algorithm. |
| LAC2 | Minimum pressure (temperature) alarm compressors for circuit 2 | Suction pressure or temperature lower than SETC2-AL6 value | signalling only | Automatically: as soon as the pressure or temperature reaches the SETC2-AL6 + differential value. (differential = 0.3bar or 1°C) |
| LAF2 | Minimum pressure (temperature) alarm fans section for circuit 2 | Condensing pressure or temperature lower than SETF2-AL32 value | signalling only | Automatically: as soon as the pressure or temperature reaches the SETF1-AL32 + differential)value. (differential = 0.3bar or 1°C) |
| HAC2 | Maximum pressure (temperature) alarm compressors for circuit 2 | Suction pressure or temperature higher than SETC2+AL7 value | signalling only | Automatically: as soon as the pressure or temperature reaches the SETC2-AL7 - differential value. (differential = 0.3bar or 1°C) |
| HAF2 | Maximum pressure (temperature) alarm fans section for circuit 2 | Condensing pressure or temperature higher than SETF2+AL33 value | It depends on parameter AL36 | Automatically: as soon as the pressure or temperature reaches the SETF2+AL33 - differential value. (differential = 0.3bar or 1°C) |
| LL2 | Liquid level alarm for circuit 2 | Proper digital Input enabled (the Input is that configured as DI1=110 Liquid level circuit 2) | signalling only | Automatically as soon as the Input is disabled |
| PrSH2 | Pre-alarm for superheat circuit 2 | Superheat 1 is less than ASH1 + ASH9 | Signal only | Automatic: when superheat exceeds ASH1 + ASH9 +1°C |
| ALSH2 | Alarm for superheat circuit 2 | Superheat 1 is less than ASH9 | Depends on ASH10 | Automatic: when superheat exceeds ASH12 + ASH9 |

| Code | Description | Cause | Action | Reset |
|------------------------------|--|--|--|--|
| LPC2 | Electronic pressure switch for low temperature/pressure of circuit 2 | Pressure/temperature < AL23 | disables the compressors | Automatic: when the pressure/temperature exceeds AL23 |
| PR2 | Suction probe circuit 2 failure alarm | Suction Probe failure or out of range (the probe is that configured as ex AI1=2 NTC probe regulation suction circuit 2) | The compressors are activated according to the AL19 parameters. | Automatically as soon as the probe restarts working. |
| PR4 | Condensing probe circuit 2 failure alarm | Condensing Probe failure or out of range (the probe is that configured as ex AI1=4 NTC probe regulation condensing circuit 2) | The fans are activated according to the AL39 parameters. | Automatically as soon as the probe restarts working. |
| Compressor Alarms | | | | |
| EA0 (for each compressor) | Compressor safeties alarm for Oil switch load | Oil switch load Input activation. (the Input is that configured as ex DI1=1 Thermal safety compressor 1 circuit 1) NOTE: with step compressors Input for each compressor has to be used. | the corresponding compressor is turned off. (with step compressors all relays referred to the Input are disabled). | Automatically as soon as the Input is disabled. |
| ETO (for each compressor) | Compressor safeties alarm for Thermal switch load | Thermal switch load Input activation. (the Input is that configured as ex Compressor oil pressostate circuit 1) NOTE: with step compressors Input for each compressor has to be used. | the corresponding compressor is turned off. (with step compressors all relays referred to the Input are disabled). | Automatically as soon as the Input is disabled. |

| Code | Description | Cause | Action | Reset |
|---------------------------------------|--|---|--|---|
| EPO (for each compressor) | Compressor safeties alarm for Pressure switch load | Pressure switch load Input activation. (the Input is that configured as ex Compressor safety pressostate circuit 1) NOTE: with step compressors Input for each compressor has to be used. | The corresponding compressor is turned off. (with step compressors all relays referred to the Input are disabled). | Automatically as soon as the Input is disabled. |
| MANT | Compressors maintenance alarm | A compressor has worked for the time set in the AL10 parameter | signalling only | Manually : reset the running hour of the compressor (vedi par 6.1) |
| GENERIC ALARMS | | | | |
| P1 | probe failure alarm | Probe 1 failure | signalling only | Automatically as soon as the probe restarts working. |
| P2 | probe failure alarm | Probe 2 failure | signalling only | Automatically as soon as the probe restarts working. |
| P3 | probe failure alarm | Probe 3 failure | signalling only | Automatically as soon as the probe restarts working. |
| P4 | probe failure alarm | Probe 4 failure | signalling only | Automatically as soon as the probe restarts working. |
| P5 | probe failure alarm | Probe 5 failure | signalling only | Automatically as soon as the probe restarts working. |
| P6 | probe failure alarm | Probe 6 failure | signalling only | Automatically as soon as the probe restarts working. |
| P7 | probe failure alarm | Probe 7 failure | signalling only | Automatically as soon as the probe restarts working. |
| P8 | probe failure alarm | Probe 8 failure | signalling only | Automatically as soon as the probe restarts working. |
| P9 | probe failure alarm | Probe 9 failure | signalling only | Automatically as soon as the probe restarts working. |
| P10 | probe failure alarm | Probe 10 failure | signalling only | Automatically as soon as the probe restarts working. |
| Fan Alarm | | | | |
| AL_AO (for each compressor) | Fan safeties alarm | Safety switch load Input activation. (the Input is that configured as ex DI1=73 Fan safety circuit 1) NOTE: with step compressors Input for each compressor has to be used. | The corresponding fan is turned off. | Automatically as soon as the Input is disabled. |

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