



# IPR208D – 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.

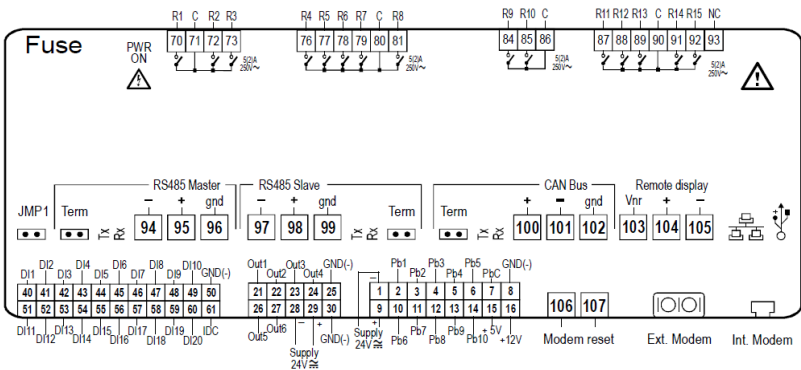
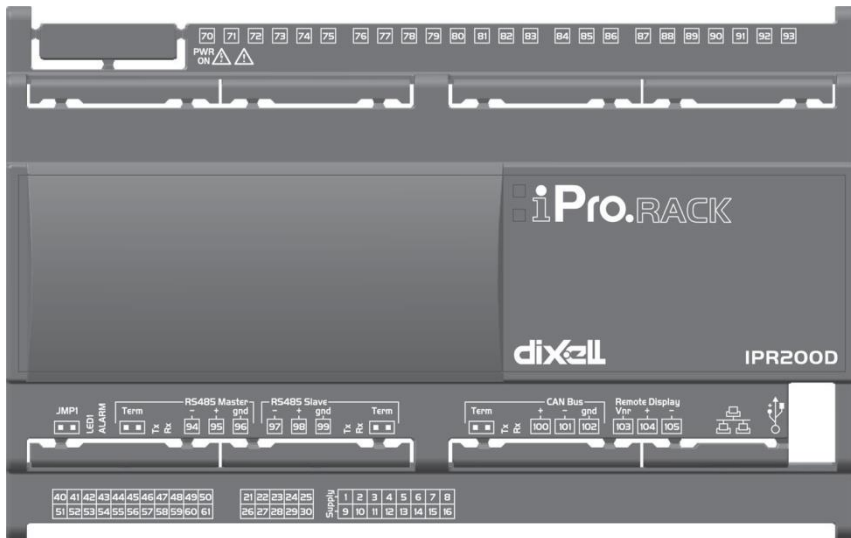
The same applications can be downloaded in the various models available (obviously adapting the number of Outputs and outputs).

### **1.2 HARDWARE ARCHITECTURE**







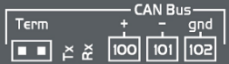




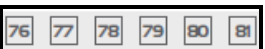

The iPRO programmable controller is structured as follows:









- 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



1.3.1 Description of the connections

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

Connector	Description
	5 NO relays, 1 common and 2 potential free (Neutral)
	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

### 1.3.2 Description of the inputs and outputs

Input No.	Type of Input	Description
1	Supply	<b>Reference “-“/GND power (24Vac or 24Vdc)</b>
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	<b>Reference “+“ power supply (24Vac or 24Vdc)</b>

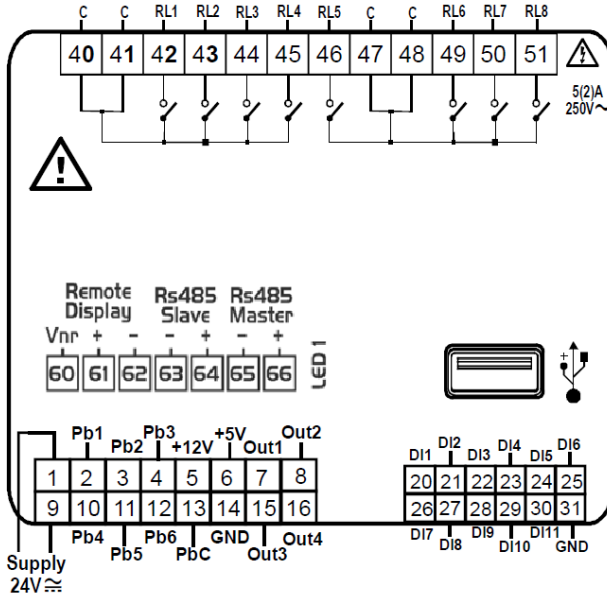
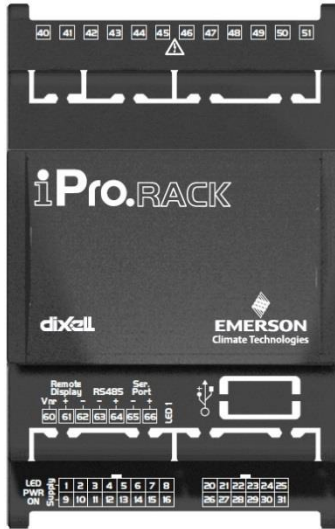
Input No.	Type of Input	Description
10	Pb6	Configurable analogue input 6 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI)
11	Pb7	Configurable analogue input 7 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI)
12	Pb8	Configurable analogue input 8 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 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





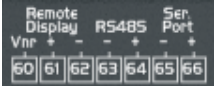

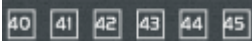

<b>Input No.</b>	<b>Type of Input</b>	<b>Description</b>
53	DI13	Opto-insulated digital input 13
54	DI14	Opto-insulated digital input 14
55	DI15	Opto-insulated digital input 15
56	DI16	Opto-insulated digital input 16
57	DI17	Opto-insulated digital input 17
58	DI18	Opto-insulated digital input 18
59	DI19	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

<b>Input No.</b>	<b>Type of Input</b>	<b>Description</b>
93	C	Potential free contact (MAX 6A)
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

**1.4 IPR208D**



**1.4.1 Description of the connections**

Connector	Description
	Connector for 24Vac/dc power supply Analogue inputs (Pb1 - Pb6, PbC) Additional power (+5Vdc, +12Vdc, GND) Analogue outputs (Out1 - Out4, GND)
	24Vac/dc digital inputs (DI1 - DI11, GND)
	Connector for remote terminal (VISOGRAPH), maximum 1 terminal per iPRO. RS485 Slave connector Serial port connector (LAN or RS485)
	USB port for downloads (BIOS, ISaGRAF® application, maps of parameters, remote display applications, network configuration, website) and uploads (log files) Connection with the computer via a USB-ETH converter
	Digital relay outputs 4 NO relays, 2 common
	Digital relay outputs 4 NO relays, 2 common

**1.4.2 Description of the inputs and outputs**

Input No.	Type of Input	Description
1	Supply	<b>Reference “-“/GND power (24Vac or 24Vdc)</b>
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	+12V	Additional power +12Vdc
6	+5V	Additional power +5Vdc
7	Out1	Analogue output 1 0 - 10V, 4 - 20mA, Relay
8	Out2	Analogue output 2 0 - 10V, 4 - 20mA, Relay
9	Supply	<b>Reference “+“ power supply (24Vac or 24Vdc)</b>
10	Pb4	Configurable analogue input 4 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI)
11	Pb5	Configurable analogue input 5 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI)

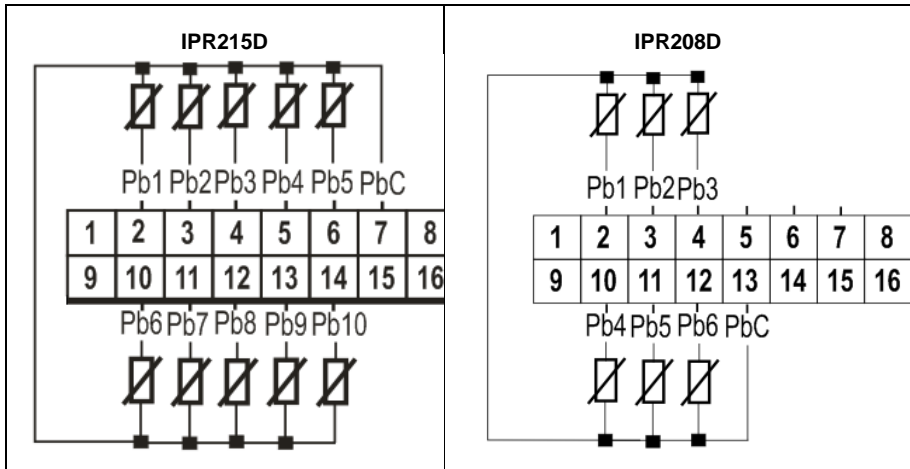
Input No.	Type of Input	Description
12	Pb6	Configurable analogue input 6 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI)
13	PbC	Common analogue inputs (NTC, PTC, DI)
14	GND(-)	Additional power reference 5Vdc and 12Vdc, analogue inputs (0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V), analogue outputs
15	Out3	Analogue output 3 0 - 10V, 4 - 20mA, Relay
16	Out4	Analogue output 4 0 - 10V, 4 - 20mA, Relay
20	DI1	Digital input 1 24Vac/dc
21	DI2	Digital input 2 24Vac/dc
22	DI3	Digital input 3 24Vac/dc
23	DI4	Digital input 4 24Vac/dc
24	DI5	Digital input 5 24Vac/dc
25	DI6	Digital input 6 24Vac/dc
26	DI7	Digital input 7 24Vac/dc
27	DI8	Digital input 8 24Vac/dc
28	DI9	Digital input 9 24Vac/dc
29	DI10	Digital input 10 24Vac/dc
30	DI11	Digital input 11 24Vac/dc
31	GND(-)	<b>Reference “-“ for digital inputs from 1 to 11 (if version with dry contacts, this input has to be used only as common for the digital inputs)</b>
40	C	Common relays 1, 2, 3 and 4 (MAX 10A)
41	C	Common relays 1, 2, 3 and 4 (MAX 10A)
42	RL1	Relay 1 normally open contact
43	RL2	Relay 2 normally open contact
44	RL3	Relay 3 normally open contact
45	RL4	Relay 4 normally open contact
46	RL5	Relay 5 normally open contact
47	C	Common relays 5, 6, 7 and 8 (MAX 10A)
48	C	Common relays 5, 6, 7 and 8 (MAX 10A)
49	RL6	Relay 6 normally open contact
50	RL7	Relay 7 normally open contact
51	RL8	Relay 8 normally open contact
60	Remote Display	Connection for VISOGRAPH remote terminal (Vnr)

Input No.	Type of Input	Description
61	Remote Display	Connection for VISOGRAPH remote terminal (+)
62	Remote Display	Connection for VISOGRAPH remote terminal (-)
63	RS485 Slave	RS485 Slave connection (-)
64	RS485 Slave	RS485 Slave connection (+)
65	LAN	LAN Connection (-)
66	LAN	LAN Connection (+)

**1.5 Probe connections – iPr215D and iPr208D**

**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.

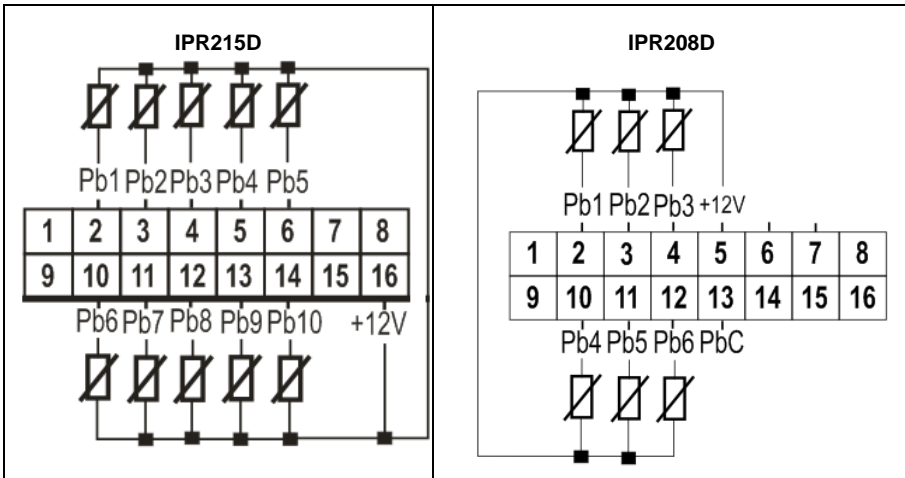


**Recommendations:**

- 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.



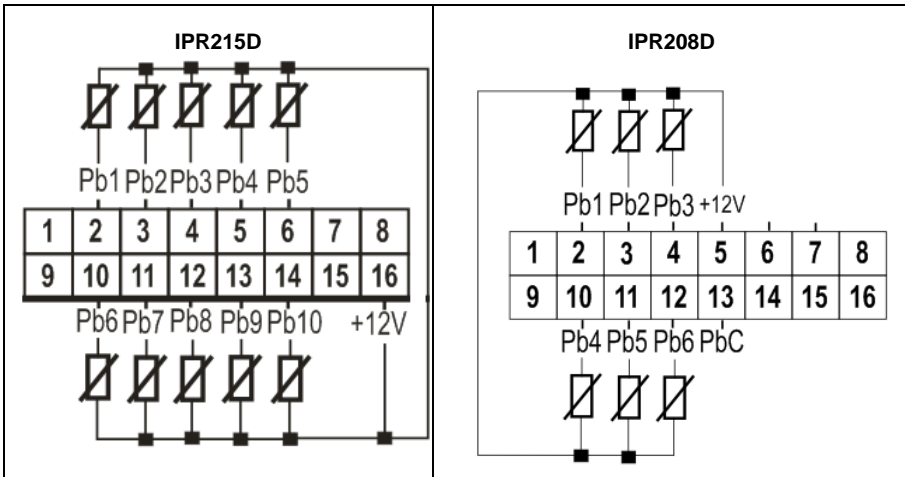
Recommendations:

- 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.



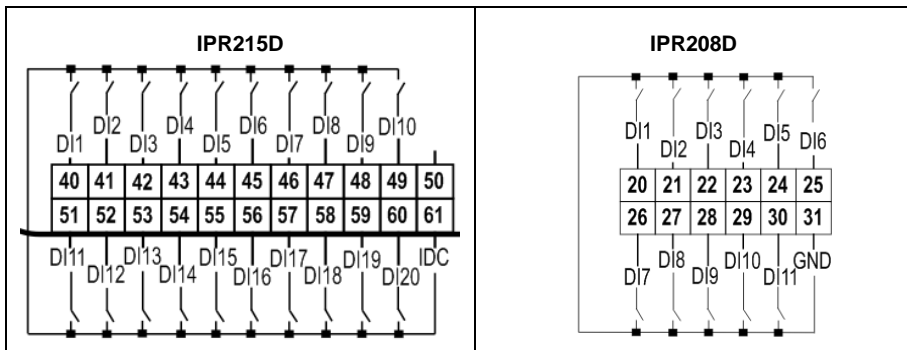
Recommendations:

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

## 1.6 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.

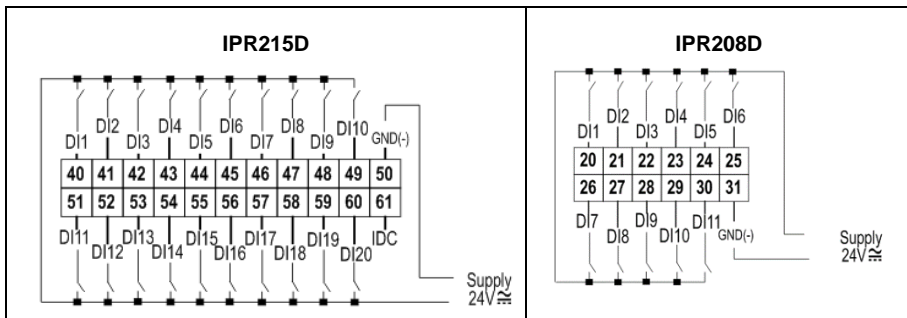
### 1.6.1 Potential-free digital inputs



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.



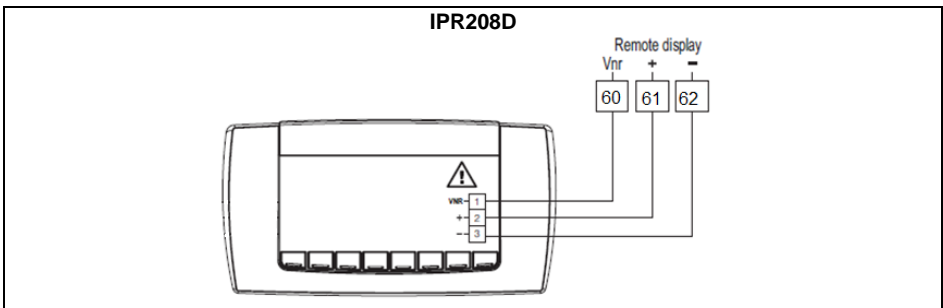
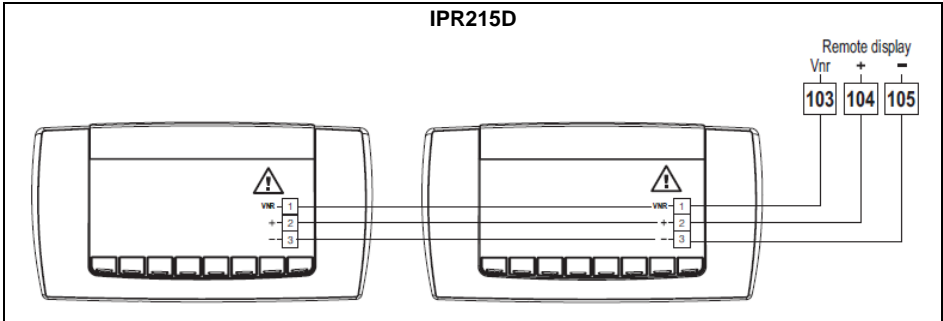
**1.7 Visograph Connections**

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

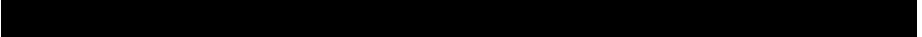
Up to 2 remote displays can be connected to iPR215D.

1 remote display can be connected to IPR208D.

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.



### 3. INTERFACE

#### 3.1 VISOGRAPH

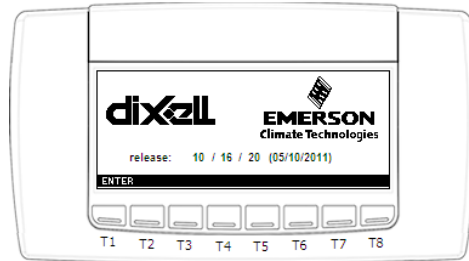
The iPRO programmable controllers allow a programmable remote LCD display (VISOGRAPH) to be connected. Through the VISOPROG processing environment, the display and buttons can be programmed as the user wishes. Text, icons and animated icons can be added to the LCD display. Functions can be associated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



**4. USER INTERFACE**

**4.1 What is displayed when the keyboard is connected**

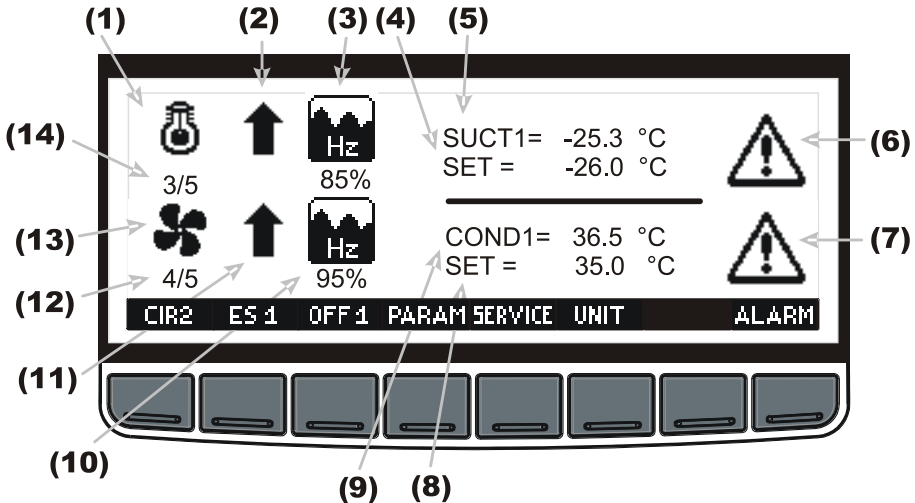
Push the ENTER key to enter the standard visualization



Where:

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

**4.2 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**

**Alarm:** to enter the alarm menu

**PARAM**

**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

**OFF1**

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

**ES1**

**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

## 4.3 Parameters setup

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

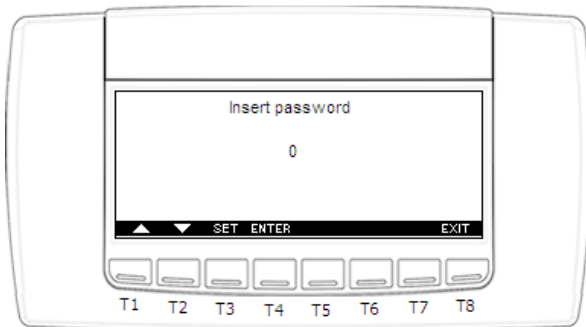
**Parameters are collected in two menu:**

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

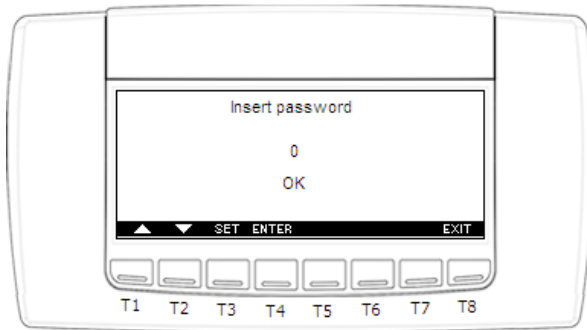
**Pr2:** menu of parameters with password. If the password is enabled, use the following procedure to put it.

### 4.3.1 Password introduction to enter Pr2

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



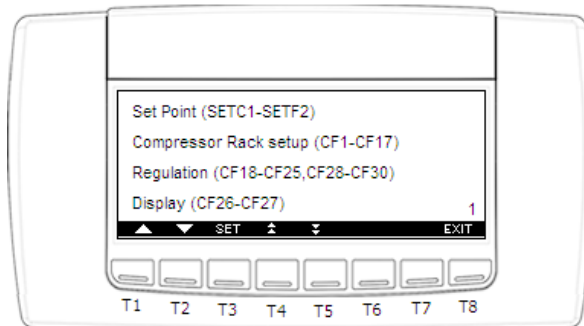
1. Push the SET key.
2. Use the UP and DOWN keys to set the password
3. Push the SET key to confirm it
4. The following message is displayed



5. Push the ENTER key to enter in Pr2 menu

### 4.3.2 Parameters grouping

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



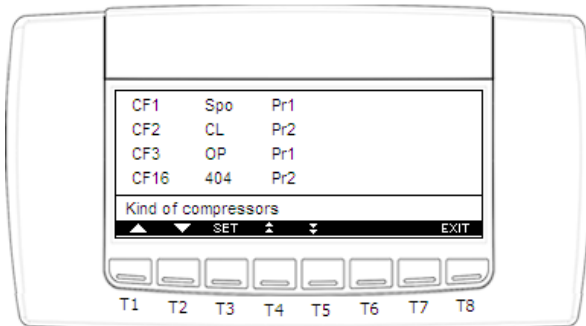
The parameters sub menu are the following:

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

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- ASH19)
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.

## 5. SERVICE MENU

The service menù collect the main functions of the controller.

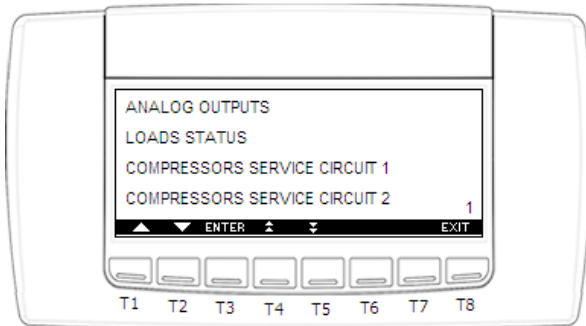
From the Service menu is possible to:

- 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.

## 5.1 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

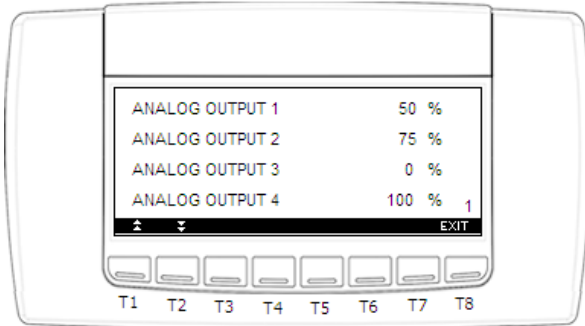


**5.2 How to see the values of analog outputs**

**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:



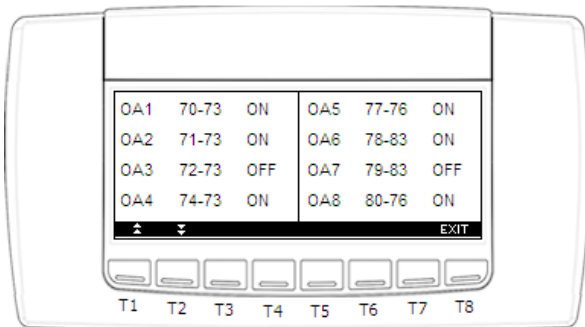
These outputs can be used to drive an external inverter or to repeat a main probe, by means of a signal 4-20mA or 0-10V.

**5.3 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.

## 5.4 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:

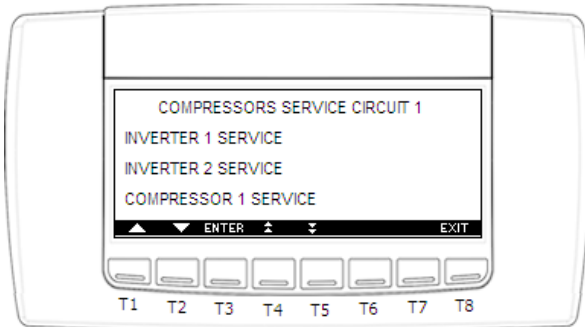
- disabled an output
- check and (eventually) erase the running hour of a load.

### 5.4.1 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:

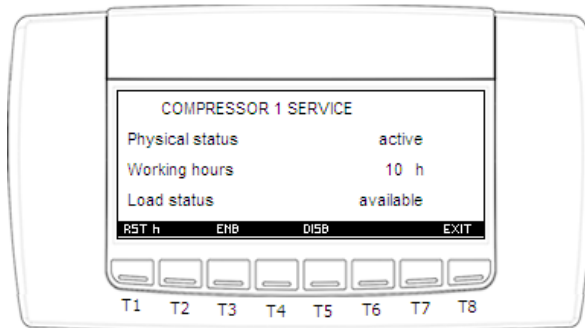


### 5.4.2 How to disabled/enabled an output during a maintenance section.

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

#### **5.4.3 Regulation with some outputs disabled.**

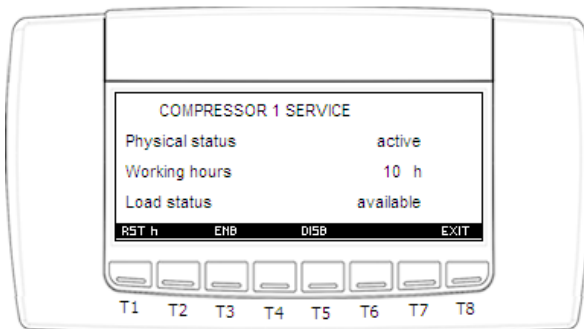
If some outputs are disabled they don't take part to the regulation, so the regulation goes on with the other outputs.

#### **5.4.4 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:



#### **5.4.5 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.

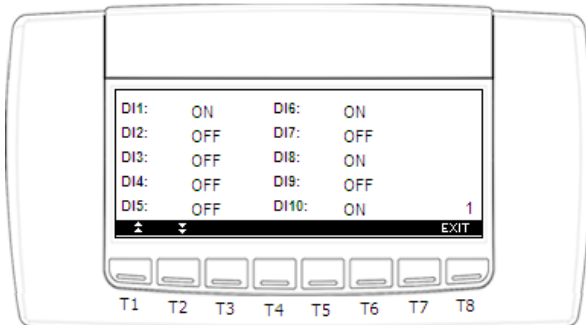
**To exit:** push the **EXIT** key to come back to the SERVICE menu.

## 5.5 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:

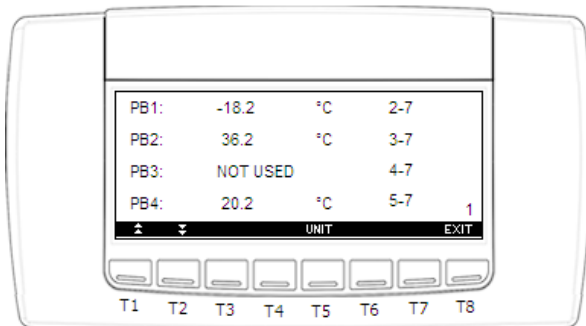


## 5.6 How to see the values of the probes

### 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:



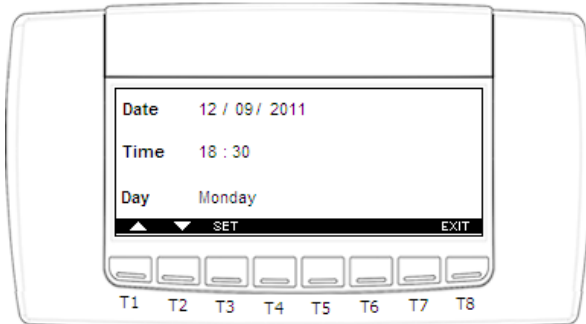
To **change** the measurement unit for the probe PB1, PB2, PB3, PB4, push **UNIT** button.

## 5.7 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:



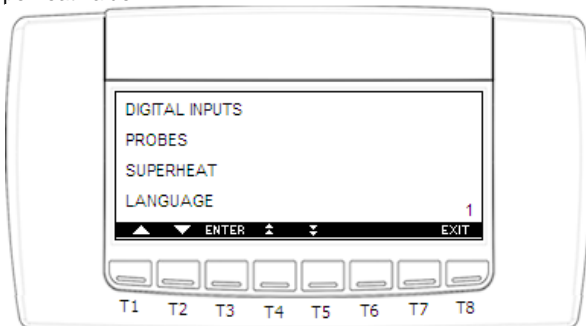
5. Set the day by means of the **UP** and **DOWN** keys.
6. Push the **SET** key, to confirm and pass to the setting of time.
7. Use the same procedure for the date.
8. Then confirm the selection by means of the SET key.

## 5.8 HOW TO CHECK THE SUPERHEAT VALUE

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

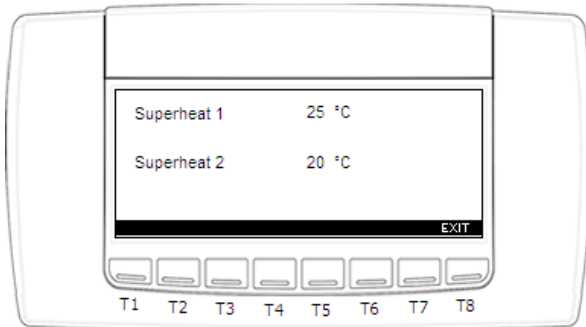
**To do this, configure the probes in the conf.file**, to calculate superheat for suction circuit 1 or 2.

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.

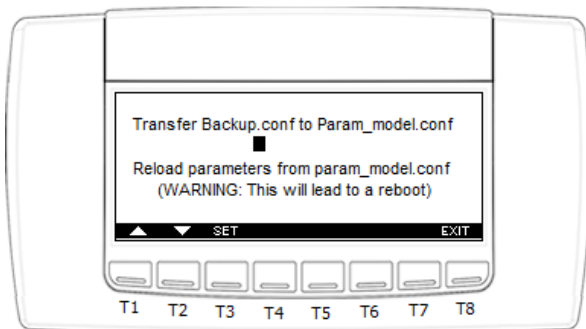


## 5.9 How to charge up the backup of the parameters

### 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 Iprack will reboot and the parameters are reloaded from the Param\_model.conf file.

## 5.10 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".

## 5.11 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.

## 5.12 How to set the Coresense

See paragraph:15.7 Circuit alarm relays

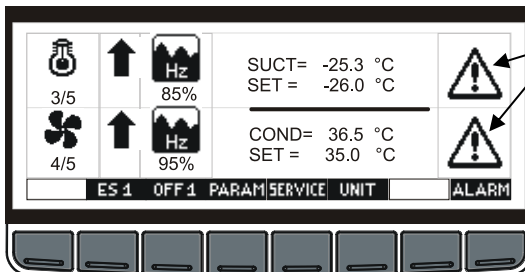
If a relay is set as circuit alarm relay 93 for circ. 1 and 94 for circ. 2 , it is activated in the following conditions:

1. Circuit in off position
2. HP from digital input
3. LP from digital input
4. Condenser high pressure alarm, when all the compressors are off.
5. Low pressure swithc alarm(LPC alarm)
6. Low SH with all the compressor off
7. If all the compressors are stopped by safety inputs.
8. High suction pressure alarm

CORESENSE INTEGRATION and

# 6. ALARMS

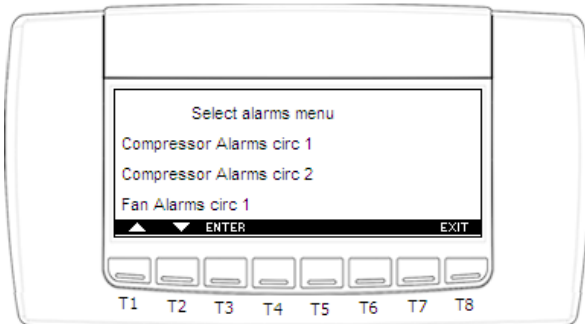
## 6.1 Menu Active alarms



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

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

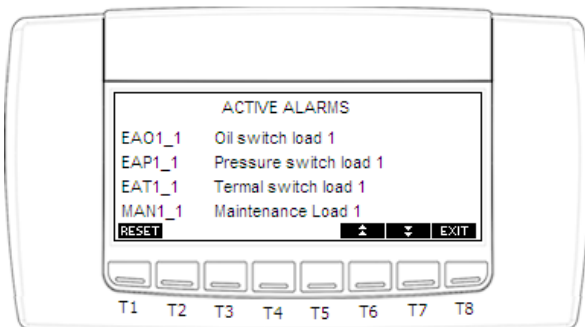
1. Push the **ALARM** key to enter the **ALARM MENU**,
2. If a alarm is present, the header of the corerspondent menu is flashing.
3. The alam menu are



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

4. Select the SECTION by means of the **UP** and **DOWN** keys.
5. 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



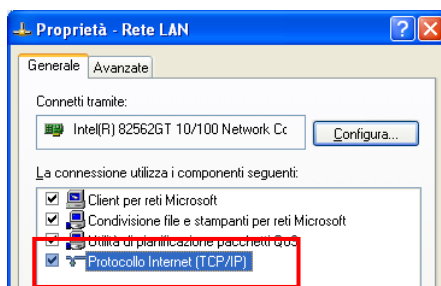
## 8. HOW TO CONNECT THE IPRORACK TO A PC

### 8.1 Direct connection (between iPRO and PC with a cable)

With this kind of connection it 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.

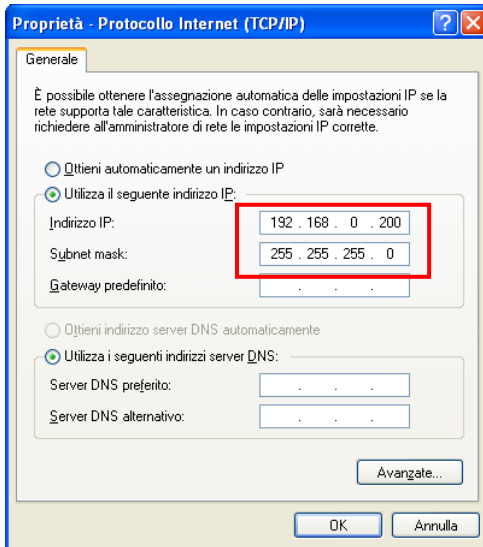


1. Disconnect your computer from the data network of your company and connect the PC with the iPRO through the Crossover cable.
2. The personal computer has to be set in the same network of the iPRO.
  - a. In the windows environment click with the mouse on "start" button
3. Choose "Control Panel" and 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**

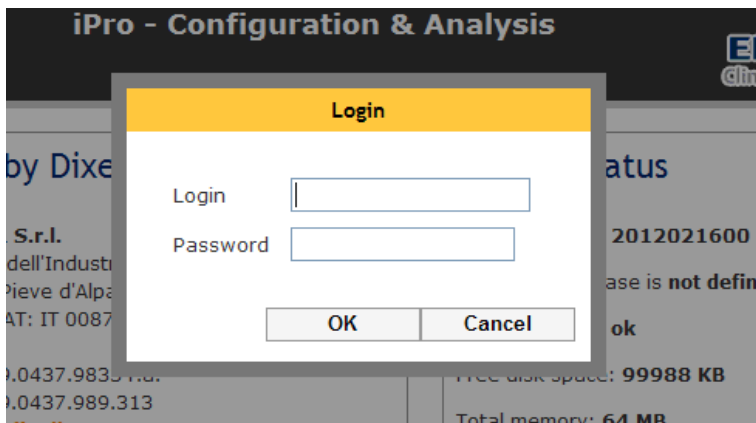


Click "OK" to confirm.

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):

 <a href="#">Login</a>	<h2>iPro - Configuration &amp; Analysis</h2>	
<ul style="list-style-type: none"> <li style="background-color: #f4a460; padding: 2px;">Home</li> <li style="padding: 2px;">Variables</li> <li style="padding: 2px;">Configure</li> <li style="padding: 2px;">Files</li> <li style="padding: 2px;">Accounts</li> <li style="padding: 2px;">Advanced</li> <li style="padding: 2px;">Firewall</li> </ul>	<p><b>iPro by Dixell S.r.l.</b></p> <p><b>DIXELL S.r.l.</b>          Z.I. Via dell'Industria, 27          32010 Pieve d'Alpago (BL) - ITALY          P.IVA/VAT: IT 00876120254</p> <p>Tel. +39.0437.9833 r.a.          Fax +39.0437.989.313  <a href="mailto:dixell@dixell.com">dixell@dixell.com</a>  <a href="http://www.dixell.com">www.dixell.com</a></p> <p><a href="#">User web site</a></p>	<p><b>System status</b></p> <p>BIOS release is <b>2012021600</b></p> <p>Application release is <b>not defined</b></p> <p>ISaGraf status: <b>ok</b></p> <p>Free disk space: <b>99988 KB</b></p> <p>Total memory: <b>64 MB</b></p> <p>IP Address: <b>10.100.81.238</b></p> <p>iPro date: <b>2012/02/22 - 16.40</b></p>

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.

<b>TCP/IP</b>	<b>Port</b>
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"/>
<b>ModBus over RS485</b>	<b>Other</b>
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"/>
<input type="button" value="OK"/> <input type="button" value="Restore Dixell Configuration"/>	

Click "OK" to confirm the operation.

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

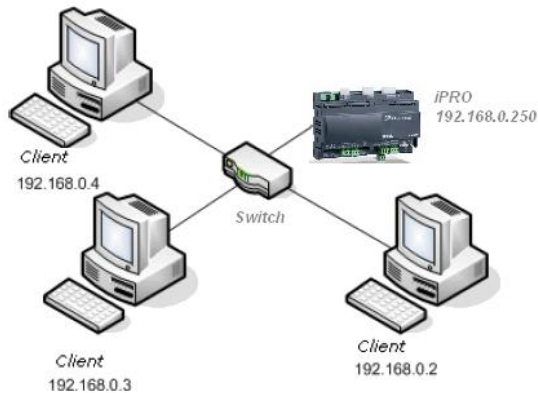
## 8.2 Intranet / Ethernet connection (Local Area Network)

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.

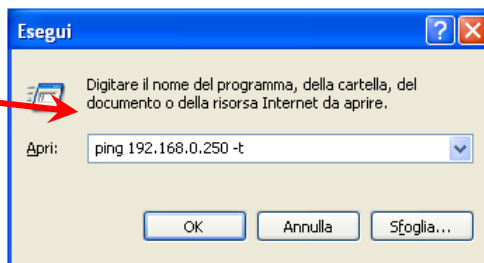
The Intranet method allows the connection to interact with iPRO from all the PC Clients.



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

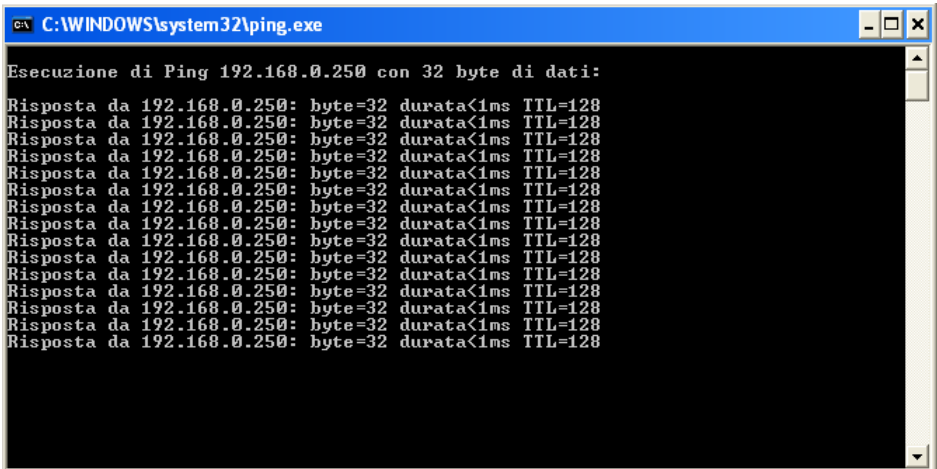
From your computer launch: start -> run

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
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
```

### 8.3 Port forwarding

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

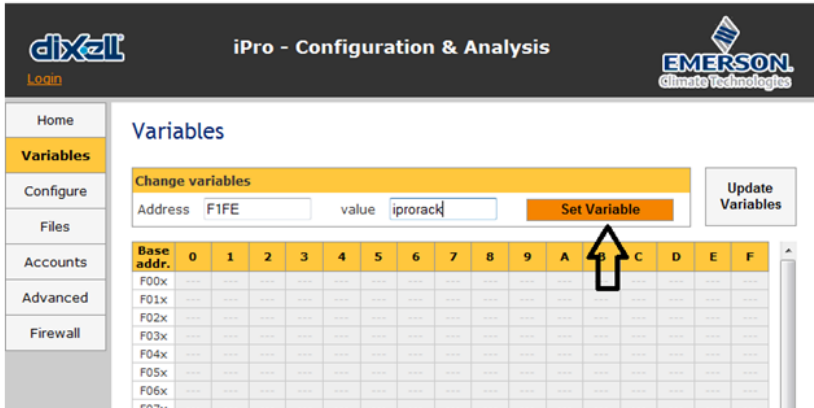
The ports that have to be opened are:

- 22
- 80
- 1131
- 6666

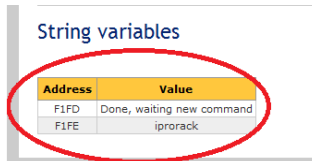
## 9. Updating the visograph from the website

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

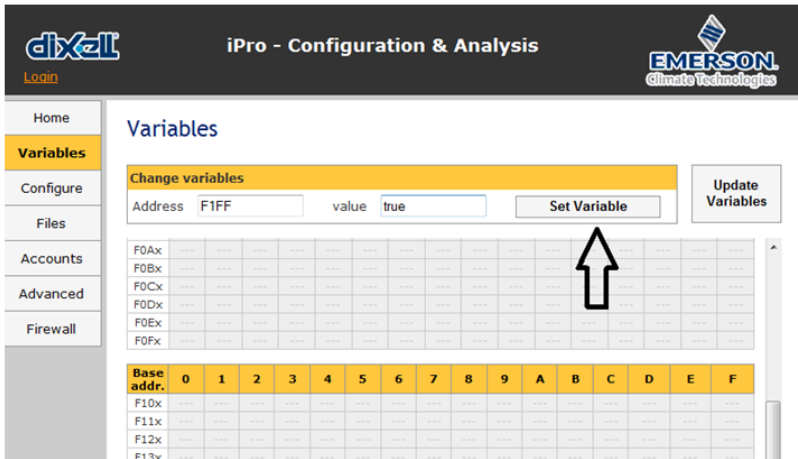
- Load the file "iprorack.bin" into the device
- Navigate to the variables folder of the web page
- Write the name of the file with no extension in the variable F1FE:
  - Put "F1FE" in the field address and "iprochill" in value
- Confirm by clicking on key "Set Variable"



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



- 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.

## 10. 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.

### 10.1 Parameters for iProRack I/O configuration

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

- **DIC** (IPR251D: 20 parameters; IPR208D: 11 parameters);
- **DOC** (IPR251D: 15 parameters; IPR208D: 8 parameters);
- **AOC** (IPR251D: 6 parameters; IPR208D: 4 parameters);
- **AIC** (IPR251D: 10 parameters; IPR208D: 6 parameters);

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

#### 10.1.1 DIGITAL-INPUTS (parameters DIC1- DIC20)

Parameter	Description	IPR215D	IPR208D
<b>DIC 1</b>	Configuration Digital Input 1	x	x
<b>DIC 2</b>	Configuration Digital Input 2	x	x
<b>DIC 3</b>	Configuration Digital Input 3	x	x
<b>DIC 4</b>	Configuration Digital Input 4	x	x
<b>DIC 5</b>	Configuration Digital Input 5	x	x
<b>DIC 6</b>	Configuration Digital Input 6	x	x
<b>DIC 7</b>	Configuration Digital Input 7	x	x
<b>DIC 8</b>	Configuration Digital Input 8	x	x
<b>DIC 9</b>	Configuration Digital Input 9	x	x
<b>DIC 10</b>	Configuration Digital Input 10	x	x
<b>DIC 11</b>	Configuration Digital Input 11	x	x
<b>DIC 12</b>	Configuration Digital Input 12	x	
<b>DIC 13</b>	Configuration Digital Input 13	x	
<b>DIC 14</b>	Configuration Digital Input 14	x	
<b>DIC 15</b>	Configuration Digital Input 15	x	
<b>DIC 16</b>	Configuration Digital Input 16	x	
<b>DIC 17</b>	Configuration Digital Input 17	x	
<b>DIC 18</b>	Configuration Digital Input 18	x	
<b>DIC 19</b>	Configuration Digital Input 19	x	
<b>DIC 20</b>	Configuration Digital Input 20	x	

#### DIGITAL INPUTS CONFIGURATION DI1-DI20

"c" close polarity "o" open polarity;

The next number indicates the Input function as described above.

#### Values

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

**10.1.2 DIGITAL-OUTPUTS (parameters DOC1- DOC15)**

Parameter	Description	IPR215D	IPR208D
<b>DOC 1</b>	Configuration Digital Output 1	x	x
<b>DOC 2</b>	Configuration Digital Output 2	x	x
<b>DOC 3</b>	Configuration Digital Output 3	x	x
<b>DOC 4</b>	Configuration Digital Output 4	x	x
<b>DOC 5</b>	Configuration Digital Output 5	x	x
<b>DOC 6</b>	Configuration Digital Output 6	x	x
<b>DOC 7</b>	Configuration Digital Output 7	x	x
<b>DOC 8</b>	Configuration Digital Output 8	x	x
<b>DOC 9</b>	Configuration Digital Output 9	x	
<b>DOC 10</b>	Configuration Digital Output 10	x	
<b>DOC 11</b>	Configuration Digital Output 11	x	
<b>DOC 12</b>	Configuration Digital Output 12	x	
<b>DOC 13</b>	Configuration Digital Output 13	x	
<b>DOC 14</b>	Configuration Digital Output 14	x	
<b>DOC 15</b>	Configuration Digital Output 15	x	

**Values**

- 0 Not used
- 1o Inverter 1 Suction Circuit 1
- 1c Inverter 1 Suction Circuit 1**
- 2o Inverter 2 Suction Circuit 1 - NOT SET IT
- 2c Inverter 2 Suction Circuit 1 - NOT SET IT**
- 3o Inverter 1 Suction Circuit 2
- 3c Inverter 1 Suction Circuit 2**
- 4o Inverter 2 Suction Circuit 2 - NOT SET IT
- 4c Inverter 2 Suction Circuit 2 - NOT SET IT**
- 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**
- 93o Alarm relay for circuit 1
- 93c Alarm relay for circuit 1
- 94o Alarm relay for circuit 2
- 94c Alarm relay for circuit 2

### 10.1.3 ANALOG-OUTPUTS (parameters AOCl- AOC6)

Parameter	Description	IPR215D	IPR208 D
<b>AOC 1</b>	Configuration Analog Output 1	x	x



<b>AOC 2</b>	Configuration Analog Output 2	x	x
<b>AOC 3</b>	Configuration Analog Output 3	x	x
<b>AOC 4</b>	Configuration Analog Output 4	x	x
<b>AOC 5</b>	Configuration Analog Output 5	x	
<b>AOC 6</b>	Configuration Analog Output 6	x	

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

**Values**

- 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

**10.1.4 ANALOG-INPUTS (parameters AIC1- AIC10)**

<b>Parameter</b>	<b>Description</b>	<b>IPR215D</b>	<b>IPR208D</b>
<b>AIC 1</b>	Configuration Analog Input 1	x	x
<b>AIC 2</b>	Configuration Analog Input 2	x	x
<b>AIC 3</b>	Configuration Analog Input 3	x	x
<b>AIC 4</b>	Configuration Analog Input 4	x	x
<b>AIC 5</b>	Configuration Analog Input 5	x	x
<b>AIC 6</b>	Configuration Analog Input 6	x	x
<b>AIC 7</b>	Configuration Analog Input 7	x	

<b>AIC 8</b>	Configuration Analog Input 8	x	
<b>AIC 9</b>	Configuration Analog Input 9	x	
<b>AIC 10</b>	Configuration Analog Input 10	x	

- 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

## 11. PARAMETERS

### 11.1.1 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

### 11.1.2 Compressor Rack setup (CF1-CF17)

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

**SPo** = compressors with the same capacity.

**SPz** = screw compressors like Bitzer, Hanbell, Refcomp etc operation.

**SPt** = 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.

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

**r22** = R22; **r40A**= R404A ;**507**= R507; **134**=r134; **r717**=r717 (ammonia); **co2** = CO2; **410** = r410; -  
**407c** = r407c; **407F** = r407F; r290 = r290

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

**r22** = R22; **r40A**= R404A ;**507**= R507; **134**=r134; **r717**=r717 (ammonia); **co2** = CO2; **410** = r410; -  
**407c** = r407c; **407F** = r407F; r290 = r290

### 11.1.3 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**

### 11.1.4 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.

### 11.1.5 Analog Inputs – Probe adjustment (Ai1-Ai11)

- AI1-10** **Probe 1-10 calibration:** (Ai7-Ai10 are present only on the IPR25D)  
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

### 11.1.6 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 - (only IPR215D)** (-1.00-Ai25 bar, -14.5÷Ai25 PSI, -100÷Ai25KPA)  
**AI25** **Probe 7 read out at 20mA/4,5V - (only IPR215D)** (Ai24÷160 bar, Ai24÷ 2320, Ai24÷16000 KPA)  
**AI26** **Probe 8 read out at 4mA/0,5V - (only IPR215D)** (-1.00-Ai27 bar, -14.5÷Ai27 PSI, -100÷Ai27KPA)  
**AI27** **Probe 8 read out at 20mA/4,5V - (only IPR215D)** (Ai26÷160 bar, Ai26÷ 2320, Ai26÷16000 KPA)  
**AI28** **Probe 9 read out at 4mA/0,5V - (only IPR215D)** (-1.00-Ai29 bar, -14.5÷Ai29 PSI, -100÷Ai29KPA)

- AI29 Probe 9 read out at 20mA/4,5V - (only IPR215D) (Ai28÷160 bar, Ai28÷ 2320, Ai28÷16000 KPA)  
 AI30 Probe 10 read out at 4mA/0,5V - (only IPR215D) (-1.00-Ai31 bar, -14.5÷Ai31 PSI, -100÷Ai31KPA)  
 AI31 Probe 10 read out at 20mA/4,5V - (only IPR215D) (Ai30÷160 bar, Ai30÷ 2320, Ai30÷16000 KPA)

### 11.1.7 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; **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

### 11.1.8 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; **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
- CDI4 Relay activated in case of liquid level alarm – circuit 2**  
**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

### 11.1.9 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:  $SETC1+(RC1)/2$  ...  $SETC1-(RC1)/2$ . 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 ÷ SETC1 bar; -70.0 ÷ SETC1 °C; -15.0 ÷ SETC1 Psi; -94.0 ÷ SETC1 °F; -100 ÷ 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** (SETC1 ÷100.00 bar; SETC1 ÷150. 0 °C; SETC1 ÷1450 Psi; SETC1 ÷302 °F; SETC1 ÷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÷20.00 bar; -50.0÷50.0 °C; -300÷300 Psi; -90÷90 °F; -2000÷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:  $SETC1+(RC1)/2$  ...  $SETC1-(RC1)/2$ . 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 ÷ SETC2 bar; -70.0 ÷ SETC2 °C; -15.0 ÷ SETC2 Psi; -94.0 ÷ SETC2 °F; -100 ÷ 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** (SETC2 ÷100.00 bar; SETC2 ÷150.0 °C; SETC2 ÷1450 Psi; SETC2 ÷302 °F; SETC2 ÷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÷20.00 bar; -50.0÷50.0 °C; -300÷300 Psi; -90÷90 °F; -2000÷2000 Kpa) this value is add to the compressor set point when the energy saving is enabled.

### **11.1.10 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: SETF1-(RC9)/2 ... SETF1+(RC9)/2. The measurement unit depends on the **CF26** par.
- RC10 Minimum fan set point – circuit 1:** (-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.
- RC11 Maximum fan set point - circuit 1 :** (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.
- RC12 Fan energy saving value - circuit 1** (-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.
- 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.

### **11.1.11 Safety Compressors (SL1- SL22)**

- SL1 Minimum time between 2 following switching ON of the same compressor - circuit 1** (0÷255 min).

- SL2** Minimum time between the switching off of a compressor and the following switching on- circuit 1 (. (0÷255min). **Note:** usually SL1 must be greater than SL2.
- SL3** Time delay between the insertion of two different compressors - circuit 1 ( (1 ÷ 5990 sec)
- SL4** Time delay between switching off of two different compressors - circuit 1 ( (1 ÷ 5990 sec)
- SL5** Minimum time load on - circuit 1 ((1 ÷ 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 (LT) is ON, also one compressor of the circuit 2 (NT) is enabled, independently from the pressure of the circuit 2. This ensures that the gas coming from the circuit 1 is sucked by the compressors of the circuit 2.
- SL14** **Maximum time the booster function is enabled (0÷999s)**  
It defines the maximum time the booster function is active, after a compressor of circuit 1 (LT) has started. After SL12 the standar regulation for circuit 2 (NT) is restored
- SL15** **Automatic switch off of compressors of circuit 1, with booster function on and none compressor of circuit 2 available (yes, no).** This situation is signalled also with "boost" warning. See alarm table
- SL16** **Minimum time between 2 following switching ON of the same compressor - circuit 2** (0÷255 min).
- SL17** **Minimum time between the switching off of a compressor and the following switching on- circuit 2** (. (0÷255min). **Note:** usually SL1 must be greater than SL2.
- SL18** **Time delay between the insertion of two different compressors - circuit 2** ( (1 ÷ 5990 sec)
- SL19** **Time delay between switching off of two different compressors - circuit 2** ( (1 ÷ 5990 sec)
- SL20** **Minimum time load on - circuit 2** (1 ÷ 5990 sec)
- SL21** **SL16 delay enabled also for the first call – Circuit 2.** If enabled, the step triggering is delayed for a "SL16" time, respect to the call.  
**no** = "SL16" not enabled;  
**yES**="SL16" enabled
- SL22** **SL17 delay enabled also for the first off – Circuit 2.** If enabled, the step triggering is delayed for a "SL17" time, respect to the call.  
**no** = "SL17" not enabled;  
**yES**="SL17" enabled

### 11.1.12 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)

### 11.1.13 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

### 11.1.14 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;)

### 11.1.15 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 to 150°C; AL24 to 1450 PSI; AL24 to 230°F; AL24 to 10000 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÷5990 sec)** 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 to 150°C; AL32 to 1450 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

**11.1.16 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.

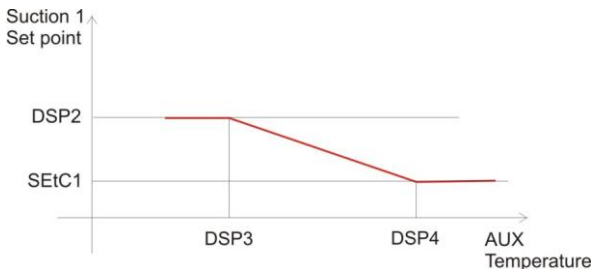
**NOTE:** if more than one probe is used for the optimization of the suction set point, only the last probe defined is considered.(ex: if the analog input 1 is configured as optimization of suction set point and also the analog input 2 ;the probe is used is the probe 2)

**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 isone probe must be set up for this function

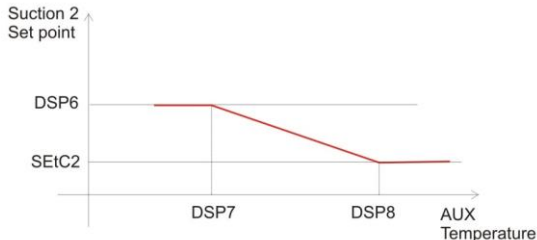
**NOTE:** if more than one probe is used for the optimization of the suction set point, only the last probe defined is considered.(ex: if the analog input 1 is configured as optimization of suction set point and also the analog input 2 ;the probe is used is the probe 2)

**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



**11.1.17 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.

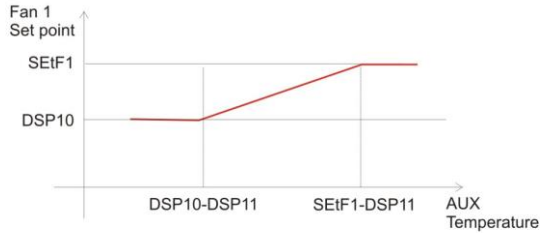
**WARNING** the dynamic set point requires a dedicated probe, one probe must be set up for this functionit is

**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



**DSP12** **NOTE:** if CF26 = bar or PSI or KPA, DSP11 is bar or PSI, the IProRack makes the changes required  
**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

**11.1.18 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** ( $AO1_4 \div 100\%$ ) It is the value of the analogue Output when a compressor has been switched off and the pressure/temperature is below the regulation band. – *Used during inverter regulation*
- AO1\_7 Exclusion band start value for analog Output 1** ( $AO1_4 \div 100\%$ ): 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** ( $AO1_7 \div 100\%$ ) – *Used during inverter regulation*
- AO1\_9 Safety value for analog Output 1** ( $0 \div 100\%$ ): it is used in case of probe's fault.
- AO1\_10 Delay between the entrance in the regulation band and the regulation activation** ( $0 \div 255\text{sec}$ ): 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.*
- AO1\_11 Analog Output 1 rise time:** ( $0 \div 255\text{ sec}$ ). 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** ( $0 \div 255\text{ sec}$ ): 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** ( $0 \div 255\text{sec}$ ). – *Used during inverter regulation*
- AO1\_14 Analog Output 1 decreasing time** ( $0 \div 255\text{sec}$ ) 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** ( $0 \div 255\text{sec}$ ) 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** ( $0 \div 255\text{sec}$ ) 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** ( $0.10 \div 25.00\text{bar}$ ;  $0.0 \div 25.0^\circ\text{C}$ ;  $1 \div 250\text{ PSI}$ ;  $1 \div 250^\circ\text{F}$ ;  $10 \div 2500\text{ KPA}$ ). It is the band with the proportional action. It replaces 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** ( $0 \div 999\text{s}$ ; 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** ( $-12.0 \div 12.0^\circ\text{C}$   $-12.00 \div 12.00\text{ BAR}$ ,  $-120 \div 120^\circ\text{F}$ ,  $-120 \div 120\text{PSI}$ ;  $-1200 \div 1200\text{KPA}$ ). It is used to move the regulation band across to the set point.
- AO1\_20 Integral action limitation** ( $0.0 \div 99.0^\circ\text{C}$ ;  $0 \div 180^\circ\text{F}$ ;  $0.00 \div 50.00\text{bar}$ ;  $0 \div 725\text{PSI}$ ;  $0 \div 5000\text{kPA}$ ) to stop the increasing of integral action when the pressure reaches the SET +  $AO1_20$  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%** ( $1 \div 255\text{min}$ )
- AO1\_24 Time of inverter functioning at 100% to restore the right lubrication** ( $1 \div 255\text{min}$ )

### **11.1.19 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 ÷ 99%)
- AO2\_5 Analog Output 2 value after compressor start** (AO2\_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*
- AO2\_6 Analog Output 2 value after a compressor is switched off** (AO2\_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*
- AO2\_7 Exclusion band start value for analog Output 2** (AO2\_4 ÷ 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 ÷ 100 %) – *Used during inverter regulation*
- AO2\_9 Safety value for analog Output 2** (0 ÷ 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 ÷ 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.*
- AO2\_11 Analog Output 2 rise time:** (0 ÷ 255 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 ÷ 255 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÷255sec). – *Used during inverter regulation*
- AO2\_14 Analog Output 2 decreasing time** (0 ÷ 255sec) 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 ÷ 255sec) 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 ÷ 255sec) 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÷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 + AO2\_17.
- AO2\_18 Integral time** (0÷999s; 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÷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.
- 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)

### 11.1.20 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)

### **11.1.21 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 ÷ 99%)
- AO4\_5 Analog Output 4 value after compressor start** (AO4\_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*
- AO4\_6 Analog Output 4 value after a compressor is switched off** (AO4\_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*
- AO4\_7 Exclusion band start value for analog Output 4** (AO4\_4 ÷ 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 ÷ 100 %) – *Used during inverter regulation*
- AO4\_9 Safety value for analog Output 4** (0 ÷ 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 ÷ 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.*
- AO4\_11 Analog Output 4 rise time:** (0 ÷ 255 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 ÷ 255 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÷255sec). – *Used during inverter regulation*
- AO4\_14 Analog Output 4 decreasing time** (0 ÷ 255sec) 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 ÷ 255sec) 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 ÷ 255sec) 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÷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 + AO4\_17.
- AO4\_18 Integral time** (0÷999s; 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÷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.

**AO4\_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 + 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)

### **11.1.22 Analog Output 5 - IPR215D only- (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 due 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)

### **11.1.23 Analog Output 6 - IPR215D only- (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 ÷ 99%)
- AO6\_5 Analog Output 6 value after compressor start** (AO6\_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*
- AO6\_6 Analog Output 6 value after a compressor is switched off** (AO6\_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*
- AO6\_7 Exclusion band start value for analog Output 6** (AO6\_5 ÷ 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 ÷ 100 %) – *Used during inverter regulation*
- AO6\_9 Safety value for analog Output 6** (0 ÷ 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 ÷ 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 due to pressure variations. – *Used during inverter regulation.*
- AO6\_11 Analog Output 6 rise time:** (0 ÷ 255 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 ÷ 255 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÷255sec). – *Used during inverter regulation*
- AO6\_15 Analog Output 6 decreasing time** (0 ÷ 255sec) 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 ÷ 255sec) 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 ÷ 255sec) 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÷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 + AO6\_17.
- AO6\_18 Integral time** (0÷999s; 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÷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.
- AO6\_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 + AO6\_20 value.
- AO6\_22 Minimum inverter capacity with poor lubrication** (0÷99%; 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)

### 11.1.24 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

### 11.1.25 Superheat

- ASH1** Differential for superheat pre-alarm 1 **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 pre-alarm 1 (0.1 to 60min)

- ASH4** Delay for signalling suction superheat alarm 1 (0÷255s)
- ASH5** Switching off compressors for alarm ASH2 (No, Yes)
- ASH6** Differential for restarting suction superheat alarm control 1 (0.1 to 15.0°C/ 1 to 30°F)
- ASH7** Delay for restarting control after superheat > ASH2+ASH6 (0.1 to 60.0 min;)
- ASH8** 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)
- ASH9** Differential for ASH8 (0.1 to 15.0°C/ 1 to 30°F)
- ASH10** Differential for superheat pre-alarm 2 (0.1 to 15.0°C/ 1 to 30°F)
- ASH11** Lower limit of suction superheat alarm 2 (0.1 to 15.0°C/ 1 to 30°F)
- ASH12** Delay for signalling suction superheat alarm 2 (0.1 to 60.0 min;).
- ASH13** Delay for signalling suction superheat alarm 2 (0÷255s)
- ASH14** Switching off compressors for alarm ASH11 (No, Yes)
- ASH15** Differential for restarting suction superheat alarm control 2 (0.1 to 15.0°C/ 1 to 30°F)
- ASH16** Delay for restarting control after superheat > ASH11+ASH15 (0.1 to 60.0 min;)
- ASH17** 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)
- ASH18** Differential for ASH17 (0.1 to 15.0°C/ 1 to 30°F)
- ASH19** Alarm relay selection for superheat 1 and 2 alarms (nu(0) - ALr(1) - ALr1(2) - ALr2(3))

### **11.1.26 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

### **11.1.27 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. - IPR215D only-** Serial address of the coresense connected to the digital output 9 (81-76 connection) (1-15; "nu" means not used)
- CO10 Address coresense 10. - IPR215D only-** Serial address of the coresense connected to the digital output 10 (82-83 connection) (1-15; "nu" means not used)
- CO11 Address coresense 11. - IPR215D only-** Serial address of the coresense connected to the digital output 11 (84-90 connection) (1-15; "nu" means not used)
- CO12 Address coresense 12. - IPR215D only-** Serial address of the coresense connected to the digital output 12 (85-88 connection) (1-15; "nu" means not used)
- CO13 Address coresense 13. - IPR215D only-** Serial address of the coresense connected to the digital output 13 (86-88 connection) (1-15; "nu" means not used)
- CO14 Address coresense 14. - IPR215D only-** Serial address of the coresense connected to the digital output 14 (91-90 connection) (1-15; "nu" means not used)
- CO15 Address coresense 15. - IPR215D only-** 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)

**11.1.28 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) - **IPR215D only**
- DIC 13** Configuration Digital Input 13 (0÷137c) - **IPR215D only**
- DIC 14** Configuration Digital Input 14 (0÷137c) - **IPR215D only**
- DIC 15** Configuration Digital Input 15 (0÷137c) - **IPR215D only**
- DIC 16** Configuration Digital Input 16 (0÷137c) - **IPR215D only**
- DIC 17** Configuration Digital Input 17 (0÷137c) - **IPR215D only**
- DIC 18** Configuration Digital Input 18 (0÷137c) - **IPR215D only**
- DIC19** Configuration Digital Input 19 (0÷137c) - **IPR215D only**
- DIC 20** Configuration Digital Input 20 (0÷137c) - **IPR215D only**

### **11.1.29 DIGITAL-OUTPUT CONFIGURATIONS (parameters DOCI-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) - **IPR215D only**
- DOC 10** Configuration Digital Output 10 (0÷92) - **IPR215D only**
- DOC 11** Configuration Digital Output 11 (0÷92) - **IPR215D only**
- DOC 12** Configuration Digital Output 12 (0÷92) - **IPR215D only**
- DOC 13** Configuration Digital Output 13 (0÷92) - **IPR215D only**
- DOC 14** Configuration Digital Output 14 (0÷92) - **IPR215D only**
- DOC 15** Configuration Digital Output 15 (0÷92) - **IPR215D only**

### **11.1.30 ANALOG-OUTPUT CONFIGURATIONS (parameters AOCl-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) - **IPR215D only**
- AOC 6** Configuration Analog Output 6 (0÷ 18) - **IPR215D only**

### **11.1.31 ANALOG-INPUT CONFIGURATIONS (parameters AICI-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) - **IPR215D only**
- AIC 8** Configuration Analog Input 8 (0÷36) - **IPR215D only**
- AIC 9** Configuration Analog Input 9 (0÷36) - **IPR215D only**
- AIC 10** Configuration Analog Input 10 (0÷36) - **IPR215D only**

## 12. REGULATION

### 12.1 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)

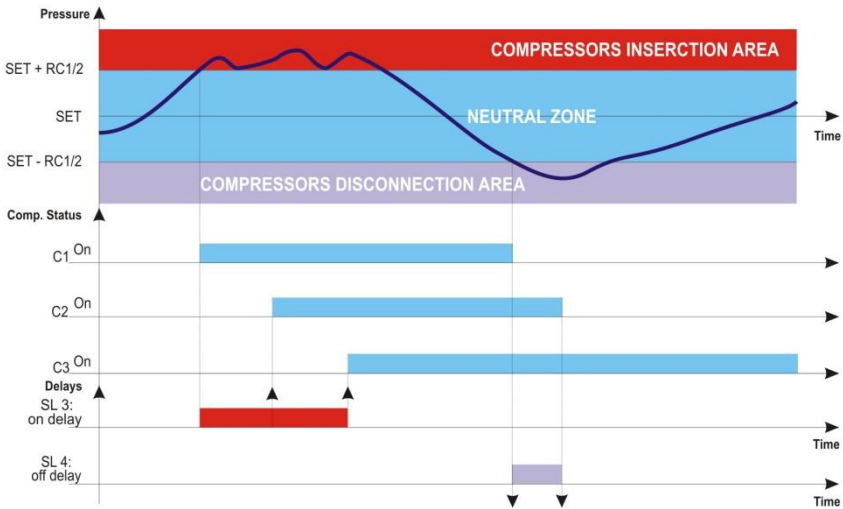
Regulation stops when the pressure (temperature) comes back into the neutral zone.

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:**

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



## 12.2 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.

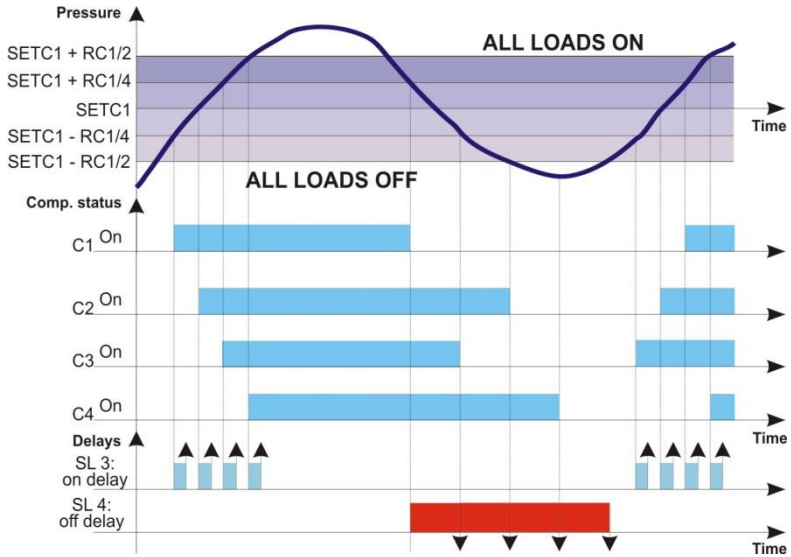
Naturally also for this regulations all the delays (SL3 and SL4) safety times (SL1, SL2, SL5) are taken in account.

### 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

<b>C1 C2 C3 C4 C5</b>	<b>Tot loads = 5 compressors</b>
<b>CF19 = Pb</b>	proportional band regulation
<b>CF22 = yES</b>	rotation
<b>SL8 = no</b> “	SL3” delay not enabled at first calling after a regulation zone.
<b>SL9 = no</b> “	SL4” delay not enabled at first calling after a regulation zone.



### 13. Digital 6d Compressor management

Regulation with Stream Digital 6D compressor.

This compressor requires 2 resources:

- a. Inverter
- b. 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:

- a. the 6D step.
- b. 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:

- a. Switch off all the other loads, following the standard logic.
- b. 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.

**14. 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.

**14.1 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)

**14.1.1 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).

	<b>C1 = Screw1</b>	<b>C2 = stp</b>	<b>C3 = stp</b>	<b>C4 = stp</b>
<b>Step 1 (25%)</b>	ON	ON	OFF	OFF
<b>Step 2 (50%)</b>	ON	OFF	ON	OFF
<b>Step 3 (75%)</b>	ON	OFF	OFF	ON
<b>Step 4 (100%)</b>	ON	OFF	OFF	OFF

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

	<b>C1 = Screw1</b>	<b>C2 = stp</b>	<b>C3 = stp</b>	<b>C4 = stp</b>
<b>Step 1 (25%)</b>	ON	OFF	ON	ON
<b>Step 2 (50%)</b>	ON	ON	OFF	ON
<b>Step 3 (75%)</b>	ON	ON	ON	OFF
<b>Step 4 (100%)</b>	ON	ON	ON	ON

**14.2 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.

**14.2.1 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)

	<b>C1 = Screw1</b>	<b>C2 = stp</b>	<b>C3 = stp</b>	<b>C4 = stp</b>
<b>Step 1 (25%)</b>	ON	OFF	OFF	OFF
<b>Step 2 (50%)</b>	ON	ON	ON	OFF
<b>Step 3 (75%)</b>	ON	ON	OFF	ON
<b>Step 4 (100%)</b>	ON	ON	OFF	OFF

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

	<b>oAi = Screw1</b>	<b>oAi+1 = stp</b>	<b>oAi+2 = stp</b>	<b>oAi+3 = stp</b>
<b>Step 1 (25%)</b>	ON	ON	ON	ON
<b>Step 2 (50%)</b>	ON	OFF	OFF	ON
<b>Step 3 (75%)</b>	ON	OFF	ON	OFF
<b>Step 4 (100%)</b>	ON	OFF	ON	ON

## 15. ANALOG INPUTS FOR INVERTER

### 15.1 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.

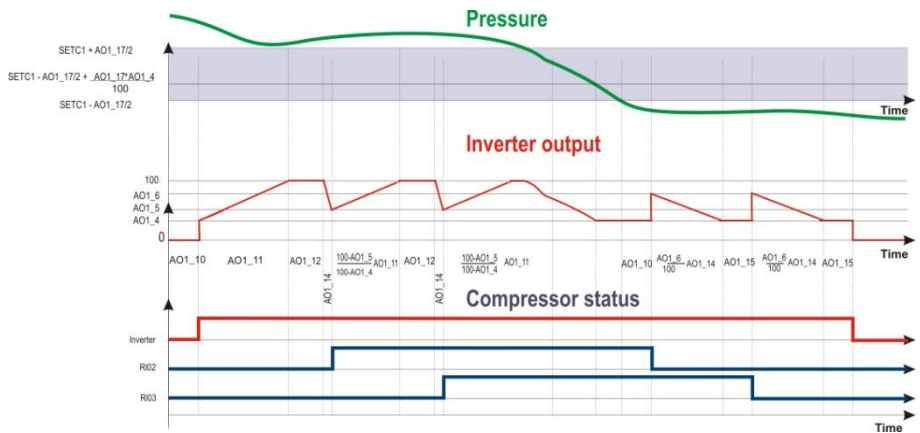
#### EX. 2 compressors. 1 frequency compressor.

**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

0 + 99 %

<b>AO1_5</b>	Analog Input1 value after compressor on	1Q6 + 100 %
<b>AO1_6</b>	Analog Input1 value after compressor off	1Q6 + 100 %
<b>AO1_10</b>	Regulation delay after entering the regulation band	0 + 255 (sec)
<b>AO1_11</b>	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)
<b>AO1_12</b>	Analog Input 1 permanency at 100% before load activation	0 + 255 (sec)
<b>AO1_13</b>	Delay between pressure (temperature) goes down the set point and start of analog Input 1 decreasing	0 + 255 (sec)
<b>AO1_16</b>	Analog Input 1 decreasing time from 100% to the AO1_4 value	0 + 255 (sec)
<b>AO1_15</b>	Analog Input1 permanency at AO1_4 before a load is switched off	0 + 255 (sec)
<b>AO1_14</b>	Analog Input1 decreasing time, from 100% to AO1_5 when a load is switched on	0 + 255 (sec)

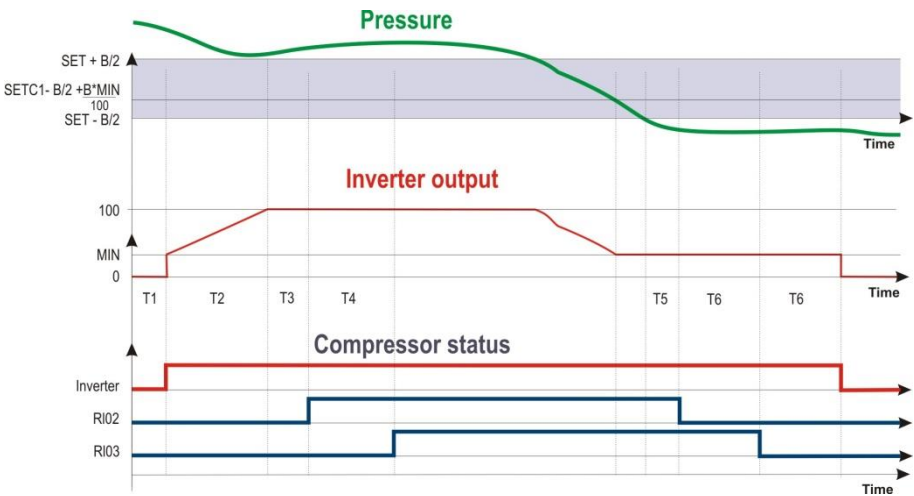
### EX: 2 compressors, 1 frequency compressor.

#### 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)
<b>T4</b> →	<b>SL3</b> 2 different loads start delay	0 ÷ 5990 sec
<b>T6</b> →	<b>SL4</b> 2 different loads off delay	0 ÷ 5990 sec

## 15.2 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

<b>AO1_4</b>	Minimum value for analog Input 1	0÷99 %
<b>AO1_5</b>	Analog Input 1 value after fan activation	(AO1_4÷100 %)
<b>AO1_6</b>	Analog Input 1 value after fan deactivation	(AO1_4÷100 %)
<b>T1</b> →	<b>AO1_10</b> Regulation delay of analog Input 1 when the pressure is in the regulation band	(0 ÷ 255s)
<b>T2</b> →	Analog Input 1 rise time from AO1_4 to 100% when the pressure is outside the regulation band	(0 ÷ 255 s)
<b>T3</b> →	<b>AO1_12</b> Analog Input 1 permanency at 100% before load activation	(0 ÷ 255 sec)
<b>T7</b> →	<b>AO1_16</b> Analog Input 1 decreasing time from 100% to AO1_4	(0 ÷ 255 sec)
<b>T6</b> →	<b>AO1_15</b> Analog Input 1 permanency at Ao1_4 before a fan is switched off with pressure below the set	(0 ÷ 255 (sec)

## 15.3 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\*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.

### 15.3.1 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.

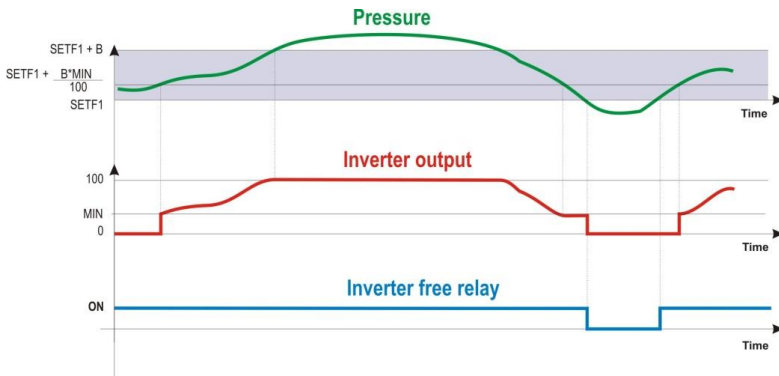
**IO\_configuration:** 5 fans, driven by one inverter.

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



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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)

## **15.4 Liquid injection valve activation for raising superheat – subcritical Co2 application**

### ***15.4.1 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”

### ***15.4.2 Adjustment***

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

SH1 = (Probe temp. set as SH1) – (Temp. of suction 1)

with SH1 < = ASH7 – ASH8	→	Valv1 on
with SH1 > = ASH7	→	Valv1 off
with ASH7 < SH1 < ASH7 – ASH8	→	maintains the status.

### ***15.4.3 Particular cases***

- 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.
- 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.

## **15.5 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.

### ***15.5.1 Functionality***

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.

## 15.6 Booster function

### 15.6.1 Parameters involved

#### SL11 **Booster function enabled:**

**no** = compressors of 2 circuits work independently

**yES** = if at least one compressor of the circuit 1 (LT) is ON, also one compressor of the circuit 2 (NT) is enabled, independently from the pressure of the circuit 2. This ensures that the gas coming from the circuit 1 is sucked by the compressors of the circuit 2.

#### SL14 **Maximum time the booster function is enabled (0÷999s)**

It defines the maximum time the booster function is active, after a compressor of circuit 1 (LT) has started. After SL12 the standar regulation for circuit 2 (NT) is restored

#### SL15 **Automatic switch off of compressors of circuit 1, with booster function on and none compressor of circuit 2 available (yes, no).** This situation is signalled also with "boost" warning. See alarm table

### 15.6.2 Behaviour

The booster function synchronises the functions between circuit 1 (LT) and circuit 2 (NT).

During the SL14 time if a compressor of Circuit 1 (LT), at list 1 compressor or Circuit 2 (NT) is forced to run. When SL14 has expired the 2 circuits re-become independent

If during SL14 all the compressors of circuit 2 are stopped by safeties, also the compressors of circuit 1 will be stopped and the "booster alarm" is generated.

The compressors of circ. 1 are prevented from starting till a compressor of circuit 2 comeback available

## 15.7 Circuit alarm relays

If a relay is set as circuit alarm relay 93 for circ. 1 and 94 for circ. 2 , it is activated in the following conditions:

9. Circuit in off position
10. HP from digital input
11. LP from digital input
12. Condenser high pressure alarm, when all the compressors are off.
13. Low pressure swithc alarm(LPC alarm)
14. Low SH with all the compressor off
15. If all the compressors are stopped by safety inputs.
16. High suction pressure alarm

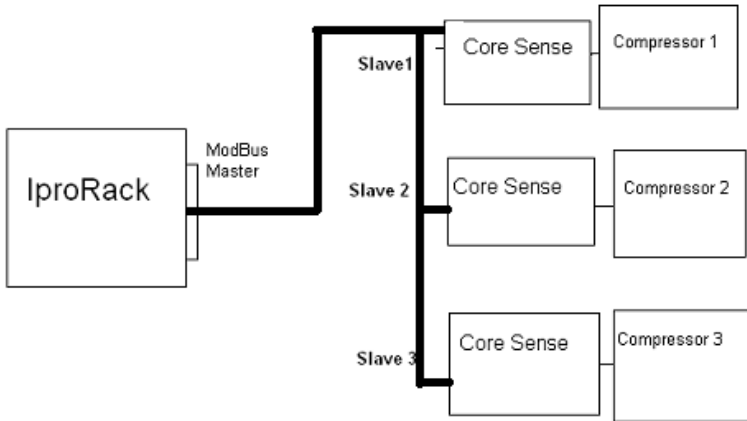
## 16. CORESENSE INTEGRATION – compatibility guarantee only for vers. F35 or later of Coresense

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.

## 16.1 CONNECTION.


CONNECTION DIAGRAM



The communication between the IproRack and the core sense device is Modbus.

**16.1.1 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)

**16.1.2 How to configure the CORESENSE communication**

<b>C01</b>	CO-ADDRESS DIGITAL OUT 1	Address core sense out 1	1 – 15; NU = not used
<b>C02</b>	CO-ADDRESS DIGITAL OUT 2	Address core sense out 2	1 – 15; NU = not used
<b>C03</b>	CO-ADDRESS DIGITAL OUT 3	Address core sense out 3	1 – 15; NU = not used
<b>C04</b>	CO-ADDRESS DIGITAL OUT 4	Address core sense out 4	1 – 15; NU = not used
<b>C05</b>	CO-ADDRESS DIGITAL OUT 5	Address core sense out 5	1 – 15; NU = not used
<b>C06</b>	CO-ADDRESS DIGITAL OUT 6	Address core sense out 6	1 – 15; NU = not used
<b>C07</b>	CO-ADDRESS DIGITAL OUT 7	Address core sense out 7	1 – 15; NU = not used
<b>C08</b>	CO-ADDRESS DIGITAL OUT 8	Address core sense out 8	1 – 15; NU = not used
<b>C09</b>	CO-ADDRESS DIGITAL OUT 9	Address core sense out 9	1 – 15; NU = not used
<b>C010</b>	CO-ADDRESS DIGITAL OUT 10	Address core sense out 10	1 – 15; NU = not used
<b>C011</b>	CO-ADDRESS DIGITAL OUT 11	Address core sense out 11	1 – 15; NU = not used
<b>C012</b>	CO-ADDRESS DIGITAL OUT 12	Address core sense out 12	1 – 15; NU = not used
<b>C013</b>	CO-ADDRESS DIGITAL OUT 13	Address core sense out 13	1 – 15; NU = not used
<b>C014</b>	CO-ADDRESS DIGITAL OUT 14	Address core sense out 14	1 – 15; NU = not used

<b>CO15</b>	CO-ADDRESS DIGITAL OUT 15	Address core sense out 15	1 – 15; NU = not used
<b>CO16</b>	CO-BAUD RATE	BAUD RATE	19200-9600(0-1)
<b>CO17</b>	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.

## 17. 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**

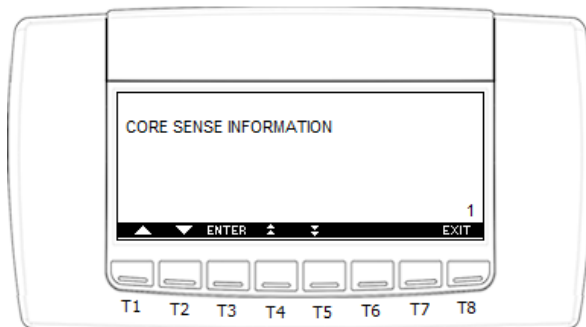
## 17.1 How to see coresense data

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

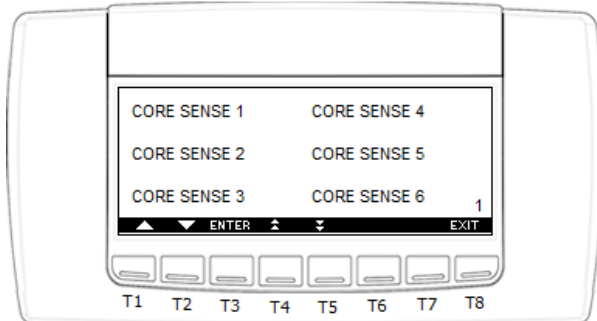
### 17.1.1 ASSET INFORMATION and OPERATING PARAMETERS

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-menù.
- Push Enter.



- Select the core sense that you want to see.

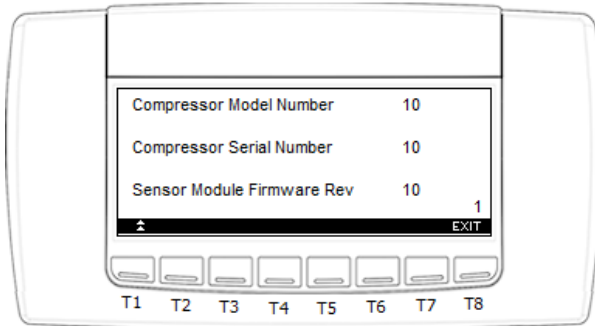
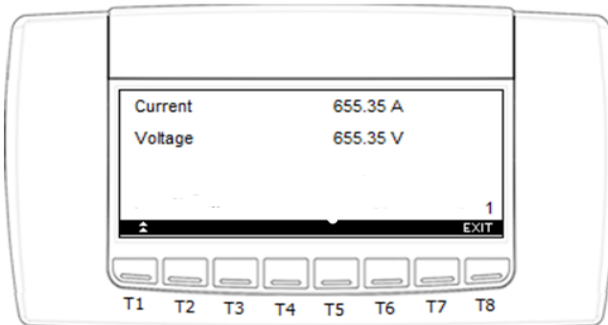


- Select for example the core sense 1.

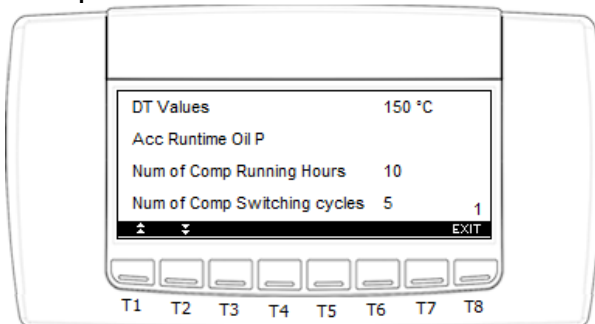


**CORE SENSE MENU**

Inside this menu there are:

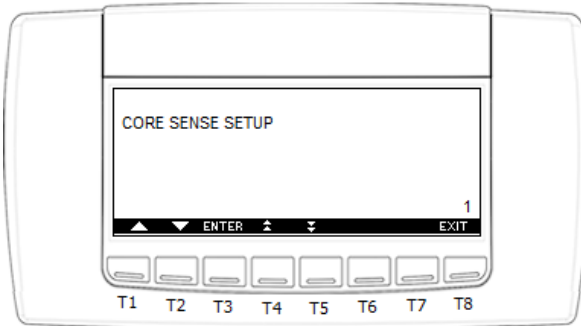
**SETTING PARAMETERS****OPERATING PARAMETERS*****17.1.2* SETTING PARAMETERS**

To set the coresense parameters:

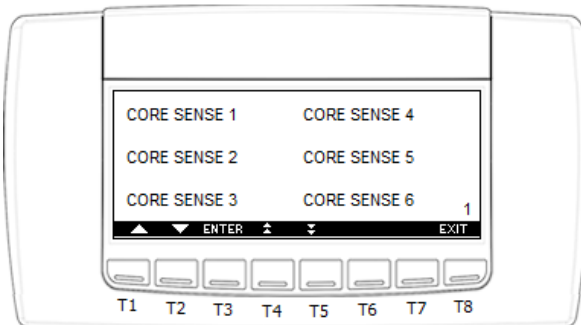


Entry in a service menu (see the paragraph 5.1):

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

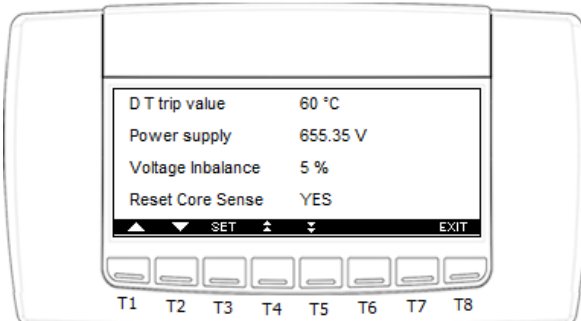


- Select the core sense that you want to modify.



- Select for example the core sense 1.

Inside this menu there is this information:

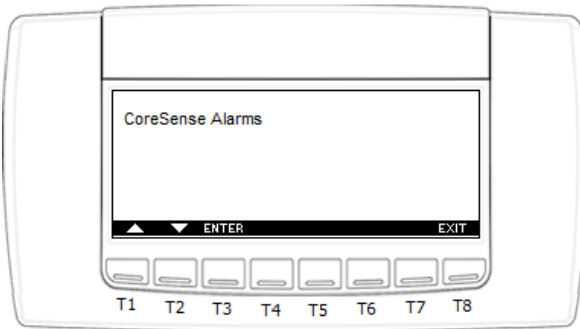


1) DT trip Value → it is a parameter to set.

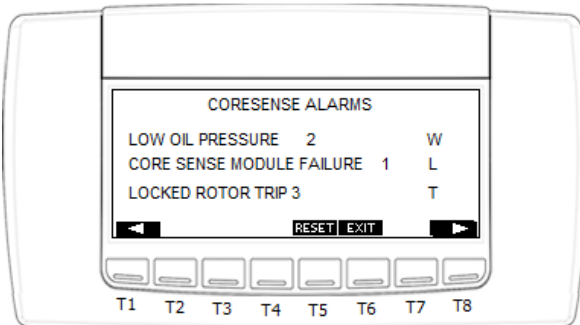
- 2) Power supply → it is a parameter to set.
- 3) Voltage Inbalance → it is a parameter to set.
- 4) Reset Core Sense → to send to the core sense a reset command.

**17.1.3 HOW TO SEE THE CORESENSE ALARMS**

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



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



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

**17.2 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 IPPrack. (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 IPPrack. (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

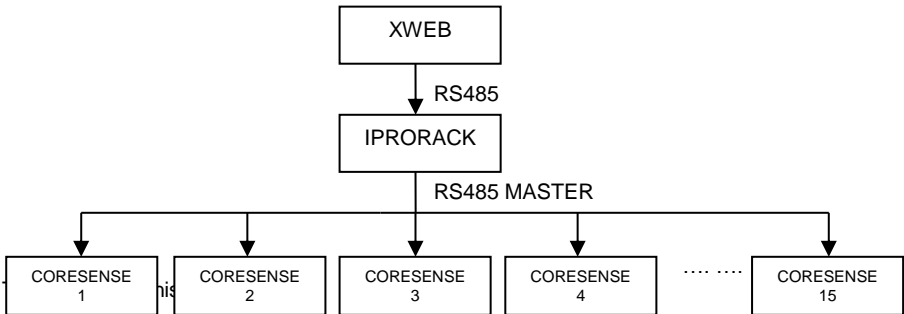
***17.2.1 List of the Alarms***

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	Communication Error to Ipro W	18 - Communication 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

## 18. CONNECTION BETWEEN XWEB- IPRORACK – CORESENSE

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.



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

	<p>RS485 Slave connector Rx and Tx LED to indicate that communication is active Closed circuit terminal (Term)</p>
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- 2) Connect the Coresense's RS485 line to the MASTER serial line of iProRack.

	<p>RS485 Master connector Rx and Tx LED to indicate that communication is active Closed circuit terminal (Term)</p>
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- 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.)

## 19. 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

### 19.1 Alarm conditions – summary table

Code	Description	Cause	Action	Reset
<b>ALARMS CIRCUIT 1</b>				
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><b>Automatically</b> 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"> <li>- The compressors restart working according to the working algorithm.</li> </ul> <p><b>Manually</b> (if AL12 activation happened in the AL13 time When the Input is disable:</p> <ul style="list-style-type: none"> <li>- Turn off and on the instrument..</li> <li>- The compressors restart working according to the working algorithm.</li> </ul>
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"> <li>• All compressors of circuit 1 are turned off.</li> <li>• All fans are of circuit 1 turned on.</li> </ul>	<p><b>Automatically</b> if the number of activation are less than AL29 in AL30 time when the Input is disable.</p> <ul style="list-style-type: none"> <li>- Compressors and fans restart working according to the working algorithm.</li> </ul> <p><b>Manually</b> if AL29 activation happened in the AL30 time When the Input is disable:</p> <ol style="list-style-type: none"> <li>1. Turn off and on the instrument..</li> <li>2. Compressors and fans restart working according to the working algorithm.</li> </ol>
LAC1	Minimum pressure (temperature) alarm compressors for circuit 1	Suction pressure or temperature lower than SETC1-AL3 value	only signalling	<p><b>Automatically:</b> as soon as the pressure or temperature reaches the SETC1-AL3 + differential value. (differential = 0.3bar or 1°C)</p>
LAF1	Minimum pressure (temperature) alarm fans section for circuit 1	Condensing pressure or temperature lower than SETF1-AL24 value	only signalling	<p><b>Automatically:</b> as soon as the pressure or temperature reaches the SETF1-AL24 + differential)value. (differential = 0.3bar or 1°C)</p>

Code	Description	Cause	Action	Reset
HAC1	Maximum pressure (temperature) alarm compressors for circuit 1	Suction pressure or temperature higher than SETC1+AL4 value	only signalling	<b>Automatically:</b> 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	<b>Automatically:</b> as soon as the pressure or temperature reaches the SETF1+AL25 - differential value. (differential = 0.3bar or 1°C)
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	<b>Automatically</b> as soon as the Input is disabled
PrSH1	Pre-alarm for superheat circuit 1	Superheat 1 is less than ASH0 + ASH1	Signal only	<b>Automatic:</b> when superheat exceeds ASH0 + ASH1 +1°C
ALSH1	Alarm for superheat circuit 1	Superheat 1 is less than ASH1	Depends on ASH3	<b>Automatic:</b> when superheat exceeds ASH5 + ASH1
LPC1	Electronic pressure switch for low temperature/ pressure of circuit 1	Pressure/temperature < AL21	disables the compressors	<b>Automatic:</b> 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.	<b>Automatically</b> 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.	<b>Automatically</b> as soon as the probe restarts working.
<b>ALARMS CIRCUIT 2</b>				

Code	Description	Cause	Action	Reset
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.	<p><b>Automatically</b> if the number of activation are less than AL16 in the AL17 time when the Input is disable.</p> <ul style="list-style-type: none"> <li>- The compressors restart working according to the working algorithm.</li> </ul> <p><b>Manually</b> (if AL16 activation happened in the AL17 time When the Input is disable:</p> <ul style="list-style-type: none"> <li>- Turn off and on the instrument.</li> <li>- The compressors restart working according to the working algorithm.</li> </ul>
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"> <li>- All compressors of circuit 2 are turned off.</li> <li>- All fans are of circuit 2 turned on.</li> </ul>	<p><b>Automatically</b> if the number of activation are less than AL29 in AL30 time when the Input is disable.</p> <ul style="list-style-type: none"> <li>- Compressors and fans restart working according to the working algorithm.</li> </ul> <p><b>Manually</b> if AL29 activation happened in the AL30 time When the Input is disable:</p> <ol style="list-style-type: none"> <li>3. Turn off and on the instrument.</li> <li>4. Compressors and fans restart working according to the working algorithm.</li> </ol>
LAC2	Minimum pressure (temperature) alarm compressors for circuit 2	Suction pressure or temperature lower than SETC2-AL6 value	signalling only	<b>Automatically:</b> 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	<b>Automatically:</b> 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	<b>Automatically:</b> 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	<b>Automatically:</b> as soon as the pressure or temperature reaches the SETF2+AL33 - differential value. (differential = 0.3bar or 1°C)



Code	Description	Cause	Action	Reset
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	<b>Automatically</b> as soon as the Input is disabled
PrSH2	Pre-alarm for superheat circuit 2	Superheat 1 is less than ASH1 + ASH9	Signal only	<b>Automatic:</b> when superheat exceeds ASH1 + ASH9 +1°C
ALSH2	Alarm for superheat circuit 2	Superheat 1 is less than ASH9	Depends on ASH10	<b>Automatic:</b> when superheat exceeds ASH12 + ASH9
LPC2	Electronic pressure switch for low temperature/ pressure of circuit 2	Pressure/temperature < AL23	disables the compressors	<b>Automatic:</b> 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.	<b>Automatically</b> 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.	<b>Automatically</b> as soon as the probe restarts working.
<b>Compressor Alarms</b>				
EA01... EA015 (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).	<b>Automatically</b> as soon as the Input is disabled.

Code	Description	Cause	Action	Reset
ETO1... ETO15 (for each compressor)	Compressor safeties alarm for Terminal switch load	Terminal 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).	<b>Automatically</b> as soon as the Input is disabled.
EPO1... EPO15 (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).	<b>Automatically</b> 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	<b>Manually:</b> reset the running hour of the compressor (vedi par 6.1)
Boost	<b>Booster alarm</b>	No compressor of Circ. 2 available	signalling only	<b>Automatically</b> as soon as a compressor of circuit 2 is available
Circ. 1 alarm	<b>Circuit 1 alarm</b>	There is a serious alarm in circuit 1	Relay set as 93 is activated	<b>Automatically</b> as soon as the serious alarm condition is no longer present
Circ. 2 alarm	<b>Circuit 2 alarm</b>	There is a serious alarm in circuit 2	Relay set as 94 is activated	<b>Automatically</b> as soon as the serious alarm condition is no longer present
<b>GENERIC ALARMS</b>				
P1	probe failure alarm	Probe 1 failure	signalling only	<b>Automatically</b> as soon as the probe restarts working.
P2	probe failure alarm	Probe 2 failure	signalling only	<b>Automatically</b> as soon as the probe restarts working.
P3	probe failure alarm	Probe 3 failure	signalling only	<b>Automatically</b> as soon as the probe restarts working.
P4	probe failure alarm	Probe 4 failure	signalling only	<b>Automatically</b> as soon as the probe restarts working.
P5	probe failure alarm	Probe 5 failure	signalling only	<b>Automatically</b> as soon as the probe restarts working.
P6	probe failure alarm	Probe 6 failure	signalling only	<b>Automatically</b> as soon as the probe restarts working.
P7	probe failure alarm	Probe 7 failure	signalling only	<b>Automatically</b> as soon as the probe restarts working.
P8	probe failure alarm	Probe 8 failure	signalling only	<b>Automatically</b> as soon as the probe restarts working.
P9	probe failure alarm	Probe 9 failure	signalling only	<b>Automatically</b> as soon as the probe restarts working.
P10	probe failure alarm	Probe 10 failure	signalling only	<b>Automatically</b> as soon as the probe restarts working.

Code	Description	Cause	Action	Reset
<b>Fan Alarm</b>				
<b>AL_AO</b> (for each fan)	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.	<b>Automatically</b> as soon as the Input is disabled.

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