
# IPRC208D - IPRC215D
# IPRC315D - VTIPR
## rel.6.4

# INDEX

# 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 CO2 Transcritical a pack (in subcritical and transcritical mode)
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).

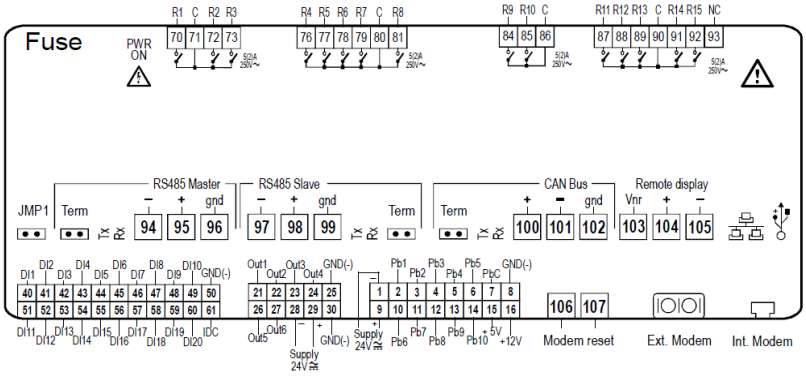
## 1.2 HARDWARE ARCHITECTURE

The iPRO programmable controller is structured as follows:

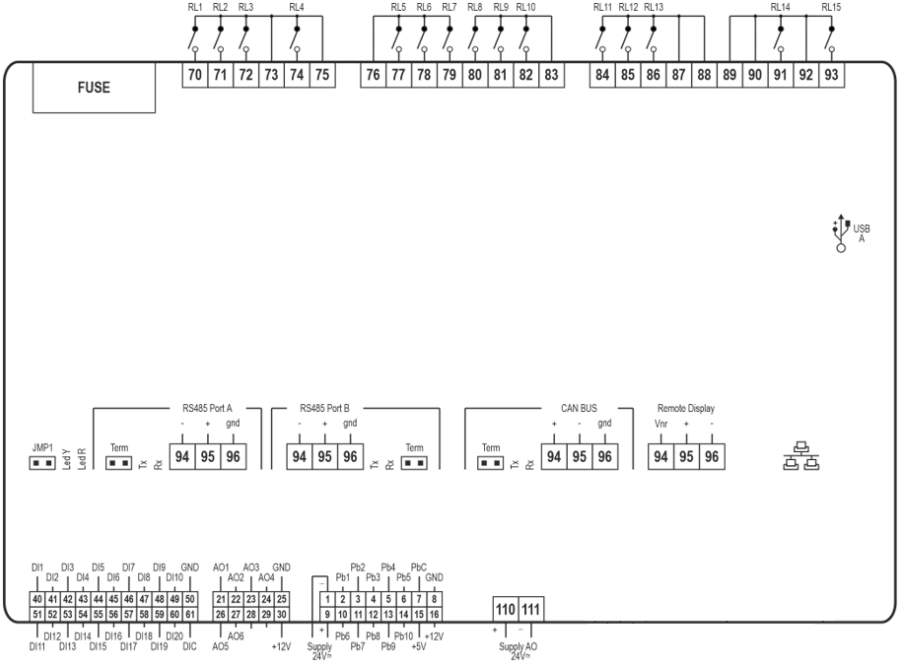
- 32-bit microprocessor used to run the application
- Bayonet connectors (Phoenix)
- The programme and parameters are stored in a permanent flash memory. No data is lost in case of power failure.
- Ethernet port.
- USB port.
- Connection to the dedicated remote LCD display.
- CANBus.
- RS485 Master.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

## 1.3 IPRC215D and IPRC315D

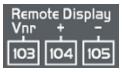
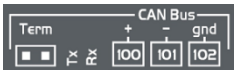

### 1.3.1.1 IPRC215D



### 1.3.1.2 IPRC315D



## 1.3.2 Description of the connections

| Connector | Description |
|---|---|
|  | Connector for 24Vac/dc power supply<br>Analogue inputs (Pb1 - Pb10, PbC)<br>Additional power (+5Vdc, +12Vdc, GND) |
|  | Opto-insulated analogue outputs (Out1 - Out6, GND)<br>**IPRC215D:** 24Vac/dc power supply for the opto-insulated analogue output |
|  | Potential free opto-insulated digital inputs (DI1 - DI20, DIC)<br>Opto-insulated 24Vac/dc digital inputs (DI1 - DI20, GND) |
|  | USB port for downloads (BIOS, ISaGRAF® application, maps of parameters, remote display applications, network configuration, website) |
|  | TCP/IP Ethernet port |
|  | Connector for remote terminal (VISOGRAPH), maximum 2 terminals per iPRO. |
|  | CANBUS connector for expansions (IPEXx0D) and drivers for electronic valves (XEVx0D<br>Rx and Tx LED to indicate that communication is active.<br>Line terminal (Term) |
|  | RS485 Slave connector for connection to monitoring system.<br>Rx and Tx LED to indicate that communication is active<br>Closed circuit terminal (Term) |
|  | RS485 Master connector for connection to Coresense<br>Rx and Tx LED to indicate that communication is active<br>Closed circuit terminal (Term) |
|  | **IPRC215D:** Digital relay outputs (for digital outputs with potential free contacts)<br>3 NO relays, 1 common |
|  | **IPRC215D:** Digital relay outputs (for digital outputs with potential free contacts)<br>5 NO relays, 1 common |
|  | **IPRC215D:** Digital relay outputs<br>2 NO relays, 1 common |
|  | **IPRC215D:** Digital relay outputs (only for 215D versions)<br>5 NO relays, 1 common and 1 potential free (Neutral) |
|  | **IPRC315D:** Digital relay outputs<br>4 NO relays, 2 common |

| Connector | Description |
|---|---|
|  | **IPRC315D:** Digital relay outputs (for digital outputs with live contacts)<br>5 NO relays, 1 common and 2 potential free (Neutral) |
|  | **IPRC315D:** Digital relay outputs<br>3 NO relays, 2 common + 2 NO relays, 3 common |
|  | Green LED to indicate the presence of power |
|  | Jumper to activate the RESCUE MODE |
|  | Yellow status LEDs (LED1) and red LED (ALARM)<br>See relative paragraph |
|  | Power supply INPUT for optoinsulated analogue outputs 24Vac/dc |

### 1.3.3 Description of the inputs and outputs

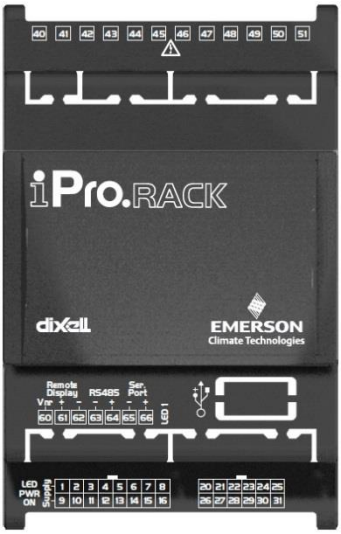
| Input No. | Type of Input | Description |
|---|---|---|
| 1 | Supply | ***Reference "-"/GND power (24Vac or 24Vdc)*** |
| 2 | Pb1 | Configurable analogue input 1 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 3 | Pb2 | Configurable analogue input 2 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0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

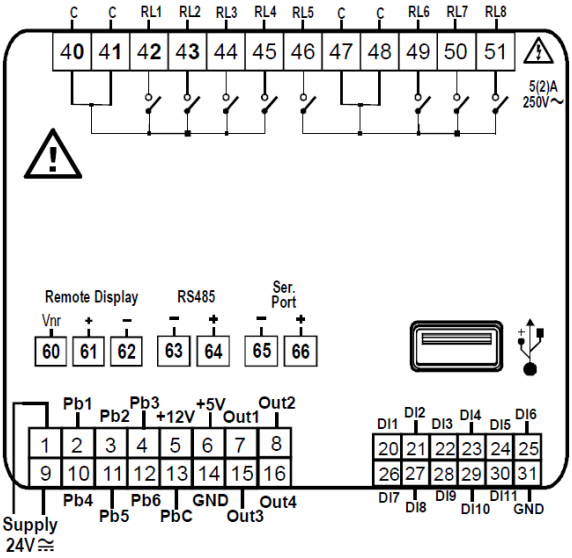
| Input No. | Type of Input | Description |
|---|---|---|
| 16 | +12V | Additional power +12Vdc |
| 21 | Out1 | Opto-insulated analogue output 1 0 - 10V |
| 22 | Out2 | Opto-insulated analogue output 2 0 - 10V |
| 23 | Out3 | Opto-insulated analogue output 3 0 - 10V |
| 24 | Out4 | Opto-insulated analogue 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 | **IPRC215D:** Power for opto-insulated analogue outputs at 24Vac or 24Vdc(-)<br>**IPRC315D: not used** |
| 29 | Supply | **IPRC215D:** Power for opto-insulated analogue outputs at 24Vac or 24Vdc(+)<br>**IPRC315D: not used** |
| 30 | GND(-)<br>+12V | **IPRC215D:**Common opto-insulated analogue output<br>**IPRC315D: + 12V not used** |
| 40 | DI1 | Opto-insulated digital input 1 |
| 41 | DI2 | Opto-insulated digital input 2 |
| 42 | DI3 | Opto-insulated digital input 3 |
| 43 | DI4 | Opto-insulated digital input 4 |
| 44 | DI5 | Opto-insulated digital input 5 |
| 45 | DI6 | Opto-insulated digital input 6 |
| 46 | DI7 | Opto-insulated digital input 7 |
| 47 | DI8 | Opto-insulated digital input 8 |
| 48 | DI9 | Opto-insulated digital input 9 |
| 49 | DI10 | Opto-insulated digital input 10 |
| 50 | GND(-) | Reference "-" for opto-insulated digital inputs 1 to 20 (if inputs 24Vac or 24Vdc) |
| 51 | DI11 | Opto-insulated digital input 11 |
| 52 | DI12 | Opto-insulated digital input 12 |
| 53 | DI13 | Opto-insulated digital input 13 |
| 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 |

| Input No. | Type of Input | Description |
|---|---|---|
| 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) |
| **IPRC215D* – Digital Outputs** | | |
| 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 |
| 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 |
| 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 |
| **IPRC315D** - Digital Outputs** | | |
| 70** | RL1 | Relay 1 normally open contact |
| 71** | RL2 | Relay 2 normally open contact |
| 72** | RL3 | Relay 3 normally open contact |
| 73** | C | Common relays 1, 2, 3 and 4 |
| 74** | RL4 | Relay 4 normally open contact |
| 75** | C | Common relays 1, 2, 3 and 4 |
| 76** | C | Common relays 5, 6 and 7 |
| 77** | RL5 | Relay 5 normally open contact |

| Input No. | Type of Input | Description |
|---|---|---|
| 78** | RL6 | Relay 6 normally open contact |
| 79** | RL7 | Relay 7 normally open contact |
| 80** | RL8 | Relay 8 normally open contact |
| 81** | RL9 | Relay 9 normally open contact |
| 82** | RL10 | Relay 10 normally open contact |
| 83** | C | Common relays 8, 9 and 10 |
| 84** | RL11 | SSR 11 normally open contact |
| 85** | RL12 | SSR 12 normally open contact |
| 86** | RL13 | SSR 13 normally open contact |
| 87** | C | Common relays 11, 12 and 13 |
| 88** | C | Common relays 11, 12 and 13 |
| 89** | C | Common relays 14 and 15 |
| 90** | C | Common relays 14 and 15 |
| 91** | RL14 | SSR 14 normally open contact |
| 92** | C | Common relays 14 and 15 |
| 93** | RL15 | SSR 15 normally open contact |
| 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 | CAN Bus connection (+) |
| 101 | CAN Bus | CAN Bus connection (-) |
| 102 | CAN Bus | CAN Bus connection (gnd) |
| 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 IPRC208D


40 41 42 43 44 45 46 47 48 49 50 51
iPro.RACK
dixell
EMERSON
Climate Technologies
Remote Display
RS485
Ser. Port
Vnr + - - + - +
60 61 62 63 64 65 66
LED
LED PWR ON
Supply
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
20 21 22 23 24 25
26 27 28 29 30 31


C C RL1 RL2 RL3 RL4 RL5 C C RL6 RL7 RL8
40 41 42 43 44 45 46 47 48 49 50 51
5(2)A
250V~
Remote Display
RS485
Ser. Port
Vnr + - - + - +
60 61 62 63 64 65 66
Pb1 Pb2 Pb3 +12V +5V Out1 Out2
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
Pb4 Pb5 Pb6 PbC GND Out3 Out4
Supply
24V~
DI1 DI2 DI3 DI4 DI5 DI6
20 21 22 23 24 25
26 27 28 29 30 31
DI7 DI8 DI9 DI10 DI11 GND

## 1.4.1 Description of the connections

| Connector | Description |
|---|---|
|  | Connector for 24Vac/dc power supply<br>Analogue inputs (Pb1 - Pb6, PbC)<br>Additional power (+5Vdc, +12Vdc, GND)<br>Analogue outputs (Out1 - Out4, GND) |
|  | 24Vac/dc digital inputs (DI1 - DI11, GND) |
|  | Connector for remote terminal (VISOGRAPH), maximum 1 terminal per iPRO.<br>RS485 Slave connector<br>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)<br>Connection with the computer via a USB-ETH converter |
|  | Digital relay outputs<br>4 NO relays, 2 common |
|  | Digital relay outputs<br>4 NO relays, 2 common |

## 1.4.2 Description of the inputs and outputs

| Input No. | Type of Input | Description |
|---|---|---|
| 1 | Supply | ***Reference "-"/GND power (24Vac or 24Vdc)*** |
| 2 | Pb1 | Configurable analogue input 1 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 3 | Pb2 | Configurable analogue input 2 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 4 | Pb3 | Configurable analogue input 3 (NTC, PTC, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 5 | +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 | ***Reference "+" power supply (24Vac or 24Vdc)*** |
| 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) |
| 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) |

| Input No. | Type of Input | Description |
|---|---|---|
| 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(-) | **Reference "-" for digital inputs from1 to 11 (if version with dry contacts, this input has to be used only as common for the digital inputs)** |
| 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) |
| 61 | Remote Display | Connection for VISOGRAPH remote terminal (+) |
| 62 | Remote Display | Connection for VISOGRAPH remote terminal (-) |
| 63 | RS485 Slave | RS485 Slave connection (-) |

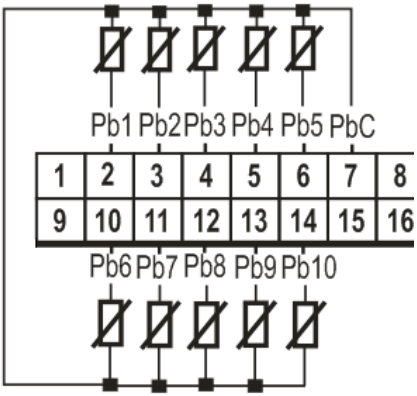
| Input No. | Type of Input | Description |
|---|---|---|
| 64 | RS485 Slave | RS485 Slave connection (+) |
| 65 | LAN | LAN Connection (-) |
| 66 | LAN | LAN Connection (+) |

## 1.5 Probe connections – IPRC215D/IPRC315D and IPRC208D

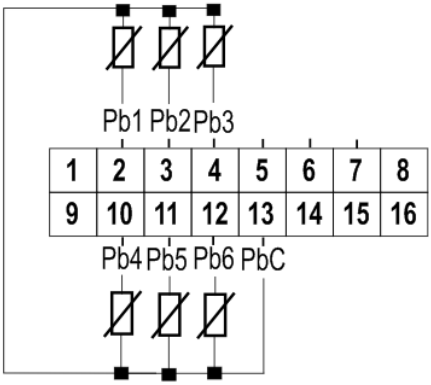
### 1.5.1 Temperature probes (NTC and PTC)

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.

**IPRC215D/ IPRC315D**




**IPRC208**

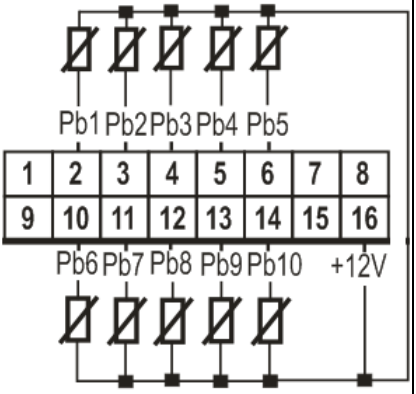



**Recommendations:**
- follow the diagram of the device used, for the numbering.
- the configuration is determined by the application.
- if used as a digital input (potential free - not live), use the same connection configuration of the sensors.

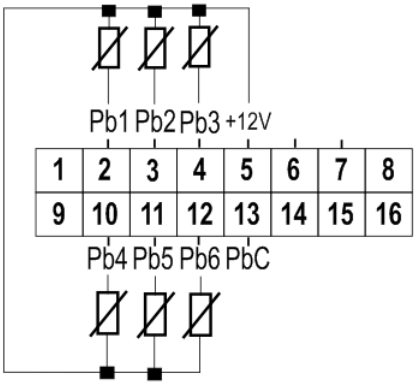
## 1.5.2 Pressure transducers and current probes (0 - 20mA, 4 - 20mA)

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.

**IPRC215D/ IPRC315D**




**IPRC208D**

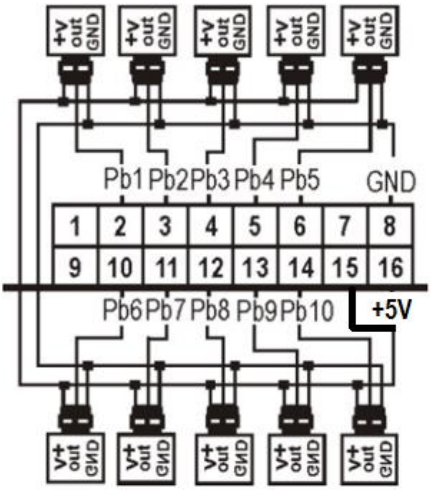



Recommendations:
- follow the diagram of the device used, for the numbering.
- the configuration is determined by the application.

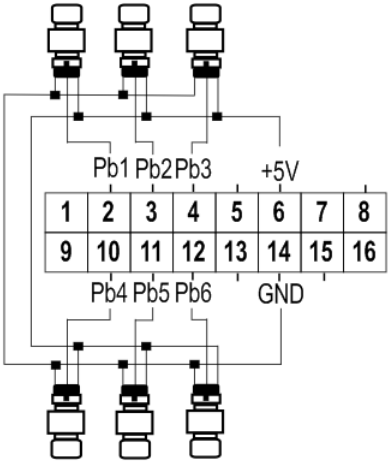
### 1.5.3 Live probes and ratiometric pressure transducers (0 - 5V)

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.

**IPRC215D**




**IPRC208D**



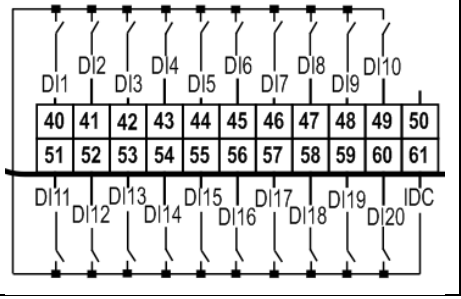

Recommendations:
- follow the diagram of the device used, for the numbering.
- the configuration is determined by the application.

## 1.6 CONNECTION OF THE DIGITAL INPUTS

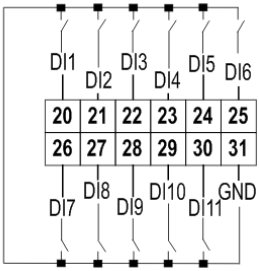
The digital inputs in the programmable controllers and expansions are fully configurable.
Depending on the model used, the digital inputs can be used as potential free or live (24Vac/dc) digital inputs.

### 1.6.1 Potential-free digital inputs

**IPRC215D/ IPRC315D**



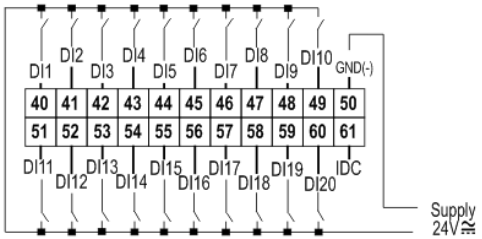

**IPRC208D**



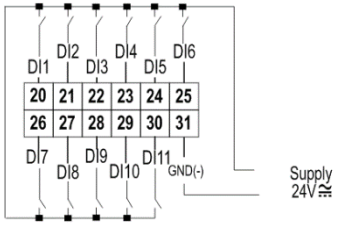

Recommendations:
- follow the diagram of the device used, for the numbering.
- the configuration is determined by the application.

### 1.6.2 Live digital inputs (24Vac/dc)

**IPRC215D/ IPRC315D**




**IPRC208D**




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

## 1.7 Connecting Analog Outputs

### 1.7.1 IPRC215D and IPRC315D Analog outputs connection

**Analog Output Isolation**
**!!!!!DO NOT USE The Same Secondary Of The Controller's Power!!!**

The Electrical Devices Controlled By The Analog Outputs Must Be Powered Separately With Another Transformer In Order To Prevent The Outputs From Malfunctioning Or Being Damaged

### Analog Outputs 0-10vdc (6)

- Analog Outputs 1-2 Use Pins 21-22
- Analog Outputs 3-4 Use Pins 23-24
- Analog Outputs 5-6 Use Pins 26-27
- The Ground Side Of Each Device Connected To An Analog Output Must Connect To Pin 25

### Remember:

- DO NOT USE The Same Secondary Of The Controller's Power.
- The electrical devices controlled by these analog outputs must be powered separately with another transformer in order to prevent the outputs from malfunctioning or being damaged
- **Analog Outputs Can Source Up To A Maximum Of 40ma On Outputs 1-4, and 20ma on Outputs 5-6**

## 1.7.2 Digital outputs

| | |
|---|---|
| **Type:** | Relays with NO, NC and SSR contacts |
| **Number of outputs:** | Up to 15 |
| **Maximum load:** | Relays with normally open contact: 5A(250Vac) SPST 5(2)A<br>SSR relays with normally open contact 1A(12 - 250Vac):<br>- only in AC load<br>- minimum current is 50mA (equivalent to 12W - 250Vac)<br>- internal impedance 300KΩ (current 0.2mA at 250Vac with an open contact) |
| **Notes:**  | Verify the capacity of the output used. There is double insulation between the digital outputs and the low voltage of the rest of the circuit. Do not use different voltages for the various groups of relays nor within each group. |

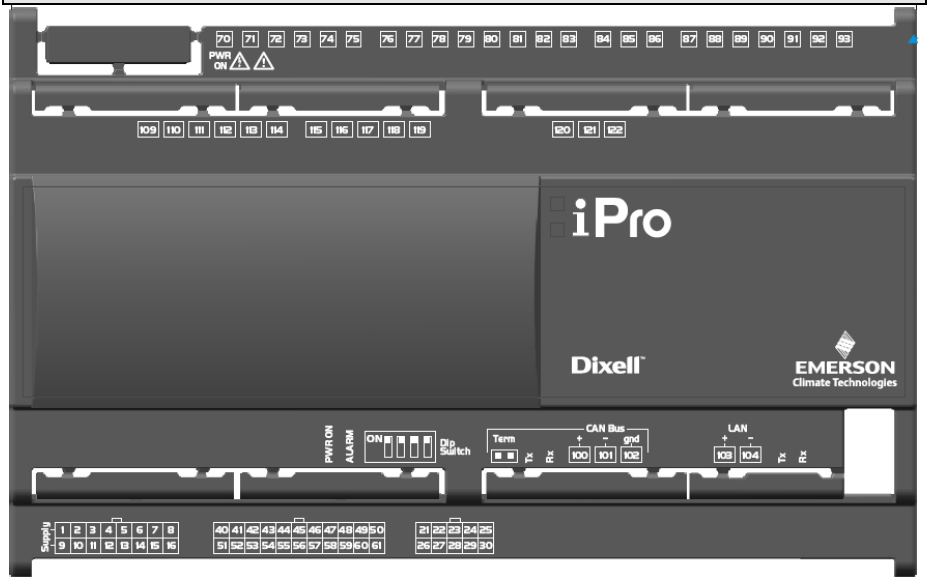
## 1.7.3 Electrical specifications

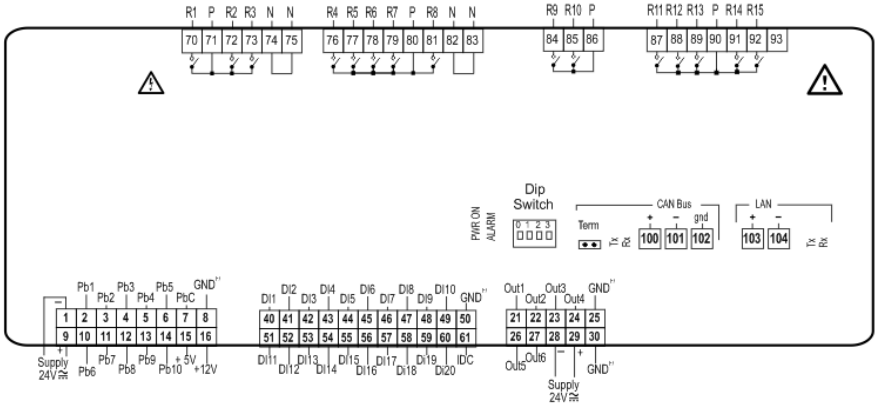
| | |
|---|---|
| **Power Supply:** | 24Vac +10/-15%, 50/60Hz<br>20 - 36Vdc |
| **Consumption:** | 20VA (Vac), 15W (Vdc) |
| **Connectors:** | Phoenix quick coupling connectors for low voltage STELVIO 90° screw connectors for digital outputs (250Vac, 6A max) |
| **Microprocessor:** | AT91RM9200 32-bit 200Mhz |
| **Permanent FLASH memory:** | 128MB, in 8-bit |
| **RAM:** | 32MB o 64MB, in 16-bit |
| **Internal clock:** | standard |

## 1.7.4 Plastic container

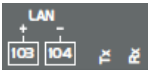
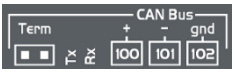
| | |
|---|---|
| **Mount:** | On a DIN rail (EN 50022, DIN 43880)<br>Fastened with screws via the removable plastic flaps. |
| **Material:** | PC-ABS Thermoplastic |
| **Self-extinguishing:** | V0 (UL94) |
| **Comparative Tracking Index (CTI):** | 300V |

## 1.8 IPX215D


iPro
Dixell
EMERSON
Climate Technologies
PWR ON
ALARM
Dip Switch
Term
CAN Bus
LAN
Supply


R1 P R2 R3 N N
R4 R5 R6 R7 P R8 N N
R9 R10 P
R11 R12 R13 P R14 R15
Dip Switch
PWR ON
ALARM
Term
CAN Bus
LAN
Supply 24V
Pb1 Pb2 Pb3 Pb4 Pb5 PbC GND
Pb6 Pb7 Pb8 Pb9 Pb10 +5V +12V
DI1 DI2 DI3 DI4 DI5 DI6 DI7 DI8 DI9 DI10 GND
DI11 DI12 DI13 DI14 DI15 DI16 DI17 DI18 DI19 DI20 IDC
Out1 Out2 Out3 Out4 GND
Out5 Out6
Supply 24V
GND

## 1.8.1 Description of the connections

| Connector | Description |
|---|---|
|  | Connector for 24Vac/dc power supply<br>Analogue inputs (Pb1 - Pb10, PbC)<br>Additional power (+5Vdc, +12Vdc, GND) |
|  | Opto-insulated analogue outputs (Out1 - Out6, GND)<br>24Vac/dc power supply for the opto-insulated analogue output |
|  | Potential free opto-insulated digital inputs (DI1 - DI20, DIC)<br>Opto-insulated 24Vac/dc digital inputs (DI1 - DI20, GND) |
|  | LAN serial port connector<br>Rx and Tx LED to indicate that communication is active |
|  | CANBUS Connector<br>Rx and Tx LED to indicate that communication is active<br>Line terminal (Term) |
|  | Dip-switch to set the address of the device. |
|  | Digital relay outputs<br>3 NO relays, 1 common and 2 potential free (Neutral) |
|  | Digital relay outputs<br>5 NO relays, 1 common and 2 potential free (Neutral) |
|  | Digital relay outputs<br>2 NO relays, 1 common |
|  | Digital relay outputs<br>5 NO relays, 1 common and 1 potential free (Neutral)<br>**The position 93 is not connected** |
|  | Green power LEDs (PWR ON) and red alarm signal LED (ALARM)<br>See relative paragraph |

## 1.8.2 Description of the inputs and outputs

| Input No. | Type of Input | Description |
|---|---|---|
| 1 | Supply | ***Reference "-"/GND power (24Vac or 24Vdc)*** |
| 2 | Pb1 | Configurable analogue input 1 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 3 | Pb2 | Configurable analogue input 2 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 4 | Pb3 | Configurable analogue input 3 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |

| | | |
|---|---|---|
| 5 | Pb4 | Configurable analogue input 4 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 6 | Pb5 | Configurable analogue input 5 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 7 | PbC | Common analogue inputs (NTC, PTC, PT1000, DI) |
| 8 | GND(-) | Additional power reference 5Vdc and 12Vdc and analogue inputs (0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V) |
| 9 | Supply | ***Reference "+" power supply (24Vac or 24Vdc)*** |
| 10 | Pb6 | Configurable analogue input 6 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 11 | Pb7 | Configurable analogue input 7 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 12 | Pb8 | Configurable analogue input 8 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 13 | Pb9 | Configurable analogue input 9 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 14 | Pb10 | Configurable analogue input 10 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V, DI) |
| 15 | +5V | Additional power +5Vdc |
| 16 | +12V | Additional power +12Vdc |
| 21 | Out1 | Opto-insulated analogue output 1 0 - 10V |
| 22 | Out2 | Opto-insulated analogue output 2 0 - 10V |
| 23 | Out3 | Opto-insulated analogue output 3 0 - 10V |
| 24 | Out4 | Opto-insulated analogue output 4 0 - 10V |
| 25 | GND(-) | Common opto-insulated analogue output |
| 26 | Out5 | Analogue output 5 0 - 10V, 4 - 20mA, Opto-insulated relay |
| 27 | Out6 | Analogue output 6 0 - 10V, 4 - 20mA, Opto-insulated relay |
| 28 | Supply | Power for opto-insulated analogue outputs at 24Vac or 24Vdc(-) |
| 29 | Supply | Power for opto-insulated analogue outputs at 24Vac or 24Vdc(+) |
| 30 | GND(-) | Common opto-insulated analogue output |
| 40 | DI1 | Opto-insulated digital input 1 |
| 41 | DI2 | Opto-insulated digital input 2 |
| 42 | DI3 | Opto-insulated digital input 3 |
| 43 | DI4 | Opto-insulated digital input 4 |
| 44 | DI5 | Opto-insulated digital input 5 |
| 45 | DI6 | Opto-insulated digital input 6 |
| 46 | DI7 | Opto-insulated digital input 7 |
| 47 | DI8 | Opto-insulated digital input 8 |
| 48 | DI9 | Opto-insulated digital input 9 |
| 49 | DI10 | Opto-insulated digital input 10 |
| 50 | GND(-) | Reference "-" for opto-insulated digital inputs 1 to 20 (if inputs 24Vac or 24Vdc) |

| | | |
|---|---|---|
| 51 | DI11 | Opto-insulated digital input 11 |
| 52 | DI12 | Opto-insulated digital input 12 |
| 53 | DI13 | Opto-insulated digital input 13 |
| 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 | P | Common relays 1, 2 and 3 (MAX 6A) |
| 72 | RL2 | Relay 2 normally open contact |
| 73 | RL3 | Relay 3 normally open contact |
| 74 | N | Potential free contact (MAX 6A) |
| 75 | N | Potential free contact (MAX 6A) |
| 76 | RL4 | Relay 4 normally open contact |
| 77 | RL5 | Relay 5 normally closed contact |
| 78 | RL6 | Relay 6 normally closed contact |
| 79 | RL7 | Relay 7 normally closed contact |
| 80 | P | Common relays 4, 5, 6, 7 and 8 (MAX 6A) |
| 81 | RL8 | Relay 8 normally closed contact |
| 82 | N | Potential free contact (MAX 6A) |
| 83 | N | Potential free contact (MAX 6A) |
| 84 | RL9 | Relay 9 normally closed contact |
| 85 | RL10 | Relay 10 normally closed contact |
| 86 | P | Common relays 9 and 10 (MAX 6A) |
| 87 | RL11 | Relay 11 normally closed contact |
| 88 | RL12 | Relay 12 normally closed contact |
| 89 | RL13 | Relay 13 normally closed contact |
| 90 | P | Common relays 11, 12, 13, 14 and 15 (MAX 6A) |
| 91 | RL14 | Relay 14 normally closed contact |
| 92 | RL15 | Relay 15 normally closed contact |

| | | |
|---|---|---|
| 93 | C | Potential free contact (MAX 6A) |
| 100 | CAN Bus | CAN Bus connection (+), not open |
| 101 | CAN Bus | CAN Bus connection (-), not open |
| 102 | CAN Bus | CAN Bus connection (insulated gnd), not open |
| 103 | LAN | LAN Connection (+) |
| 104 | LAN | LAN Connection (-) |

## 1.9 Technical specifications

### 1.9.1 Analogue inputs

| | |
|---|---|
| **Analogue conversion type:** | 10-bit A/D converter |
| **Number of inputs:** | 10 |
| **Type of analogue input:**<br>**(configurable via software parameter)** | NTC Dixell (-50T110°C; 10KΩ±1% at 25°C)<br>PTC Dixell(-55T115°C; 990Ω±1% at 25°C)<br>Digital input (potential free contact)<br>Voltage:, 0 - 5V (input resistance 3.7KΩ )<br>Current:, 4 - 20mA (input resistance 100Ω) |
| **Digital input status variation detection time:** | 100ms (in any case it depends on the cycle time set by the user in the given application) |
| **Accuracy:** | NTC, PTC: ±1℃<br>0-5V: ±100mV<br>4-20mA: ±0.30mA |
| **Additional power:** | +12V: 200mA in total<br>+5v: 100mA |
| **Notes:**  | Any inputs that are powered with a voltage that differs from that supplied by the device (+12V or +5V) must be powered separately with another transformer (do not use the same secondary of the controller's power) in order to prevent the inputs from malfunctioning or being damaged. |

### 1.9.2 Digital inputs

| | |
|---|---|
| **Type:**<br>**(configurable via software parameter)** | Opto-insulated potential free or live contact (24Vac/dc)<br>External power 24Vac/dc ±20% |
| **Number of inputs:** | 20 |
| **Digital input status variation detection time:** | 100ms (in any case it depends on the cycle time set by the user in the given application) |
| **Notes:**  | If the digital inputs are used with voltage, use another transformer (do not use the same secondary of the controller's power) in order to prevent the inputs from malfunctioning or being damaged. |

## 1.9.3 Analogue outputs

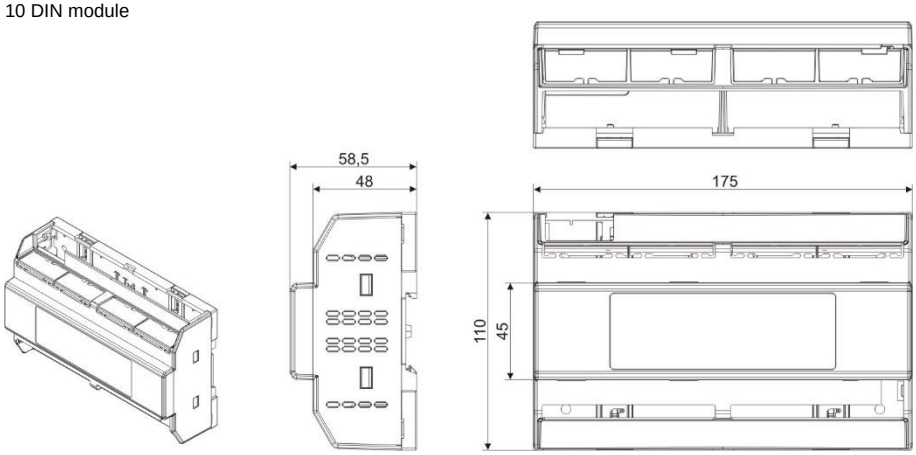
| | |
|---|---|
| **Type:** | Opto-insulated with separate 24Vac/dc power supply |
| **Number of outputs:** | 6 |
| **Type of analogue output:**<br>**(configurable via software parameter)** | 4 fixed outputs 0-10Vdc (Out1 - Out4)<br>2 configurable outputs 0-10Vdc, 4-20mA (Out5 and Out6) |
| **Maximum load:** | 40mA (Out1 - Out4)<br>20mA (Out5 and Out6) max with configured outputs 0-10Vdc<br>400Ω max with configured outputs 4-20Ma<br>22Ω per live analogue output |
| **Accuracy:** | Out1 - Out4: ±2% full scale<br>Out5 – Out6: ±2% full scale |
| **Resolution:** | 8bit |
| **Notes:**  | The electrical devices controlled by these analogue outputs must be powered separately with another transformer (do not use the same secondary of the controller's power) in order to prevent the outputs from malfunctioning or being damaged. |

## 1.9.4 Digital outputs

| | |
|---|---|
| **Type:** | Relays with NO, NC and SSR contacts |
| **Number of outputs:** | Up to 15 |
| **Maximum load:** | Relays with normally open contact: 5A(250Vac) SPST 5(2)A<br>SSR relays with normally open contact 1A(12 - 250Vac):<br>- only in AC load<br>- minimum current is 50mA (equivalent to 12W - 250Vac)<br>- internal impedance 300KΩ (current 0.2mA at 250Vac with an open contact) |
| **Notes:**  | Verify the capacity of the output used. There is double insulation between the digital outputs and the low voltage of the rest of the circuit.<br>Do not use different voltages for the various groups of relays nor within each group. |

## 1.9.5 Mechanical specifications

10 DIN module




## 1.9.6 Electrical specifications

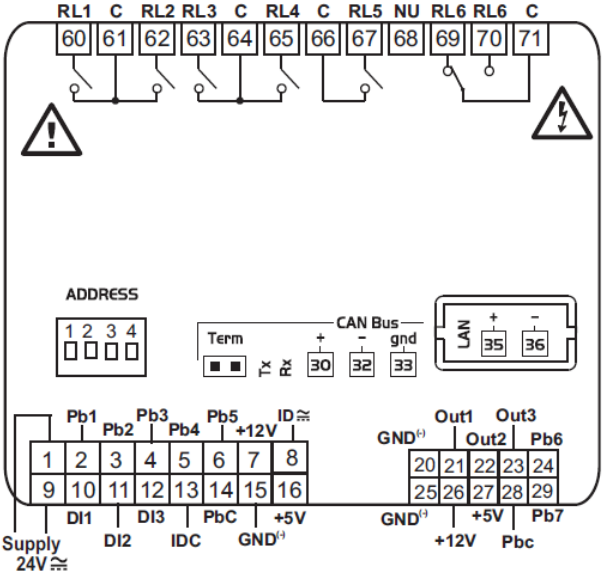
| | |
|---|---|
| **Power Supply:** | 24Vac +10/-15%, 50/60Hz<br>20 - 36Vdc |
| **Consumption:** | 20VA (Vac), 15W (Vdc) |
| **Connectors:** | Phoenix quick coupling connectors for low voltage STELVIO 90° screw connectors for digital outputs (250Vac, 6A max) |
| **Microprocessor:** | AT91RM9200 32-bit 200Mhz |
| **Permanent FLASH memory:** | 128MB, in 8-bit |
| **RAM:** | 32MB o 64MB, in 16-bit |
| **Internal clock:** | standard |

## 1.9.7 Plastic container

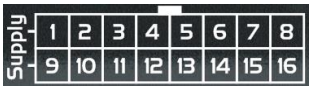
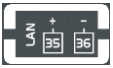
| | |
|---|---|
| **Mount:** | On a DIN rail (EN 50022, DIN 43880)<br>Fastened with screws via the removable plastic flaps. |
| **Material:** | PC-ABS Thermoplastic |
| **Self-extinguishing:** | V0 (UL94) |
| **Comparative Tracking Index (CTI):** | 300V |
| **Colour:** | White |

## 1.10 IPX206D


60 61 62 63 64 65 66 67 68 69 70 71
PWR ON
ALARM
iPro
dixell
EMERSON
Climate Technologies
ADDRESS
Term
CAN Bus
+ - gnd
Tx Rx
30 32 33
LAN
+ -
35 36
Supply
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
20 21 22 23 24
25 26 27 28 29


RL1 C RL2 RL3 C RL4 C RL5 NU RL6 RL6 C
60 61 62 63 64 65 66 67 68 69 70 71
ADDRESS
1 2 3 4
Term
CAN Bus
+ - gnd
Tx Rx
30 32 33
LAN
+ -
35 36
Pb1 Pb2 Pb3 Pb4 Pb5 +12V ID
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
DI1 DI2 DI3 IDC PbC GND(-) +5V
Supply 24V
Out1 Out2 Out3 Pb6 Pb7
GND(-) +5V +12V
20 21 22 23 24
25 26 27 28 29
GND(-) +5V +12V Pbc

## 1.10.1 Description of the connections

| Connector | Description |
|---|---|
|  | Connector for 24Vac/dc power supply<br>Analogue inputs (Pb1 - Pb5, PbC)<br>Potential free digital inputs (DI1 - DI3, DIC) or Power supply digital inputs (DI1 – DI3, ID)<br>Additional power (+5Vdc, +12Vdc, GND) |
|  | Analogue outputs (Out1..Out3, GND)<br>Analogue inputs (Pb6 - Pb7, PbC)<br>Additional power (+5Vdc, +12Vdc, GND) |
|  | Digital relay outputs (depend on the part number of the device):<br>5 NO relays + 1 changeover relay or 4 NO relays + 1 changeover relay + 1 SSR relay |
|  | CANBUS Connector<br>Rx and Tx LED to indicate that communication is active<br>Line terminal (Term) |
|  | LAN serial port connector |
|  | Dip-switch to set the address of the device (for CANBUS and LAN communication). |
|  | Green LED to indicate the presence of the power supply |
|  | Red status LED (ALARM)<br>See relative paragraph |

## 1.10.2 Description of the inputs and outputs

| Input | Type of Input | Description |
|---|---|---|
| 1 | Supply | ***Reference "-"/GND power (24Vac or 24Vdc)*** |
| 2 | Pb1 | Configurable analogue input 1 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 5V, 0 - 1V, 0 - 10V, DI, not used) |
| 3 | Pb2 | Configurable analogue input 2 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 5V, 0 - 1V, 0 - 10V, DI, not used) |
| 4 | Pb3 | Configurable analogue input 3 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 5V, 0 - 1V, 0 - 10V, DI, not used) |
| 5 | Pb4 | Configurable analogue input 4 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 5V, 0 - 1V, 0 - 10V, DI, not used) |
| 6 | Pb5 | Configurable analogue input 5 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 5V, 0 - 1V, 0 - 10V, DI, not used) |
| 7 | +12V | Additional power +12Vdc |
| 8 | ID | Common for digital inputs from 1 to 3 when power supply (24Vac/dc) |
| 9 | Supply | ***Reference "+" power supply (24Vac or 24Vdc)*** |
| 10 | DI1 | Digital input 1 (potential free contact (13) or power supply (8)) |

| | | |
|---|---|---|
| 11 | DI2 | Digital input 2 (potential free contact (13) or power supply (8)) |
| 12 | DI3 | Digital input 3 (potential free contact (13) or power supply (8)) |
| 13 | DIC | Common for digital inputs from 1 to 3 when potential free |
| 14 | Pbc | Common analogue inputs (NTC, PTC, PT1000, DI) |
| 15 | GND(-) | Additional power reference 5Vdc and 12Vdc and analogue inputs (0 - 20mA, 4 - 20mA, 0 - 10V, 0 - 1V, 0 - 5V) |
| 16 | +5V | Additional power +5Vdc |
| 20 | GND(-) | Additional power reference 5Vdc, 12Vdc and analogue outputs |
| 21 | Out1 | Analogue output 1 0 - 10V |
| 22 | Out2 | Analogue output 2 0 - 10V |
| 23 | Out3 | Analogue output 3 0 - 10V |
| 24 | Pb6 | Configurable analogue input 6 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 5V, 0 - 1V, 0 - 10V, DI, not used) |
| 25 | GND(-) | Additional power reference 5Vdc, 12Vdc and analogue outputs |
| 26 | +12V | Additional power +12Vdc |
| 27 | +5V | Additional power +5Vdc |
| 28 | Pbc | Common analogue inputs (NTC, PTC, PT1000, DI) |
| 29 | Pb7 | Configurable analogue input 7 (NTC, PTC, PT1000, 0 - 20mA, 4 - 20mA, 0 - 5V, 0 - 1V, 0 - 10V, DI, not used) |
| 30 | CAN Bus | CAN Bus connection (+), not open |
| 32 | CAN Bus | CAN Bus connection (-), not open |
| 33 | CAN Bus | CAN Bus connection (gnd), not open |
| 35 | LAN | LAN connection (+) |
| 36 | LAN | LAN connection (-) |
| 60 | RL1 | Relay 1 normally open contact |
| 61 | C | Common relays 1 and 2 (MAX 5A) |
| 62 | RL2 | Relay 2 normally open contact |
| 63 | RL3 | Relay 3 normally open contact |
| 64 | C | Common relays 3 and 4 (MAX 5A) |
| 65 | RL4 | Relay 4 normally open contact |
| 66 | C | Common relay 5 (please check the electrical characteristics of the relay used ) |
| 67 | RL5 | Relay 5 normally open contact (please check the electrical characteristics of the relay used ) |
| 68 | NU | Not used |
| 69 | RL6 | Relay 6 normally closed contact |
| 70 | RL6 | Relay 6 normally open contact |
| 71 | C | Common relay 6 (MAX 8A) |

## 1.11 Technical specifications

### 1.11.1 Analogue inputs

| | |
|---|---|
| **Analogue conversion type:** | 10-bit A/D converter |
| **Number of inputs:** | 7 |
| **Type of analogue input:**<br>**(configurable via software parameter)** | NTC Dixell (-50T110°C; 10KΩ±1% at 25°C)<br>PTC Dixell(-55T115°C; 990Ω±1% at 25°C)<br>Digital input (potential free contact)<br>Voltage: 0 - 5V, (input resistance 3.7KΩ )<br>Current:, 4 - 20mA (input resistance 100Ω) |
| **Digital input status variation detection time:** | 100ms (in any case it depends on the cycle time set by the user in the given application) |
| **Accuracy:** | NTC, PTC,: ±1°C<br>0-5V: ±100mV<br>4-20mA: ±0.30mA |
| **Additional power:** | +12V: 40mA max per terminal<br>+5v: 100mA |
| **Notes:** | Any inputs that are powered with a voltage that differs from that supplied by the device (+12V or +5V) must be powered separately with another transformer (do not use the same secondary of the controller's power) in order to prevent the inputs from malfunctioning or being damaged. |

### 1.11.2 Digital inputs

| | |
|---|---|
| **Type:**<br>**(configurable via software parameter)** | Opto-insulated potential free contact or power supply |
| **Number of inputs:** | 3 |
| **Digital input status variation detection time:** | 100ms (in any case it depends on the cycle time set by the user in the given application) |
| **Notes:** | Pay attention to use the right common input when the digital inputs are used as dry contacts or power supply contacts. |

### 1.11.3 Analogue outputs

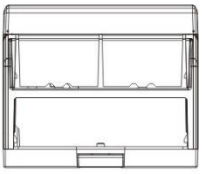
| | |
|---|---|
| **Type:** | Non opto-insulated internal power |
| **Number of outputs:** | 3 |
| **Type of analogue output:**<br>**(configurable via software parameter)** | 3 fixed outputs 0-10Vdc (Out1 - Out3) |
| **Maximum load:** | 40mA (Out1 - Out3)<br>22Ω per live analogue output |
| **Accuracy:** | Out1 - Out3: ±2% full scale |
| **Resolution:** | 8bit |
| **Notes:** | The electrical devices controlled by these analogue outputs must be powered separately with another transformer (do not use the same secondary of the controller's power) in order to prevent the outputs from malfunctioning or being damaged. |

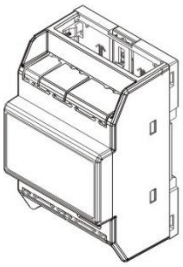
## 1.11.4 Digital outputs

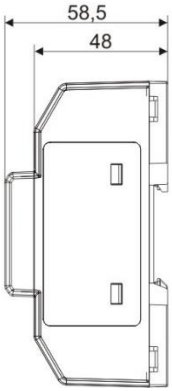
| | |
|---|---|
| **Type:** | Relays with NO, NC and SSR contacts |
| **Number of outputs:** | 6 |
| **Type of output:**<br>**(configurable via software parameter)** | Relays with normally open contact:<br>- RL1, RL2, RL3, RL4, RL5*<br>Relays with changeover contact:<br>- RL6<br>SSR relays with normally open contact:<br>- RL5*<br>**(*) the kind of the relay RL5 depend on the model of the device.** |
| **Maximum load:** | Relays with normally open contact: 5A(250Vac) SPST 5(2)A<br>Relays with changeover contact: 8A(250Vac) SPDT 8(3)A<br>SSR relays with normally open contact 1A(12 - 250Vac):<br>- only in AC load<br>- minimum current is 50mA (equivalent to 12W - 250Vac)<br>- internal impedance 300KΩ (current 0.2mA at 250Vac with an open contact) |
| **Notes:** | Verify the capacity of the output used. There is double insulation between the digital outputs and the low voltage of the rest of the circuit.<br>The common relays of the outputs are separate and split into groups. |

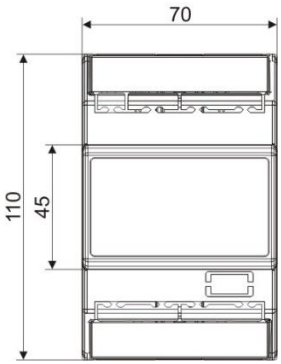
## 1.11.5 Mechanical specifications

4 DIN module







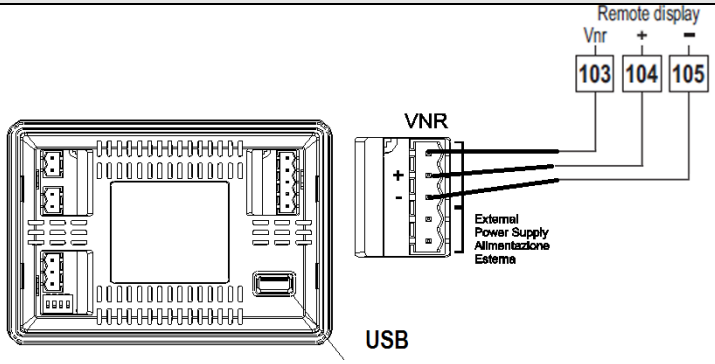
### 1.11.6 Electrical specifications

| | |
|---|---|
| **Power Supply:** | 24Vac +10/-15%, 50/60Hz<br>20 - 36Vdc |
| **Consumption:** | 10VA (Vac), 10W (Vdc) |
| **Connectors:** | Phoenix quick coupling connectors for low voltage (for IPX206D)<br>STELVIO 90° screw connectors for digital outputs (250Vac, 6A max) |

### 1.11.7 Plastic container

| | |
|---|---|
| **Mount:** | On a DIN rail (EN 50022, DIN 43880)<br>Fastened with screws via the removable plastic flaps. |
| **Material:** | PC-ABS Thermoplastic |
| **Self-extinguishing:** | V0 (UL94) |
| **Comparative Tracking Index (CTI):** | 300V |
| **Colour:** | Black |

## 1.12 Visotouch Connections



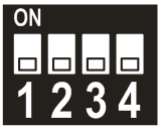
# 2 SYSTEM CONFIGURATION

## 2.1 CANBUS ADDRESSES OF EXPANSIONS AND DRIVERS

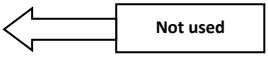
The IPRC215D can be connected via CANBUS the following devices, that must have the addresses reported in the below table

| | | CANBUS ADDRESS | | | | |
|---|---|---|---|---|---|---|
| | | **IPRC215D** | **IPX206D** | **IPX215D** | **XEV20D_1** | **XEV20D_2** |
| 1 | STAND ALONE | X | | | | |
| 2 | WITH 1 EXPANSION – Case 1 | X | 2 | | 3 | 4 |
| 3 | WITH 1 EXPANSION – Case 2 | X | | 1 | 3 | 4 |
| 4 | WITH 2 EXPANSIONS | X | 2 | 1 | 3 | 4 |

The address is set is set via a dip-switch and numbering is binary as shown in the table below:



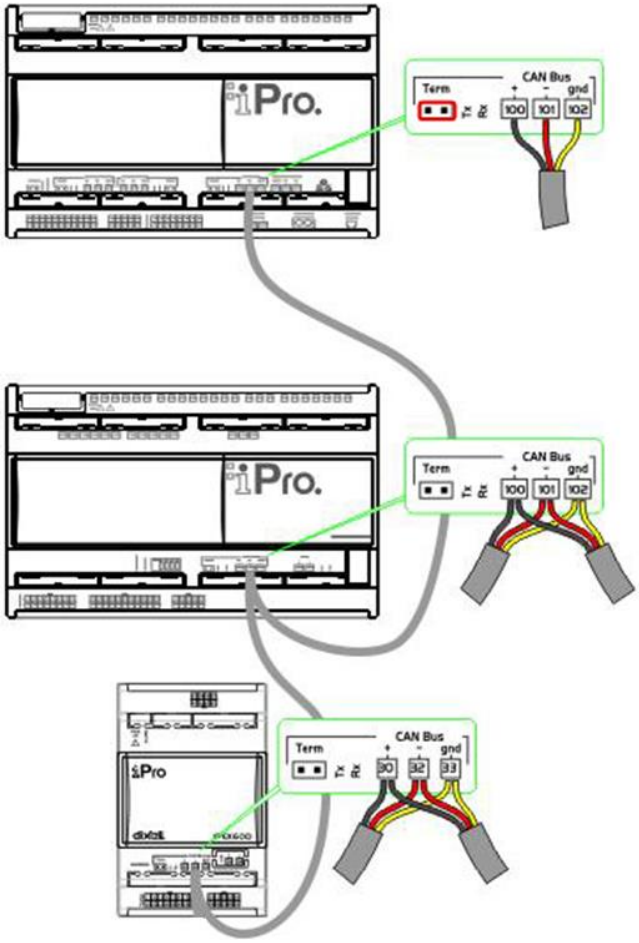

| | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Adr. | 0 | OFF | OFF | OFF | OFF |
| Adr. | 1 | ON | OFF | OFF | OFF |
| Adr. | 2 | OFF | ON | OFF | OFF |
| Adr. | 3 | ON | ON | OFF | OFF |
| Adr. | 4 | OFF | OFF | ON | OFF |
| Adr. | 5 | ON | OFF | ON | OFF |
| Adr. | 6 | OFF | ON | ON | OFF |
| Adr. | 7 | ON | ON | ON | OFF |
| Adr. | 8 | OFF | OFF | OFF | ON |
| Adr. | 9 | ON | OFF | OFF | ON |
| Adr. | 10 | OFF | ON | OFF | ON |
| Adr. | 11 | ON | ON | OFF | ON |
| Adr. | 12 | OFF | OFF | ON | ON |
| Adr. | 13 | ON | OFF | ON | ON |
| Adr. | 14 | OFF | ON | ON | ON |
| Adr. | 15 | ON | ON | ON | ON |




**If the address is changed while the device is on, the iProRACK and the Expansion- Driver must be switched off and on again to confirm the new address.**

## 2.2 EXPANSIONS AND DRIVERS – Wiring

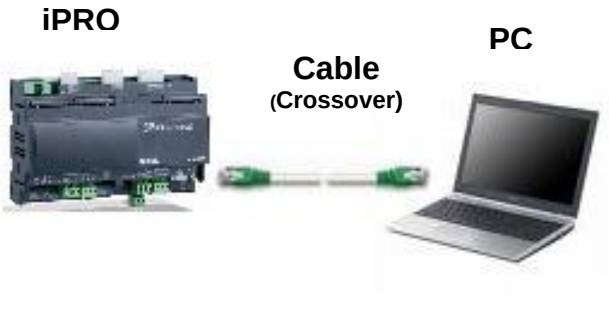
### 2.2.1 CANBUS CONNECTION



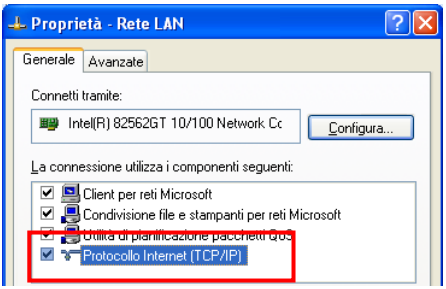
# 3 HOW TO CONNECT THE IPRORACK TO A PC

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

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

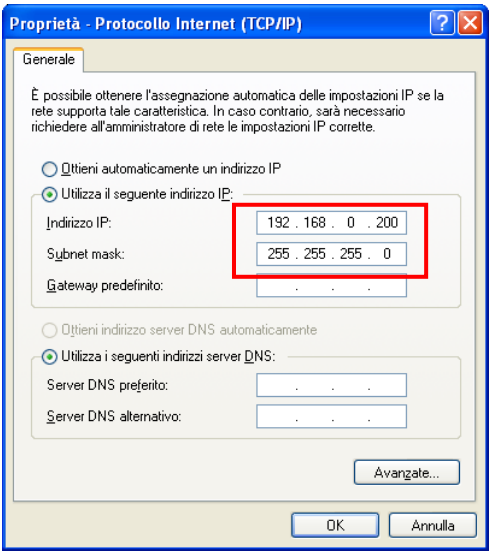



1. Disconnect your computer from the data network of your company and connect the PC with the iPRO through the Crossover cable.
2. The personal computer has to be set in the same network of the iPRO.
   a. In the windows environment click with the mouse on “**start**” button
3. Choose “**Control Panel**”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




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

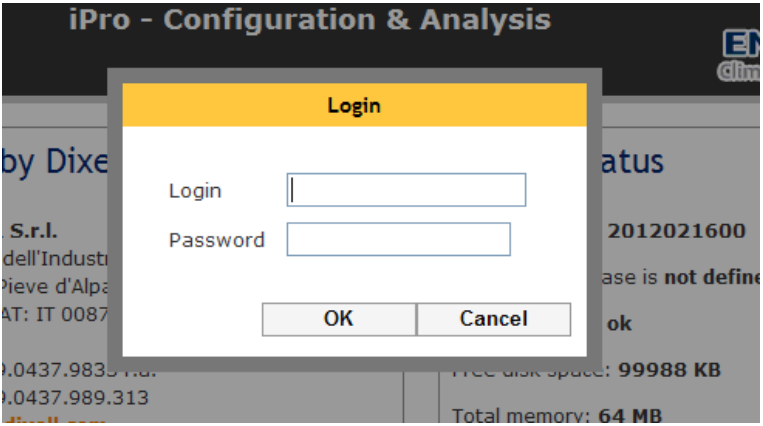
**IP address: 192.168.0.200**
**Subnet Mask: 255.255.255.0**




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):

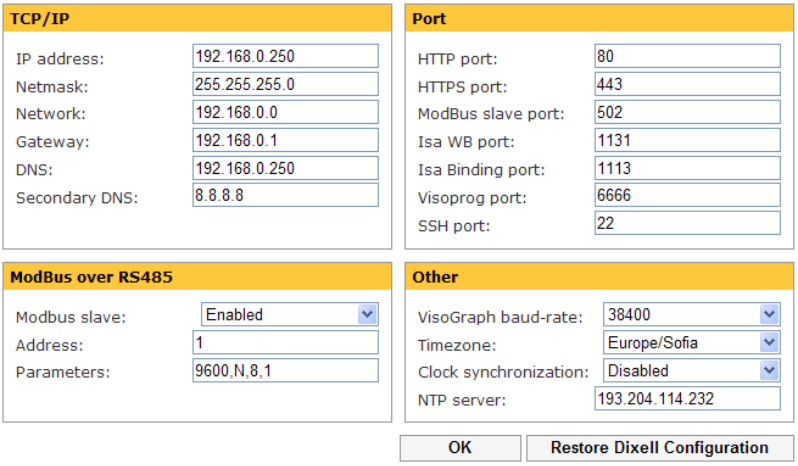
To be able to modify the settings, it is necessary to do the login.
Click Login:




**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.

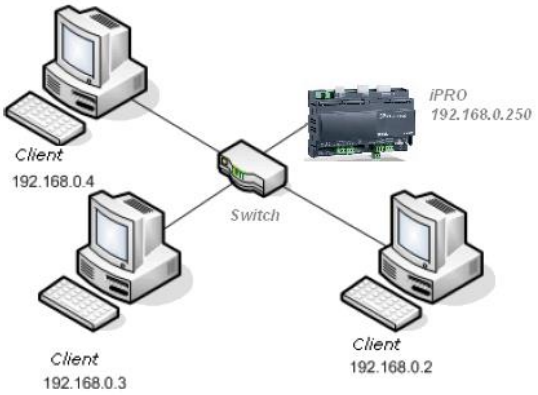



Click “OK” to confirm the operation.

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

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

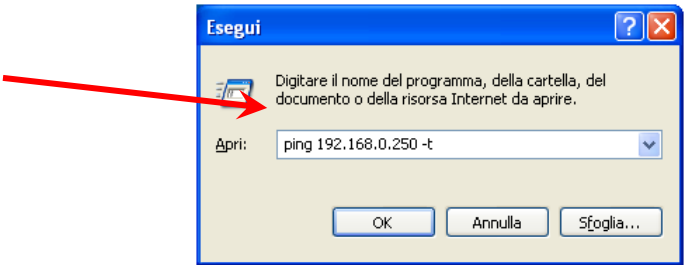
The Intranet or Ethernet connection should be initially managed by the net administrator that will assign one free IP address to reach the iPRO. This number is an example of what you should expect with the default IP of the iPRO: 192.168.0.250.
After receiving the address from your network Administrator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

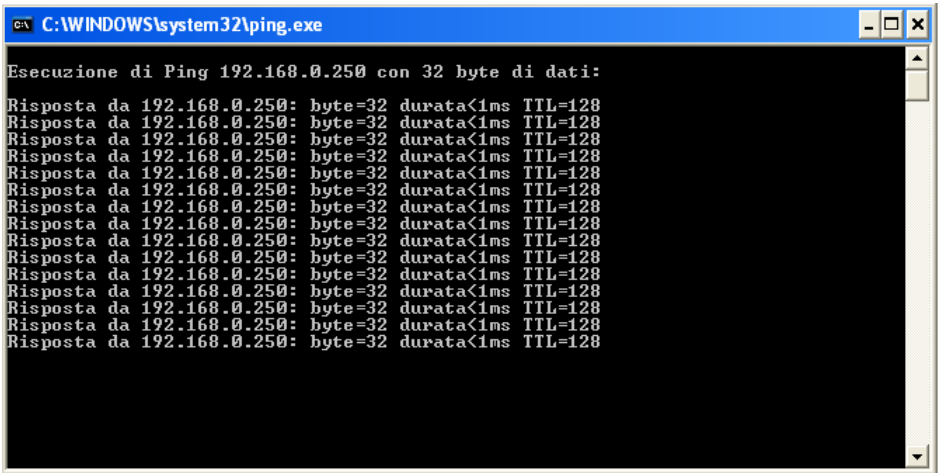
From your computer launch: start -→ run

In the box write the following string:




Then click OK.

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




## 3.3 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:

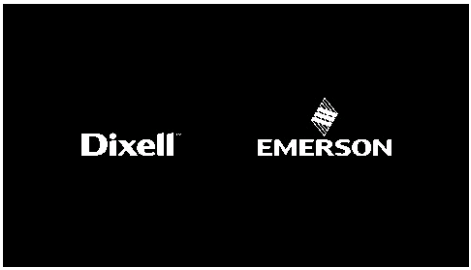
- **22**
- **80**
- **1131**
- **6666**

# 4 VISOTOUCH VTIPR

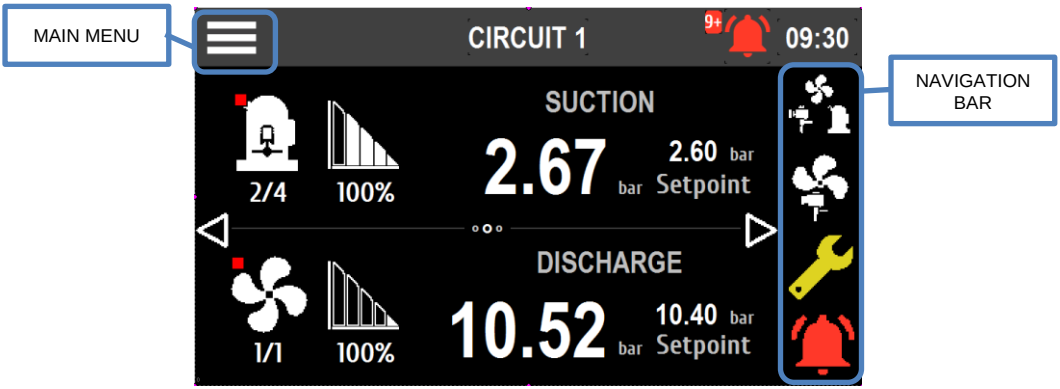

The iProRACK rel. 6.4 can be connected to remote touch panel Visotouch, where the main variables and status are been displayed and the user can set up the system.

## 4.1 What is displayed when the keyboard is connected

Touch the panel to enter the main screen visualization
The visotuoch come back to this menu after several minutes without any touches.



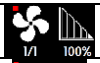
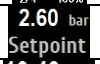
## 4.2 Main screen visualization

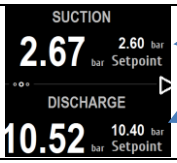



### 4.2.1 Main icons: touch to move to…

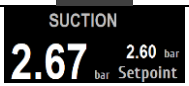
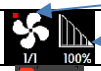
| | |
|---|---|
|  | Go to page **GENERAL MENU** |
|  | Go to page **SCHEMATIC** |
|  | Go to page **GASCOOLER** |
|  | Go to page **SERVICE** |
|  | Go to page **ALARM** |
|  | Go to page **CIRCUIT 2** if present |
| | Go to page **PARALLEL COMPRESSORS** if present |
|  | Go to page ALARM |

### 4.2.2 Other icons to move to…

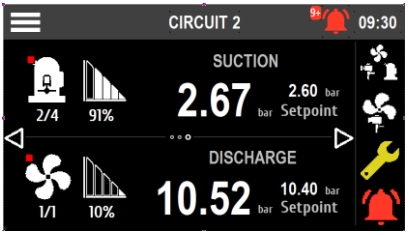
| | |
|---|---|
|  | Go to page **GASCOOLER** |
|  | Go to page **COMPRESSORS** |
|  | Go to page **SET POINT** |
|  | Go to page SET POINT |

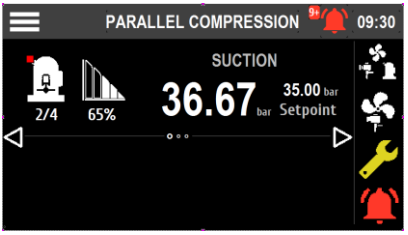
| | |
|---|---|
|  | Click to "**unit measure**" (bar) to modify unit measure from bar to Celsius |

## 4.2.3 Icons meanings

| | |
|---|---|
|  | Real time clock (h:min) |
|  | Circuit 1 (MT) Suction pressure (temperature) value<br>and<br>Suction set point |
|  | Gas cooler pressure value<br>and<br>Gas cooler set point (always in temperature) |
|  | VSD compressor speed %,<br>Number of compressors running/available |
|  | % of fan speed |
|  | Icon present only if there is one or more alarm(s) active. The number from 1 to 9+ is for the number of alarms active |
|  | The icon is white if there are no alarms active |

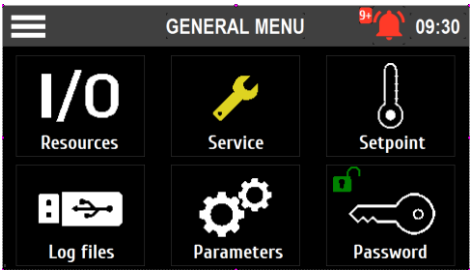
**NOTE: the above schema is true also for CIRCUIT 2 (LT) and PARALLEL COMPRESSORS page if they are present. See below pic.**

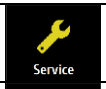
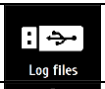
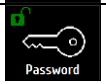


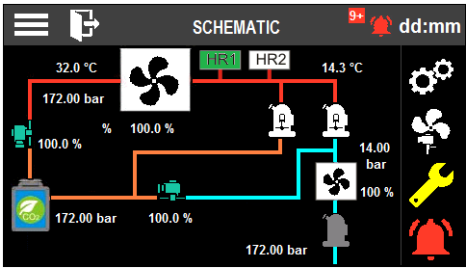
## 4.3 GENERAL MENU

From each page touch the  to enter the **GENERAL MENU**



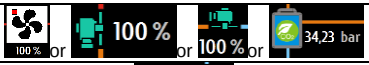

| | | | |
|---|---|---|---|
|  | Go to page **SERVICE** |  | Go to **LOG FILE** |
|  | Go to page **PARAMETER** |  | Go to page **SETPOINT** |
|  | Go to **PASSWORD**<br>  Password inserted<br>  No password inserted |  | Go to **I/O** Page |

## 4.4 SCHEMATIC

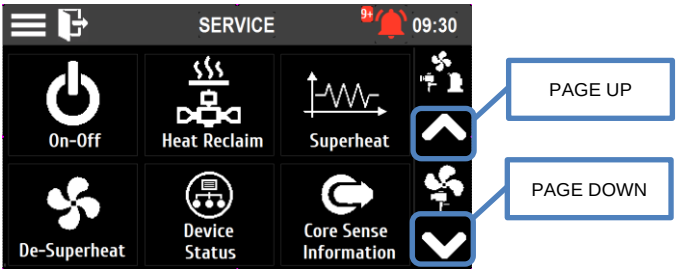


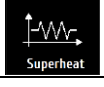

According to the resources enabled, in this page the schematic of the circuit and the main variables are displayed

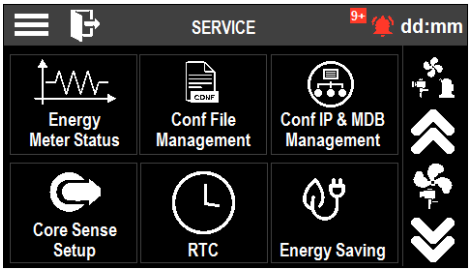
### 4.4.1 Icons to move to…

| | |
|---|---|
| | Go to **MAIN PAGE** |
| | Go to page **PARAMETER** |
| | |
|  | Go to page **GASCOOLER** |
|  | Go to **LOW TEMPERATURE SUCTION LINE PAGE** |
|  | Go to **DE-SUPERHETER 1** page |
|  | Go to **MEDIUM TEMPERATURE SUCTION LINE PAGE** |
| | Go to **PARALLEL COMPRESSION DETAILS PAGE** |
|  | Go to **HR2 DETAILS PAGE**<br>Green HR2 ON; White HR2 OFF |
|  | Go to **HR1 DETAILS PAGE**<br>Green HR1 ON; White HR1 OFF |

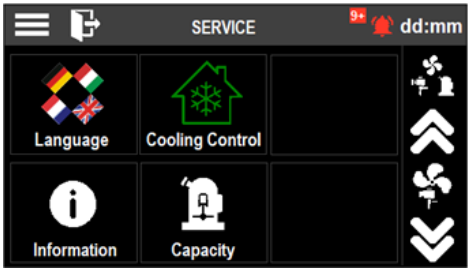
## 4.5 SERVICE




| | | | |
|---|---|---|---|
|  | Go to **ON_OFF** page |  | Go to **DE-SUPERHEATER** page |
|  | Go to **Heat Reclaim** page |  | Go to **Device_Status** page |
|  | Go to **Suction Superheat** page |  | Go to **Coresense** Inf select page |

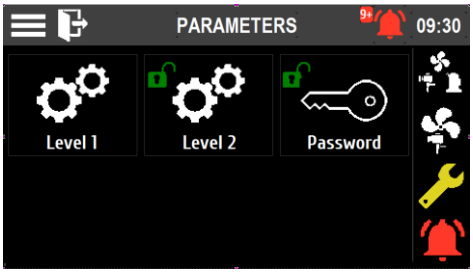



| | | | |
|---|---|---|---|
| Energy Meter Status | Go to **Energy Meter** Status page | Core Sense Setup | Go to **CoresenseSetup** page |
| Conf File Management | Go to **Conf file Management** page | Real Time Clock | Go to **Real Time Clock** page |
| Conf IP & MDB Address | Go to **Conf IP & ModBus** Address page | Energy Saving | Go to **Energy Saving** page |




| | | | |
|---|---|---|---|
| Language | Go to Language page | INFORMATION | Go to information page |
| Cooling Control | Go to Cooling Control page | Capacity | Go to **System Capacity** page |

## 4.6 PARAMETER

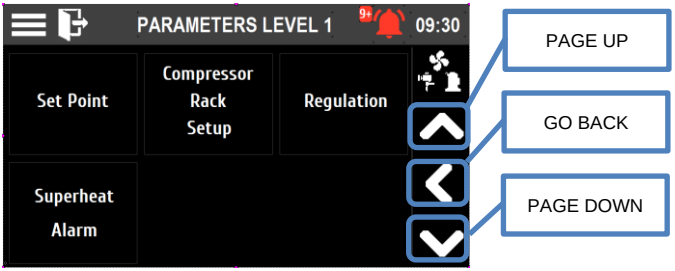


### 4.6.1 Icons to move to…

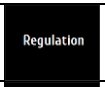
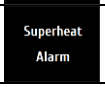
| | | | |
|---|---|---|---|
|  | Go to **PASSWORD**<br>  Password inserted<br>  Password protected |  | Go to **PARAMETER LEVEL 2**<br>If the PSW is requested, open directly the PSW value |
|  | Go to **PARAMETER LEVEL 1** | | |

## 4.7 PARAMETER LEVEL 1

This page contains all the parameters that can be modified without requiring a password.
The parameter are collected in groups of omogeneus parameter.
The number of groups depends on the setting of the controller




### 4.7.1 Icons to move to…

| | | | |
|---|---|---|---|
|  | Go to **SET POINT** parameters* |  | Go to page **Regulation** parameters* |
|  | Go to page **COMPRESSOR RACK SETUP** parameters* |  | Go to page **Superheat Alarm** parameters* |

The parameters sub menu are the following:

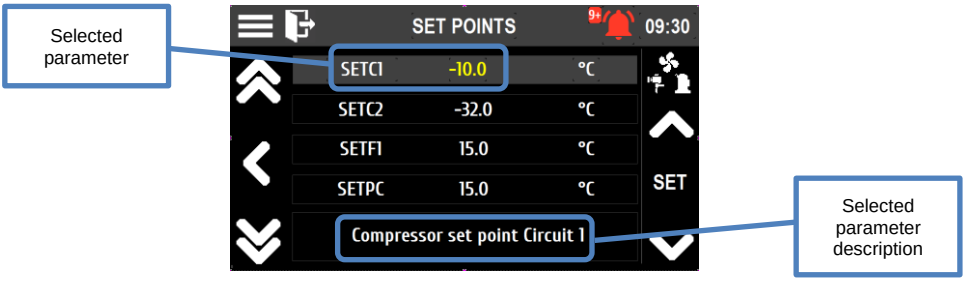
- **Set Point (SETC1-SETC2, SETPC)**
- **Compressor Rack setup (CF1, CF16-CF17, CF33)**
- **Different capacity Compressors setup(CF4-CF15, CF31-CF32)**
- **Regulation (CF18-CF25, CF28-CF30, CF34)**
- **Display (CF26-CF27)**
- **Analog Inputs_1 Probe 1-10 adjustment (Ai1-Ai11)**
- **Analog Inputs_2 Pressure Probe 1-10 set up (Ai12-Ai31)**
- **Analog Inputs_3 Probe 11-17 adjustment (Ai32-Ai38)**
- **Analog Inputs_4 Pressure Probe 11-17 set up (Ai39-Ai52)**
- **Analog Inputs_5 Probe 18-27 adjustment (Ai53-Ai62)**
- **Analog Inputs_6 Pressure Probe 18-27 set up (Ai63-Ai82)**
- **Gas cooler Heat Reclaim (HTRC0-HTRC42)**
- **Gas cooler (GC1-GC97)**
- **Safety Digital Inputs (SD1-SD3)**
- **Digital Inputs for liquid level (CDI1-CDI14)**
- **Compressor Action (RC1-RC8, RC25, RC35-RC42, RC45-RC48)**

- **Safety Compressors (SL1-SL11, SL14-SL23)**
- **Fan Action (RC9-RC24, RC33-RC34, RC43-RC44)**
- **Safety Fans(SL12-SL13)**
- **Alarms Configuration (AC1-AC2)**
- **Compressor Alarms (AL1-AL23)**
- **Fan Alarms (AL24-AL46)**
- **Dynamic Setpoint Suction (DSP1- DSP8)**
- **Dynamic Setpoint Condenser (DSP9-DSP16)**
- **Analog Outputs 1 (AO1_1- AO1_26)**
- **Analog Outputs 2 (AO2_1- AO2_26)**
- **Analog Outputs 3 (AO3_1- AO3_26)**
- **Analog Outputs 4 (AO4_1- AO4_26)**
- **Analog Outputs 5 (AO5_1- AO5_26)**
- **Analog Outputs 6 (AO6_1- AO6_26)**
- **Auxiliary Outputs (AR1-AR26)**
- **Superheat Alarms (ASH1- ASH38)**
- **Other (OT1 – OT7)**
- **Coresense configuration(CO1-CO30)**
- **DI CONFIGURATION (DIC1- DIC43)**
- **DO CONFIGURATION (DOC1- DOC36)**
- **AO CONFIGURATION (AOC1- AOC15)**
- **AI CONFIGURATION (AIC1- AIC27)**
- **DHS (DSH1-DSH18)**
- **Parallel Compression Regulation (PC1-PC10)**
- **Gas Leak Detector (GLD1-GLD24)**
- **Discharge Temperature (DSC1-DSC14)**

* The presence of this group depends on the controller setting. This could be not present or additional groups can be present.

## 4.7.2 EXAMPLE PARAMETER LEVEL 1 GROUP 1

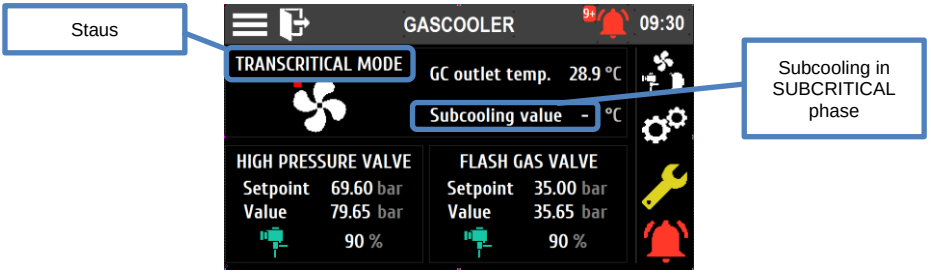
NOTE: The list of parameters changes according to iProRACK configuration
Once one of the parameter groups has been entered it has the following layout




Use the **UP** and **DOWN** arrow to scroll among the parameters list
USE **SET** to select a parameter and to confirm a parameter value
Use **DOUBLE UP** and **DOUBLE DOWN** to scroll among the parameter screens.
**NOTE:** is the screen is not touch for a quite long time the controller comes back to the main page

## 4.8 GASCOOLER

The GASCOOLER page, contains information related to the GasCooler and Flash Tank.

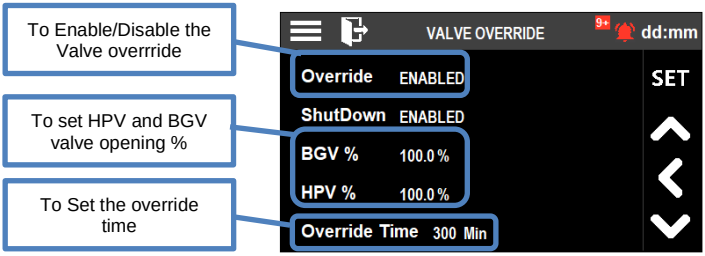



### 4.8.1 Icons to move to…

| | | | |
|---|---|---|---|
| 90 % | Go to page **VALVE OVERRIDING** to override HPV value | 90 % | Go to page **VALVE OVERRIDING** to override BPV value |

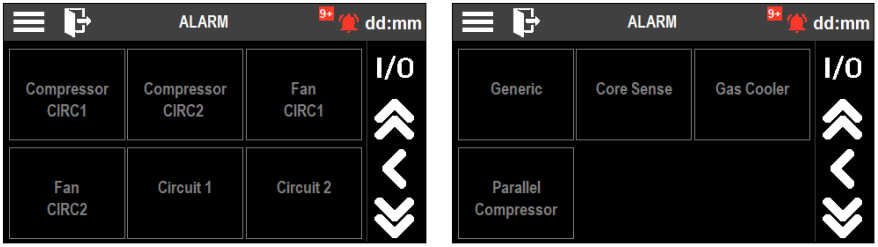
## 4.9 VALVE OVERRIDE

In this stage is possible to overrid the valve opening.




**NOTE: To close completely the HPV and B**ypass valve enable the **ShutDown** function.

## 4.10 ALARM PAGES

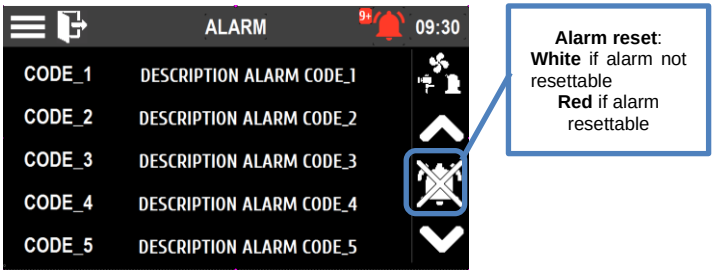



To help the navigation among the alarms, the alarms are divided in several menus.

When an alarm is active the correspondent menu is flashing
Touch the active menu to see which alarm is active

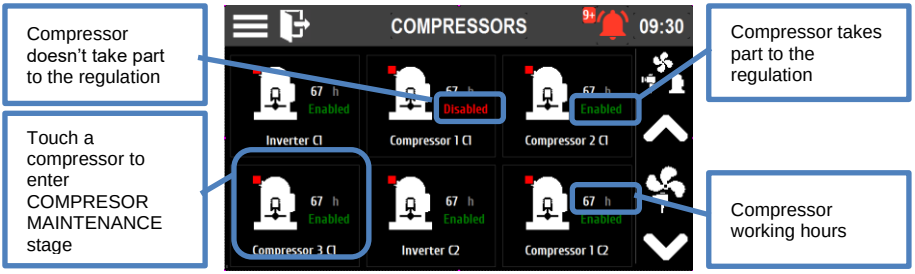
### 4.10.1 Alarm menu structure

The alarm menu has the following structure

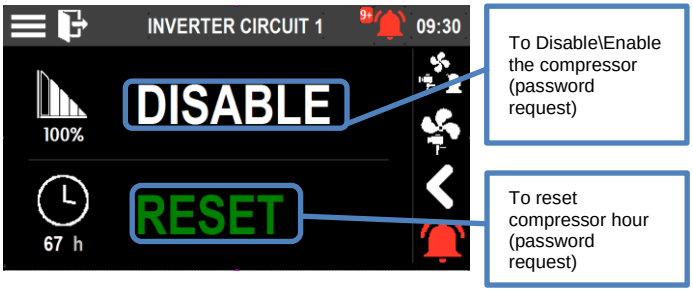



## 4.11 COMPRESSOR PAGE

This page is visible only if there are more than one compressor enabled.
The number of compressors displayed is according to the real number of compressors present.
The compressors are identified as C1 for circuit 1 (MT) and C2 for Cricuit 2 (LT) or as PL for Parallel compression (PL)



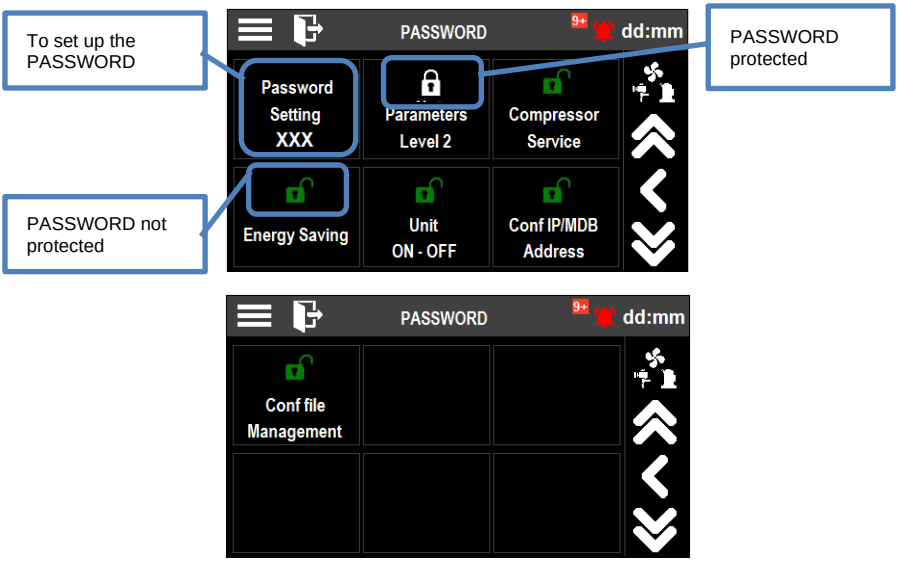

### 4.11.1 COMPRESSOR MAINTENANCE




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

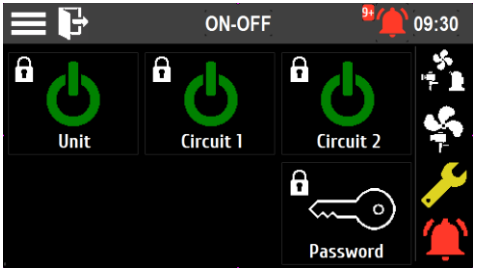
## 4.12 PASSWORD

The PASSWORD screen allows to set up a password (security code) and set which screens or menu are password protected. Below the menu that can be password protected

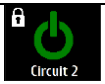
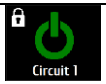



## 4.13 ON-OFF

This menu is designed to switch on and off each single circuit or all the rack
The PASSWORD menu allows to come to the password menu.

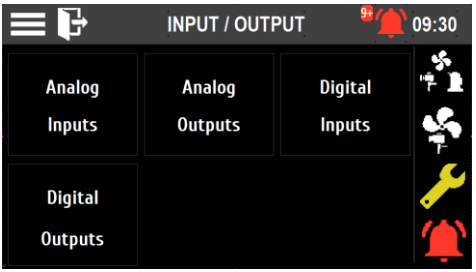



### 4.13.1 Touch the icons to …

| | | | |
|---|---|---|---|
|   | ON-OFF unit<br>Gray unit OFF<br>Green unit ON |   | Present only if there are 2 circuits enabled<br>ON-OFF Circuit 2<br>Gray Circuit 2 OFF;<br>Green Circuit 2 ON |
|   | Present only if there are 2 circuits enabled<br>ON-OFF Circuit 1<br>Gray Circuit 1 OFF<br>Green Circuit 1 ON |   | Go to **PASSWORD**<br>Password inserted<br>No password inserted |

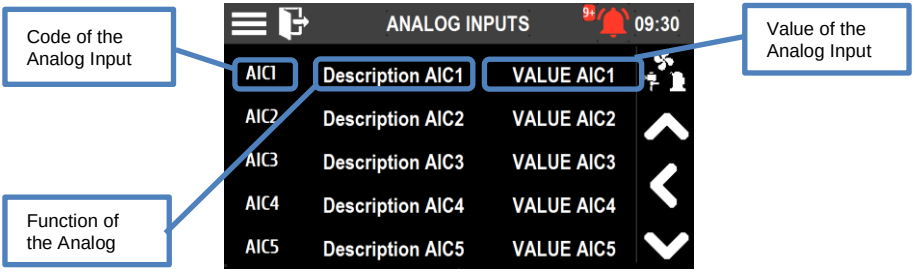
## 4.14 I/O Page

This page is design to display the status or values of controllers I/Os.

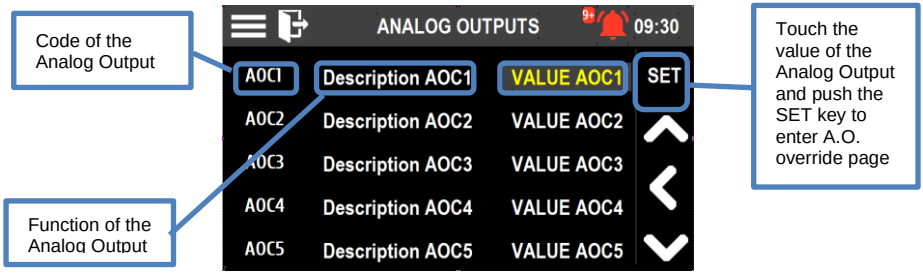



| | | | |
|---|---|---|---|
| Analog Inputs | Go to **ANALOG INPUTS** | Digital Inputs | Go to **DIGITAL INPUTS** |
| Analog Outputs | Go to **ANALOG OUTPUTS** | Digital Outputs | Go to **DIGITAL OUTPUTS** |

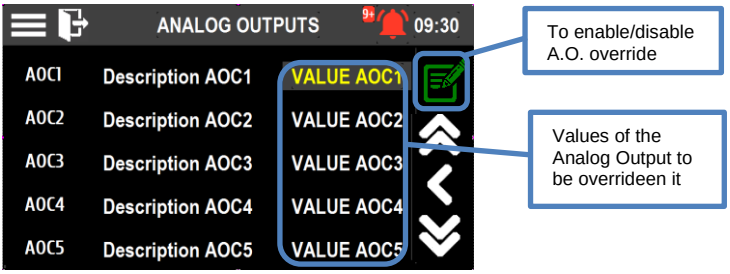
### 4.14.1 ANALOG INPUTS



## 4.14.2 ANALOG OUTPUTS



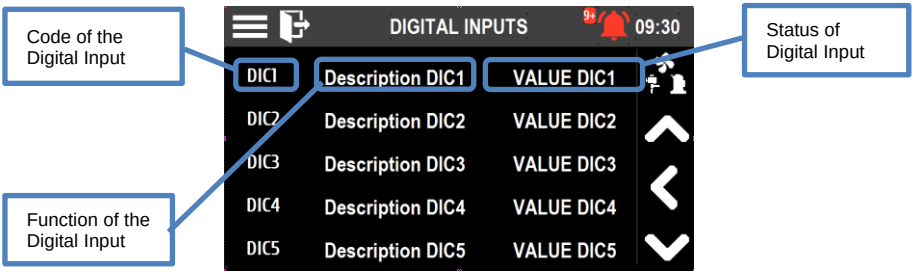

## 4.14.3 ANALOG OUTPUTS – HOW TO OVERRIDE THEM



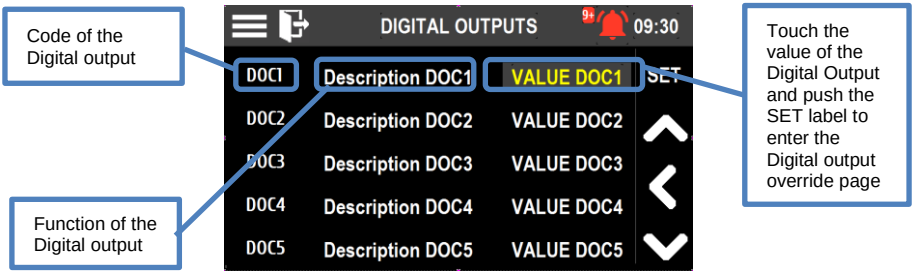

A.O. can be overridden

A.O. can't be overridden

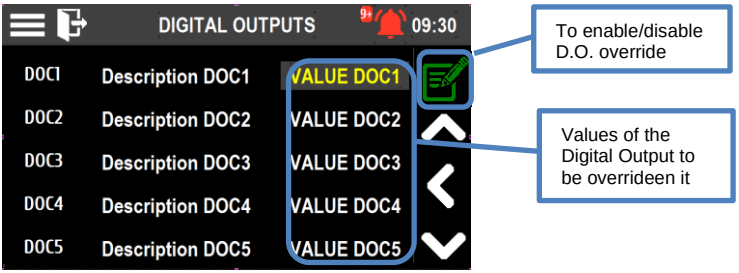
## 4.14.4 DIGITAL INPUTS



## 4.14.5 DIGITAL OUTPUTS



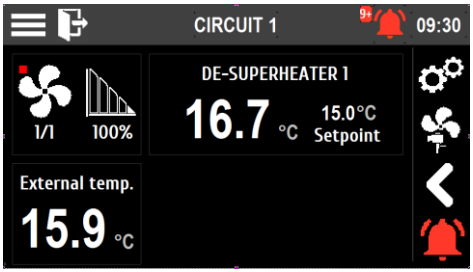

## 4.14.6 DIGITAL OUTPUTS – HOW TO OVERRIDE THEM




 D.O. can be overridden

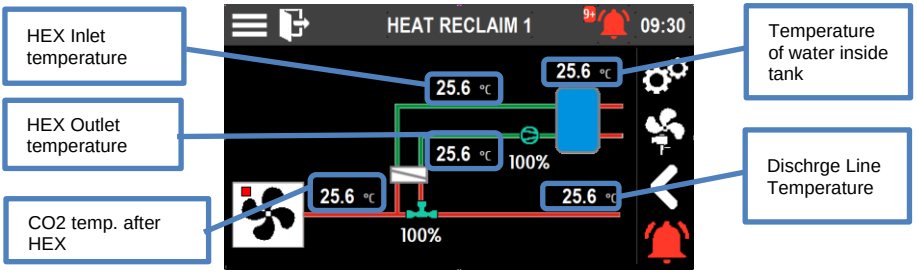
 D.O. can't be overridden

## 4.15 DE-SUPERHEATER 1



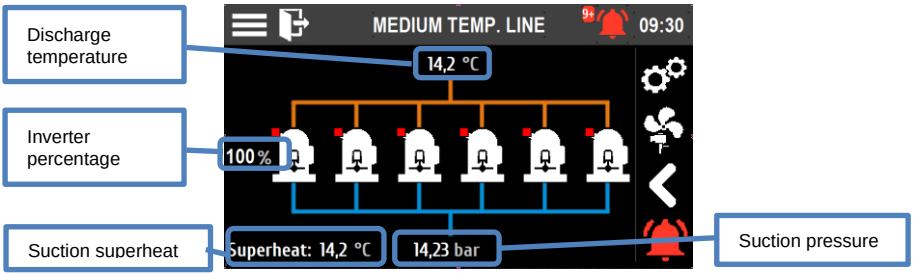

| | | | |
|---|---|---|---|
| 1/1 100% | % of de-superheater fan speed | External temp. 15.9 °C | External temp value (present only if the probe will be use in de-superheater regulation) |
| DE-SUPERHEATER 1 16.7 °C 15.0°C Setpoint | Information related to De-superheater, set point and outlet temperature | | |

## 4.16 HEAT RECLAIM 1 (Page X)




| | | | |
|---|---|---|---|
| 100% | Present if pump enabled.<br>White if pump OFF<br>Green if pump ON<br>% present if pump modulating | 100% | White if 3-ways valve OFF<br>Green if 3-ways valve ON<br>If in the future the valve will be modulating the % will be showed |

## 4.17 COMPRESSORS DETAILS (EXAMPLE)

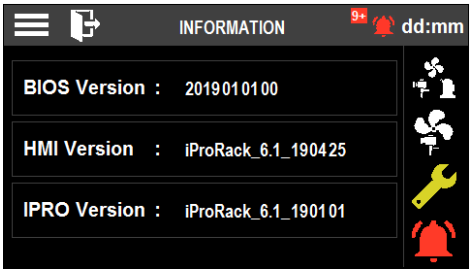



Example with 6 compressors. This is the max number of compressors displayed in a stage.
If the icons is animated the correspondent compressor is running.
This layout is used for:

- MEDIUM TEMP. LINE
- LOW TEMP LINE
- PARALLEL LINE

## 4.18 INFORMATION PAGE

This page contains information about: BIOS, IPRORACK APPLICATION, VISOTOUCH APPLICATIONS



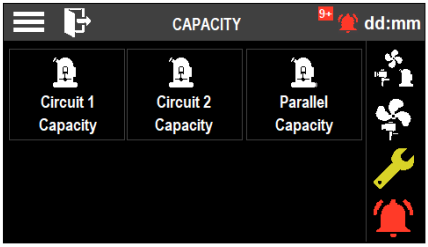

## 4.19 CAPACITY PAGE

This page contains information RACK real time capacity.
To have this page proper set, this function has to be enabled by parameter: CF41: MT compressor, CF45 LT compressor, and CF49: Parallel compressor.
Furthermore, the parameters related to compressor capacity:

- CF4-CF9 for Circuit 1: MT
- CF10-CF15 for Circuit 1: LT
- CF36-CF41 for parallel compresors

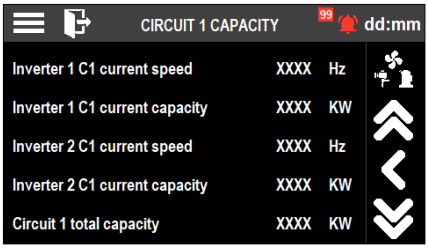
Have to be set.
Together with the parameter related to the VSD compressor capacity:

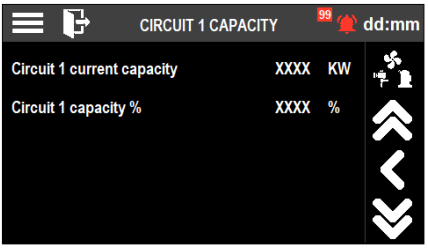
- CF42- CF44: inverter Circuit 1: MT
- CF46- CF48: inverter Circuit 2: LT
- CF50- CF52: inverter parallel compressors




| | | | |
|---|---|---|---|
| Circuit 1 Capacity | When CF41=1, go to page CAPACITY DETAIL. To show circuit1 compressors' capacities. When CF41=0, this icon will be gray and not clickable. | Circuit 2 Capacity | When CF45=1 and circuit 2 is configured, go to page CAPACITY DETAIL. To show circuit2 compressors' capacities. Otherwise, this icon will be gray and not clickable. |
| Parallel Capacity | When CF49=1 and parallel circuit is configured, Go to page CAPACITY DETAIL. Show parallel circuit compressors' capacities. Otherwise, this icon will be gray and not clickable. | | |

### 4.19.1 CAPACITY DETAIL PAGE




## 4.20 LOG FILE PAGE

In this page it's possible to **export the files**, of the logs of the iProRACK : "Alarm log" and "Parameter log".
To do it, an USB stick has to be inserted in the USB receptacle.
The files contain the following information

- **Alarm Log** the info related to the alarms happened: type of alarm, start and stop time.
- **ParamLog** log of the following variables every 5 mis

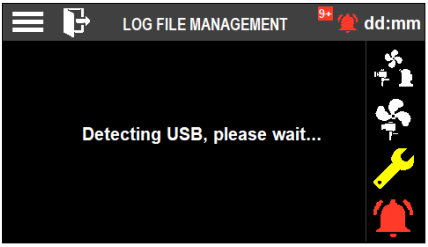
| No | Variable |
|---|---|
| 1 | Suction pressure Circuit 1 |
| 2 | Condensing pressure C1 |
| 3 | Gas cooler outlet temperature |
| 4 | Fan output voltage C1 |
| 5 | HPV valve opening |
| 6 | BGV valve opening |
| 7 | Suction pressure C2 |
| 8 | External temperature |

If a probe/valve is not configured, it shows "NU".
If a probe is in alarm, it shows "ERR".

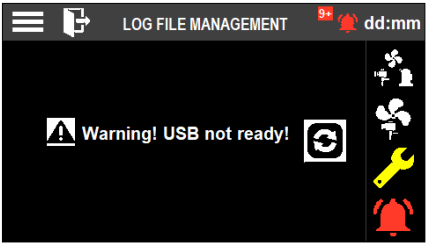
Note: The log files are only enabled when CF26=°C/Bar or CF26=Bar/°C.

After clicking the 

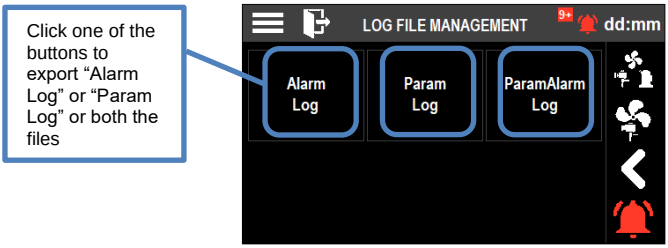
icon from **General Menu**, it will show the information “Detecting USB, please wait…”



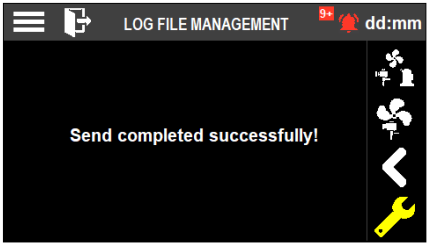

If none USB is inserted into the ipro, it will show the waring “Warning! USB not ready!”

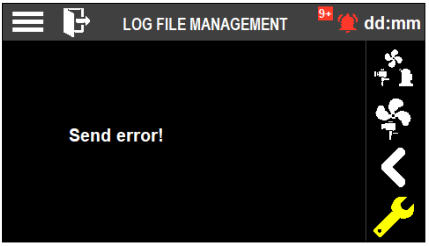



 Click this icon to detect the USB again.
If the USB is detected, it will show the log list, user can choose the log file that needs to be exported.



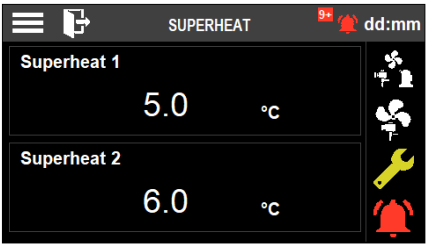

At the end one of the following messages is displayed:



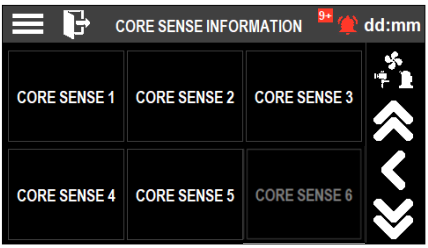

In case of error repeat the operations or change the USB stick.

## 4.21 SUPERHEAT PAGE



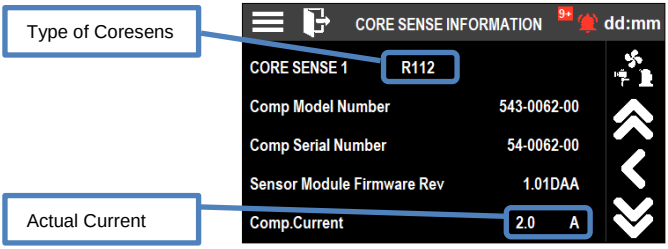

The Superheat page displays the SH value of Circuit 1 and Circuit 2 suction line.
Superheat1 is the superheat value for MT line.
Superheat2 is the superheat value for LT line.
If LT line is not present, only Superheat1 is shown.

## 4.22 CORE SENSE INFORMATION

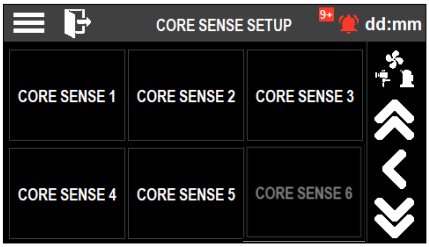



The **Coresene Page** shows how many coresenses are connected to the iProRACK, up to 15.
If some core senses are not configured, the corresponding icon is disabled.
By clicking the icon, user can check the detailed information of each core sense.

### 4.22.1 CORESENSE INFORMATION PAGE

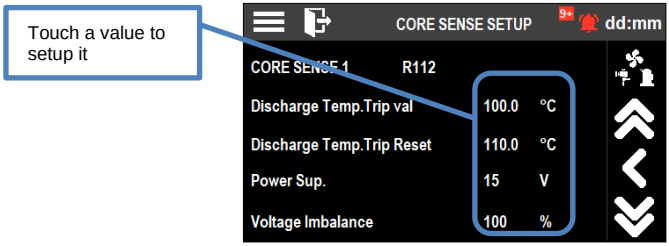


## 4.23 CORE SENSE SETUP

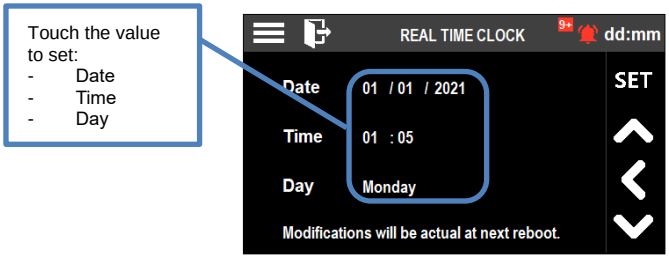



The **Coresene Setup Page** shows how many coresenses are connected to the iProRACK, up to 15.
If some core senses are not configured, the corresponding icon is disabled.
By clicking the icon, user can setup the parameters of each coresense.

### 4.23.1 CORESENSE SETUP PAGE



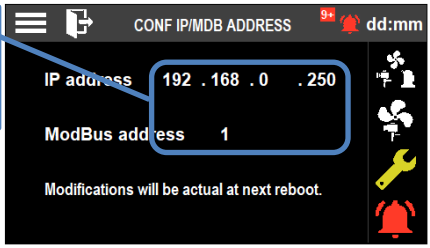

## 4.24 REAL TIME CLOCK




Switch off and on the iProRACK to allow the modifications take place.

## 4.25 CONF IP & MODBUS ADDRESS

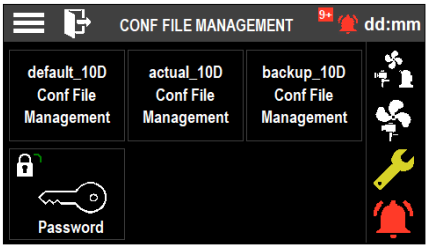
Touch the value to set:
- IP address
- Modbus address




Switch off and on the iProRACK to allow the modifications take place.

## 4.26 CONF FILE MANAGEMENT

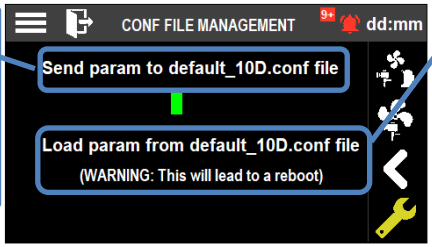
The **CONF FILE MANAGEMENT** page, allow to:
- Save a map as **Default, useful when a good configuration has been set.** Once saved as **Default,** this map can be loaded to restore the configuration.
- **Suggestion: after the commissioning save the Actual map in the Default map**
- **Actual** is the current parameter map.
- **Back up** is used as copy of the Actual. In case of corruption of Actual file il will be used to restore current configuration




| | | | |
|---|---|---|---|
| default_10D Conf File Management | Go to page **Default_10d Conf File Management**. | backup_10D Conf File Management | Go to page **Backup_10d Conf File Management.** |
| actual_10D Conf File Management | Go to page **Actual_10d Conf File Management.** | Password | Go to **PASSWORD**<br>No password protected<br>Password protected |

### 4.26.1 Default_10d Conf File

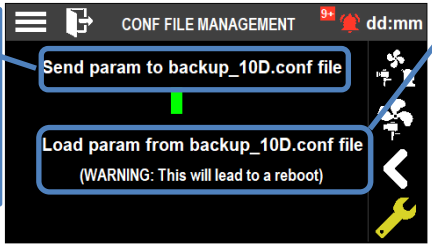
Touch here to COPY the current map in the Default map.
Useful to save the map after the commissioning or when the rack is optimized




Touch here to LOAD the Default Map in the iProRAck. The map saved as Default will be loaded and used by iProRack. Useful to restore a known configuration.

### 4.26.2 Backup_10d Conf File

Touch here to COPY the current map in the Backup map.
The Backup map is in any case updated automatically when the current map is updated

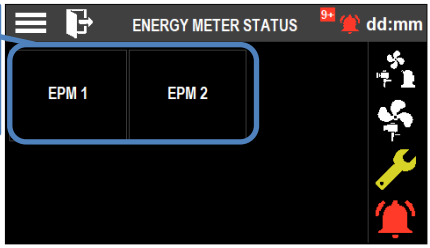



Touch here to LOAD the Backpu Map in the iProRAck. The map saved as Backup will be loaded and used by iProRack

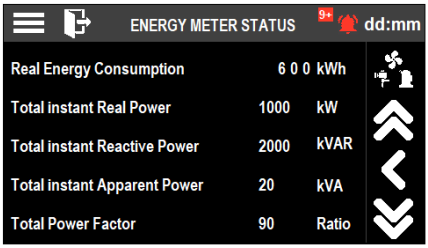
## 4.27 ENERGY METER STATUS

In case the Energy Meter EPM is connected this stage is available

Touch one of th box to see the value detected by the energy meter




### 4.27.1 Energy Meter Status Page

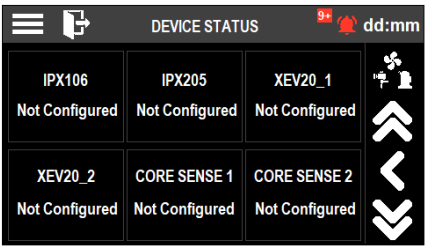


## 4.28 DEVICE STATUS

In this page is shown the status of the devices, like:

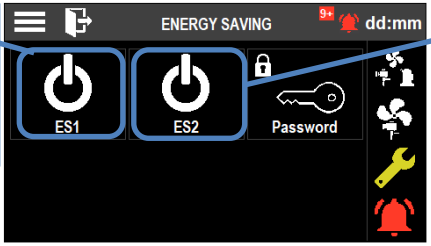
- Expansion board IPX206D or IPX215D
- Stepper Valve XEV20D
- Coresenses

Touch a box to see further details




## 4.29 ENERGY SAVING

Enable/Disable energy saving of Circuit 1
Gray: energy saving is disabled
Green: energy saving is enabled



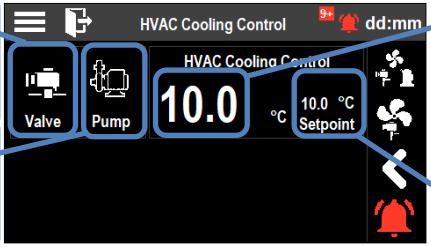

Enable/Disable energy saving of Circuit 2
Gray: energy saving is disabled
Green: energy saving is enabled

## 4.30 COOLING CONTROL

This page is designed to manage the HVAC cooling feature, see paragraph 21.

**Gray** HVAC cooling valve is closed
**Green** HVAC cooling valve is open

**Gray** HVAC cooling pump is off
**Green** HVAC cooling pump is on



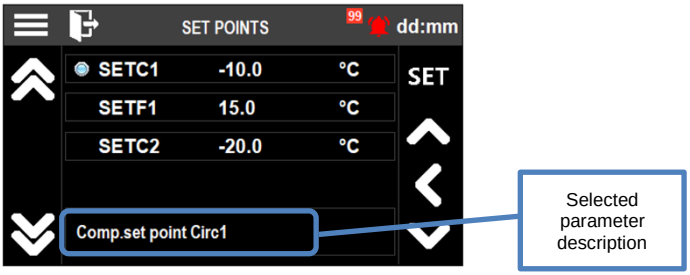

Temperature Probe value Evaporator in HVAC cooling control

HVAC cooling control setpoint

## 4.31 SET POINTS

This page allows direct access to the main set points of the rack.
They can be seen and changed.
They are:

- SETC1 = Pressure/temp. set point of Circuit 1: MT
- SETF1 = Temp. set point of gas cooler
- SETC2 = Pressure/temp. set point of Circuit 2: LT
- SETP = Pressure set point of parallel compressors



# 5 CONFIGURATION SUB-MENU

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

## 5.1 Parameters for iProRACK I/O configuration

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

- **DIC (IPR251D: 43 parameters)**
- **DOC (IPR251D: 36 parameters);**
- **AOC (IPR251D: 6 parameters);**
- **AIC (IPR251D: 27 parameters);**

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

### 5.1.1 DIGITAL-INPUTS (parameters DIC1- DIC43)

| Parameter | Description | IPRC215D | IPX206D | IPX215D |
|---|---|---|---|---|
| **DIC1** | Configuration Digital Input 1 | x | | |
| **DIC 2** | Configuration Digital Input 2 | x | | |
| **DIC 3** | Configuration Digital Input 3 | x | | |
| **DIC 4** | Configuration Digital Input 4 | x | | |
| **DIC 5** | Configuration Digital Input 5 | x | | |
| **DIC 6** | Configuration Digital Input 6 | x | | |
| **DIC 7** | Configuration Digital Input 7 | x | | |
| **DIC 8** | Configuration Digital Input 8 | x | | |
| **DIC 9** | Configuration Digital Input 9 | x | | |
| **DIC 10** | Configuration Digital Input 10 | x | | |
| **DIC 11** | Configuration Digital Input 11 | x | | |
| **DIC 12** | Configuration Digital Input 12 | x | | |
| **DIC 13** | Configuration Digital Input 13 | x | | |
| **DIC 14** | Configuration Digital Input 14 | x | | |
| **DIC 15** | Configuration Digital Input 15 | x | | |
| **DIC 16** | Configuration Digital Input 16 | x | | |
| **DIC 17** | Configuration Digital Input 17 | x | | |
| **DIC 18** | Configuration Digital Input 18 | x | | |
| **DIC 19** | Configuration Digital Input 19 | x | | |
| **DIC 20** | Configuration Digital Input 20 | x | | |
| **DIC 21** | Configuration Digital Input 21 | | x | |
| **DIC 22** | Configuration Digital Input 22 | | x | |
| **DIC 23** | Configuration Digital Input 23 | | x | |
| **DIC 24** | Configuration Digital Input 24 | | | x |
| **DIC 25** | Configuration Digital Input 25 | | | x |
| **DIC 26** | Configuration Digital Input 26 | | | x |
| **DIC 27** | Configuration Digital Input 27 | | | x |
| **DIC 28** | Configuration Digital Input 28 | | | x |
| **DIC 29** | Configuration Digital Input 29 | | | x |
| **DIC 30** | Configuration Digital Input 30 | | | x |
| **DIC 31** | Configuration Digital Input 31 | | | x |
| **DIC 32** | Configuration Digital Input 32 | | | x |
| **DIC 33** | Configuration Digital Input 33 | | | x |
| **DIC 34** | Configuration Digital Input 34 | | | x |
| **DIC 35** | Configuration Digital Input 35 | | | x |
| **DIC 36** | Configuration Digital Input 36 | | | x |
| **DIC 37** | Configuration Digital Input 37 | | | x |

| Parameter | Description | IPRC215D | IPX206D | IPX215D |
|---|---|---|---|---|
| **DIC 38** | Configuration Digital Input 38 | | | x |
| **DIC 39** | Configuration Digital Input 39 | | | x |
| **DIC 40** | Configuration Digital Input 40 | | | x |
| **DIC 41** | Configuration Digital Input 41 | | | x |
| **DIC 42** | Configuration Digital Input 42 | | | x |
| **DIC 43** | Configuration Digital Input 43 | | | x |

## DIGITAL INPUTS CONFIGURATION DIC1-DIC43

**"c"** the digital input is activated by closing the contacts
**"o"** the digital input is activated by opening the contacts;
The next number indicates the Input function as described above.

**Values**
0 Not used
1o Compressor 1 oil pressostate Circuit 1
1c Compressor 1 oil pressostate 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
90c 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 Heat reclaim 1 (see the note here below)
97c Heat reclaim 1
98o Heat reclaim 2
98c Heat reclaim 2
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 ON/OFF (see the note here below)
103c ON/OFF
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 (see the note here below)
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 Oil of compressor with Inverter suction Circuit 1
115c Oil of compressor with Inverter suction Circuit 1
116o Safety of Compressor with Inverter Suction Circuit 1
116c Safety of Compressor with Inverter Suction Circuit 1

117o Thermal Safety of Compressor with Inverter suction Circuit 1
117c Thermal Safety of Compressor with Inverter suction Circuit 1
118o Oil of compressor with Inverter suction Circuit 2
118c Oil of compressor with Inverter suction Circuit 2
119o Safety of Compressor with Inverter Suction Circuit 2
119c Safety of Compressor with Inverter Suction Circuit 2
120o Thermal Safety of Compressor with Inverter suction Circuit 2
120c Thermal Safety of Compressor with 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: it stops the compressor related to the Coresense 1
123c Safety Input Coresense 1: it stops the compressor related to the Coresense 1
124o Safety Input Coresense 2: it stops the compressor related to the Coresense 2
124c Safety Input Coresense 2: it stops the compressor related to the Coresense 2
125o Safety Input Coresense 3: it stops the compressor related to the Coresense 3
125c Safety Input Coresense 3: it stops the compressor related to the Coresense 3
126o Safety Input Coresense 4: it stops the compressor related to the Coresense 4
126c Safety Input Coresense 4: it stops the compressor related to the Coresense 4
127o Safety Input Coresense 5: it stops the compressor related to the Coresense 5
127c Safety Input Coresense 5: it stops the compressor related to the Coresense 5
128o Safety Input Coresense 6: it stops the compressor related to the Coresense 6
128c Safety Input Coresense 6: it stops the compressor related to the Coresense 6
129o Safety Input Coresense 7: it stops the compressor related to the Coresense 7
129c Safety Input Coresense 7: it stops the compressor related to the Coresense 7
130o Safety Input Coresense 8: it stops the compressor related to the Coresense 8
130c Safety Input Coresense 8: it stops the compressor related to the Coresense 8
131o Safety Input Coresense 9: it stops the compressor related to the Coresense 9
131c Safety Input Coresense 9: it stops the compressor related to the Coresense 9
132o Safety Input Coresense 10: it stops the compressor related to the Coresense 10
132c Safety Input Coresense 10: it stops the compressor related to the Coresense 10
133o Safety Input Coresense 11: it stops the compressor related to the Coresense 11
133c Safety Input Coresense 11: it stops the compressor related to the Coresense 11
134o Safety Input Coresense 12: it stops the compressor related to the Coresense 12
134c Safety Input Coresense 12: it stops the compressor related to the Coresense 12
135o Safety Input Coresense 13: it stops the compressor related to the Coresense 13
135c Safety Input Coresense 13: it stops the compressor related to the Coresense 13
136o Safety Input Coresense 14: it stops the compressor related to the Coresense 14
136c Safety Input Coresense 14: it stops the compressor related to the Coresense 14
137o Safety Input Coresense 15: it stops the compressor related to the Coresense 15
137c Safety Input Coresense 15: it stops the compressor related to the Coresense 15
138o Inverter suction 1 safety
138c Inverter suction 1 safety
139o Inverter suction 2 safety
139c Inverter suction 2 safety
140o Inverter 2 safety - circuit 1
140c Inverter 2 safety - circuit 1
141o Inverter 2 safety – circuit 2
141c Inverter 2 safety – circuit 2
142o Start AUX output 1
142c Start AUX output 1
143o Start AUX output 2
143c Start AUX output 2
144o Start AUX output 3
144c Start AUX output 3
145o Start AUX output 4
145c Start AUX output 4
146o Start AUX output 5
146c Start AUX output 5
147o Start AUX output 6
147c Start AUX output 6
148o Start AUX output 7

148c Start AUX output 7
149o Start AUX output 8
149c Start AUX output 8
150o Burst disc alarm
150c Burst disc alarm
151o Phase fail alarm
151c Phase fail alarm
152o External alarm 1
152c External alarm 1
153o External alarm 2
153c External alarm 2
154o External alarm 3
154c External alarm 3
155o External alarm 4
155c External alarm 4
156o H-R2 pump flow switch
156c H-R2 pump flow switch
157o H-R2 pump thermal protection
157c H-R2 pump thermal protection
158o Thermal Safety De-Superheater 1
158c Thermal Safety De-Superheater 1
159o Thermal Safety De-Superheater 2
159c Thermal Safety De-Superheater 2
160o Thermal Safety De-Superheater 3
160c Thermal Safety De-Superheater 3
161o Low oil level in oil seperator circuit 1
161c Low oil level in oil seperator circuit 1
162o High oil level in oil seperator circuit 1
162c High oil level in oil seperator circuit 1
163o Low oil level in oil seperator circuit 2
163c Low oil level in oil seperator circuit 2
164o Change oil separator switch
164c Change oil separator switch
165o High oil separator lockout
165c High oil separator lockout
166o Rack exhaust fan
166c Rack exhaust fan
167o Break glass switch
167c Break glass switch
168o High oil level in oil seperator circuit 2
168c High oil level in oil seperator circuit 2
169o Silent function circuit 1
169c Silent function circuit 1
170o Silent function circuit 2
170c Silent function circuit 2
173o Parallel compression- Compressor 1 oil pressostate
173c Parallel compression- Compressor 1 oil pressostate
174o Parallel compression- Compressor 1 Safety pressostate
174c Parallel compression- Compressor 1 Safety pressostate
175o Parallel compression- Compressor 1 Thermal Safety
175c Parallel compression- Compressor 1 Thermal Safety
176o Parallel compression- Compressor 2 oil pressostate
176c Parallel compression- Compressor 2 oil pressostate
177o Parallel compression- Compressor 2 Safety pressostate
177c Parallel compression- Compressor 2 Safety pressostate
178o Parallel compression- Compressor 2 Thermal Safety
178c Parallel compression- Compressor 2 Thermal Safety
179o Parallel compression- Compressor 3 oil pressostate
179c Parallel compression- Compressor 3 oil pressostate
180o Parallel compression- Compressor 3 Safety pressostate
180c Parallel compression- Compressor 3 Safety pressostate
181o Parallel compression- Compressor 3 Thermal Safety
181c Parallel compression- Compressor 3 Thermal Safety

182o Parallel compression- Frequency compressor, oil pressostate
182c Parallel compression- Frequency compressor, oil pressostate
183o Parallel compression- Frequency compressor, Safety pressostate
183c Parallel compression- Frequency compressor, Safety pressostate
184o Parallel compression- Frequency compressor, Thermal Safety
184c Parallel compression- Frequency compressor, Thermal Safety
185o Parallel compression– Inverter Safety
185c Parallel compression– Inverter Safety
186o Low oil level in oil receiver circuit 1
186c Low oil level in oil receiver circuit 1
187o Low oil level in oil receiver circuit 2
187c Low oil level in oil receiver circuit 2
188o Adiabatic spray alarm
188c Adiabatic spray alarm
189o HVAC control request
189c HVAC control request
190o HVAC pump flow switch
190c HVAC pump flow switch
191o HVAC pump thermal protection
191c HVAC pump thermal protection
192o Suction receiver high level
192c Suction receiver high level
193o Suction receiver low level
193c Suction receiver low level
194o Vapour Ejector control request
194c Vapour Ejector control request
195o Full Suction receiver
195c Full Suction receiver
196o Comp.1 Circ1 in maintenance
196c Comp.1 Circ1 in maintenance
197o Comp.2 Circ1 in maintenance
197c Comp.2 Circ1 in maintenance
198o Comp.3 Circ1 in maintenance
198c Comp.3 Circ1 in maintenance
199o Comp.4 Circ1 in maintenance
199c Comp.4 Circ1 in maintenance
200o Comp.5 Circ1 in maintenance
200c Comp.5 Circ1 in maintenance
201o Comp.6 Circ1 in maintenance
201c Comp.6 Circ1 in maintenance
202o Comp.7 Circ1 in maintenance
202c Comp.7 Circ1 in maintenance
203o Comp.8 Circ1 in maintenance
203c Comp.8 Circ1 in maintenance
204o Comp.9 Circ1 in maintenance
204c Comp.9 Circ1 in maintenance
205o Comp.10 Circ1 in maintenance
205c Comp.10 Circ1 in maintenance
206o Comp.11 Circ1 in maintenance
206c Comp.11 Circ1 in maintenance
207o Comp.12 Circ1 in maintenance
207c Comp.12 Circ1 in maintenance
208o Comp.1 Circ2 in maintenance
208c Comp.1 Circ2 in maintenance
209o Comp.2 Circ2 in maintenance
209c Comp.2 Circ2 in maintenance

210o Comp.3 Circ2 in maintenance
210c Comp.3 Circ2 in maintenance
211o Comp.4 Circ2 in maintenance
211c Comp.4 Circ2 in maintenance
212o Comp.5 Circ2 in maintenance
212c Comp.5 Circ2 in maintenance
213o Comp.6 Circ2 in maintenance
213c Comp.6 Circ2 in maintenance
214o Comp.7 Circ2 in maintenance
214c Comp.7 Circ2 in maintenance
215o Comp.8 Circ2 in maintenance
215c Comp.8 Circ2 in maintenance
216o Comp.9 Circ2 in maintenance
216c Comp.9 Circ2 in maintenance
217o Comp.10 Circ2 in maintenance
217c Comp.10 Circ2 in maintenance
218o Comp.11 Circ2 in maintenance
218c Comp.11 Circ2 in maintenance
219o Comp.12 Circ2 in maintenance
219c Comp.12 Circ2 in maintenance
220o Comp.1 PC in maintenance
220c Comp.1 PC in maintenance
221o Comp.2 PC in maintenance
221c Comp.2 PC in maintenance
222o Comp.3 PC in maintenance
222c Comp.3 PC in maintenance
223o Inverter Circ1 in maintenance
223c Inverter Circ1 in maintenance
224o Inverter Circ2 in maintenance
224c Inverter Circ2 in maintenance
225o Inverter PC in maintenance
225c Inverter PC in maintenance
226o High flash tank liquid level Circuit 1
226c High flash tank liquid level Circuit 1
227o Oil of inverter compressor 2 suction Circuit 1
227c Oil of inverter compressor 2 suction Circuit 1
228o Safety pressostate of inverter compressor 2 Suction Circuit 1
228c Safety pressostate of inverter compressor 2 Suction Circuit 1
229o Thermal Safety of Inverter compressor2suction Circuit 1
229c Thermal Safety of Inverter compressor2 suction Circuit 1
230o Oil of inverter compressor 2 suction Circuit 2
230c Oil of inverter compressor 2 suction Circuit 2
231o Safety pressostate of inverter compressor 2 Suction Circuit 2
231c Safety pressostate of inverter compressor 2 Suction Circuit 2
232o Thermal Safety of inverter compressor 2 suction Circuit 2
232c Thermal Safety of inverter compressor 2 suction Circuit 2
233o Oil of inverter 2 compressor Parallel compressor
233c Oil of inverter 2 compressor Parallel compressor
234o Safety pressostate of inverter 2 compressor Parallel compressor
234c Safety pressostate of inverter 2 compressor Parallel compressor
235o Thermal Safety of inverter 2 compressor Parallel compressor
235c Thermal Safety of inverter 2 compressor Parallel compressor
236o Parallel compressor inverter 2 safety
236c Parallel compressor inverter 2 safety
237o Parallel compression- Compressor 4 oil pressostate
237c Parallel compression- Compressor 4 oil pressostate
238o Parallel compression- Compressor 4 Safety pressostate
238c Parallel compression- Compressor 4 Safety pressostate

| | |
|---|---|
| 239o | Parallel compression- Compressor 4 Thermal Safety |
| 239c | Parallel compression- Compressor 4 Thermal Safety |
| 240o | Parallel compression- Compressor 5 oil pressostate |
| 240c | Parallel compression- Compressor 5 oil pressostate |
| 241o | Parallel compression- Compressor 5 Safety pressostate |
| 241c | Parallel compression- Compressor 5 Safety pressostate |
| 242o | Parallel compression- Compressor 5 Thermal Safety |
| 242c | Parallel compression- Compressor 5 Thermal Safety |

***Note**: if both 103 and 111 are present, only the 103 is used, the 111 is ignored. The same for 103 and 112.*
***Note**: if there is a heat reclaim DI active, the corresponding relay is activated (DO119-DO120). The set point of the condenser circuit1 has to be summed to RC33 in case the HR1 is enabled (all the conditions for HR1 are met), set point = setCircuit + dyn + ES + RC33.*
***Note**: CRO function is only used for evaporator set point.*
*If when the Disable CRO Circuit DI is not active (e.g. Circuit 1)*
*Instead use the formula set point = setCircuit1 + dyn + ES*
*Use the CRO value sent by xWeb, set point = CRO.*
*There are 2 ways for coming back to set point = setCiircuit1 + dyn + ES*
*1) The "Disable CRO Circuit 1" is enabled.*
*2) If the "Disable CRO Circuit 1" is still disabled, after a timeout of 5mins.*
*In fact, the xWeb every minute sends again the same CRO command.*
***Note**: the silent function is only for fans.*

## 5.1.2 DIGITAL-OUTPUTS (parameters DOC1- DOC36)

| Parameter | Description | IPRC215D | IPX206D/ IPX106D | IPX215D/ IPX115D |
|---|---|---|---|---|
| **DOC1** | Configuration Digital Output 1 | x | | |
| **DOC 2** | Configuration Digital Output 2 | x | | |
| **DOC 3** | Configuration Digital Output 3 | x | | |
| **DOC 4** | Configuration Digital Output 4 | x | | |
| **DOC 5** | Configuration Digital Output 5 | x | | |
| **DOC 6** | Configuration Digital Output 6 | x | | |
| **DOC 7** | Configuration Digital Output 7 | x | | |
| **DOC 8** | Configuration Digital Output 8 | x | | |
| **DOC 9** | Configuration Digital Output 9 | x | | |
| **DOC 10** | Configuration Digital Output 10 | x | | |
| **DOC 11** | Configuration Digital Output 11 | x | | |
| **DOC 12** | Configuration Digital Output 12 | x | | |
| **DOC 13** | Configuration Digital Output 13 | x | | |
| **DOC 14** | Configuration Digital Output 14 | x | | |
| **DOC 15** | Configuration Digital Output 15 | x | | |
| **DOC 16** | Configuration Digital Output 16 | | x | |
| **DOC 17** | Configuration Digital Output 17 | | x | |
| **DOC 18** | Configuration Digital Output 18 | | x | |
| **DOC 19** | Configuration Digital Output 19 | | x | |
| **DOC 20** | Configuration Digital Output 20 | | x | |
| **DOC 21** | Configuration Digital Output 21 | | x | |
| **DOC 22** | Configuration Digital Output 22 | | | x |
| **DOC 23** | Configuration Digital Output 23 | | | x |
| **DOC 24** | Configuration Digital Output 24 | | | x |
| **DOC 25** | Configuration Digital Output 25 | | | x |
| **DOC 26** | Configuration Digital Output 26 | | | x |
| **DOC 27** | Configuration Digital Output 27 | | | x |
| **DOC 28** | Configuration Digital Output 28 | | | x |
| **DOC 29** | Configuration Digital Output 29 | | | x |
| **DOC 30** | Configuration Digital Output 30 | | | x |
| **DOC 31** | Configuration Digital Output 31 | | | x |
| **DOC 32** | Configuration Digital Output 32 | | | x |
| **DOC 33** | Configuration Digital Output 33 | | | x |
| **DOC 34** | Configuration Digital Output 34 | | | x |
| **DOC 35** | Configuration Digital Output 35 | | | x |
| **DOC 36** | Configuration Digital Output 36 | | | x |

**Values**

| | |
|---|---|
| 0 | Not used |
| 1o | Inverter 1 Suction Circuit 1 |
| 1c | Inverter 1 Suction Circuit 1 |
| 2o | Inverter 2 Suction Circuit 1 |
| 2c | Inverter 2 Suction Circuit 1 |
| 3o | Inverter 1 Suction Circuit 2 |
| 3c | Inverter 1 Suction Circuit 2 |
| 4o | Inverter 2 Suction Circuit 2 |
| 4c | Inverter 2 Suction Circuit 2 |
| 5o | Inverter Condenser Circuit 1 |
| 5c | Inverter Condenser Circuit 1 |
| 6o | Inverter Condenser Circuit 2 |
| 6c | Inverter Condenser Circuit 2 |
| 7o | Compressor 1 Circuit 1 |

| | |
|---|---|
| 7c | Compressor 1 Circuit 1 |
| 8o | Step n° 1 Compressor 1 Circuit 1 |
| 8c | Step n° 1 Compressor 1 Circuit 1 |
| 9o | Step n° 2 Compressor 1 Circuit 1 |
| 9c | Step n° 2 Compressor 1 Circuit 1 |
| 10o | Step n° 3 Compressor 1 Circuit 1 |
| 10c | Step n° 3 Compressor 1 Circuit 1 |
| 11o | Compressor 2 Circuit 1 |
| 11c | Compressor 2 Circuit 1 |
| 12o | Step n° 1 Compressor 2 Circuit 1 |
| 12c | Step n° 1 Compressor 2 Circuit 1 |
| 13o | Step n° 2 Compressor 2 Circuit 1 |
| 13c | Step n° 2 Compressor 2 Circuit 1 |
| 14o | Step n° 3 Compressor 2 Circuit 1 |
| 14c | Step n° 3 Compressor 2 Circuit 1 |
| 15o | Compressor 3 Circuit 1 |
| 15c | Compressor 3 Circuit 1 |
| 16o | Step n° 1 Compressor 3 Circuit 1 |
| 16c | Step n° 1 Compressor 3 Circuit 1 |
| 17o | Step n° 2 Compressor 3 Circuit 1 |
| 17c | Step n° 2 Compressor 3 Circuit 1 |
| 18o | Step n° 3 Compressor 3 Circuit 1 |
| 18c | Step n° 3 Compressor 3 Circuit 1 |
| 19o | Compressor 4 Circuit 1 |
| 19c | Compressor 4 Circuit 1 |
| 20o | Step n° 1 Compressor 4 Circuit 1 |
| 20c | Step n° 1 Compressor 4 Circuit 1 |
| 21o | Step n° 2 Compressor 4 Circuit 1 |
| 21c | Step n° 2 Compressor 4 Circuit 1 |
| 22o | Step n° 3 Compressor 4 Circuit 1 |
| 22c | Step n° 3 Compressor 4 Circuit 1 |
| 23o | Compressor 5 Circuit 1 |
| 23c | Compressor 5 Circuit 1 |
| 24o | Step n° 1 Compressor 5 Circuit 1 |
| 24c | Step n° 1 Compressor 5 Circuit 1 |
| 25o | Step n° 2 Compressor 5 Circuit 1 |
| 25c | Step n° 2 Compressor 5 Circuit 1 |
| 26o | Step n° 3 Compressor 5 Circuit 1 |
| 26c | Step n° 3 Compressor 5 Circuit 1 |
| 27o | Compressor 6 Circuit 1 |
| 27c | Compressor 6 Circuit 1 |
| 28o | Step n° 1 Compressor 6 Circuit 1 |
| 28c | Step n° 1 Compressor 6 Circuit 1 |
| 29o | Step n° 2 Compressor 6 Circuit 1 |
| 29c | Step n° 2 Compressor 6 Circuit 1 |
| 30o | Step n° 3 Compressor 6 Circuit 1 |
| 30c | Step n° 3 Compressor 6 Circuit 1 |
| 31o | Compressor 1 Circuit 2 |
| 31c | Compressor 1 Circuit 2 |
| 32o | Step n° 1 Compressor 1 Circuit 2 |
| 32c | Step n° 1 Compressor 1 Circuit 2 |
| 33o | Step n° 2 Compressor 1 Circuit 2 |
| 33c | Step n° 2 Compressor 1 Circuit 2 |
| 34o | Step n° 3 Compressor 1 Circuit 2 |
| 34c | Step n° 3 Compressor 1 Circuit 2 |
| 35o | Compressor 2 Circuit 2 |
| 35c | Compressor 2 Circuit 2 |
| 36o | Step n° 1 Compressor 2 Circuit 2 |
| 36c | Step n° 1 Compressor 2 Circuit 2 |
| 37o | Step n° 2 Compressor 2 Circuit 2 |
| 37c | Step n° 2 Compressor 2 Circuit 2 |
| 38o | Step n° 3 Compressor 2 Circuit 2 |
| 38c | Step n° 3 Compressor 2 Circuit 2 |

| | |
|---|---|
| 39o | Compressor 3 Circuit 2 |
| 39c | Compressor 3 Circuit 2 |
| 40o | Step n° 1 Compressor 3 Circuit 2 |
| 40c | Step n° 1 Compressor 3 Circuit 2 |
| 41o | Step n° 2 Compressor 3 Circuit 2 |
| 41c | Step n° 2 Compressor 3 Circuit 2 |
| 42o | Step n° 3 Compressor 3 Circuit 2 |
| 42c | Step n° 3 Compressor 3 Circuit 2 |
| 43o | Compressor 4 Circuit 2 |
| 43c | Compressor 4 Circuit 2 |
| 44o | Step n° 1 Compressor 4 Circuit 2 |
| 44c | Step n° 1 Compressor 4 Circuit 2 |
| 45o | Step n° 2 Compressor 4 Circuit 2 |
| 45c | Step n° 2 Compressor 4 Circuit 2 |
| 46o | Step n° 3 Compressor 4 Circuit 2 |
| 46c | Step n° 3 Compressor 4 Circuit 2 |
| 47o | Compressor 5 Circuit 2 |
| 47c | Compressor 5 Circuit 2 |
| 48o | Step n° 1 Compressor 5 Circuit 2 |
| 48c | Step n° 1 Compressor 5 Circuit 2 |
| 49o | Step n° 2 Compressor 5 Circuit 2 |
| 49c | Step n° 2 Compressor 5 Circuit 2 |
| 50o | Step n° 3 Compressor 5 Circuit 2 |
| 50c | Step n° 3 Compressor 5 Circuit 2 |
| 51o | Compressor 6 Circuit 2 |
| 51c | Compressor 6 Circuit 2 |
| 52o | Step n° 1 Compressor 6 Circuit 2 |
| 52c | Step n° 1 Compressor 6 Circuit 2 |
| 53o | Step n° 2 Compressor 6 Circuit 2 |
| 53c | Step n° 2 Compressor 6 Circuit 2 |
| 54o | Step n° 3 Compressor 6 Circuit 2 |
| 54c | Step n° 3 Compressor 6 Circuit 2 |
| 55o | Compressor 7 Circuit 1 |
| 55c | Compressor 7 Circuit 1 |
| 56o | Compressor 8 Circuit 1 |
| 56c | Compressor 8 Circuit 1 |
| 57o | Compressor 9 Circuit 1 |
| 57c | Compressor 9 Circuit 1 |
| 58o | Compressor 10 Circuit 1 |
| 58c | Compressor 10 Circuit 1 |
| 59o | Compressor 11 Circuit 1 |
| 59c | Compressor 11 Circuit 1 |
| 60o | Compressor 12 Circuit 1 |
| 60c | Compressor 12 Circuit 1 |
| 61o | Compressor 7 Circuit 2 |
| 61c | Compressor 7 Circuit 2 |
| 62o | Compressor 8 Circuit 2 |
| 62c | Compressor 8 Circuit 2 |
| 63o | Compressor 9 Circuit 2 |
| 63c | Compressor 9 Circuit 2 |
| 64o | Compressor 10 Circuit 2 |
| 64c | Compressor 10 Circuit 2 |
| 65o | Compressor 11 Circuit 2 |
| 65c | Compressor 11 Circuit 2 |
| 66o | Compressor 12 Circuit 2 |
| 66c | Compressor 12 Circuit 2 |
| 67o | Fan 1 Circuit 1 |
| 67c | Fan 1 Circuit 1 |
| 68o | Fan 2 Circuit 1 |
| 68c | Fan 2 Circuit 1 |
| 69o | Fan 3 Circuit 1 |
| 69c | Fan 3 Circuit 1 |
| 70o | Fan 4 Circuit 1 |

| | |
|---|---|
| 70c | Fan 4 Circuit 1 |
| 71o | Fan 5 Circuit 1 |
| 71c | Fan 5 Circuit 1 |
| 72o | Fan 6 Circuit 1 |
| 72c | Fan 6 Circuit 1 |
| 73o | Fan 7 Circuit 1 |
| 73c | Fan 7 Circuit 1 |
| 74o | Fan 8 Circuit 1 |
| 74c | Fan 8 Circuit 1 |
| 75o | Fan 9 Circuit 1 |
| 75c | Fan 9 Circuit 1 |
| 76o | Fan 10 Circuit 1 |
| 76c | Fan 10 Circuit 1 |
| 77o | Fan 11 Circuit 1 |
| 77c | Fan 11 Circuit 1 |
| 78o | Fan 12 Circuit 1 |
| 78c | Fan 12 Circuit 1 |
| 79o | Fan 1 Circuit 2 |
| 79c | Fan 1 Circuit 2 |
| 80o | Fan 2 Circuit 2 |
| 80c | Fan 2 Circuit 2 |
| 81o | Fan 3 Circuit 2 |
| 81c | Fan 3 Circuit 2 |
| 82o | Fan 4 Circuit 2 |
| 82c | Fan 4 Circuit 2 |
| 83o | Fan 5 Circuit 2 |
| 83c | Fan 5 Circuit 2 |
| 84o | Fan 6 Circuit 2 |
| 84c | Fan 6 Circuit 2 |
| 85o | Fan 7 Circuit 2 |
| 85c | Fan 7 Circuit 2 |
| 86o | Fan 8 Circuit 2 |
| 86c | Fan 8 Circuit 2 |
| 87o | Fan 9 Circuit 2 |
| 87c | Fan 9 Circuit 2 |
| 88o | Fan 10 Circuit 2 |
| 88c | Fan 10 Circuit 2 |
| 89o | Fan 11 Circuit 2 |
| 89c | Fan 11 Circuit 2 |
| 90o | Fan 12 Circuit 2 |
| 90c | Fan 12 Circuit 2 |
| 91o | Alarm |
| 91c | Alarm |
| 92o | Alarm type 1 |
| 92c | Alarm type 1 |
| 93o | Alarm type 2 |
| 93c | Alarm type 2 |
| 94o | Auxiliary output 1 |
| 94c | Auxiliary output 1 |
| 95o | Auxiliary output 2 |
| 95c | Auxiliary output 2 |
| 96o | Auxiliary output 3 |
| 96c | Auxiliary output 3 |
| 97o | Auxiliary output 4 |
| 97c | Auxiliary output 4 |
| 98o | Auxiliary output 5 |
| 98c | Auxiliary output 5 |
| 99o | Auxiliary output 6 |
| 99c | Auxiliary output 6 |
| 100o | Auxiliary output 7 |
| 100c | Auxiliary output 7 |
| 101o | Auxiliary output 8 |
| 101c | Auxiliary output 8 |

102o OnF
102c OnF
103o Inverter free circuit 1
103c Inverter free circuit 1
104o Inverter free circuit 2
104c Inverter free circuit 2
105o Valve superheat circuit 1
105c Valve superheat circuit 1
106o Valve superheat circuit 2
106c Valve superheat circuit 2
107 Not used
108 Not used
109o By-pass inverter 1 Suction Circuit 1
109c By-pass inverter 1 Suction Circuit 1
110o By-pass inverter 1 Suction Circuit 2
110c By-pass inverter 1 Suction Circuit 2
111o Not used
111c Not used
112o Not used
112c Not used
113o Condenser drain valve output
113c Condenser drain valve output
114o Liquid line solenoid
114c Liquid line solenoid
115o Circuit Alarm relay for circuit 1
115c Circuit Alarm relay for circuit 1
116o Circuit Alarm relay for circuit 2
116c Circuit Alarm relay for circuit 2
117o Hot Gas injection valve into Flash tank (HGV_FT)
117c Hot Gas injection valve into Flash tank (HGV_FT)
118o Not used
118c Not used
119o Not used
119c Not used
120o Heat reclaim 1
120c Heat reclaim 1
121o Heat reclaim 2
121c Heat reclaim 2
122o Exhaust fan
122c Exhaust fan
123o Liquid injection valve circuit 1
123c Liquid injection valve circuit 1
124o Liquid injection valve circuit 2
124c Liquid injection valve circuit 2
125o Heat reclaim 3 way valve output
125c Heat reclaim 3 way valve output
126o H-R water pump output
126c H-R water pump output
127o Parallel compression- Inverter
127c Parallel compression- Inverter
128o Parallel compression– Compressor 1
128c Parallel compression– Compressor 1
129o Parallel compression – Step Compr. 1
129c Parallel compression – Step Compr. 1
130o Parallel compression– Compressor 2
130c Parallel compression– Compressor 2
131o Parallel compression – Step Compr. 2
131c Parallel compression – Step Compr. 2
132o Parallel compression– Compressor 3
132c Parallel compression– Compressor 3
133o Parallel compression – Step Compr. 3
133c Parallel compression – Step Compr. 3
134o De-superheat 1

| | |
|---|---|
| 134c | De-superheat 1 |
| 135o | De-superheat 2 |
| 135c | De-superheat 2 |
| 136o | De-superheat 3 |
| 136c | De-superheat 3 |
| 137o | Heat reclaim2 3 Way valve |
| 137c | Heat reclaim2 3 Way valve |
| 138o | 3 Way valve by pass |
| 138c | 3 Way valve by pass |
| 139o | H-R2 water pump output |
| 139c | H-R2 water pump output |
| 140o | Inverter 2 Parallel |
| 140c | Inverter 2 Parallel |
| 141o | Parallel compression– Compressor 4 |
| 141c | Parallel compression– Compressor 4 |
| 142o | Parallel compression– Compressor 5 |
| 142c | Parallel compression– Compressor 5 |
| 143o | Not used |
| 143c | Not used |
| 144o | Not used |
| 144c | Not used |
| 145o | Not used |
| 145c | Not used |
| 146o | Oil injection valve Circuit 1 |
| 146c | Oil injection valve Circuit 1 |
| 147o | Oil injection valve Circuit 2 |
| 147c | Oil injection valve Circuit 2 |
| 148o | Low oil level in circuit 1 alarm |
| 148c | Low oil level in circuit 1 alarm |
| 149o | Low oil level in circuit 2 alarm |
| 149c | Low oil level in circuit 2 alarm |
| 150o | Adiabatic spray |
| 150c | Adiabatic spray |
| 150o | Adiabatic spray |
| 150c | Adiabatic spray |
| 151o | Solenoid valve for HVAC control |
| 151c | Solenoid valve for HVAC control |
| 152o | Pump for HVAC control |
| 152c | Pump for HVAC control |
| 153o | Compressor(s) in medium temperature line not available |
| 153c | Compressor(s) in medium temperature line not available |
| 154o | Compressor(s) in low temperature line not available |
| 154c | Compressor(s) in low temperature line not available |
| 155o | Suction receiver high level |
| 155c | Suction receiver high level |
| 156o | Suction receiver low level |
| 156c | Suction receiver low level |
| 157o | Liquid Ejector |
| 157c | Liquid Ejector |
| 158o | Vapour Ejector 1 |
| 158c | Vapour Ejector 1 |
| 159o | Vapour Ejector 2 |
| 159c | Vapour Ejector 2 |
| 160o | Vapour Ejector 3 |
| 160c | Vapour Ejector 3 |
| 161o | Vapour Ejector 4 |
| 161c | Vapour Ejector 4 |
| 162o | Vapour Ejector 5 |
| 162c | Vapour Ejector 5 |
| 163o | Reservoir unloading valve |
| 163c | Reservoir unloading valve |

## 5.1.3 ANALOG-OUTPUTS (parameters AOC1- AOC15)

| Parameter | Description | IPRC215D | | IPX206D | | IPX215D | |
|---|---|---|---|---|---|---|---|
| | | TYPE | RANGE | TYPE | RANGE | TYPE | RANGE |
| **AOC1** | Configuration Analog Output 1 | V | TAB B | | | | |
| **AOC 2** | Configuration Analog Output 2 | V | TAB B | | | | |
| **AOC 3** | Configuration Analog Output 3 | V | TAB B | | | | |
| **AOC 4** | Configuration Analog Output 4 | V | TAB B | | | | |
| **AOC 5** | Configuration Analog Output 5 | AV | TAB A | | | | |
| **AOC 6** | Configuration Analog Output 6 | AV | TAB A | | | | |
| **AOC 7** | Configuration Analog Output 7 | | | V | TAB D | | |
| **AOC 8** | Configuration Analog Output 8 | | | V | TAB D | | |
| **AOC 9** | Configuration Analog Output 9 | | | V | TAB D | | |
| **AOC 10** | Configuration Analog Output 10 | | | | | V | TAB D |
| **AOC 11** | Configuration Analog Output 11 | | | | | V | TAB D |
| **AOC 12** | Configuration Analog Output 12 | | | | | V | TAB D |
| **AOC 13** | Configuration Analog Output 13 | | | | | V | TAB D |
| **AOC 14** | Configuration Analog Output 14 | | | | | AV | TAB C |
| **AOC 15** | Configuration Analog Output 15 | | | | | AV | TAB C |

**NB**: **V** = 0-10V; **AV** = 4-20mA or 0-10V

**TAB A: Output 4÷20mA - 0÷10V ( IPRC215D 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 Circuit2 |
| 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 |
| 19 | 0-10V H-R water pump output |

| | |
|---|---|
| 20 | 0-10V HPV output |
| 21 | 0-10V BGV ouptout |
| 22 | 4-20mA H-R1 water pump output |
| 23 | 4-20mA HPV output |
| 24 | 4-20mA BGV output |
| 25 | 0-10V Inverter parallel compression |
| 26 | 4-20mA Inverter parallel compression |
| 27 | 0-10V De-superheat 1 |
| 28 | 4-20mA De-superheat 1 |
| 29 | 0-10V De-superheat 2 |
| 30 | 4-20mA De-superheat 2 |
| 31 | 0-10V De-superheat 3 |
| 32 | 4-20mA De-superheat 3 |
| 33 | 0-10V H-R2 water pump output |
| 34 | 4-20mA H-R2 water pump output |
| 35 | 0-10V Oil injection valve circuit 1 |
| 36 | 0-10V Oil injection valve circuit 2 |
| 37 | 4-20mA Oil injection valve circuit 1 |
| 38 | 4-20mA Oil injection valve circuit 2 |
| 39 | 0-10V Heat reclaim 3 way valve output |
| 40 | 0-10V 3 Way valve gas cooler by pass |
| 41 | 4-20mA Heat reclaim 3 way valve output |
| 42 | 4-20mA 3 Way valve gas cooler by pass |
| 43 | 0-10V reservoir unloading valve |
| 44 | 4-20mA reservoir unloading valve |
| 45 | 0-10V Inverter 2 parallel compression |
| 46 | 4-20mA Inverter 2 parallel compression |
| 47 | 0-10V for liquid injection Circuit 1 |
| 48 | 0-10V for liquid injection Circuit 2 |
| 49 | 4-20mA for liquid injection Circuit 1 |
| 50 | 4-20mA for liquid injection Circuit 2 |

**TAB B: Output 0÷10V (parameters IPRC215D AOC1-AOC4)**

| | |
|---|---|
| 0 | Not used |
| 1 | Proportional 0-10 V output |
| 2 | 0-10V output inverter 1 Suction Circuit 1 |
| 3 | 0-10V output inverter 2 Suction Circuit 1 |
| 4 | 0-10V output inverter 1 Suction Circuit 2 |
| 5 | 0-10V output inverter 2 Suction Circuit 2 |
| 6 | 0-10V output inverter condenser Circuit 1 |
| 7 | 0-10V output inverter condenser Circuit 2 |
| 8 | 0-10V output inverter condenser free Circuit 1 |
| 9 | 0-10V output inverter condenser free Circuit 2 |
| 10 | 0-10V H-R water pump output |
| 11 | 0-10V HPV output |
| 12 | 0-10V BGV ouptout |
| 13 | 0-10V Inverter parallel compression |
| 14 | 0-10V De-superheat 1 |
| 15 | 0-10V De-superheat 2 |
| 16 | 0-10V De-superheat 3 |
| 17 | 0-10V H-R2 water pump output |
| 18 | 0-10V Oil injection valve circuit 1 |
| 19 | 0-10V Oil injection valve circuit 2 |
| 20 | 0-10V Heat reclaim 3 way valve output |
| 21 | 0-10V 3 Way valve gas cooler by pass |
| 22 | 0-10V reservoir unloading valve |

| | |
|---|---|
| 23 | 0-10V Inverter 2 parallel compression |
| 24 | 0-10V for liquid injection Circuit 1 |
| 25 | 0-10V for liquid injection Circuit 2 |

**TAB C: Output 4÷20mA - 0÷10V (parameters IPX215D: AOC14-AOC15)**

| | |
|---|---|
| 0 | Not used |
| 1 | 0-10V H-R water pump output |
| 2 | 0-10V HPV output |
| 3 | 0-10V BY-PASS VALVE ouptout |
| 4 | 4-20mA H-R water pump output |
| 5 | 4-20mA HPV output |
| 6 | 4-20mA BY-PASS VALVE output |
| 7 | 0-10V De-superheat 1 |
| 8 | 4-20mA De-superheat 1 |
| 9 | 0-10V De-superheat 2 |
| 10 | 4-20mA De-superheat 2 |
| 11 | 0-10V De-superheat 3 |
| 12 | 4-20mA De-superheat 3 |
| 13 | 0-10V H-R2 water pump output |
| 14 | 4-20mA H-R2 water pump output |
| 15 | 0-10V Oil injection valve circuit 1 |
| 16 | 0-10V Oil injection valve circuit 2 |
| 17 | 4-20mA Oil injection valve circuit 1 |
| 18 | 4-20mA Oil injection valve circuit 2 |
| 19 | 0-10V Heat reclaim 3 way valve output |
| 20 | 0-10V 3 Way valve gas cooler by pass |
| 21 | 4-20mA Heat reclaim 3 way valve output |
| 22 | 4-20mA 3 Way valve gas cooler by pass |
| 23 | 0-10V reservoir unloading valve |
| 24 | 4-20mA reservoir unloading valve |
| 25 | 0-10V for liquid injection Circuit 1 |
| 26 | 0-10V for liquid injection Circuit 2 |
| 27 | 4-20mA for liquid injection Circuit 1 |
| 28 | 4-20mA for liquid injection Circuit 2 |

**TAB D: Output 0÷10V (IPX215D: AOC7-AOC13)**

| | |
|---|---|
| 0 | Not used |
| 1 | 0-10V H-R water pump output |
| 2 | 0-10V HPV output |
| 3 | 0-10V BY-PASS VALVE ouptout |
| 4 | 0-10V De-superheat 1 |
| 5 | 0-10V De-superheat 2 |
| 6 | 0-10V De-superheat 3 |
| 7 | 0-10V H-R2 water pump output |
| 8 | 0-10V Oil injection valve circuit 1 |
| 9 | 0-10V Oil injection valve circuit 2 |
| 10 | 0-10V Heat reclaim 3 way valve output |
| 11 | 0-10V 3 Way valve gas cooler by pass |
| 12 | 0-10V reservoir unloading valve |
| 13 | 0-10V for liquid injection Circuit 1 |
| 14 | 0-10V for liquid injection Circuit 2 |

### 5.1.4 ANALOG-INPUTS (parameters AIC1- AIC35)

| Parameter | Description | min | max | IPRC215D/ IPR210D | IPX206D | IPX215D | XEV20D_ 1 | XEV20D_ 2 |
|---|---|---|---|---|---|---|---|---|
| **AIC 1** | Configuration Analog Input 1 | 0 | 178 | x | | | | |
| **AIC 2** | Configuration Analog Input 2 | 0 | 178 | x | | | | |
| **AIC 3** | Configuration Analog Input 3 | 0 | 178 | x | | | | |
| **AIC 4** | Configuration Analog Input 4 | 0 | 178 | x | | | | |
| **AIC 5** | Configuration Analog Input 5 | 0 | 178 | x | | | | |
| **AIC 6** | Configuration Analog Input 6 | 0 | 178 | x | | | | |
| **AIC 7** | Configuration Analog Input 7 | 0 | 178 | x | | | | |
| **AIC 8** | Configuration Analog Input 8 | 0 | 178 | x | | | | |
| **AIC 9** | Configuration Analog Input 9 | 0 | 178 | x | | | | |
| **AIC 10** | Configuration Analog Input 10 | 0 | 178 | x | | | | |
| **AIC 11** | Configuration Analog Input 11 | 0 | 178 | | x | | | |
| **AIC 12** | Configuration Analog Input 12 | 0 | 178 | | x | | | |
| **AIC 13** | Configuration Analog Input 13 | 0 | 178 | | x | | | |
| **AIC 14** | Configuration Analog Input 14 | 0 | 178 | | x | | | |
| **AIC 15** | Configuration Analog Input 15 | 0 | 178 | | x | | | |
| **AIC 16** | Configuration Analog Input 16 | 0 | 178 | | x | | | |
| **AIC 17** | Configuration Analog Input 17 | 0 | 178 | | x | | | |
| **AIC 18** | Configuration Analog Input 18 | 0 | 178 | | | x | | |
| **AIC 19** | Configuration Analog Input 19 | 0 | 178 | | | x | | |
| **AIC 20** | Configuration Analog Input 20 | 0 | 178 | | | x | | |
| **AIC21** | Configuration Analog Input 21 | 0 | 178 | | | x | | |
| **AIC 22** | Configuration Analog Input 22 | 0 | 178 | | | x | | |
| **AIC 23** | Configuration Analog Input 23 | 0 | 178 | | | x | | |
| **AIC 24** | Configuration Analog Input 24 | 0 | 178 | | | x | | |
| **AIC 25** | Configuration Analog Input 25 | 0 | 178 | | | x | | |
| **AIC 26** | Configuration Analog Input 26 | 0 | 178 | | | x | | |
| **AIC 27** | Configuration Analog Input 27 | 0 | 178 | | | x | | |
| **AIC 28** | Configuration Analog Input 28 | 0 | 145 | | | | x | |

| Parameter | Description | min | max | IPRC215D/ IPR210D | IPX206D | IPX215D | XEV20D_ 1 | XEV20D_ 2 |
|---|---|---|---|---|---|---|---|---|
| **AIC 29** | Configuration Analog Input 29 | 0 | 145 | | | | **x** | |
| **AIC 30** | Configuration Analog Input 30 | 0 | 178 | | | | **x** | |
| **AIC 31** | Configuration Analog Input 31 | 0 | 178 | | | | **x** | |
| **AIC 32** | Configuration Analog Input 32 | 0 | 145 | | | | | x |
| **AIC 33** | Configuration Analog Input 33 | 0 | 145 | | | | | **x** |
| **AIC 34** | Configuration Analog Input 24 | 0 | 178 | | | | | x |
| **AIC 35** | Configuration Analog Input 25 | 0 | 178 | | | | | **x** |

*Note*: XEV20 has 4 AIs: They can be NTC, NTC CPC, PTC. It means that AIC28, AIC29 AI32, AI33can be only NTC, NTC CPC, PTC.

**Configuration for AIC1 to AIC35**
**The Configuration for AIC1 to AIC27:**

| Value | Setting |
|---|---|
| 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 Thermostat Aux5 |
| 10 | NTC Temperature probe Thermostat Aux6 |
| 11 | NTC Temperature probe Thermostat Aux7 |
| 12 | NTC Temperature probe Thermostat Aux8 |
| 13 | NTC Temperature probe Dynamic / Split set condenser 1 |
| 14 | NTC Temperature probe Dynamic / Split set condenser 2 |
| 15 | NTC Temperature probe Dynamic set suction 1 |
| 16 | NTC Temperature probe Dynamic set suction 2 |
| 17 | NTC Temperature probe Superheat 1 |
| 18 | NTC Temperature probe Superheat 2 |
| 19 | PTC Temperature probe Suction Circuit1 |
| 20 | PTC Temperature probe Suction Circuit2 |
| 21 | PTC Temperature probe Condenser Circuit1 |
| 22 | PTC Temperature probe Condenser Circuit2 |
| 23 | PTC Temperature probe Thermostat Aux1 |
| 24 | PTC Temperature probe Thermostat Aux2 |
| 25 | PTC Temperature probe Thermostat Aux3 |
| 26 | PTC Temperature probe Thermostat Aux4 |
| 27 | PTC Temperature probe Thermostat Aux5 |
| 28 | PTC Temperature probe Thermostat Aux6 |
| 29 | PTC Temperature probe Thermostat Aux7 |
| 30 | PTC Temperature probe Thermostat Aux8 |
| 31 | PTC Temperature probe Dynamic/ Split set condenser 1 |
| 32 | PTC Temperature probe Dynamic/ Split set condenser 2 |
| 33 | PTC Temperature probe Dynamic set suction 1 |
| 34 | PTC Temperature probe Dynamic set suction 2 |
| 35 | PTC Temperature probe Superheat 1 |
| 36 | PTC Temperature probe Superheat 2 |
| 37 | 4-20mA Pressure Probe Suction Circuit1 |

| Value | Setting |
|---|---|
| 38 | 4-20mA Pressure Probe Suction Circuit2 |
| 39 | 4-20mA Pressure Probe Condenser Circuit1 |
| 40 | 4-20mA Pressure Probe Condenser Circuit2 |
| 41 | 0-5 V Pressure Probe Suction Circuit1 |
| 42 | 0-5 V Pressure Probe Suction Circuit2 |
| 43 | 0-5 V Pressure Probe Condenser Circuit1 |
| 44 | 0-5 V Pressure Probe Condenser Circuit2 |
| 45 | NTC Suction Temperature Compressor 1 Circuit 1 |
| 46 | NTC Suction Temperature Compressor 2 Circuit 1 |
| 47 | NTC Suction Temperature Compressor 3 Circuit 1 |
| 48 | NTC Suction Temperature Compressor 4 Circuit 1 |
| 49 | NTC Suction Temperature Compressor 5 Circuit 1 |
| 50 | NTC Suction Temperature Compressor 6 Circuit 1 |
| 51 | NTC Suction Temperature Compressor 7 Circuit 1 |
| 52 | NTC Suction Temperature Compressor 8 Circuit 1 |
| 53 | NTC Suction Temperature Compressor 9 Circuit 1 |
| 54 | NTC Suction Temperature Compressor 10 Circuit 1 |
| 55 | NTC Suction Temperature Compressor 11 Circuit 1 |
| 56 | NTC Suction Temperature Compressor 12 Circuit 1 |
| 57 | NTC Suction Temperature Compressor 1 Circuit 2 |
| 58 | NTC Suction Temperature Compressor 2 Circuit 2 |
| 59 | NTC Suction Temperature Compressor 3 Circuit 2 |
| 60 | NTC Suction Temperature Compressor 4 Circuit 2 |
| 61 | NTC Suction Temperature Compressor 5 Circuit 2 |
| 62 | NTC Suction Temperature Compressor 6 Circuit 2 |
| 63 | NTC Suction Temperature Compressor 7 Circuit 2 |
| 64 | NTC Suction Temperature Compressor 8 Circuit 2 |
| 65 | NTC Suction Temperature Compressor 9 Circuit 2 |
| 66 | NTC Suction Temperature Compressor 10 Circuit 2 |
| 67 | NTC Suction Temperature Compressor 11 Circuit 2 |
| 68 | NTC Suction Temperature Compressor 12 Circuit 2 |
| 69 | NTC Discharge Temperature Compressor 1 Circuit 1 |
| 70 | NTC Discharge Temperature Compressor 2 Circuit 1 |
| 71 | NTC Discharge Temperature Compressor 3 Circuit 1 |
| 72 | NTC Discharge Temperature Compressor 4 Circuit 1 |
| 73 | NTC Discharge Temperature Compressor 5 Circuit 1 |
| 74 | NTC Discharge Temperature Compressor 6 Circuit 1 |
| 75 | NTC Discharge Temperature Compressor 7 Circuit 1 |
| 76 | NTC Discharge Temperature Compressor 8 Circuit 1 |
| 77 | NTC Discharge Temperature Compressor 9 Circuit 1 |
| 78 | NTC Discharge Temperature Compressor 10 Circuit 1 |
| 79 | NTC Discharge Temperature Compressor 11 Circuit 1 |
| 80 | NTC Discharge Temperature Compressor 12 Circuit 1 |
| 81 | NTC Discharge Temperature Compressor 1 Circuit 2 |
| 82 | NTC Discharge Temperature Compressor 2 Circuit 2 |
| 83 | NTC Discharge Temperature Compressor 3 Circuit 2 |
| 84 | NTC Discharge Temperature Compressor 4 Circuit 2 |
| 85 | NTC Discharge Temperature Compressor 5 Circuit 2 |
| 86 | NTC Discharge Temperature Compressor 6 Circuit 2 |
| 87 | NTC Discharge Temperature Compressor 7 Circuit 2 |
| 88 | NTC Discharge Temperature Compressor 8 Circuit 2 |
| 89 | NTC Discharge Temperature Compressor 9 Circuit 2 |
| 90 | NTC Discharge Temperature Compressor 10 Circuit 2 |
| 91 | NTC Discharge Temperature Compressor 11 Circuit 2 |
| 92 | NTC Discharge Temperature Compressor 12 Circuit 2 |
| 93 | NTC OAT |
| 94 | PTC OAT |
| 95 | NTC De-superheat 1 |
| 96 | PTC De-superheat 1 |
| 97 | NTC De-superheat 2 |
| 98 | PTC De-superheat 2 |
| 99 | NTC De-superheat 3 |

| Value | Setting |
|---|---|
| 100 | PTC De-superheat 3 |
| 101 | NTC-CPC Temperature probe Thermostat Aux1 |
| 102 | NTC-CPC Temperature probe Thermostat Aux2 |
| 103 | NTC-CPC Temperature probe Thermostat Aux3 |
| 104 | NTC-CPC Temperature probe Thermostat Aux4 |
| 105 | NTC-CPC Temperature probe Thermostat Aux5 |
| 106 | NTC-CPC Temperature probe Thermostat Aux6 |
| 107 | NTC-CPC Temperature probe Thermostat Aux7 |
| 108 | NTC-CPC Temperature probe Thermostat Aux8 |
| 109 | NTC-CPC Suction Temperature Compressor 1 Circuit 1 |
| 110 | NTC-CPC Suction Temperature Compressor 2 Circuit 1 |
| 111 | NTC-CPC Suction Temperature Compressor 3 Circuit 1 |
| 112 | NTC-CPC Suction Temperature Compressor 4 Circuit 1 |
| 113 | NTC-CPC Suction Temperature Compressor 5 Circuit 1 |
| 114 | NTC-CPC Suction Temperature Compressor 6 Circuit 1 |
| 115 | NTC-CPC Suction Temperature Compressor 7 Circuit 1 |
| 116 | NTC-CPC Suction Temperature Compressor 8 Circuit 1 |
| 117 | NTC-CPC Suction Temperature Compressor 9 Circuit 1 |
| 118 | NTC-CPC Suction Temperature Compressor 10 Circuit 1 |
| 119 | NTC-CPC Suction Temperature Compressor 11 Circuit 1 |
| 120 | NTC-CPC Suction Temperature Compressor 12 Circuit 1 |
| 121 | NTC-CPC Suction Temperature Compressor 1 Circuit 2 |
| 122 | NTC-CPC Suction Temperature Compressor 2 Circuit 2 |
| 123 | NTC-CPC Suction Temperature Compressor 3 Circuit 2 |
| 124 | NTC-CPC Suction Temperature Compressor 4 Circuit 2 |
| 125 | NTC-CPC Suction Temperature Compressor 5 Circuit 2 |
| 126 | NTC-CPC Suction Temperature Compressor 6 Circuit 2 |
| 127 | NTC-CPC Suction Temperature Compressor 7 Circuit 2 |
| 128 | NTC-CPC Suction Temperature Compressor 8 Circuit 2 |
| 129 | NTC-CPC Suction Temperature Compressor 9 Circuit 2 |
| 130 | NTC-CPC Suction Temperature Compressor 10 Circuit 2 |
| 131 | NTC-CPC Suction Temperature Compressor 11 Circuit 2 |
| 132 | NTC-CPC Suction Temperature Compressor 12 Circuit 2 |
| 133 | NTC Rack temperature |
| 134 | PTC Rack temperature |
| 135 | 0-5V Liquid level |
| 136 | NTC Suction float temperature Circuit 1 |
| 137 | NTC Suction float temperature Circuit 2 |
| 138 | PTC Suction float temperature Circuit 1 |
| 139 | PTC Suction float temperature Circuit 2 |
| 140 | NTC-CPC Temperature probe Dynamic / Split set condenser 1 |
| 141 | NTC-CPC Temperature probe Dynamic / Split set condenser 2 |
| 142 | 4-20mA Gas Leak Detector 1 probe |
| 143 | 1-5V Gas Leak Detector 1 probe (see the note here below) |
| 144 | 4-20mA Gas Leak Detector 2 probe |
| 145 | 1-5V Gas Leak Detector 2 probe (see the note here below) |
| 146 | 4-20mA Gas Leak Detector 3 probe |
| 147 | 1-5V Gas Leak Detector 3 probe (see the note here below) |
| 148 | 4-20mA Gas Leak Detector 4 probe |
| 149 | 1-5V Gas Leak Detector 4 probe (see the note here below) |
| 150 | NTC-CPC Temperature probe Dynamic set suction 1 |
| 151 | NTC-CPC Temperature probe Dynamic set suction 2 |
| 152 | 4-20mA Pressure Probe of CO2 flash tank |
| 153 | 0-5V Pressure Probe of CO2 flash tank |
| 154 | NTC Gas cooler outlet temperature |
| 155 | CPC Gas cooler outlet temperature |
| 156 | NTC Discharge line temperature circuit 1 |
| 157 | NTC Discharge line temperature circuit 2 |
| 158 | PTC Discharge line temperature circuit 1 |
| 159 | PTC Discharge line temperature circuit 2 |
| 160 | NTC H-R secondry fluid outlet temperature |
| 161 | NTC-CPC H-R secondry fluid outlet temperature |

| Value | Setting |
|---|---|
| 162 | NTC H-R secondry fluid inlet temperature |
| 163 | NTC-CPC H-R secondry fluid inlet temperature |
| 164 | NTC H-R tank water temperature |
| 165 | NTC-CPC H-R water temperature |
| 166 | NTC CO2 Temperature post heat reclaim |
| 167 | NTC temperature before HPV |
| 168 | NTC-CPC temperature before HPV |
| 169 | 4-20mA Gas Cooler pressure |
| 170 | 0-5V Gas Cooler pressure |
| 171 | 0-10V H-R1 signal |
| 172 | 4-20mA H-R1 signal |
| 173 | 4-20mA Gas Discharge pressure |
| 174 | 0-5V Gas Discharge pressure |
| 175 | NTC Suction line temperature parallel compressor |
| 176 | NTC Discharge line temperature parallel compressor |
| 177 | PTC Suction line temperature parallel compressor |
| 178 | PTC Discharge line temperature parallel compressor |
| 179 | NTC H-R2 secondry fluid outlet temperature (Thr2 out) |
| 180 | NTC-CPC H-R2 secondry fluid outlet temperature (Thr2 out) |
| 181 | NTC H-R2 secondry fluid inlet temperature (Thr2 in) |
| 182 | NTC-CPC H-R2 secondry fluid inlet temperature (Thr2 in) |
| 183 | NTC H-R2 tank water temperature (Twt2) |
| 184 | NTC-CPC H-R2 water temperature (Twt2) |
| 185 | NTC CO2 Temperature post heat reclaim 2 (Tphr2) |
| 186 | NTC-CPC AUX Temperature probe suction circ.1 |
| 187 | NTC-CPC AUX Temperature probe suction circ.2 |
| 188 | NTC-CPC OAT |
| 189 | NTC-CPC De-superheat 1 |
| 190 | NTC-CPC De-superheat 2 |
| 191 | NTC-CPC De-superheat 3 |
| 192 | NTC-CPC Rack temperature |
| 193 | NTC-CPC Suction float temperature Circuit 1 |
| 194 | NTC-CPC Suction float temperature Circuit 2 |
| 195 | NTC-CPC Discharge line temperature circuit 1 |
| 196 | NTC-CPC Discharge line temperature circuit 2 |
| 197 | NTC-CPC Suction line temperature parallel compressor |
| 198 | NTC-CPC Discharge line temperature parallel compressor |
| 199 | 4-20mA Oil pressure receiver circuit 1 |
| 200 | 4-20mA Oil pressure receiver circuit 2 |
| 201 | 0-5V Oil pressure receiver circuit 1 |
| 202 | 0-5V Oil pressure receiver circuit 2 |

**Configuration for AIC28 to AIC35**

| Value | Setting |
|---|---|
| 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 Thermostat Aux5 |
| 10 | NTC Temperature probe Thermostat Aux6 |
| 11 | NTC Temperature probe Thermostat Aux7 |
| 12 | NTC Temperature probe Thermostat Aux8 |
| 13 | NTC Temperature probe Dynamic / Split set condenser 1 |
| 14 | NTC Temperature probe Dynamic / Split set condenser 2 |
| 15 | NTC Temperature probe Dynamic set suction 1 |

| Value | Setting |
|---|---|
| 16 | NTC Temperature probe Dynamic set suction 2 |
| 17 | NTC AUX Temperature probe suction circ.1 |
| 18 | NTC AUX Temperature probe suction circ.2 |
| 19 | PTC Temperature probe Suction Circuit1 |
| 20 | PTC Temperature probe Suction Circuit2 |
| 21 | PTC Temperature probe Condenser Circuit1 |
| 22 | PTC Temperature probe Condenser Circuit2 |
| 23 | PTC Temperature probe Thermostat Aux1 |
| 24 | PTC Temperature probe Thermostat Aux2 |
| 25 | PTC Temperature probe Thermostat Aux3 |
| 26 | PTC Temperature probe Thermostat Aux4 |
| 27 | PTC Temperature probe Thermostat Aux5 |
| 28 | PTC Temperature probe Thermostat Aux6 |
| 29 | PTC Temperature probe Thermostat Aux7 |
| 30 | PTC Temperature probe Thermostat Aux8 |
| 31 | PTC Temperature probe Dynamic/ Split set condenser 1 |
| 32 | PTC Temperature probe Dynamic/ Split set condenser 2 |
| 33 | PTC Temperature probe Dynamic set suction 1 |
| 34 | PTC Temperature probe Dynamic set suction 2 |
| 35 | PTC AUX Temperature probe suction circ.1 |
| 36 | PTC AUX Temperature probe suction circ.2 |
| 45 | NTC Suction Temperature Compressor 1 Circuit 1 |
| 46 | NTC Suction Temperature Compressor 2 Circuit 1 |
| 47 | NTC Suction Temperature Compressor 3 Circuit 1 |
| 48 | NTC Suction Temperature Compressor 4 Circuit 1 |
| 49 | NTC Suction Temperature Compressor 5 Circuit 1 |
| 50 | NTC Suction Temperature Compressor 6 Circuit 1 |
| 51 | NTC Suction Temperature Compressor 7 Circuit 1 |
| 52 | NTC Suction Temperature Compressor 8 Circuit 1 |
| 53 | NTC Suction Temperature Compressor 9 Circuit 1 |
| 54 | NTC Suction Temperature Compressor 10 Circuit 1 |
| 55 | NTC Suction Temperature Compressor 11 Circuit 1 |
| 56 | NTC Suction Temperature Compressor 12 Circuit 1 |
| 57 | NTC Suction Temperature Compressor 1 Circuit 2 |
| 58 | NTC Suction Temperature Compressor 2 Circuit 2 |
| 59 | NTC Suction Temperature Compressor 3 Circuit 2 |
| 60 | NTC Suction Temperature Compressor 4 Circuit 2 |
| 61 | NTC Suction Temperature Compressor 5 Circuit 2 |
| 62 | NTC Suction Temperature Compressor 6 Circuit 2 |
| 63 | NTC Suction Temperature Compressor 7 Circuit 2 |
| 64 | NTC Suction Temperature Compressor 8 Circuit 2 |
| 65 | NTC Suction Temperature Compressor 9 Circuit 2 |
| 66 | NTC Suction Temperature Compressor 10 Circuit 2 |
| 67 | NTC Suction Temperature Compressor 11 Circuit 2 |
| 68 | NTC Suction Temperature Compressor 12 Circuit 2 |
| 69 | PTC Discharge Temperature Compressor 1 Circuit 1 |
| 70 | PTC Discharge Temperature Compressor 2 Circuit 1 |
| 71 | PTC Discharge Temperature Compressor 3 Circuit 1 |
| 72 | PTC Discharge Temperature Compressor 4 Circuit 1 |
| 73 | PTC Discharge Temperature Compressor 5 Circuit 1 |
| 74 | PTC Discharge Temperature Compressor 6 Circuit 1 |
| 75 | PTC Discharge Temperature Compressor 7 Circuit 1 |
| 76 | PTC Discharge Temperature Compressor 8 Circuit 1 |
| 77 | PTC Discharge Temperature Compressor 9 Circuit 1 |
| 78 | PTC Discharge Temperature Compressor 10 Circuit 1 |
| 79 | PTC Discharge Temperature Compressor 11 Circuit 1 |
| 80 | PTC Discharge Temperature Compressor 12 Circuit 1 |
| 81 | PTC Discharge Temperature Compressor 1 Circuit 2 |

| Value | Setting |
|---|---|
| 82 | PTC Discharge Temperature Compressor 2 Circuit 2 |
| 83 | PTC Discharge Temperature Compressor 3 Circuit 2 |
| 84 | PTC Discharge Temperature Compressor 4 Circuit 2 |
| 85 | PTC Discharge Temperature Compressor 5 Circuit 2 |
| 86 | PTC Discharge Temperature Compressor 6 Circuit 2 |
| 87 | PTC Discharge Temperature Compressor 7 Circuit 2 |
| 88 | PTC Discharge Temperature Compressor 8 Circuit 2 |
| 89 | PTC Discharge Temperature Compressor 9 Circuit 2 |
| 90 | PTC Discharge Temperature Compressor 10 Circuit 2 |
| 91 | PTC Discharge Temperature Compressor 11 Circuit 2 |
| 92 | PTC Discharge Temperature Compressor 12 Circuit 2 |
| 93 | NTC OAT |
| 94 | PTC OAT |
| 95 | NTC De-superheat 1 |
| 96 | PTC De-superheat 1 |
| 97 | NTC De-superheat 2 |
| 98 | PTC De-superheat 2 |
| 99 | NTC De-superheat 3 |
| 100 | PTC De-superheat 3 |
| 101 | NTC-CPC Temperature probe Thermostat Aux1 |
| 102 | NTC-CPC Temperature probe Thermostat Aux2 |
| 103 | NTC-CPC Temperature probe Thermostat Aux3 |
| 104 | NTC-CPC Temperature probe Thermostat Aux4 |
| 105 | NTC-CPC Temperature probe Thermostat Aux5 |
| 106 | NTC-CPC Temperature probe Thermostat Aux6 |
| 107 | NTC-CPC Temperature probe Thermostat Aux7 |
| 108 | NTC-CPC Temperature probe Thermostat Aux8 |
| 109 | NTC-CPC Suction Temperature Compressor 1 Circuit 1 |
| 110 | NTC-CPC Suction Temperature Compressor 2 Circuit 1 |
| 111 | NTC-CPC Suction Temperature Compressor 3 Circuit 1 |
| 112 | NTC-CPC Suction Temperature Compressor 4 Circuit 1 |
| 113 | NTC-CPC Suction Temperature Compressor 5 Circuit 1 |
| 114 | NTC-CPC Suction Temperature Compressor 6 Circuit 1 |
| 115 | NTC-CPC Suction Temperature Compressor 7 Circuit 1 |
| 116 | NTC-CPC Suction Temperature Compressor 8 Circuit 1 |
| 117 | NTC-CPC Suction Temperature Compressor 9 Circuit 1 |
| 118 | NTC-CPC Suction Temperature Compressor 10 Circuit 1 |
| 119 | NTC-CPC Suction Temperature Compressor 11 Circuit 1 |
| 120 | NTC-CPC Suction Temperature Compressor 12 Circuit 1 |
| 121 | NTC-CPC Suction Temperature Compressor 1 Circuit 2 |
| 122 | NTC-CPC Suction Temperature Compressor 2 Circuit 2 |
| 123 | NTC-CPC Suction Temperature Compressor 3 Circuit 2 |
| 124 | NTC-CPC Suction Temperature Compressor 4 Circuit 2 |
| 125 | NTC-CPC Suction Temperature Compressor 5 Circuit 2 |
| 126 | NTC-CPC Suction Temperature Compressor 6 Circuit 2 |
| 127 | NTC-CPC Suction Temperature Compressor 7 Circuit 2 |
| 128 | NTC-CPC Suction Temperature Compressor 8 Circuit 2 |
| 129 | NTC-CPC Suction Temperature Compressor 9 Circuit 2 |
| 130 | NTC-CPC Suction Temperature Compressor 10 Circuit 2 |
| 131 | NTC-CPC Suction Temperature Compressor 11 Circuit 2 |
| 132 | NTC-CPC Suction Temperature Compressor 12 Circuit 2 |
| 133 | NTC Rack temperature |
| 134 | PTC Rack temperature |
| 136 | NTC Suction float temperature Circuit 1 |
| 137 | NTC Suction float temperature Circuit 2 |
| 138 | PTC Suction float temperature Circuit 1 |
| 139 | PTC Suction float temperature Circuit 2 |
| 140 | NTC-CPC Temperature probe Dynamic / Split set condenser 1 |

| Value | Setting |
|---|---|
| 141 | NTC-CPC Temperature probe Dynamic / Split set condenser 2 |
| 150 | NTC-CPC Temperature probe Dynamic set suction 1 |
| 151 | NTC-CPC Temperature probe Dynamic set suction 2 |
| 154 | NTC Gas cooler outlet temperature |
| 155 | CPC Gas cooler outlet temperature |
| 156 | NTC Discharge line temperature circuit 1 |
| 157 | NTC Discharge line temperature circuit 2 |
| 158 | PTC Discharge line temperature circuit 1 |
| 159 | PTC Discharge line temperature circuit 2 |
| 160 | NTC H-R secondry fluid outlet temperature (Throut) |
| 161 | NTC-CPC H-R secondry fluid outlet temperature (Throut) |
| 162 | NTC H-R secondry fluid inlet temperature (Thrin) |
| 163 | NTC-CPC H-R secondry fluid inlet temperature (Thrin) |
| 164 | NTC H-R tank water temperature (Twt) |
| 165 | NTC-CPC H-R water temperature (Twt) |
| 166 | NTC CO2 Temperature post heat reclaim (Tphr) |
| 167 | NTC temperature before HPV (Thpv) |
| 168 | NTC-CPC temperature before HPV (Thpv) |
| 175 | NTC Suction line temperature parallel compressor |
| 176 | NTC Discharge line temperature parallel compressor |
| 177 | PTC Suction line temperature parallel compressor |
| 178 | PTC Discharge line temperature parallel compressor |
| 179 | NTC H-R2 secondry fluid outlet temperature (Thr2 out) |
| 180 | NTC-CPC H-R2 secondry fluid outlet temperature (Thr2 out) |
| 181 | NTC H-R2 secondry fluid inlet temperature (Thr2 in) |
| 182 | NTC-CPC H-R2 secondry fluid inlet temperature (Thr2 in) |
| 183 | NTC H-R2 tank water temperature (Twt2) |
| 184 | NTC-CPC H-R2 water temperature (Twt2) |
| 185 | NTC CO2 Temperature post heat reclaim 2 (Tphr2) |
| 186 | NTC-CPC AUX Temperature probe suction circ.1 |
| 187 | NTC-CPC AUX Temperature probe suction circ.2 |
| 188 | NTC-CPC OAT |
| 189 | NTC-CPC De-superheat 1 |
| 190 | NTC-CPC De-superheat 2 |
| 191 | NTC-CPC De-superheat 3 |
| 192 | NTC-CPC Rack temperature |
| 193 | NTC-CPC Suction float temperature Circuit 1 |
| 194 | NTC-CPC Suction float temperature Circuit 2 |
| 195 | NTC-CPC Discharge line temperature circuit 1 |
| 196 | NTC-CPC Discharge line temperature circuit 2 |
| 197 | NTC-CPC Suction line temperature parallel compressor |
| 198 | NTC-CPC Discharge line temperature parallel compressor |
| 203 | NTC Temperature Probe Evaporator in HVAC cooling control |
| 204 | NTC CPC Temperature Probe Evaporator in HVAC cooling control |

# 6 PARAMETERS

## 6.1.1 Set Point (SETC1-SETF2,SETPC)

**SETC1 Compressor Circuit 1 Set Point**
*Range*: RC2÷RC3
*UM*: according to CF26

**SETC2 Compressor Circuit 2 Set Point**
*Range*: RC6÷RC7
*UM*: according to CF26

**SETF1 Condenser Circuit 1 Set Point**
*Range*: RC10÷RC11
*UM*: according to CF26

**SETF2 Condenser Circuit 2 Set Point**
*Range*: RC14÷RC15
*UM*: according to CF26

**SETPC Parallel compression 1 Set Point**
*Range*: GC20÷PC3
*UM*: Always in Pressure, depending on the paremeter CF26:
**CF26 = CDEC:** (bar)
**CF26 = F:** (PSI)
**CF26 = BAR:** bar (°C)
**CF26 = PSI:** PSI (°F)
**CF26 = KPA:** KPA (°C)
**CF26 = CKPA:** (KPA)

## 6.1.2 Compressor Rack setup (CF1, CF33, CF16-CF17)

**CF1** **Kind of compressors - circuit 1:** to set the kind of compressors.
**SPo =** compressors with the same capacity.
**BtZ =** screw compressors like Bitzer, Hanbell, Refcomp etc operation.
**Frtz =** screw compressors like Frascold operation.
**dPO =** mixed capacities

**CF33** **Kind of compressors - circuit 2**
To set the kind of compressors.
**SPo =** compressors with the same capacity
**BtZ =** screw compressors like Bitzer, Hanbell, Refcomp etc operation
**Frtz =** screw compressors like Frascold operation
**dPO =** mixed capacities

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

| Param Value | LABEL | REFRIGERANT | OPERATING RANGE |
|---|---|---|---|
| 0 | R22 | r22 | -50-60°C/-58÷120°F |
| 1 | r404A | r404A | -50-60°C/-58÷120°F |
| 2 | r507 | r507 | -70-60°C/-94÷120°F |
| 3 | r134A | r134A | -70-60°C/-94÷120°F |
| 4 | 717 | 717 | -50-60°C/-58÷120°F |
| 5 | r744 | r744 - Co2 | -50-30°C/-58÷86°F |
| 6 | r410 | r410 | -50-60°C/-58÷120°F |
| 7 | r407C | r407C | -50-60°C/-58÷120°F |

| | | | |
|---|---|---|---|
| 8 | r407F | r407F | -50-60°C/-58÷120°F |
| 9 | r407A | r407A | -50-60°C/-58÷120°F |
| 10 | r290 | r290 – Propane | -50-60°C/-58÷120°F |
| 11 | r450A | r450A | -45-60°C/-69÷120°F |
| 12 | r513 | r513 | -45-60°C/-69÷120°F |
| 13 | r448 | r448A | -45-60°C/-69÷120°F |
| 14 | r449 | r449A | -45-60°C/-69÷120°F |
| 15 | r32 | r32 | -55-60°C/-94÷120°F |
| 16 | r1234ze | r1234ze | -18÷50°C/0÷122°F |

**CF17 Kind of gas CIRCUIT 2**
Like CF16
*Range*: 0÷16

### 6.1.3 Different Capacity Compressors setup (CF4-CF15)

**CF4- CF9 Power of compressor 1-6 Circuit 1**
For setting the capacity of single compressor (insert in each parameter the capacity of the compressor used).
**E.I.** 3 compressors with following capacity: 10, 20, 40 KW. The parameters have to be set in this way: CF4=10, CF5=20, CF6=40 CF7=CF8=CF9=0.
*Range*: 0÷100; 0 = not used
*UM*: KW

**CF10- CF15 Power of compressor 1-6 Circuit 2**
Like CF4-CF9.
*Range*: 0÷100; 0 = not used
*UM*: KW

### 6.1.4 Regulation (CF18-CF25, CF28-CF30, CF34, CF34-CF52)

**CF18 Type of regulation for compressor Circuit 1**
*Range*: 0÷2
0: **db =** neutral zone
1: **Pb =** proportional band

**CF19 Type of regulation for compressor Circuit 2**
*Range*: 0÷2
0: **db =** neutral zone
1: **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**

**CF34 Parallel Compressor rotation**
*Range*: 0÷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.

**CF35 Kind of parallel compressors**
To set the kind of compressors.
*Range*: 0÷1
0: **SPo =** compressors with the same capacity
1: **dPO =** mixed capacities

**CF36- CF41 Power of parallel compressor 1-5**
For setting the capacity of single compressor (insert in each parameter the capacity of the compressor used).
**E.I.** 3 compressors with following capacity: 10, 20, 40 KW. The parameters have to be set in this way: CF36=10, C37=20, CF38=40.
*Range*: 0÷100; 0 = not used
*UM*: KW

**CF41 Circuit 1: suction Group % capacity calculation**
*Range*: 0÷1
0: **NO =** suction Group % capacity is not calculated
1: **YES** = suction Group % capacity is calculated

**CF42 Inverter Circuit 1: capacity**
*Range: 0÷100; 0 = not used*
*UM: KW*

**CF43 Inverter Circuit 1 min speed (Hz)**
*Range: 10÷100;*
*UM: Hz*

**CF44 Inverter Circuit 1 MAX speed (Hz)**
*Range: 10÷100;*
*UM: Hz*

**CF45 Circuit 2: suction Group % capacity calculation**
*Range*: 0÷1
0: **NO =** suction Group % capacity is not calculated
1: **YES** = suction Group % capacity is calculated

**CF46 Inverter Circuit 2: capacity**
*Range: 0÷100; 0 = not used*
*UM: KW*

**CF47 Inverter Circuit 2 min speed (Hz)**
*Range: 10÷100;*
*UM: Hz*

**CF48 Inverter Circuit 2 MAX speed (Hz)**
*Range: 10÷100;*
*UM: Hz*

**CF49 Parallel compressor suction Group % capacity calculation**

*Range*: 0÷1
0: **NO =** suction Group % capacity is not calculated
1: **YES** = suction Group % capacity is calculated

**CF50 Inverter of parallel compressors capacity**
*Range: 0÷100; 0 = not used*
*UM: KW*

**CF51 Inverter of parallel compressors min speed (Hz)**
*Range: 10÷100;*
*UM: Hz*

**CF52 Inverter of parallel compressors MAX speed (Hz)**
*Range: 10÷100;*
*UM: Hz*

## 6.1.5 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 pharentesis other measurement unit.
**CDEC:** °C with decimal point (bar);
**F:** °F (PSI)**;**
**BAR:** bar (°C)**;**
**PSI:** PSI (°F)**;**
**KPA:** KPA (°C)
**CKPA:** °C (KPA)

***NOTE: the IProRACK does not perform any automatic conversion of the parameters. The parameters must be entered in the correct unit.***
**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.**

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

**AI1-10** **Probe 1-10 calibration:** ***(AI7-AI10 are present only on the IPRC215D)***
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; **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

## 6.1.7 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 IPRC215D)*** (-1.00-Ai25 bar, -14.5÷Ai25 PSI**,** -100÷Ai25KPA)

**AI25** **Probe 7 read out at 20mA/4,5V- *(only IPRC215D)*** (Ai24÷160 bar, Ai24÷ 2320**,** Ai24÷16000 KPA)

**AI26** **Probe 8 read out at 4mA/0,5V - *(only IPRC215D)*** (-1.00-Ai27 bar, -14.5÷Ai27 PSI**,** -100÷Ai27KPA)

**AI27** **Probe 8 read out at 20mA/4,5V- *(only IPRC215D)*** (Ai26÷160 bar, Ai26÷ 2320**,** Ai26÷16000 KPA)

**AI28** **Probe 9 read out at 4mA/0,5V - *(only IPRC215D)*** (-1.00-Ai29 bar, -14.5÷Ai29 PSI**,** -100÷Ai29KPA)

**AI29** **Probe 9 read out at 20mA/4,5V - *(only IPRC215D)*** (Ai28÷160 bar, Ai28÷ 2320**,** Ai28÷16000 KPA)

**AI30** **Probe 10 read out at 4mA/0,5V - *(only IPRC215D)*** (-1.00-Ai31 bar, -14.5÷Ai31 PSI**,** -100÷Ai31KPA)

**AI31** **Probe 10 read out at 20mA/4,5V - *(only IPRC215D)*** (Ai30÷160 bar, Ai30÷ 2320**,** Ai30÷16000 KPA)

**AI32-AI38 Probe 11-17 calibration (IPX 4 din)**
*Range*: -12.00÷12.00 bar; 12.0÷12.0 °C; -120÷120 PSI; -120÷120 °F; -1200÷1200 KPA; -1600÷1600 PPM (if the probe is “4-20mA Gas Leak Detector”); -20%÷120% (if the probe is “0-5V Liquid level”); -1.000 ÷ 1.000 V; -2.000 ÷ 2.000 mA
*UM*: according to CF26

**AI39** **Probe 11 value at 4mA/0V/1V (IPX 4 din)**
*Range*: -1.00÷AI40 bar; -15÷AI40 PSI; -100÷AI40 KPA; 0÷AI40 PPM (if the probe is “4-20mA Gas Leak Detector”); -20%÷AI40 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

**AI40** **Probe 11 value at 20mA/5V/5V (IPX 4 din)**
*Range*: AI39÷160.00 bar; AI39÷2320 PSI; AI39÷16000 KPA; AI39÷50000 PPM (if the probe is “4-20mA Gas Leak Detector”); AI39÷120 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

……

**AI51** **Probe 17 value at 4mA/0V/1V (IPX 4 din)**
*Range*: -1.00÷AI52 bar; -15÷AI52 PSI; -100÷AI52 KPA; 0÷AI52 PPM (if the probe is “4-20mA Gas Leak Detector”); -20%÷AI52 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

**AI52** **Probe 17 value at 20mA/5V/5V (IPX 4 din)**
*Range*: AI51÷160.00 bar; AI51÷2320 PSI; AI51÷16000 KPA; AI51÷50000 PPM (if the probe is “4-20mA Gas Leak Detector”); AI51÷120 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

**AI53-AI62 Probe 18-27 calibration (IPX 10 din)**
*Range*: -12.00÷12.00 bar; 12.0÷12.0 °C; -120÷120 PSI; -120÷120 °F; -1200÷1200 KPA; -1600÷1600 PPM (if the probe is “4-20mA Gas Leak Detector”); -20%÷120% (if the probe is “0-5V Liquid level”); -1.000 ÷ 1.000 V; -2.000 ÷ 2.000 mA
*UM*: according to CF26

**AI63 Probe 18 value at 4mA/0V/1V (IPX 10 din)**
*Range*: -1.00÷AI64 bar; -15÷AI64 PSI; -100÷AI64 KPA; 0÷AI64 PPM (if the probe is “4-20mA Gas Leak Detector”); -20%÷AI64 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

**AI64 Probe 18 value at 20mA/5V/5V (IPX 10 din):**
*Range*: AI63÷160.00 bar; AI63÷2320 PSI; AI63÷16000 KPA; AI63÷50000 PPM (if the probe is “4-20mA Gas Leak Detector”); AI63÷120 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

……

**AI81 Probe 27 value at 4mA/0V/1V (IPX 10 din)**
*Range*: -1.00÷AI82 bar; -15÷AI82 PSI; -100÷AI82 KPA; 0÷AI82 PPM (if the probe is “4-20mA Gas Leak Detector”); -20%÷AI82 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

**AI82 Probe 27 value at 20mA/5V/5V (IPX 10 din):**
*Range*: AI81÷160.00 bar; AI81÷2320 PSI; AI81÷16000 KPA; AI81÷50000 PPM (if the probe is “4-20mA Gas Leak Detector”); AI81÷120 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

**AI83-AI84 Probe 28-29 calibration (XEV20_1)**
*Range*: -12.00÷12.00 bar; 12.0÷12.0 °C; -120÷120 PSI; -120÷120 °F; -1200÷1200 KPA;
*UM*: according to CF26

**AI85-AI86 Probe 30-31 calibration (XEV20_1)**
*Range*: -12.00÷12.00 bar; 12.0÷12.0 °C; -120÷120 PSI; -120÷120 °F; -1200÷1200 KPA; -1600÷1600 PPM (if the probe is “4-20mA Gas Leak Detector”); -20%÷120% (if the probe is “0-5V Liquid level”) ; -1.000 ÷ 1.000 V; -2.000 ÷ 2.000 mA
*UM*: according to CF26

**AI87 Probe 30 value at 4mA/0V/1V (XEV20_1)**
*Range*: -1.00÷AI88 bar; -15÷AI88 PSI; -100÷AI88 KPA; 0÷AI88 PPM (if the probe is “4-20mA Gas Leak Detector”); 0%÷AI88 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

**AI88 Probe 30 value at 20mA/5V/5V (XEV20_1):**
*Range*: AI87÷160.00 bar; AI87÷2320 PSI; AI87÷16000 KPA; AI87÷50000 PPM (if the probe is “4-20mA Gas Leak Detector”); AI87÷100 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

**AI89 Probe 31 value at 4mA/0V/1V (XEV20_1)**
*Range*: -1.00÷AI90 bar; -15÷AI90 PSI; -100÷AI90 KPA; 0÷AI90 PPM (if the probe is “4-20mA Gas Leak Detector”); 0%÷AI90 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

**AI90 Probe 31 value at 20mA/5V/5V (XEV20_1):**
*Range*: AI89÷160.00 bar; AI89÷2320 PSI; AI89÷16000 KPA; AI89÷50000 PPM (if the probe is “4-20mA Gas Leak Detector”); AI89÷100 % (if the probe is “0-5V Liquid level”)
*UM*: according to CF26

**AI91-AI92 Probe 32-33 calibration (XEV20_2)**
*Range*: -12.00÷12.00 bar; 12.0÷12.0 °C; -120÷120 PSI; -120÷120 °F; -1200÷1200 KPA;
*UM*: according to CF26

**AI93-AI94 Probe 34-35 calibration (XEV20_2)**
*Range*: -12.00÷12.00 bar; 12.0÷12.0 °C; -120÷120 PSI; -120÷120 °F; -1200÷1200 KPA; -1600÷1600 PPM (if the probe is “4-20mA Gas Leak Detector”); -20%÷120% (if the probe is “0-5V Liquid level”) ; -1.000 ÷ 1.000 V; -2.000 ÷ 2.000 mA
*UM*: according to CF26

**AI95 Probe 34 value at 4mA/0V/1V (XEV20_2)**

*Range*: -1.00÷AI96 bar; -15÷AI96 PSI; -100÷AI96 KPA; 0÷AI96 PPM (if the probe is "4-20mA Gas Leak Detector"); 0%÷AI96 % (if the probe is "0-5V Liquid level")
*UM*: according to CF26

**AI96 Probe 34 value at 20mA/5V/5V (XEV20_2):**
*Range*: AI95÷160.00 bar; AI95÷2320 PSI; AI95÷16000 KPA; AI95÷50000 PPM (if the probe is "4-20mA Gas Leak Detector"); AI95÷100 % (if the probe is "0-5V Liquid level")
*UM*: according to CF26

**AI97 Probe 35 value at 4mA/0V/1V (XEV20_2)**
*Range*: -1.00÷AI98 bar; -15÷AI98 PSI; -100÷AI98 KPA; 0÷AI98 PPM (if the probe is "4-20mA Gas Leak Detector"); 0%÷AI98 % (if the probe is "0-5V Liquid level")
*UM*: according to CF26

**AI98 Probe 35 value at 20mA/5V/5V (XEV20_2):**
*Range*: AI97÷160.00 bar; AI97÷2320 PSI; AI97÷16000 KPA; AI97÷50000 PPM (if the probe is "4-20mA Gas Leak Detector"); AI97÷100 % (if the probe is "0-5V Liquid level")
*UM*: according to CF26

## 6.1.8 Safety digital Inputs (SD1- SD3)

*Note*: SDI1 and SDI3 take effect also to the parallel compressor digital input alarms.

**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 willrestarts when the correspondent digital Input is disabled
**yES =** manual recover for the alarms of fan

**SDI3 Relay activated in case of compressor or fan alarms:**
**nu =** no relay activation, only visual signalling; **AIr:** all the C(i) Inputs set as ALr; **ALr1:** all the C(i) Inputs set as ALr1, **ALr2:** all the C(i) Inputs set as ALr2

**SDI4 Loads de-activation in case of phase fail digital input alarm**
*Range*: 0÷1
0: **no =** the phase fail produces only a warning, only visual signalling
1: **yes:** all the loads are switched off

## 6.1.9 Digital Inputs for liquid level (CDI1-CDI4)

**CDI1 Delay of Low Liquid level digital Input - circuit 1** (0 ÷ 255 min)

**CDI2 Delay of Low Liquid level digital Input - circuit 1** (0 ÷ 255 min)

**CDI3 Relay activated in case of flash tank liquid level alarm – circuit 1**
**nu =** no relay activation, only visual signalling; **AIr:** all the C(i) Inputs set as ALr; **ALr1:** all the C(i) Inputs set as ALr1, **ALr2:** all the C(i) Inputs set as ALr2

**CDI4 Relay activated in case of flash tank liquid level alarm – circuit 2**
**nu =** no relay activation, only visual signalling; **AIr:** all the C(i) Inputs set as ALr; **ALr1:** all the C(i) Inputs set as ALr1, **ALr2:** all the C(i) Inputs set as ALr2

## 6.1.10 Compressor Action (RC1-RC8, RC25)

**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.

**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.

**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.

**RC25** **Regulation band width for parallel compressors**
The band is symmetrical compared to the target set point, with extremes:
SETPC-(RC25)/2 ... SETPC+(RC25)/2.
(0.10÷10.00 bar; 1÷80 PSI; 10÷1000 KPA, according to CF26 parameter)

## 6.1.11 Parallel Compression Regulation (PC1-PC10)

**PC1** **BY-PASS Valve percentage to activate parallel compression**
It's the percentage used to enable parallel compression to move the regulation from BY-PASS valve to parallel compression.
If PC1 = 0, the parallel compression is ALWAYS ON. This means that the compressors can start without waiting for a certain % of BY-PASS (opening). The BY-PASS VALVE maintains its safety function operating at PC3. If the compressors are stopped caused to the safety delays, the regulation comes back to the standard regulation with GC20 as set point.
*Range*: 0÷99%

**PC2** **Time with BY-PASS valve ≥ PC1 before the activatation of the parallel compression**
If the BY-PASS VALVE valve remains open with a percentage equal or higher than PC1 for PC2 time, the BY-PASS valve will use the PC3 set point and the parallel compression is started.
*Range*: 0÷255
*UM*: sec

**PC3** **Pressure setpoint for BY-PASS valve when the parallel compression is activated**
It's the pressure set point for BY-PASS valve when the parallel compression is activated. It replaces the GC20 flash tank pressure set point when the parallel compression is working
*Range*: SETPC÷500.00 bar; SETPC÷7250 PSI; SETPC÷50000 KPA
*UM*: Always in Pressure, depending on the paremeter CF26:
**CF26 = CDEC:** bar
**CF26 = F:** PSI
**CF26 = BAR:** bar

**CF26 = PSI:** PSI
**CF26 = KPA:** KPA
**CF26 = CKPA:** KPA

**PC4** **Minimum time between 2 following switching ON of the same parallel compressor**
*Range*: 0÷1000
*UM*: min

**PC5** **Minimum time between the switching OFF of a parallel compressor and the following switching ON**
*Range*: 0÷1000
*UM*: min

**PC6** **Time delay between the insertion of two different parallel compressors**
*Range*: 1÷5990
*UM*: sec

**PC7** **Time delay between switching OFF of two different parallel compressors**
*Range*: 1÷5990
*UM*: sec

**PC8** **Minimum time parallel compressor ON**
*Range*: 1÷5990
*UM*: sec

**PC9** **Regulation band of the parallel compression inverter**
It is the band with the proportional action. It replaces RC57 for the inverter regulation. It is accross the set point SETPC. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the AOX_13 when the pressure/temperature is equal or higher than SETPC + PC9.
Range: 0.10÷10.00bar; 1÷80 PSI; 10÷1000 KPA
UM: Always in Pressure, depending on the paremeter CF26:
**CF26 = CDEC:** (bar)
**CF26 = F:** (PSI)
**CF26 = BAR:** bar (°C)
**CF26 = PSI:** PSI (°F)
**CF26 = KPA:** KPA (°C)
**CF26 = CKPA:** (KPA)

**PC10** **Band offset of the parallel compression inverter**
It is used to move the regulation band across to the set point.
Range: -12.00 ÷ 12.00 BAR, -120÷120PSI; 1200÷1200KPA
UM: Always in Pressure, depending on the paremeter CF26:
**CF26 = CDEC:** (bar)
**CF26 = F:** (PSI)
**CF26 = BAR:** bar (°C)
**CF26 = PSI:** PSI (°F)
**CF26 = KPA:** KPA (°C)
**CF26 = CKPA:** (KPA)

**Note: If AOC3 = 25, the parameters used for the inverter of parallel compressions are: AO3_1…AO3_26, and the exception to this is: instead use AO3_17, PC9 is used, instead use AO3_19, PC10 is used**

**PC11** **Disable Parallel compression with heat reclaim ON**
*0*= **NO**
*1=YES*

## 6.1.12 Safety Compressors (SL1- SL11& SL14-SL24 )

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

**SL2** **Minimum time between the switching off of a compressor and the following switching on.** (0÷255min). **Note**: usually SL1 must be greater than SL2.

**SL3** **Time delay between the insertion of two different compressors** (0 ÷ 5990 sec)

**SL4** **Time delay between switching off of two different compressors** (0 ÷ 5990 sec)

**SL5** **Minimum time load on (**(0 ÷ 5990 sec)

**SL6** **Maximum time load on** (0 ÷ 24 h; with 0 this function is disabled.) If a compressor keeps staying on for the SL6 time, it is switched off and it can restart after the SL2 standard time or after the SL7 time with frequency compressor.

**SL7** **Minimum time a frequency compressor stays off after SL6 time** (0÷255 min)

**SL8** **SL3 delay enabled also for the first call**. If enabled, the step triggering is delayed for a "SL3" time, respect to the call.
**no** = "SL3" not enabled;
**yES**="SL3" enabled

**SL9** **SL4 delay enabled also for the first off**. If enabled, the step triggering is delayed for a "SL4" time, respect to the call.
**no** = "SL4" not enabled;
**yES**="SL4" enabled

**SL10** **Input delay at power on** (0 ÷ 255 sec)

**SL11** **Booster function enabled**
**no =** compressors of Circuits 1 and 2 work independently
**yES** = if at least one compressor of the Circuit 2 (BT) is ON, also one compressor of the Circuit 1 (TN) is enabled, independently from the pressure of the Circuit 1. This ensures that the gas coming from the Circuit 2 is suct by the compressors of the Circuit 1.

**SL14** **Maximum time the booster function is enabled (5÷999s)**
It defines the maximum time the booster function is active, after a compressor of circuit 2 (LT) has started. After SL14 the standar regulation for circuit 1 (NT) is restored

**SL15** **Automatic switch off of compressors of circuit 2, with booster function on and none compressor of circuit 1 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** **SL18 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** **SL19 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

**SL23** **Minimum time a frequency compressor stays off – circuit2**

0÷255min

**SL24** **Fan pre-start before first compressor activation enabling**
*Range*: 0÷1
0=NO, function disabled
1=YES, function enabled

## 6.1.13 Fan Action (RC9-RC16, RC31-RC34, RC43-RC44, RC49-52)

**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.

**RC31** **Inverter Fan circuit1 management mode.**
*Range:* 0÷1
*0=Direct Acting*
*1=Reverse Acting*
AOCx=

| | |
|---|---|
| 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 |
| 15 | 4-20mA output inverter condenser Circuit 1 |
| 16 | 4-20mA output inverter condenser Circuit |
| 17 | 4-20mA output inverter condenser free Circuit 1 |
| 18 | 4-20mA output inverter condenser free Circuit 2 |

**RC32 Inverter Fan circuit2 management mode.**
*Range:* 0÷1
*0=Direct Acting*
*1=Reverse Acting*
(Same AOCx as RC31)

**RC33 Fan heat reclaim 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 heat reclaim DI is active.

**RC34 Fan heat reclaim 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 heat reclaim DI is active.

**RC49 Analog output setting for condenser fan management with adiabatic spray enabled**
*Range*: 0÷2
0: **No limitation**
1: **Analog output limited to AOx_20**
2: **Fix at AOx_20**

**RC50 Tempearature Set point (to stop) adiabatic spray**
*Range*: 0.0÷50°C; 32.0÷122 °F;
*UM*: according to CF26

**RC51 Differential for adiabatic spray regulation**
It is added to the set point RC50
*Range:* 0.1÷25.0°C; 1÷50°F
*UM:* according to CF26

**RC52 Adiabatic function disabled during heat reclaim**
*Range:* 0÷1
*0=NO,* adiabatic function is enabled also during heat reclaim
1=YES, adiabatic function is disabled in case of heat reclaim

## 6.1.14 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)

## 6.1.15 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
**NOTE1 for CO2 applications only absolute alarms are available.**
**NOTE2 for CO2 applications only pressure alarms are available.**
**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 AL25

**NOTE2 for CO2 applications only pressure, absolute alarms are available**

## 6.1.16 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
**SCO = (Stop Compressor Only)** electronic pressure switch enabled but without giving any alarm
Note: In case SCO, the parallel compressors will follow their regulation.

**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
**SCO = (Stop Compressor Only)** electronic pressure switch enabled but without giving any alarm
Note: In case SCO, the parallel compressors will follow their regulation.

**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**;)

## 6.1.17 Fan Alarms (AL24-AL46)

**AL24** **Low pressure (temperature) alarm for fans – circuit 1:**
**With AC2 = ABS:** If the pressure (temperature - not available for CO2 applcations) falls below the "AL24" value, the "Low alarm – Condensation 1" is activated at the end of the AL26 period of time".
*Range:* -1.00 to AL25 **bar**; -50 to AL25 **°C**; -14 to AL25 **Psi**; -58 to AL25 **°F**; -100 to AL25 **Kpa**
*UM*: according to CF26

**With AC2 = REL:** - NOT AVAILABLE FOR CO2 APPLICATIONS - 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.
*Range*: 0.10 ÷ 30.00 bar; 0.0 ÷ 100.0 **°C**; 1÷430 **Psi**; 1÷200.0 **°F**; 10 ÷ 3000 **Kpa**
*UM*: according to CF26

**AL25** **High pressure (temperature) alarm for fans– Circuit 1**
**With AC2 = ABS:** If the pressure (temperature - not available for CO2 applcations) exceeds the "AL25" value, the "High alarm – Condensation 1" is activated at the end of the AL26 period of time
*Range:* AL24 to 150.00 bar; AL24 to 150 °C; AL24 to 2176 Psi; AL24 to 302 °F; AL24 to 15000 Kpa
*UM*: according to CF26

**NOTE: This alarm work in parallel with GC19 Pressure value near HP cut out alarm. Set AL25 higher than GC19, for a proper working.**

**With AC2 = REL:** - NOT AVAILABLE FOR CO2 APPLICATIONS 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.
*Range:* 0.10 to 30.00bar; 0.0 to 100.0 °C; 1 to 430 PSI; 1 to 200.0°F; 10 to 3000KPA
*UM:* according to CF26

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

**AL27** **Compressors off with pressure (temperature) alarm for fans– circuit 1**
**no =** compressors are not influenced by this alarm
**yES =** compressors are turned off in case of high pressure (temperature) alarm of fans

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

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

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

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

**AL32** **Low pressure (temperature) alarm for fans – circuit 2:**
(**With AC2 = REL:0.10** ÷ 30.00 **bar**; 0.0 ÷ 100.0 **°C**; 1÷430 **Psi**; 1÷200.0 **°F**; 10 ÷ 3000 **Kpa**
**With AC2 = ABS:** -1.00 to AL33 bar; -50 to AL33 °C; -14 to AL33 PSI; -58 to AL33 °F; -100 to AL33 KPA) The measurement unit depends on CF26 parameter.
**With AC2 = REL** If the pressure (temperature) falls below the "SETF2-AL32" value, the "Low alarm – Condensation 2" is activated at the end of the AL34 period of time.
**With AC2 = ABS** If the pressure (temperature) falls below the "AL32" value, the "Low alarm – Condensation 2" is activated at the end of the AL34 period of time.

**AL33** **High pressure (temperature) alarm for fans– circuit 2:**
(**With AC2 = REL** 0.10 to 30.00bar; 0.0 to 100.0°C; 1 to 430 PSI; 1 to 200.0°F; 10 to 3000KPA
**With AC2 = ABS** AL32 to 110.00bar; AL32 to150°C; AL32 to1595 PSI; AL32 to 230°F; AL32 to 11000 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)

**AL40** **Relay activated in case of pressure (temperature) alarms of fans**
**nu =** no relay activation, only visual signalling; **AIr:** all the C(i) Inputs set as ALr; **ALr1:** all the C(i) Inputs set as ALr1, **ALr2:** all the C(i) Inputs set as ALr2

## 6.1.18 Min and max analog liquid level in % and delay (AL47-AL52)

**AL47** **Min Liquid level.**
*Range:* 0÷AL48
*UM:* %

**AL48** **Max Liquid level.**
*Range:* AL47÷100
*UM:* %

**AL49** **Delay to signal LL and HL alarm.**
*Range:* 0÷255
*UM:* min
This parameter is used only for Low liquid level alarm into flash tank from analog input, for low liquid level from digital input, the delay is CDI1.

**AL50** **Differential for liquid level alarm recovery.**
*Range:* 0÷25
*UM:* %

**AL51** **LT, MT and Parallel compressors shut down in case of Max Liquid level alarm in flash tank.**
*Range:* no, yes
*UM:* num
NOTE: all the compressors are shut off with interval of 1s

**AL52** **High flash tank liquid level alarm delay**
*Range:* 0÷5000
*UM:* sec
*Resolution:* 10 sec
*This parameter is used both for High liquid level alarm from digital input (DIC xx = 226) and for High liquid level alarm from analog input: AICxx = 135 > AL48*

## 6.1.19 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.

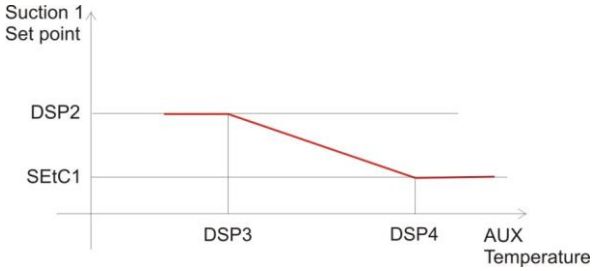
**NOTE:** if more than one probe is used for the optimization of the suction set point, only the last probe defined is considered.(ex: if the analog input 1 is configurated as optimization of suction set point and also the analog input 2 ;the probe is used is the probe 2)

**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 configurated 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) Iti 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


## 6.1.20 Dynamic Setpoint Condenser (DSP9- DSP16)

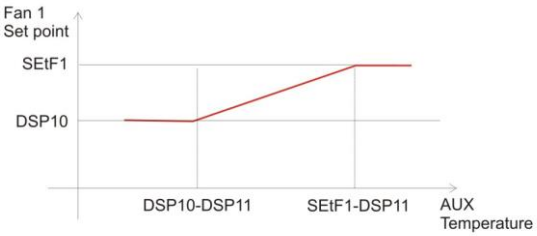
**DSP9** **Dynamic set enabled for condenser- circuit 1**
**no =** standard regulation
**yES =** the SETF1 varies according to the setting of DSP10, DSP11.
**WARNING** the dynamic set point requires a dedicated probe, one probe must be set up for this functionit is

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

**DSP11 Differential for condenser dynamic set point –circuit 1 - Subcritical**
*Range*: DSP15÷50.0 °C; DSP15÷90 °F
The way of working of this algorithm is explained in the following exemplum.

**Example**

| | | |
|---|---|---|
| The ext temperature > SETF1-DSP11 | ==> | "real SEtF1" = SETF1 |
| The ext temperature < DSP10-DSP11 | ==> | "real SetF1"= DSP10 |
| DSP10- DSP11 < ext temperature < SETF1- DSP11 | ==> | DSP10 <"real SEtF1"< SEtF1 |




**NOTE:** if CF26 = bar or PSI or KPA, DSP11 is bar or PSI, the IProRACK makes the changes required
*Note*: If AUX temperature probe fails, the fan set point of circuit1 is forced to DSP10

**DSP12 Dynamic set enabled for condenser- circuit 2**
**no =** standard regulation
**yES =** the SETF2 varies according to the setting of DSP13, DSP14.
**WARNING** the dynamic set point requires a dedicated probe, one probe must be set up for this functionit is

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

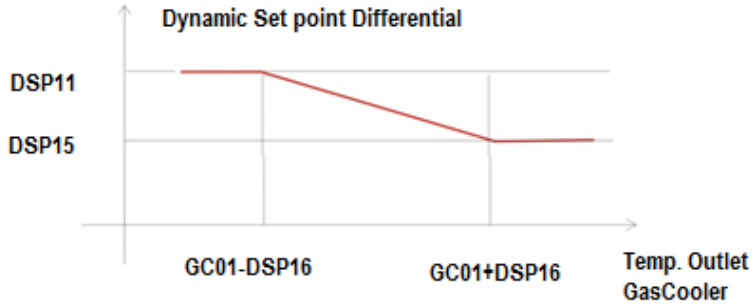
**DSP14 Differential for condenser dynamic set point –circuit 2** (-50.0÷50.0°C; -90÷90°F). The way of working of this algorithm is explained in the following example.

**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 |

**DSP15 Differential for condenser dynamic set point during transcritical mode - Circuit 1 -**
*Range*:(-50.0÷DSP11 °C; -90÷ DSP11 °F, according to CF26)

**DSP16 Half Dead Band Width to join up DSP11 and DSP15 around the transcritical temperature**
*Range*: 0.1÷50.0 °C; 1÷90 °F, according to CF26
When the circuit 1 dynamic set point for fan is enabled 2 differntiala are used:
**DSP11 in subcritical mode**, **DSP15 in transcritical mode**
Around the GC01 value, the 2 set points are joined according to the following formula:
With Gas cooler outlet temperature detected by the probe AICxx = 154 or 155 < GC01-DSP16 → differential = DSP11
With Gas cooler outlet temperature detected by the probe AICxx = 154 or 155 > GC01+DSP16 → differential = DSP15
With Gas cooler outlet temperature: GC01-DSP16 =<AICxx = 154 or 155 =< GC01+DSP16 → DSP15=<differential =< DSP11




## 6.1.21 Analog Output 1 (AO1_1-AO1_26)

**AO1_1 Reference probe for analogue Output 1**

**AO1_10DIN:**
*Range:* 0÷9
**0: Pb1** = (term. 2-7 (if the probe is configured as NTC PTC))
**1: Pb2** = (term. 3-7 (if the probe is configured as NTC PTC))
**2: Pb3** = (term. 4-7 (if the probe is configured as NTC PTC))
**3: Pb4** = (term. 5-7 (if the probe is configured as NTC PTC))
**4: Pb5** = (term. 6-7 (if the probe is configured as NTC PTC))
**5: Pb6** = (term. 10-7 (if the probe is configured as NTC PTC))
**6: Pb7** = (term. 11-7 (if the probe is configured as NTC PTC))
**7: Pb8** = (term. 12-7 (if the probe is configured as NTC PTC))
**8: Pb9** = (term. 13-7 (if the probe is configured as NTC PTC))
**9: Pb10** = (term. 14-7 (if the probe is configured as NTC PTC))

**AO1_2 Adjustment of read out for the analog Output 1**
Used with analog output set as "proportional", see AoC1.
*Range:* -1.00÷100.00 bar; -15÷1450 PSI; -70÷150°C; -94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO1_3 Adjustment of read out for the analog Output 1 at 20mA/10V**
Used with analog output set as "proportional", see AoC1.
*Range:* -1.00÷100.00 bar; -15÷1450PSI; -70÷150°C; 94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO1_4 Minimum value for analogue Output 1**
*Range*: 0 ÷ AO1_13

**AO1_5 Analog Output 1 value after compressor start**
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*
*Range:* AO1_4 ÷ AO1_13

**AO1_6 Analog Output 1 value after a compressor is switched off**
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*
*Range:* AO1_4 ÷ AO1_13

**AO1_7 Exclusion band start value for analog Output 1**
it excludes a range of frequencies that could create problems to the compressor. – *Used during inverter regulation*
*Range:* AO1_4 ÷ AO1_8

**AO1_8 Exclusion band end value for analog Output 1**
*Used during inverter regulation*
*Range:* AO1_7 ÷ 99 %

**AO1_9 Safety value for analog Output 1**
it is used in case of probe's fault.
*Range:* 0 ÷ AO1_13

**AO1_10 Delay between the entrance in the regulation band and the regulation activation**
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.*
*Range:* 0 ÷ 255
*UM*: sec

**AO1_11 Analog Output 1 rise time**
It is the time necessary to the analog Output to pass from the AO1_4 ÷ AO1_13 when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*
*Range:* 0 ÷ 255
*UM*: sec

**AO1_12 Analog Output 1 permanency at AO1_13 before load activation**
the analog Output remains at AO1_13 value for this time before a load is activated. – *Used during inverter regulation*
*Range:* 0 ÷ 255
*UM*: sec

**AO1_13 Max value for analogue Output 1**
*Range*: AO1_4 -100%

**AO1_14 Analog Output 1 decreasing time**
It is the time taken from the analog Output to pass from the AO1_13 to the AO1_4 value. It is used during the switching off phase, when the pressure is lower than the set point.
*Range:* 0 ÷ 255
*UM*: sec

**AO1_15 Analog Output 1 permanency at AO1_4 before a load is switched off**
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.
*Range*: 0 ÷ 255
*UM:* sec

**AO1_16 Analog Output 1 decreasing time when a load is switched on**
It is the time necessary to the analog Output to pass from AO1_13 to AO1_5 when a load is
*Range:* 0 ÷ 255
*UM:* sec

**AO1_17 Regulation band**
It is the band with the proportional action. It is accross the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the AO1_13 when the pressure/temperature is equal or higher than set + AO1_17.
*Range:* 0.10÷10.00bar; 0.0÷25.0°C; 1÷80 PSI; 1÷50°F;10÷1000 KPA
*UM:* according to CF26

**AO1_18 Integral time**
It sets the pound of the proportional action. The higher is AO1_18, the lower is the integral action support.
*Range:* 0÷999
0: integral action excluded
*UM:* s

**AO1_19 Band offset**.
It is used to move the regulation band across to the set point.
*Range:* -12.0÷12.0°C -12.00 ÷ 12.00 BAR, -120÷120°F, -120÷120PSI; 1200÷1200KPA
*UM:* according to CF26

**AO1_20** (Maximum) value of A.O.1 during adiabatic spray
*Range*: AO1_4 ÷ AO1_13
*UM:* %

**AO1_21 Maximum value of A.o.1 during silent mode**
*Range:* AO1_5/AO1_6 ÷AO1_13

**AO1_22 Minimum inverter capacity with poor lubrication**
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 AO1_13 for the AO1_24 time in order to force the right lubrication.
*Range*: 0÷99%
0: function excluded

**AO1_23 Maximum inverter functioning time at a lower frequency than AO1_22, before working at AO1_13**
*Range*: 1÷255
*UM*: min

**AO1_24 Time of inverter functioning at AO1_13 to restore the right lubrication**
*Range*: 1÷255
*UM*: min

**AO1_25 Maximum time, analog output 1 is off when AOC1 = 6 or 7 or 8 or 9 or 15 or 16 or 17 or 18**
*Range*: 0.0÷24.0h; with 0 the function is disabled
*UM*: 10min

**AO1_26 Time of analog output 1 at maximum AO1_13 when AO1_25 timer is over**
*Range*: 1÷255
*UM*: min

## 6.1.22 Analog Output 2 (AO2_1- AO2_26)

**AO2_1 Reference probe for analogue Output 2,** it is used only when the analog Output is configured as FREE in the io.conf file

**AO1_10DIN:**
*Range:* 0÷9
**0: Pb1** = (term. 2-7 (if the probe is configured as NTC PTC))
**1: Pb2** = (term. 3-7 (if the probe is configured as NTC PTC))
**2: Pb3** = (term. 4-7 (if the probe is configured as NTC PTC))
**3: Pb4** = (term. 5-7 (if the probe is configured as NTC PTC))
**4: Pb5** = (term. 6-7 (if the probe is configured as NTC PTC))
**5: Pb6** = (term. 10-7 (if the probe is configured as NTC PTC))
**6: Pb7** = (term. 11-7 (if the probe is configured as NTC PTC))
**7: Pb8** = (term. 12-7 (if the probe is configured as NTC PTC))
**8: Pb9** = (term. 13-7 (if the probe is configured as NTC PTC))
**9: Pb10** = (term. 14-7 (if the probe is configured as NTC PTC))

**AO2_2 Adjustment of read out for the analog Output**
It is used only when the analog Output is configured as FREE in the io.conf file
*Range:* -1.00÷100.00 bar; -15÷1450PSI; -70÷150°C; -94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO2_3 Adjustment of read out for the analog Output 2 at 20mA/10V**
It is used only when the analog Output is configured as FREE in the io.conf file
*Range:* -1.00÷100.00 bar; -15÷1450PSI; -70÷150°C; 94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO2_4 Minimum value for analogue Output 2**
*Range*: 0 ÷ AO2_13

**AO2_5 Analog Output 2 value after compressor start**
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*
*Range:* AO2_4 ÷ AO2_13

**AO2_6 Analog Output 2 value after a compressor is switched off**
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*
*Range:* AO2_4 ÷ AO2_13

**AO2_7 Exclusion band start value for analog Output 2**
it excludes a range of frequencies that could create problems to the compressor. – Used during inverter regulation
*Range:* AO2_4 ÷ AO2_8

**AO2_8 Exclusion band end value for analog Output 2**
*Used during inverter regulation*
*Range:* AO2_7 ÷ 99 %

**AO2_9 Safety value for analog Output 2**
it is used in case of probe's fault.
*Range:* 0 ÷ AO2_13

**AO2_10 Delay between the entrance in the regulation band and the regulation activation**
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.*
*Range:* 0 ÷ 255
*UM*: sec

**AO2_11 Analog Output 2 rise time**
It is the time necessary to the analog Output to pass from the AO2_4 ÷ AO2_13, when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*
*Range:* 0 ÷ 255
*UM*: sec

**AO2_12 Analog Output 2 permanency at AO2_13 before load activation**
the analog Output remains at AO2_13 value for this time before a load is activated. – *Used during inverter regulation*
*Range:* 0 ÷ 255
*UM*: sec

**AO2_13 Max value for analogue Output 2**
*Range*: AO2_4 -100%

**AO2_14 Analog Output 2 decreasing time**
It is the time taken from the analog Output to pass from the AO2_13 to the AO2_4 value. It is used during the switching off phase, when the pressure is lower than the set point.
*Range:* 0 ÷ 255
*UM*: sec

**AO2_15 Analog Output 2 permanency at AO2_4 before a load is switched off**
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.
*Range:* 0 ÷ 255
*UM*: sec

**AO2_16 Analog Output 2 decreasing time when a load is switched on**
It is the time necessary to the analog Output to pass from AO2_13 to AO2_5 when a load is switched on.
*Range:* 0 ÷ 255
*UM*: sec

**AO2_17 Regulation band**
It is the band with the proportional action. It is accross the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the AO2_13 when the pressure/temperature is equal or higher than set + AO2_17.
*Range:* 0.10÷10.00bar; 0.0÷25.0°C; 1÷80 PSI; 1÷50°F;10÷1000 KPA
*UM:* according to CF26

**AO2_18 Integral time**
It sets the pound of the proportional action. The higher is AO2_18 , the lower is the integral action support.
*Range:* 0÷999
0: integral action excluded
*UM:* s

**AO2_19 Band offset**
it is used to move the regulation band across to the set point.
*Range:* -12.0÷12.0°C -12.00 ÷ 12.00 BAR, -120÷120°F, -120÷120PSI; 1200÷1200KPA
*UM:* according to CF26

**AO2_20** (Maximum) value of A.O.2 during adiabatic spray
*Range*: AO2_4 ÷ AO2_13
*UM:* %

**AO2_21 Maximum value of A.o.2 during silent mode**
*Range:* AO2_5/AO2_6 ÷ AO2_13

**AO2_22 Minimum inverter capacity with poor lubrication**
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 AO2_13 for the AO2_24 time in order to force the right lubrication.
*Range*: 0÷99%
0: function excluded

**AO2_23 Maximum inverter functioning time at a lower frequency than AO2_22, before working at AO2_13**
*Range*: 1÷255
*UM*: min

**AO2_24 Time of inverter functioning at AO2_13 to restore the right lubrication**
*Range*: 1÷255
*UM*: min

**AO2_25 Maximum time, analog output 2 is off when AOC2 = 6 or 7 or 8 or 9 or 15 or 16 or 17 or 18**
*Range*: 0.0÷24.0h; with 0 the function is disabled
*UM*: 10min

**AO2_26 Time of analog output 2 at maximum AO2_13 when AO2_25 timer is over**
*Range*: 1÷255
*UM*: min

## 6.1.23 Analog Output 3 (AO3_1- AO3_26)

**AO3_1 Reference probe for analogue Output 3,** it is used only when the analog Output is configured as FREE in the io.conf file

**AO1_10DIN:**
*Range:* 0÷9
**0: Pb1** = (term. 2-7 (if the probe is configured as NTC PTC))
**1: Pb2** = (term. 3-7 (if the probe is configured as NTC PTC))
**2: Pb3** = (term. 4-7 (if the probe is configured as NTC PTC))
**3: Pb4** = (term. 5-7 (if the probe is configured as NTC PTC))
**4: Pb5** = (term. 6-7 (if the probe is configured as NTC PTC))
**5: Pb6** = (term. 10-7 (if the probe is configured as NTC PTC))
**6: Pb7** = (term. 11-7 (if the probe is configured as NTC PTC))
**7: Pb8** = (term. 12-7 (if the probe is configured as NTC PTC))
**8: Pb9** = (term. 13-7 (if the probe is configured as NTC PTC))
**9: Pb10** = (term. 14-7 (if the probe is configured as NTC PTC))

**AO3_2 Adjustment of read out for the analog Output 3**
It is used only when the analog Output is configured as FREE in the io.conf file
*Range:* -1.00÷100.00 bar; -15÷1450PSI; -70÷150°C; -94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO3_3 Adjustment of read out for the analog Output 3 at 20mA/10V**
It is used only when the analog Output is configured as FREE in the io.conf file
*Range:* -1.00÷100.00 bar; -15÷1450PSI; -70÷150°C; 94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO3_4 Minimum value for analogue Output 3**
*Range*: 0 ÷ AO3_13

**AO3_5 Analog Output 3 value after compressor start**
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*
*Range:* AO3_4 ÷ AO3_13

**AO3_6 Analog Output 3 value after a compressor is switched off**
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*
*Range:* AO3_4 ÷ AO3_13

**AO3_7 Exclusion band start value for analog Output 3**
it excludes a range of frequencies that could create problems to the compressor. – Used during inverter regulation
Range: AO3_4 ÷ AO3_8

**AO3_8 Exclusion band end value for analog Output** 3
*Used during inverter regulation*
*Range:* AO3_7 ÷ 99 %

**AO3_9 Safety value for analog Output 2**
it is used in case of probe's fault.
*Range:* 0 ÷ AO3_13

**AO3_10 Delay between the entrance in the regulation band and the regulation activation**
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.*
*Range:* 0 ÷ 255
*UM*: sec

**AO3_11 Analog Output 2 rise time**
It is the time necessary to the analog Output to pass from the AO3_4 ÷ AO3_13 when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*
*Range:* 0 ÷ 255

*UM*: sec

**AO3_12 Analog Output 2 permanency at AO3_13 before load activation**
the analog Output remains at AO3_13 value for this time before a load is activated. – *Used during inverter regulation*
*Range:* 0 ÷ 255
*UM*: sec

**AO3_13 Max value for analogue Output 3**
*Range*: AO3_4 -100%

**AO3_14 Analog Output 2 decreasing time**
It is the time taken from the analog Output to pass from the AO3_13 to the AO3_4 value. It is used during the switching off phase, when the pressure is lower than the set point.
*Range:* 0 ÷ 255
*UM*: sec

**AO3_15 Analog Output 2 permanency at AO3_4 before a load is switched off**
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.
*Range:* 0 ÷ 255
*UM*: sec

**AO3_16 Analog Output 3 decreasing time when a load is switched on**
It is the time necessary to the analog Output to pass from AO3_13 to AO3_5 when a load is switched on.
*Range:* 0 ÷ 255
*UM*: sec

**AO3_17 Regulation band**
It is the band with the proportional action. It is accross the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the AO3_13 when the pressure/temperature is equal or higher than set + AO3_17.
*Range:* 0.10÷10.00bar; 0.0÷25.0°C; 1÷80 PSI; 1÷50°F;10÷1000 KPA
*UM:* according to CF26

**AO3_18 Integral time**
It sets the pound of the proportional action. The higher is AO3_18 , the lower is the integral action support.
*Range:* 0÷999
0: integral action excluded
*UM:* s

**AO3_19 Band offset**
it is used to move the regulation band across to the set point.
*Range:* -12.0÷12.0°C -12.00 ÷ 12.00 BAR, -120÷120°F, -120÷120PSI; 1200÷1200KPA
*UM:* according to CF26

**AO3_20** (Maximum) value of A.O.3 during adiabatic spray
*Range*: AO3_4 ÷ AO3_13
*UM:* %

**AO3_21 Maximum value of A.o.3 during silent mode**
*Range:* AO3_5/AO3_6 ÷ AO3_13

**AO3_22 Minimum inverter capacity with poor lubrication**
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 AO3_13 for the AO3_24 time in order to make the right lubrication.
*Range*: 0÷99%
0: function excluded

**AO3_23 Maximum inverter functioning time at a lower frequency than AO3_22, before working at AO3_13**
*Range*: 1÷255
*UM*: min

**AO3_24 Time of inverter functioning at AO3_13 to restore the right lubrication**
*Range*: 1÷255
*UM*: min

**AO3_25 Maximum time, analog output 3 is off when AOC3 = 6 or 7 or 8 or 9 or 15 or 16 or 17 or 18**
*Range*: 0.0÷24.0h; with 0 the function is disabled
*UM*: 10min

**AO3_26 Time of analog output 3 at maximum AO3_13 when AO3_25 timer is over**
*Range*: 1÷255
*UM*: min

## 6.1.24 Analog Output 4 (AO4_1- AO4_26)

**AO4_1 Reference probe for analogue Output 4,** it is used only when the analog Output is configured as FREE in the io.conf file

**AO1_10DIN:**
*Range:* 0÷9
**0: Pb1** = (term. 2-7 (if the probe is configured as NTC PTC))
**1: Pb2** = (term. 3-7 (if the probe is configured as NTC PTC))
**2: Pb3** = (term. 4-7 (if the probe is configured as NTC PTC))
**3: Pb4** = (term. 5-7 (if the probe is configured as NTC PTC))
**4: Pb5** = (term. 6-7 (if the probe is configured as NTC PTC))
**5: Pb6** = (term. 10-7 (if the probe is configured as NTC PTC))
**6: Pb7** = (term. 11-7 (if the probe is configured as NTC PTC))
**7: Pb8** = (term. 12-7 (if the probe is configured as NTC PTC))
**8: Pb9** = (term. 13-7 (if the probe is configured as NTC PTC))
**9: Pb10** = (term. 14-7 (if the probe is configured as NTC PTC))

**AO4_2 Adjustment of read out for the analog Output 4**
It is used only when the analog Output is configured as FREE in the io.conf file
*Range:* -1.00÷100.00 bar; -15÷1450PSI; -70÷150°C; -94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO4_3 Adjustment of read out for the analog Output 4 at 20mA/10V**
It is used only when the analog Output is configured as FREE in the io.conf file
*Range:* -1.00÷100.00 bar; -15÷1450PSI; -70÷150°C; 94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO4_4 Minimum value for analogue Output 4**
*Range*: 0 ÷ AO4_13

**AO4_5 Analog Output 4 value after compressor start**
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*
*Range:* AO4_4 ÷ AO4_13

**AO4_6 Analog Output 4 value after a compressor is switched off**
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*
*Range:* AO4_4 ÷ AO4_13

**AO4_7 Exclusion band start value for analog Output** 2
it excludes a range of frequencies that could create problems to the compressor. – Used during inverter regulation

*Range*: AO4_4 ÷ AO4_8

**AO4_8 Exclusion band end value for analog Output 2**
*Used during inverter regulation*
*Range:* AO4_7 ÷ 99 %

**AO4_9 Safety value for analog Output 2**
it is used in case of probe's fault.
*Range:* 0 ÷ AO4_13

**AO4_10 Delay between the entrance in the regulation band and the regulation activation**
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.*
*Range:* 0 ÷ 255
*UM*: sec

**AO4_11 Analog Output 2 rise time**
It is the time necessary to the analog Output to pass from the AO4_4 ÷ AO4_13, when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*
*Range:* 0 ÷ 255
*UM*: sec

**AO4_12 Analog Output 2 permanency at AO4_13 before load activation**
the analog Output remains at AO4_13 value for this time before a load is activated. – *Used during inverter regulation*
*Range:* 0 ÷ 255
*UM*: sec

**AO4_13 Max value for analogue Output 4**
*Range*: AO4_4 -100%

**AO4_14 Analog Output 2 decreasing time (**
It is the time taken from the analog Output to pass from the AO4_13 to the AO4_4 value. It is used during the switching off phase, when the pressure is lower than the set point.
*Range:* 0 ÷ 255
*UM*: sec

**AO4_15 Analog Output 2 permanency at AO4_4 before a load is switched off**
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.
*Range:* 0 ÷ 255
*UM*: sec

**AO4_16 Analog Output 4 decreasing time when a load is switched on**
It is the time necessary to the analog Output to pass from AO4_13 to AO4_5 when a load is switched on.
*Range:* 0 ÷ 255
*UM*: sec

**AO4_17 Regulation band**
It is the band with the proportional action. It is accross the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the AO4_13 when the pressure/temperature is equal or higher than set + AO4_17.
*Range:* 0.10÷10.00bar; 0.0÷25.0°C; 1÷80 PSI; 1÷50°F;10÷1000 KPA
*UM:* according to CF26

**AO4_18 Integral time**
It sets the pound of the proportional action. The higher is AO4_18 , the lower is the integral action support.
*Range:* 0÷999
0: integral action excluded

*UM:* s

**AO4_19 Band offset**
It is used to move the regulation band across to the set point.
*Range:* -12.0÷12.0°C -12.00 ÷ 12.00 BAR, -120÷120°F, -120÷120PSI; 1200÷1200KPA
*UM:* according to CF26

**AO4_20** (Maximum) value of A.O.4 during adiabatic spray
*Range*: AO4_4 ÷ AO4_13
*UM:* %

**AO4_21 Maximum value of A.o.4 during silent mode**
*Range:* AO4_5/AO4_6 ÷ AO4_13

**AO4_22 Minimum inverter capacity with poor lubrication**
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 AO4_13 for the AO4_24 time in order to force the right lubrication.
*Range*: 0÷99%
0: function excluded

**AO4_23 Maximum inverter functioning time at a lower frequency than AO4_22, before working at AO4_13**
*Range*: 1÷255
*UM*: min

**AO4_24 Time of inverter functioning at AO4_13 to restore the right lubrication**
*Range*: 1÷255
*UM*: min

**AO4_25 Maximum time, analog output 4 is off when AOC4 = 6 or 7 or 8 or 9 or 15 or 16 or 17 or 18**
*Range*: 0.0÷24.0h; with 0 the function is disabled
*UM*: 10min

**AO4_26 Time of analog output 4 at maximum AO4_13 when AO4_25 timer is over**
*Range*: 1÷255
*UM*: min

## 6.1.25 Analog Output 5 (AO5_1- AO5_26)

**AO5_1 Reference probe for analogue Output 5,** it is used only when the analog Output is configured as FREE in the io.conf file

**AO1_10DIN:**
*Range:* 0÷9
**0: Pb1** = (term. 2-7 (if the probe is configured as NTC PTC))
**1: Pb2** = (term. 3-7 (if the probe is configured as NTC PTC))
**2: Pb3** = (term. 4-7 (if the probe is configured as NTC PTC))
**3: Pb4** = (term. 5-7 (if the probe is configured as NTC PTC))
**4: Pb5** = (term. 6-7 (if the probe is configured as NTC PTC))
**5: Pb6** = (term. 10-7 (if the probe is configured as NTC PTC))
**6: Pb7** = (term. 11-7 (if the probe is configured as NTC PTC))
**7: Pb8** = (term. 12-7 (if the probe is configured as NTC PTC))
**8: Pb9** = (term. 13-7 (if the probe is configured as NTC PTC))
**9: Pb10** = (term. 14-7 (if the probe is configured as NTC PTC))

**AO5_2 Adjustment of read out for the analog Output 5**
It is used only when the analog Output is configured as FREE in the io.conf file
*Range:* -1.00÷100.00 bar; -15÷1450PSI; -70÷150°C; -94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO5_3 Adjustment of read out for the analog Output 5 at 20mA/10V**
It is used only when the analog Output is configured as FREE in the io.conf file
*Range:* -1.00÷100.00 bar; -15÷1450PSI; -70÷150°C; 94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO5_4 Minimum value for analogue Output 5**
*Range*: 0 ÷ AO5_13

**AO5_5 Analog Output 5 value after compressor start**
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*
*Range:* AO5_4 ÷ AO5_13

**AO5_6 Analog Output 5 value after a compressor is switched off**
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*
*Range:* AO5_4 ÷ AO5_13

**AO5_7 Exclusion band start value for analog Output 5**
it excludes a range of frequencies that could create problems to the compressor. – Used during inverter regulation
*Range*: AO5_4 ÷ AO5_8

**AO5_8 Exclusion band end value for analog Output 5**
*Used during inverter regulation*
*Range:* AO5_7 ÷ 99 %

**AO5_9 Safety value for analog Output 5**
it is used in case of probe's fault.
*Range:* 0 ÷ AO5_13

**AO5_10 Delay between the entrance in the regulation band and the regulation activation**
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.*
*Range:* 0 ÷ 255
*UM*: sec

**AO5_11 Analog Output 5 rise time**
It is the time necessary to the analog Output to pass from the AO5_4 ÷ AO5_13, when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*
*Range:* 0 ÷ 255
*UM*: sec

**AO5_12 Analog Output 5 permanency at AO5_13 before load activation**
the analog Output remains at AO5_13 value for this time before a load is activated. – *Used during inverter regulation*
*Range:* 0 ÷ 255
*UM*: sec

**AO5_13 Max value for analogue Output 5**
*Range*: AO5_4 -100%

**AO5_14 Analog Output 5 decreasing time**
It is the time taken from the analog Output to pass from the AO5_13 to the AO5_4 value. It is used during the switching off phase, when the pressure is lower than the set point.
*Range:* 0 ÷ 255
*UM*: sec

**AO5_15 Analog Output 5 permanency at AO5_5 before a load is switched off**
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.
*Range:* 0 ÷ 255
*UM*: sec

**AO5_16 Analog Output 5 decreasing time when a load is switched on**
It is the time necessary to the analog Output to pass from AO5_13 to AO5_5 when a load is switched on.
*Range:* 0 ÷ 255
*UM*: sec

**AO5_17 Regulation band**
It is the band with the proportional action.It is accross the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the AO5_13 when the pressure/temperature is equal or higher than set + AO5_17.
*Range:* 0.10÷10.00bar; 0.0÷25.0°C; 1÷80 PSI; 1÷50°F;10÷1000 KPA
*UM:* according to CF26

**AO5_18 Integral time**
It sets the pound of the proportional action. The higher is AO5_18 , the lower is the integral action support.
*Range:* 0÷999
0: integral action excluded
*UM:* s

**AO5_19 Band offset**
It is used to move the regulation band across to the set point.
*Range:* -12.0÷12.0°C -12.00 ÷ 12.00 BAR, -120÷120°F, -120÷120PSI; 1200÷1200KPA
*UM:* according to CF26

**AO5_20** (Maximum) value of A.O.5 during adiabatic spray
*Range*: AO5_4 ÷ AO5_13
*UM:* %

**AO5_21 Maximum value of A.o.5 during silent mode (AO5_5/AO5_6 ÷ AO5_13)**
*Range:* AO5_5/AO5_6 ÷ AO5_13

**AO5_22 Minimum inverter capacity with poor lubrication**
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 AO5_13 for the AO5_24 time in order to force the right lubrication.
*Range*: 0÷99%
0: function excluded

**AO5_23 Maximum inverter functioning time at a lower frequency than AO5_22, before working at AO5_13**
*Range*: 1÷255
*UM*: min

**AO5_24 Time of inverter functioning at AO5_13 to restore the right lubrication**
*Range*: 1÷255
*UM*: min

**AO5_25 Maximum time, analog output 5 is off when AOC5 = 6 or 7 or 8 or 9 or 15 or 16 or 17 or 18**
*Range*: 0.0÷24.0h; with 0 the function is disabled
*UM*: 10min

**AO5_26 Time of analog output 5 at maximum** AO5_13 **when AO5_25 timer is over**
*Range*: 1÷255
*UM*: min

## 6.1.26 Analog Output 6 (AO6_1- AO6_26)

**AO6_1 Reference probe for analogue Output 6,** it is used only when the analog Output is configured as FREE in the io.conf file

**AO1_10DIN:**
*Range:* 0÷9
**0: Pb1** = (term. 2-7 (if the probe is configured as NTC PTC))
**1: Pb2** = (term. 3-7 (if the probe is configured as NTC PTC))
**2: Pb3** = (term. 4-7 (if the probe is configured as NTC PTC))
**3: Pb4** = (term. 5-7 (if the probe is configured as NTC PTC))
**4: Pb5** = (term. 6-7 (if the probe is configured as NTC PTC))
**5: Pb6** = (term. 10-7 (if the probe is configured as NTC PTC))
**6: Pb7** = (term. 11-7 (if the probe is configured as NTC PTC))
**7: Pb8** = (term. 12-7 (if the probe is configured as NTC PTC))
**8: Pb9** = (term. 13-7 (if the probe is configured as NTC PTC))
**9: Pb10** = (term. 14-7 (if the probe is configured as NTC PTC))

**AO6_2 Adjustment of read out for the analog Output 6**
It is used only when the analog Output is configured as FREE in the io.conf file
*Range:* -1.00÷100.00 bar; -15÷1450PSI; -70÷150°C; -94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO6_3 Adjustment of read out for the analog Output 6 at 20mA/10V**
It is used only when the analog Output is configured as FREE in the io.conf file
*Range:* -1.00÷100.00 bar; -15÷1450PSI; -70÷150°C; 94÷302°F; -100÷10000 KPA
*UM:* according to CF26

**AO6_4 Minimum value for analogue Output 6**
*Range*: 0 ÷ AO6_13

**AO6_5 Analog Output 6 value after compressor start**
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*
*Range:* AO6_4 ÷ AO6_13

**AO6_6 Analog Output 6 value after a compressor is switched off**
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*
*Range:* AO6_4 ÷ AO6_13

**AO6_7 Exclusion band start value for analog Output 6**
it excludes a range of frequencies that could create problems to the compressor. – Used during inverter regulation
*Range*: AO6_4 ÷ AO6_8

**AO6_8 Exclusion band end value for analog Output 6**
Used during inverter regulation
*Range:* AO6_7 ÷ 99 %

**AO6_9 Safety value for analog Output 6**
it is used in case of probe's fault.
*Range:* 0 ÷ AO6_13

**AO6_10 Delay between the entrance in the regulation band and the regulation activation**
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.*
*Range:* 0 ÷ 255
*UM*: sec

**AO6_11 Analog Output 6 rise time**

It is the time necessary to the analog Output to pass from the AO6_4 ÷ AO6_13, when a compressor has started and the pressure/temperature is above the regulation band. – *Used during inverter regulation.*

*Range:* 0 ÷ 255

*UM*: sec

**AO6_12 Analog Output 6 permanency at AO6_13 before load activation**

the analog Output remains at AO6_13 value for this time before a load is activated. – *Used during inverter regulation*

*Range:* 0 ÷ 255

*UM*: sec

**AO6_13 Max value for analogue Output 6**

*Range*: AO6_4 -100%

**AO6_14 Analog Output 6 decreasing time**

It is the time taken from the analog Output to pass from the AO6_13 to the AO6_4 value. It is used during the switching off phase, when the pressure is lower than the set point.

*Range:* 0 ÷ 255

*UM*: sec

**AO6_15 Analog Output 6 permanency at AO6_5 before a load is switched off**

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.

*Range:* 0 ÷ 255

*UM*: sec

**AO6_16 Analog Output 6 decreasing time when a load is switched on**

It is the time necessary to the analog Output to pass from AO6_13 to AO6_5 when a load is switched on.

*Range:* 0 ÷ 255

*UM*: sec

**AO6_17 Regulation band**

It is the band with the proportional action. It is accross the set point. The proportional action starts when the temperature/pressure value is higher than the set point and it reaches the AO6_13 when the pressure/temperature is equal or higher than set + AO6_17.

*Range:* 0.10÷10.00bar; 0.0÷25.0°C; 1÷80 PSI; 1÷50°F;10÷1000 KPA

*UM:* according to CF26

**AO6_18 Integral time**

It sets the pound of the proportional action. The higher is AO6_18 , the lower is the integral action support.

*Range:* 0÷999

0: integral action excluded

*UM:* s

**AO6_19 Band offset**

It is used to move the regulation band across to the set point.

*Range:* -12.0÷12.0°C -12.00 ÷ 12.00 BAR, -120÷120°F, -120÷120PSI; 1200÷1200KPA

*UM:* according to CF26

**AO6_20** (Maximum) value of A.O.6 during adiabatic spray

*Range*: AO6_4 ÷ AO6_13

*UM:* %

**AO6_21 Maximum value of A.o.6 during silent mode**

*Range:* AO6_5/AO6_6 ÷100

**AO6_22 Minimum inverter capacity with poor lubrication**

If the frequency compressor works for the AO6_23 time with a frequency (in percentage) equal or

lower than AO5_22, it is forced to work at AO6_13 for the AO6_24 time in order to force the right lubrication.
*Range*: 0÷99%
0: function excluded

**AO6_23 Maximum inverter functioning time at a lower frequency than AO6_22, before working at AO6_13**
*Range*: 1÷255
*UM*: min

**AO6_24 Time of inverter functioning at AO6_13 to restore the right lubrication**
*Range*: 1÷255
*UM*: min

**AO6_25 Maximum time, analog output 6 is off when AOC6 = 6 or 7 or 8 or 9 or 15 or 16 or 17 or 18**
*Range*: 0.0÷24.0h; with 0 the function is disabled
*UM*: 10min

**AO6_26 Time of analog output 6 at maximum AO6_13 when AO6_25 timer is over**
*Range*: 1÷255
*UM*: min

## 6.1.27 Auxiliary outputs (AR1-AR26)

**AR1** **Set point for auxiliary relay 1 (-40÷110°C/-40÷230°F)** it is used for all the relays configured as ausiliary 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 Ausiliary 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 Ausiliary 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 Ausiliary 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

**AR13** **Set point for auxiliary relay 5** (-40÷110°C/-40÷230°F) it is used for all the relays configured as auxiliary 5.

**AR14** **Differential for aux relay 5 (0,1÷25,0°C/1÷50°F)** Intervention differential for relay AUX5**.**
**Cooling (AR15 = CL):** Cut IN is AR13+ AR14. Cut OUT is when the temperature reaches the set point AR13.
**Heating (AR15=Ht):** Cut IN is AR13- AR14. Cut OUT is when the temperature reaches the set point. AR13

**AR15** **Kind of action for aux. 5**
**CL =** cooling
**Ht =** heating

**AR16** **Set point for auxiliary relay 6** (-40÷110°C/-40÷230°F) it is used for all the relays configured as auxiliary 6.

**AR17** **Differential for aux relay 6 (0,1÷25,0°C/1÷50°F)** Intervention differential for relay AUX6**.**
**Cooling (AR18 = CL):** Cut IN is AR16+ AR17. Cut OUT is when the temperature reaches the set point AR16.
**Heating (AR18=Ht):** Cut IN is AR16- AR17. Cut OUT is when the temperature reaches the set point. AR16

**AR18** **Kind of action for aux. 6**
**CL =** cooling
**Ht =** heating

**AR19** **Auxiliary output 1 delay, when activated by digital input**
*Range:* 0÷5000
*UM:* sec

**AR20** **Auxiliary output 2 delay, when activated by digital input**
*Range:* 0÷5000
*UM:* sec

**AR21** **Auxiliary output 3 delay, when activated by digital input**
*Range:* 0÷5000
*UM:* sec

**AR22** **Auxiliary output 4 delay, when activated by digital input**
*Range:* 0÷5000
*UM:* sec

**AR23** **Auxiliary output 5 delay, when activated by digital input**
*Range:* 0÷5000
*UM:* sec

**AR24** **Auxiliary output 6 delay, when activated by digital input**
*Range:* 0÷5000
*UM:* sec

**AR25** **Auxiliary output 7 delay, when activated by digital input**
*Range:* 0÷5000
*UM:* sec

**AR26** **Auxiliary output 8 delay, when activated by digital input**
*Range:* 0÷5000
*UM:* sec

## 6.1.28 Superheat Circuit 1(ASH1- ASH7)

**ASH1** **Differential for superheat pre-alarm 1** **(**0.1 to 15.0°C/ 1 to 30°F)

**ASH2** **Lower limit of suction superheat alarm 1** **(**0.1 to 15.0°C/ 1 to 30°F)

**ASH3** **Delay for signalling suction superheat alarm 1** **(**0 to 5000 sec, resolution 10 sec;)

**ASH4** **Delay for signalling suction superheat alarm 1** **(**0÷255sec)

**ASH5** **Switching off compressors for alarm ASH2 (**No;Yes)

**ASH6** **Differential to restart suction superheat alarm control 1 (**0.1÷15.0°C; 1 to 30°F; according to CF26)

**ASH7** **Delay to restart control after superheat > ASH2+ASH6 (**0÷5000sec, Res. 10 sec)

## 6.1.29 Hot gas injection valve 1 for SH control (ASH8-ASH9)

**ASH8** **Superheat value 1 at which to enable valve 1 for injecting hot gas (hot action)**
**(**0.1÷15.0°C; 1 to 30°F; according to CF26)

**ASH9** **Differential for ASH8 (**0.1÷15.0°C; 1 to 30°F; to CF26)

## 6.1.30 Superheat Circuit 2(ASH10- ASH16)

**ASH10** **Differential for superheat pre-alarm 2** **(**0.1÷15.0°C; 1 to 30°F; according to CF26)

**ASH11** **Bottom limit of suction superheat alarm 2 (**0.1÷15.0°C; 1 to 30°F; according to CF26)

**ASH12** **Delay for signalling suction pre-superheat alarm 2 (**0÷5000sec; *Resolution:* 10 sec)

**ASH13** **Delay for signalling suction superheat alarm 2** **(**0÷255sec)

**ASH14** **Switching off compressors for alarm ASH11 (**No; Yes)

**ASH15** **Differential for restarting suction superheat alarm control 2**
**(**0.1÷15.0°C; 1 to 30°F*;* according to CF26)

**ASH16** **Delay for restarting control after superheat > ASH11+ASH15**
(0÷5000sec; *Resolution:* 10 sec)

## 6.1.31 Hot gas injection valve 2 for SH control (ASH17-ASH18)

**ASH17** **Superheat value 2 at which to enable valve 2 for injecting hot gas (hot action)**
(0.1÷15.0°C; 1 to 30°F; according to CF26)

**ASH18** **Differential for ASH17 (**0.1÷15.0°C; 1÷30°F; according to CF26)

## 6.1.32 Superheat Alarm relay (ASH19)

**ASH19 Alarm relay selection for superheat 1 and 2 alarms**
(nu = no alarm relay activation; ALr = general alarm relay activation; ALr1 = Alarm 1 relay activation; ALr2 = Alarm 2 relay activation)

## 6.1.33 Hot gas injection valves controlled by temperatura control (ASH20-ASH25)

**ASH20 Hot gas valve circuit 1 activated also by temperature control (**no, yes**)**

**ASH21 Suction 1 temperature value at which the hot gas valve is enabled (hot action)**
**(**-50÷110°C/ -58 to 230°F; according to CF26)

**ASH22 Differential for ASH21** (0.1÷15.0°C; 1 to 30°F; according to CF26)

**ASH23 Hot gas valve circuit 2 activated also by temperature control (no, yes)**

**ASH24 Suction 2 temperature value, at which the hot gas valve is enabled (hot action)**
**(**-50÷110°C/ -58 to 230°F; according to CF26)

**ASH25 Differential for ASH24** (0.1÷15.0°C; 1 to 30°F; according to CF26)

## 6.1.34 Liquid injection valves (ASH26-ASH42)

**ASH26 Liquid injection valve circuit 1 activated also by SH control (no, yes)**

**ASH27 High Superheat value of circuit 1 to enable liquid injection (cooling action)**
**(**1.0÷100.0°C; 1 to 180°F; according to CF26)

**ASH28 Differential for ASH27** (0.1÷15.0°C; 1 to 30°F; according to CF26)

**ASH29 Liquid injection valve circuit 2 activated also by SH control (no, yes)**

**ASH30 High Superheat value of circuit 2 to enable liquid injection (cooling action)**
**(**1.0÷100.0°C; 1 to 180°F; according to CF26)

**ASH31 Differential for ASH30** (0.1÷15.0°C; 1 to 30°F; according to CF26)

**ASH32 Liquid injection valve, circuit 1, activated also by temperature control (no, yes)**

**ASH33 Delay after compressor start, before initiatingthe suction temperature control:**
This delay is used both for circuit 1 and circuit 2. (0÷15min)

**ASH34 Suction 1 temperature value at which the liquid injection valve is enabled (cooling action)**
**(**-50÷110°C/ -58 to 230°F; according to CF26)

**ASH35 Differential for ASH34** (0.1÷15.0°C; 1 to 30°F; according to CF26)

**ASH36 Liquid injection valve, circuit 2, activated also by temperature control (no, yes)**

**ASH37 Suction 2 temperature value at which the liquid injection valve is enabled (cooling action)**
**(**-50÷110°C/ -58 to 230°F; according to CF26)

**ASH38 Differential for ASH37** (0.1÷15.0°C; 1 to 30°F; according to CF26)

**ASH39 On time for liquid injection valve circuit 1**
*Range:* 3÷500
*UM:* sec
*Resolution:* 1 sec

**ASH40 Off time for liquid injection valve Circuit 1**
*Range:* 0÷500
*UM:* sec
*Resolution:* 1 sec

**ASH41 On time for liquid injection valve Circuit 2**
*Range:* 3÷500
*UM:* sec
*Resolution:* 1 sec

**ASH42 Off time for liquid injection valve Cicuit 2**
*Range:* 0÷500
*UM:* sec
*Resolution:* 1 sec

## 6.1.35 Discharge temperature management and alarms (DSC1-DSC14)

**DSC1 Circuit 1, Liquid injection valve activated also by discharge temperature**
*Range*: 0÷1
0: no
1: yes

**DSC2 Circuit 1, discharge temperature threshold to activate the liquid injection valve**
*Range:* 0.0÷150.0°C; 32 to 302°F
*UM:* according to CF26

**DSC3 Circuit 1, Differential for DSC2**
*Range:* 0.1÷15.0°C; 1 to 30°F
*UM:* according to CF26

**DSC4 Circuit 1, High discharge temperature alarm, circuit 1**
*Range:* 0.0÷150.0°C; 32 to 302°F
*UM:* according to CF26

**DSC5 Circuit 1, High discharge temperature alarm delay**
*Range:* 0÷60
*UM:* min

**DSC6 Circuit 1, Delay before stopping compressors, with High discharge temperature alarm:**
*Range:* 0÷255
*UM:* min

**DSC7 Circuit 1, Interval between 2 compressors turning off in case of high discharge temperature alarm:**
*Range:* 0÷255
*UM:* sec

**DSC8 Circuit 2, Liquid injection valve activated also discharge temperature**
*Range*: 0÷1
0: no
1: yes

**DSC9 Circuit 2, discharge temperature threshold to activate the liquid injection valve**
*Range:* 0.0÷150.0°C; 32 to 302°F
*UM:* according to CF26

**DSC10 Circuit 2, Differential for DSC9** e **DSC11**
*Range:* 0.1÷15.0°C; 1 to 30°F
*UM:* according to CF26

**DSC11 Circuit 2, High discharge temperature alarm**

*Range:* 0.0÷150.0°C; 32 to 302°F
*UM:* according to CF26

**DSC12 Circuit 2, High discharge temperature alarm delay**
*Range:* 0÷60
*UM:* min

**DSC13 Circuit 2, Delay before stopping compressors, with high discharge temperature alarm:**
*Range:* 0÷255
*UM:* min

**DSC14 Circuit 2, Interval between 2 compressors turning off in case of high discharge temperature alarm:**
*Range:* 0÷255
*UM:* sec

## 6.1.36 Gas Leak Detector(GLD1-GLD24)

When configured rack leak detection monitors PPM reading from refrigerant leak sensor. In the event leak is detected at value GLD3 iPro calls alarm : GLeak1(2) PreAlm. GLeak1(2) PreAlm is for signalling only and clears automatically when PPM reaches levels below GLD3. When leak is detected at GLD4 iPro calls GLeak1(2) Alarm. In the event GLeak1(2) Alarm initiate rack shut down.

**GLD1 Pre-alarm threshold for Gas Leak Detector 1**
*Range:* 0÷GLD2
*UM:* PPM

**GLD2 Alarm threshold for Gas Leak Detector 1**
*Range:* GLD1÷50000
*UM:* PPM

**GLD3 Differential for Gas Leak pre-alarm recover Detector 1**
*Range:* 1÷50000
*UM:* PPM

**GLD4 Relay activation in case of Gas Leak pre-alarm Detector 1**
*Range:* 0÷8
0: nu
1: Aux. output 1
2: Aux. output 2
3: Aux. output 3
4: Aux. output 4
5: Aux. output 5
6: Aux. output 6
7: Aux. output 7
8: Aux. output 8

**GLD5 Relay activation in case of Gas Leak alarm Detector 1**
*Range:* 0÷8
0: nu
1: Aux. output 1
2: Aux. output 2
3: Aux. output 3
4: Aux. output 4
5: Aux. output 5
6: Aux. output 6
7: Aux. output 7
8: Aux. output 8

**GLD6 Pre-alarm threshold for Gas Leak Detector 2**
*Range:* 0÷GLD7
*UM:* PPM

**GLD7 Alarm threshold for Gas Leak Detector 2**
*Range:* GLD6÷50000
*UM:* PPM

**GLD8 Differential for Gas Leak pre-alarm recover Detector 2**
*Range:* 1÷50000
*UM:* PPM

**GLD9 Relay activation in case of Gas Leak pre-alarm Detector 2**
Range: 0÷8
0: nu
1: Aux. output 1
2: Aux. output 2
3: Aux. output 3
4: Aux. output 4
5: Aux. output 5
6: Aux. output 6
7: Aux. output 7
8: Aux. output 8

**GLD10 Relay activation in case of Gas Leak alarm Detector 2**
Range: 0÷8
0: nu
1: Aux. output 1
2: Aux. output 2
3: Aux. output 3
4: Aux. output 4
5: Aux. output 5
6: Aux. output 6
7: Aux. output 7
8: Aux. output 8

**GLD11 Pre-alarm threshold for Gas Leak Detector 3 (**0÷GLD12)
*Range:* 0÷GLD12
*UM:* PPM

**GLD12 Alarm threshold for Gas Leak Detector 3** (GLD11÷50000 PPM)
*Range:* GLD11÷50000
*UM:* PPM

**GLD13 Differential for Gas Leak pre-alarm recover Detector 3**
*Range:* 1÷50000
*UM:* PPM

**GLD14 Relay activation in case of Gas Leak pre-alarm Detector 3**
Range: 0÷8
0: nu
1: Aux. output 1
2: Aux. output 2
3: Aux. output 3
4: Aux. output 4
5: Aux. output 5
6: Aux. output 6
7: Aux. output 7
8: Aux. output 8

**GLD15 Relay activation in case of Gas Leak alarm Detector 3**
Range: 0÷8
0: nu
1: Aux. output 1
2: Aux. output 2
3: Aux. output 3
4: Aux. output 4

5: Aux. output 5
6: Aux. output 6
7: Aux. output 7
8: Aux. output 8

**GLD16 Pre-alarm threshold for Gas Leak Detector 4 (**0÷GLD17)
*Range:* **0**÷ GLD17
*UM:* PPM

**GLD17 Alarm threshold for Gas Leak Detector 4** (GLD16÷50000 PPM)
*Range:* GLD16÷50000
*UM:* PPM

**GLD18 Differential for Gas Leak pre-alarm recover Detector 4** (1÷50000 PPM)
*Range:* 1÷50000
*UM:* PPM

**GLD19 Relay activation in case of Gas Leak pre-alarm Detector 4 (nu,** Aux. output 1, …, Aux output 8**)**
Range: 0÷8
0: nu
1: Aux. output 1
2: Aux. output 2
3: Aux. output 3
4: Aux. output 4
5: Aux. output 5
6: Aux. output 6
7: Aux. output 7
8: Aux. output 8

**GLD20 Relay activation in case of Gas Leak alarm Detector 4 (nu,** Aux. output 1, …, Aux output 8)
Range: 0÷8
0: nu
1: Aux. output 1
2: Aux. output 2
3: Aux. output 3
4: Aux. output 4
5: Aux. output 5
6: Aux. output 6
7: Aux. output 7
8: Aux. output 8

**GLD21 Differential for Gas Leak alarm recover Detector 1**
*Range:* 1÷50000
*UM:* PPM

**GLD22 Differential for Gas Leak alarm recover Detector 2**
*Range:* 1÷50000
*UM:* PPM

**GLD23 Differential for Gas Leak alarm recover Detector 3**
*Range:* 1÷50000
*UM:* PPM

**GLD24 Differential for Gas Leak alarm recover Detector 4**
*Range:* 1÷50000
*UM:* PPM

## 6.1.37 Other (OT1-OT7)

**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

**OT7** **EEPROM map identification,** read only, for internal use.
*Range:* 1 ÷ 255

***Note: OT7 only can be changed from Wizmate; it is read only for Viso.***

## 6.1.38 DIGITAL-INPUTS Configuration (DIC1-DIC43)

**DIC 1** Configuration Digital Input 1 (0÷187c)
**DIC 2** Configuration Digital Input 2 (0÷187c)
**DIC 3** Configuration Digital Input 3 (0÷187c)
**DIC 4** Configuration Digital Input 4 (0÷187c)
**DIC 5** Configuration Digital Input 5 (0÷187c)
**DIC 6** Configuration Digital Input 6 (0÷187c)
**DIC 7** Configuration DIgital Input 7 (0÷187c)
**DIC 8** Configuration Digital Input 8 (0÷187c)
**DIC9** Configuration Digital Input 9 (0÷187c)
**DIC 10** Configuration Digital Input 10 (0÷187c)
**DIC 11** Configuration Digital Input 11 (0÷187c)
**DIC 12** Configuration Digital Input 12 (0÷187c) *(Only for IPRC215D)*
**DIC 13** Configuration Digital Input 13 (0÷187c) *(Only for IPRC215D)*
**DIC 14** Configuration Digital Input 14 (0÷187c) *(Only for IPRC215D)*
**DIC 15** Configuration Digital Input 15 (0÷187c) *(Only for IPRC215D)*
**DIC 16** Configuration Digital Input 16 (0÷187c) *(Only for IPRC215D)*
**DIC 17** Configuration Digital Input 17 (0÷187c) *(Only for IPRC215D)*
**DIC 18** Configuration Digital Input 18 (0÷187c) *(Only for IPRC215D)*
**DIC19** Configuration Digital Input 19 (0÷187c) *(Only for IPRC215D)*
**DIC 20** Configuration Digital Input 20 (0÷187c) *(Only for IPRC215D)*
**DIC 21** Configuration Digital Input 21 (0÷187c)
**DIC 22** Configuration Digital Input 22 (0÷187c)
**DIC 23** Configuration Digital Input 23 (0÷187c)
**DIC 24** Configuration Digital Input 24 (0÷187c) *(Only for IPRC215D)*
**DIC 25** Configuration Digital Input 25 (0÷187c) *(Only for IPRC215D)*
**DIC 26** Configuration Digital Input 26 (0÷187c) *(Only for IPRC215D)*
**DIC 27** Configuration Digital Input 27 (0÷187c) *(Only for IPRC215D)*
**DIC 28** Configuration Digital Input 28 (0÷187c) *(Only for IPRC215D)*
**DIC 29** Configuration Digital Input 29 (0÷187c) *(Only for IPRC215D)*
**DIC 30** Configuration Digital Input 30 (0÷187c) *(Only for IPRC215D)*
**DIC 31** Configuration Digital Input 31 (0÷187c) *(Only for IPRC215D)*
**DIC 32** Configuration Digital Input 32 (0÷187c) *(Only for IPRC215D)*
**DIC 33** Configuration Digital Input 33 (0÷187c) *(Only for IPRC215D)*
**DIC 34** Configuration Digital Input 34 (0÷187c) *(Only for IPRC215D)*
**DIC 35** Configuration Digital Input 35 (0÷187c) *(Only for IPRC215D)*
**DIC 36** Configuration Digital Input 36 (0÷187c) *(Only for IPRC215D)*
**DIC 37** Configuration Digital Input 37 (0÷187c) *(Only for IPRC215D)*
**DIC 38** Configuration Digital Input 38 (0÷187c) *(Only for IPRC215D)*
**DIC 39** Configuration Digital Input 39 (0÷187c) *(Only for IPRC215D)*
**DIC 40** Configuration Digital Input 40 (0÷187c) *(Only for IPRC215D)*

**DIC 41** Configuration Digital Input 41 (0÷187c) *(Only for IPRC215D)*
**DIC 42** Configuration Digital Input 42 (0÷187c) *(Only for IPRC215D)*
**DIC 43** Configuration Digital Input 43 (0÷187c) *(Only for IPRC215D)*

## 6.1.39 DIGITAL-OUTPUTS (parameters DOC1- DOC36)

**DOC 1** Configuration Digital Output 1 (0÷150c)
**DOC 2** Configuration Digital Output 2 (0÷150c)
**DOC 3** Configuration Digital Output 3 (0÷150c)
**DOC 4** Configuration Digital Output 4 (0÷150c)
**DOC 5** Configuration Digital Output 5 (0÷150c)
**DOC 6** Configuration Digital Output 6 (0÷150c)
**DOC 7** Configuration Digital Output 7 (0÷150c)
**DOC 8** Configuration Digital Output 8 (0÷150c)
**DOC 9** Configuration Digital Output 9 (0÷150c) *(Only for IPRC215D)*
**DOC 10** Configuration Digital Output 10 (0÷150c) *(Only for IPRC215D)*
**DOC 11** Configuration Digital Output 11 (0÷150c) *(Only for IPRC215D)*
**DOC 12** Configuration Digital Output 12 (0÷150c) *(Only for IPRC215D)*
**DOC 13** Configuration Digital Output 13 (0÷150c) *(Only for IPRC215D)*
**DOC 14** Configuration Digital Output 14 (0÷150c) *(Only for IPRC215D)*
**DOC 15** Configuration Digital Output 15 (0÷150c) *(Only for IPRC215D)*
**DOC 16** Configuration Digital Output 16 (0÷150c)
**DOC 17** Configuration Digital Output 17 (0÷150c)
**DOC 18** Configuration Digital Output 18 (0÷150c)
**DOC 19** Configuration Digital Output 19 (0÷150c)
**DOC 20** Configuration Digital Output 20 (0÷150c)
**DOC 21** Configuration Digital Output 21 (0÷150c)
**DOC 22** Configuration Digital Output 22 (0÷150c) *(Only for IPRC215D)*
**DOC 23** Configuration Digital Output 23 (0÷150c) *(Only for IPRC215D)*
**DOC 24** Configuration Digital Output 24 (0÷150c) *(Only for IPRC215D)*
**DOC 25** Configuration Digital Output 25 (0÷150c) *(Only for IPRC215D)*
**DOC 26** Configuration Digital Output 26 (0÷150c) *(Only for IPRC215D)*
**DOC 27** Configuration Digital Output 27 (0÷150c) *(Only for IPRC215D)*
**DOC 28** Configuration Digital Output 28 (0÷150c) *(Only for IPRC215D)*
**DOC 29** Configuration Digital Output 29 (0÷150c) *(Only for IPRC215D)*
**DOC 30** Configuration Digital Output 30 (0÷150c) *(Only for IPRC215D)*
**DOC 31** Configuration Digital Output 31 (0÷150c) *(Only for IPRC215D)*
**DOC 32** Configuration Digital Output 32 (0÷150c) *(Only for IPRC215D)*
**DOC 33** Configuration Digital Output 33 (0÷150c) *(Only for IPRC215D)*
**DOC 34** Configuration Digital Output 34 (0÷150c) *(Only for IPRC215D)*
**DOC 35** Configuration Digital Output 35 (0÷150c) *(Only for IPRC215D)*
**DOC 36** Configuration Digital Output 36 (0÷150c) *(Only for IPRC215D)*

## 6.1.40 ANALOG-OUTPUTS (parameters AOC1- AOC15)

**AOC 1** Configuration Analog Output 1
Range; IPRC215D/IPR210D: TAB B
**AOC 2** Configuration Analog Output 2
Range: IPRC215D/IPR210D: TAB B
**AOC 3** Configuration Analog Output 3
Range:; IPRC215D/IPR210D: TAB B
**AOC 4** Configuration Analog Output 4
Range:; IPRC215D/IPR210D: TAB B
**AOC 5** Configuration Analog Output 5 *(Only for IPRC215D)*
Range: IPRC215D/IPR210D: TAB A
**AOC 6** Configuration Analog Output 6 *(Only for IPRC215D)*
Range: IPRC215D/IPR210D: TAB A
**AOC 7** Configuration Analog Output 6
Range: IPX206D/IPX106D TAB D
**AOC 8** Configuration Analog Output 6
Range: IPX206D/IPX106D TAB D
**AOC 9** Configuration Analog Output 6

Range: IPX206D/IPX106D TAB D

**AOC 10** Configuration Analog Output 6 *(Only for IPRC215D)*
Range: IPX215D/IPX125D TAB D

**AOC 11** Configuration Analog Output 6 *(Only for IPRC215D)*
Range: IPX215D/IPX125D TAB D

**AOC 12** Configuration Analog Output 6 *(Only for IPRC215D)*
Range: IPX215D/IPX125D TAB D

**AOC 13** Configuration Analog Output 6 *(Only for IPRC215D)*
Range: IPX215D/IPX125D TAB D

**AOC 14** Configuration Analog Output 6 *(Only for IPRC215D)*
Range: IPX215D/IPX125D TAB C

**AOC 15** Configuration Analog Output 6 *(Only for IPRC215D)*
Range: IPX215D/IPX125D TAB C

**Note**: about TAB A, TAB B, TAB C, TAB D, please reference to 5.1.3 **ANALOG-OUTPUTS (parameters AOC1- AOC15)**

## 6.1.41 ANALOG-INPUTS (parameters AIC1- AIC35)

**AIC 1** Configuration Analog Input 1 (0÷204)
**AIC 2** Configuration Analog Input 2 (0÷204)
**AIC 3** Configuration Analog Input 3 (0÷204)
**AIC 4** Configuration Analog Input 4 (0÷204)
**AIC 5** Configuration Analog Input 5 (0÷204)
**AIC 6** Configuration Analog Input 6 (0÷204)
**AIC 7** Configuration Analog Input 7 (0÷204) *(Only for IPRC215D)*
**AIC 8** Configuration Analog Input 8 (0÷204) *(Only for IPRC215D)*
**AIC 9** Configuration Analog Input 9 (0÷204) *(Only for IPRC215D)*
**AIC 10** Configuration Analog Input 10 (0÷204) *(Only for IPRC215D)*
**AIC 11** Configuration Analog Input 11 (0÷204)
**AIC 12** Configuration Analog Input 12 (0÷204)
**AIC 13** Configuration Analog Input 13 (0÷204)
**AIC 14** Configuration Analog Input 14 (0÷204)
**AIC 15** Configuration Analog Input 15 (0÷204)
**AIC 16** Configuration Analog Input 16 (0÷202)
**AIC 17** Configuration Analog Input 17 (0÷202)
**AIC 18** Configuration Analog Input 18 (0÷202) *(Only for IPRC215D)*
**AIC 19** Configuration Analog Input 19 (0÷202) *(Only for IPRC215D)*
**AIC 20** Configuration Analog Input 20 (0÷202) *(Only for IPRC215D)*
**AIC 21** Configuration Analog Input 21 (0÷202) *(Only for IPRC215D)*
**AIC 22** Configuration Analog Input 22 (0÷202) *(Only for IPRC215D)*
**AIC 23** Configuration Analog Input 23 (0÷202) *(Only for IPRC215D)*
**AIC 24** Configuration Analog Input 24 (0÷202) *(Only for IPRC215D)*
**AIC 25** Configuration Analog Input 25 (0÷202) *(Only for IPRC215D)*
**AIC 26** Configuration Analog Input 26 (0÷202) *(Only for IPRC215D)*
**AIC 27** Configuration Analog Input 27 (0÷202) *(Only for IPRC215D)*
**AIC 28** Configuration Analog Input 28 (0÷198)
**AIC 29** Configuration Analog Input 29 (0÷198)
**AIC 30** Configuration Analog Input 30 (0÷198)
**AIC 31** Configuration Analog Input 31 (0÷198)
**AIC 32** Configuration Analog Input 32 (0÷198) *(Only for IPRC215D)*
**AIC 33** Configuration Analog Input 33 (0÷198) *(Only for IPRC215D)*
**AIC 34** Configuration Analog Input 34 (0÷198) *(Only for IPRC215D)*
**AIC 35** Configuration Analog Input 35 (0÷198) *(Only for IPRC215D)*

## 6.1.42 Coresense configuration (CO1- CO30)

**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. - *IPRC215D 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. - *IPRC215D 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. - *IPRC215D 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. - *IPRC215D 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. - *IPRC215D 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. - *IPRC215D 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. - *IPRC215D only-*** Serial address of the coresense connected to the digital output 15 (93-88 connection) **(1-15; "nu" means not used)**

**Configuration of CO16 - CO30,** to configure coresense model type:

**CO16 Coresense model 1**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO17 Coresense model 2**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO18 Coresense model 3**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO19 Coresense model 4**
Range: 1÷3

1=R112
2=R1011
3=R1501

**CO20 Coresense model 5**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO21 Coresense model 6**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO22 Coresense model 7**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO23 Coresense model 8**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO24 Coresense model 9**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO25 Coresense model 10**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO26 Coresense model 11**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO27 Coresense model 12**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO28 Coresense model 13**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO29 Coresense model 14**
Range: 1÷3
1=R112
2=R1011
3=R1501

**CO30 Coresense model 15**
Range: 1÷3
1=R112
2=R1011
3=R1501

**NOTE:**
**The IProRACK recognized the 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)**

## 6.1.43 HVAC COOLING CONTROL (CC01-CC07)

**CC01 Activation delay between Pump and Solenoid valve**
Range 0÷600 sec

**CC02 De-activation delay between Solenoid valve and Pump**
Range 0÷600 sec

**CC03 Set point for Pump for HVAC control**
Range -50.0°C ÷ 100.0°C; -58 ÷ 212 °F;

**CC04 Differential for CC03**
Range 0.1 ÷ 30.0°C; 1÷ 54°F

**CC05 Gascooler outlet temperature threshold to enable the HVAC stop**
Range -50.0°C ÷ 100.0°C; -58 ÷ 212 °F;

**CC06 HVAC stop delay with suction temperature > SETC1 + differential + parallel compr. at 100% + gas** cooler outlet temperature > CC05
Range 0÷255 min

**CC07 HVAC enabling delay after stop for high temperature conditions**
Range 0÷255 min

## 6.1.44 GAS COOLER HEAT RECLAIM HTRC (HTRC0-HTRC46)

**HTRC0 Type of input for Pressure modulation during Heat reclaim**
(0 = Voltage; 1 = temperature )

**HTRC1** Start point for the HR regulation
*Range*: 0.000 ÷ HTRC2 V; 4.000 ÷ HTCR2 mA

**HTRC2 End point for the HR regulation**
*Range*: HTRC1÷10.000 V; HTCR1÷20.000 mA

**HTRC3 Pressure set point to use when the HR input has the HTRC1 value**
*Range*: 50.00÷HTRC4 bar; 725÷HTRC4 PSI; 5000÷HTRC4 KPA
*UM*: according to CF26

**HTRC4 Pressure set point to use when the HR input has the HTRC2 value**
*Range*: HTRC3÷120.00 bar; HTRC3÷1740 PSI; HTRC3÷12000 KPA
*UM*: according to CF26

**HTRC5 Delta pressure step from H-R to Normal Regulation**
*Range*: 0.10÷15.00 bar; 1÷220PSI; 10÷1500 KPA
*UM*: according to CF26

**HTRC6 Time for the HTRC5 pressure step from H-R to normal regulation**

*Range*: 1÷15
*UM*: min

**HTRC7 Low discharge temperature to stop H-R**
*Range*: -40.0÷150°C; -40÷302°F
*UM*: according to CF26

**HTRC8** Differential to restart H-R when is stopped by low discharge temperature
*Range*: 0.1÷15.0°C; 1÷30°F
*UM*: according to CF26

**HTRC9 Heat reclaim stop delay with discharge temperature below HTRC7**
*Range*: 1÷15
*UM*: min

**HTRC10 Low post exchanger CO2 temperature to stop H-R**
*Range*: -40.0÷150°C; -40÷302°F
*UM*: according to CF26

**HTRC11 Differential to restart H-R when is stopped by low post exchanger temperature**
*Range*: 0.1÷15.0°C; 1÷30°F
*UM*: according to CF26

**HTRC12 Heat reclaim stop delay with post heat exchanger temperature below HTRC10**
*Range*: 1÷15
*UM*: min

**HTRC13 H-R restart time when is stopped by: no one compressor running, low discharge temperature, low post heat exchanger temperature**
*Range*: 0÷60
*UM*: min

**HTRC14 Water tank temperature set point (HTRC0 = 1) for HR1**
*Range*: 10÷90°C; 50÷194°F
*UM*: according to CF26

**HTRC15 Water tank temperature regulation band (HTRC0 = 1) for HR1**
*Range*: 1÷30°C; ~~1~~ 2÷60°F
*UM*: according to CF26

**HTRC16 Temperature differential set point at outlet and inlet of HR1 (HTRC0 = 1)**
*Range*: 1÷30°C; 1÷60°F
*UM*: according to CF26

**HTRC17 Temperature differential regulation band (HTRC0 = 1) for HR1**
*Range*: 1÷30°C; ~~1~~ 2÷60°F
1÷60°F
*UM*: according to CF26

**HTRC18 Delta pressure step from Normal Regulation to H-R regulation**
*Range*: 0.1÷15.0bar; 1÷220PSI; 10÷1500KPA
*UM*: according to CF26

**HTRC19 Time for the HTRC16 pressure step from Normal Regulation to H-R regulation**
*Range*: 1÷15
*UM*: min

**HTRC20 Low HR2 outlet temperature to stop H-R, when H-R 2 is working. It's detected by the probe set as Tphr2**
*Range*: -40÷150°C; -40÷302°F
*UM*: according to CF26

**HTRC21 Heat reclaim stop delay with HR2 outlet temperature below HTRC20**

*Range*: 1÷15
*UM*: min

**HTRC22 Water tank temperature set point for HR2**
*Range*: 10÷90°C; 50÷194°F
*UM*: according to CF26

**HTRC23 Water tank temperature regulation band for HR2**
*Range*: 1÷30°C; ~~1~~ 2÷60°F
*UM*: according to CF26

**HTRC24 Temperature differential set point at outlet and inlet of HR2**
*Range*: 1÷30°C; 1÷60°F
*UM*: according to CF26

**HTRC25 Temperature differential regulation band for HR2**
*Range*: 1÷30°C; ~~1~~ 2÷60°F
*UM*: according to CF26

**HTRC26 HR1 min analog output**
*Range*: 0÷HTRC27
*UM*: %

**HTRC27 HR1 max analog output**
*Range*: HTRC26÷100
*UM*: %

**HTRC28 Max % variation of HR1 analog output per second** 1÷100
*Range*: 1÷100
*UM*: %

**HTRC29 HR2 min analog output**
*Range*: 0÷HTRC30
*UM*: %

**HTRC30 HR2 max analog output**
*Range*: HTRC29÷100
*UM*: %

**HTRC31 Max % variation of HR2 analog output per second** 1÷100
*Range*: 1÷100
*UM*: %

**HTRC32 Time for flow switch 1 verification**
*Range*: 0÷15
*UM*: sec

**HTRC33 Time for flow switch 2 verification**
*Range*: 0÷15
*UM*: sec

**HTRC34 Time pump 1 on after reaching the set point**
*Range*: 0÷600
*UM*: sec

**HTRC35 Time pump 2 on after reaching the set point**
*Range*: 0÷600
*UM*: sec

**HTRC36 With HTRC0 = 1, Pump 1 regulation tank or differential**
Range: 0÷1
0 = Tank; 1 = Differential

**HTRC37 Pump 2 regulation: tank water or differential**
Range: 0÷1
0 = Tank; 1 = Differential
**HTRC38 Gas cooler by-pass enabled**
Range: 0÷1
0 = no; 1 = yes

**HTRC39 Differential for gas cooler by pass enabled**
*Range*: 0.0÷20.0°C; 0÷36°F
*UM*: according to CF26

**HTRC40 Time for confirmation of gas cooler bypass activation**
*Range*: 0÷600s

**HTRC41 Water tank high temperature alarm for HR1**
*Range*: 10÷100°C; 50÷212°F
*UM*: according to CF26

**HTRC42 Water tank high temperature alarm for HR2**
*Range*: 10÷100°C; 50÷212°F
*UM*: according to CF26

**HTRC43** End pont for gas cooler by-pass during HR
*Range*: HTRC2÷HTCR44 V; HTCR2÷ HTCR44 mA

**HTRC44** Start pont for gas cooler by-pass during HR
*Range*: HTRC43÷10.00 V; HTCR43÷ 20.00 mA

**HTRC45** Differential to disabled gas cooler by pass
*Range*: 1.00÷10.00bar; 14÷145PSI; 100÷1000KPA
*UM*: according to CF26

**HTRC46 Disable heat reclaim in case of low liquid level in the flash tank**
*Range*: 0÷1
0 = no; 1 = yes;

**HTRC47 Disable heat reclaim in case of MT compressor (circuit 1 compressors) off** (no-yes)
*Range*: 0÷1
0 = no; 1 = yes;
If all the medium temperature compressors are off, it's possible to decide if Heat Reclaim will be disabled or keep on working

## 6.1.45 Gas cooler (GC1-GC111)

### 6.1.45.1 TRANSCRITICAL REGULATION

**GC01 Setpoint for Subcritical and Transcritical mode switch**
*Range*: -3.0÷42.0°C; 27÷108°F
*UM*: according to CF26

**GC02 Hysteresis for Subcritical and Transcritical mode switch**
*Range*: 0.0÷20.0°C; 0÷36°F
*UM*: according to CF26

**GC03 Gas cooler Minimum pressure set point in transcritical mode**
*Range*: 0.00÷200.00 bar; 0÷2900 PSI; 0÷20000 KPA
*UM*: according to CF26

**GC04 Proportional band in transcritical mode for PID regulation of HPV**
*Range*: 0.00÷500.00 bar; 0÷7250 PSI; 0÷50000 KPA
*UM*: according to CF26

**GC05** **Proportional band offset for PID regulation of HPV**
*Range*: -10.0÷50.00 bar; -145÷725 PSI; -1000÷5000 KPA
*UM*: according to CF26

**GC06** **Integral time for PID regulation of HPV**
*Range*: 0÷1000
*UM*: sec

**GC07** **Derivative time for PID regulation of HPV**
*Range*: 0÷1000

**GC11** **Maximum opening percentage for HPV valve**
*Range*: GC12÷100
*UM*: %

**GC12** **Minimum opening percentage for HPV valve**
*Range*: 0÷GC11
*UM*: %

### 6.1.45.2 TRANSCRITICAL MAX PRESSURE - SAFETIES

**GC13** **Maximum allowable pressure set point in gas cooler**
*Range*: 0.00÷200.00 bar; 0÷2900 PSI; 0÷20000 KPA
*UM*: according to CF26
The parameter **GC13** is the maximum allowable pressure set point for gas cooler. If from the formula Temp/press, that maximize the COP in trans mode, a higher value is calculated, the **GC13 value is used** as set point

**GC14** **Set point to restart opening HPV valve after a HP digital input trigger**
*Range*: 0.00÷200.00 bar; 0÷2900 PSI; 0÷20000 KPA
*UM*: according to CF26
After a HP d.i. trigger, the HPV valve doesn't open till the pressure goes below this value.

**GC15** **Safety delay before restarting standard regulation after the HP digital input deactivation**
*Range*: 0÷255
*UM*: sec

**GC18** **Fix opening percentage or subcooling action of HPV in subcritical mode**
*Range*: **0÷100**: the HPV valve is open at this percentage in subcritical mode
**with -1:** the HPV valve is managed to maintain the GC87 subcooling temperature in subcritical mode
*UM*: %

**GC19** **High pressure alarm in gas cooler,** threshold to stop compressors in case of high pressure in the gas cooler, same behavior of AL25
*Range*: 0.00÷150.00 bar; 0÷2175 PSI; 0÷15000 KPA
*UM*: according to CF26
If the condenser pressure reaches the value GC19 and AL27 = YES, the compressor of the circuit 1, parallel, and Circuit 2 are switched off every AL28 sec.
The fans are forced at maximum speed.
The alarm recovers when the pressure goes below GC19 -5bar (72.5PSI).

### 6.1.45.3 FLASH TANK REGULATION

**GC20** **Flash tank pressure setpoint**
*Range*: 0.00÷90.00 bar; 0÷1305 PSI; 0÷9000 KPA
*UM*: according to CF26
*Note*: if parallel compressors are used, the max limit will be SETPC. If the user tries to set GC20 ≥ SETPC, the flash tank pressure set point is forced at SETPC.

**GC21 Proportional band for PID regulation of ByPass Valve (BPV)**
*Range*: 0.00÷500.00 bar; 0÷7250 PSI; 0÷50000 KPA
*UM*: according to CF26

**GC22 Proportional band offset for PID regulation of ByPass Valve (BPV)**
*Range*: 0.00÷500.00 bar; 0÷7250 PSI; 0÷50000 KPA
*UM*: according to CF26

**GC23 Integral time for PID regulation of BPV**
*Range*: 0÷1000
*UM*: sec

**GC24 Derivative sampling time for PID regulation of BPV**
*Range*: 0÷1000
*UM*: sec

**GC25 Derivative time for PID regulation of BPV**
*Range*: 0÷1000
*UM*: sec

**GC26 Maximum opening percentage for BPV**
*Range*: GC27÷100
*UM*: %

**GC27 Minimum opening percentage for BPV**
*Range*: 0÷GC26
*UM*: %

### 6.1.45.4 SAFETIES

**GC28 Flash tank high pressure setpoint alarm**
*Range*: GC29÷150.00 bar; GC29÷2175 PSI; GC29÷15000 KPA
*UM*: according to CF26

**GC29 Flash tank high pressure setpoint Pre-Alarm**
*Range*: 0.00÷GC28 bar; 0÷ GC28 PSI; 0÷ GC28 KPA
*UM*: according to CF26

**GC30 Differential for recovery of flash tank high pressure alarm**
*Range*: 0.00÷500.00 bar; 0÷7250 PSI; 0÷50000 KPA
*UM*: according to CF26

**GC31 Flash tank low pressure setpoint alarm**
*Range*: 0.00÷ GC29 bar; 0÷GC29PSI; 0÷GC29KPA
*UM*: according to CF26

**GC32 Differential for recovery of low pressure alarm**
*Range*: 0.00÷500.00 bar; 0÷7250 PSI; 0÷50000 KPA
*UM*: according to CF26

**GC33 Rate at which the HPV will close in safe mode**
*Range*: 0÷600
*UM*: sec

**GC34 HPV % open during Subcritical with sensor failure**
*Range*: 0÷100
*UM*: %

**GC35 HPV % open during Transcritical with sensor failure**
*Range*: 0÷100
*UM*: %

**GC36 HPV % open during low pressure safety mode**

*Range*: 0÷100
*UM*: %

**GC37 BPV % open during high pressure safety mode**
*Range*: 0÷100
*UM*: %

### 6.1.45.5 XEV20D_1: VALVE SETTINGS

****** WARNING ABOUT THE VALVE SETTING: the unique and valid reference has to be considered the datasheet made by valve manufacturer. Dixell cannot be considered responsible in case of valve damaging due to wrong settings********

**GC38 Valves types for value1 and 2 of XEV20D_1**
*Range*: 1÷4
1: Unipolar
2: Bipolar normal
3: Bipolar wave
4: Bipolar, normal mode, CV

**NOTE:** both the valve must be of the same type: unipolar or bipolar.

**GC39 Max number of steps for valve 1 of XEV20D_1**
*Range*: 0÷800
*UM*: 10step
**NOTE:** the resolution of this parameter is 10 steps. GC39 = 100 means the valve has 1000 steps

**GC40 Min steps for valve 1 of XEV20D_1**
*Range*: 0÷500
*UM*: step
**NOTE:** the resolution of this parameter is 1 step. With GC39 = 100 and GC40 = 30 means the valve has 1000 steps, and the regulation band is between step 30 and step 1000. The controller will consider the 30$^{th}$ step as "zero point" of the regulation.

**GC41 Extra steps for Valve1 during close of XEV20D_1**
*Range*: 0÷500
*UM*: step
**NOTE:** controller will perform additional GC41 steps during closing phase. See documentation of valve manufacturer about the setting of this parameter.

**GC42 Step rate for valve 1 of XEV20D_1**
*Range*: 10÷600
*UM*: step/sec
**NOTE:** both the valve must have the same step rate. If the valves have different step use one XEV20D for each valve.

**GC43 Moving current for valve 1 of XEV20D_1**
*Range*: 0÷100
*UM*: 10mA
**NOTE:** the resolution of this parameter is 10mA. GC43 = 10 means the valve requires 100mA to be moved properly.

**GC44 Holding current for valve 1 of XEV20D_1**
*Range*: 0÷100
*UM*: 10mA
**NOTE:** the resolution of this parameter is 10mA. GC44 = 8 means the valve requires 80mA to hold the position.

**GC45 Max steps for valve 2 of XEV20D_1**
*Range*: 0÷800
*UM*: 10step

**NOTE:** the resolution of this parameter is 10 steps. GC45 = 100 means the valve has 1000 steps

**GC46** **Min steps for valve 2 of XEV20D_1**
*Range*: 0÷500
*UM*: step
**NOTE:** the resolution of this parameter is 1 step. With GC45 = 100 and GC46 = 30 means the valve has 1000 steps, and the regulation band is between step 30 and step 1000. The controller will consider the 30th step as "zero point" of the regulation.

**GC47** **Extra steps for Valve2 close of XEV20D_1**
*Range*: 0÷500
*UM*: step
**NOTE:** controller will perform additional GC41 steps during closing phase. See valve manufacturer documentation about the setting of this parameter.

**GC48** **Step rate for valve 2 of XEV20D_1**
*Range*: 10÷600
*UM*: step/sec
**NOTE:** both the valve must have the same step rate. If the valves have different step use one XEV20D for each valve.

**GC49** **Moving current for valve 2 of XEV20D_1**
*Range*: 0÷100
*UM*: 10mA
**NOTE:** the resolution of this parameter is 10mA. GC49 = 10 means the valve requires 100mA to be moved properly

**GC50** **Hold current for valve 2 of XEV20D_1**
*Range*: 0÷100
*UM*: 10mA
**NOTE:** the resolution of this parameter is 10mA. GC50 = 8 means the valve requires 80mA to hold the position.

**GC51** **Valve 1 of the XEV20D of XEV20D_1 function**
*Range*: 0÷2
**0:** **HPV,** high pressure valve
**1:** **BGV**, by pass valve
**2:** not used

**GC52** **Valve 2 of the XEV20D of XEV20D_1 function**
*Range*: 0÷2
**0:** **HPV,** high pressure valve
**1:** **BGV**, by pass valve
**2:** not used

**GC103** DutyCycle1 Duty Cycle for Valve1 of XEV20D_1
*Range*: 10÷100
*UM*: %

**GC104** DutyCycle2 Duty Cycle for Valve2 of XEV20D_1
*Range*: 10÷100
*UM*: %

### 6.1.45.6 VALVE SERVICE FUNCTIONS

**GC53** **Hour when the HPV calibration mode initiate**
*Range*: 0÷24; 0 = disable
*UM*: hour

**GC54** **HPV Interval days when calibrating happens**
*Range*: 0÷7; 0 = disable
*UM*: day

**GC55 Hour when the BY-PASS VALVE calibration mode initiate**
*Range*: 0÷24; 0 = disable
*UM*: hour

**GC56 BY-PASS VALVE Interval days when calibrating happens**
*Range*: 0÷7; 0 = disable
*UM*: day

**GC57 HPV Calibration T Frame**
*Range*: 0÷12
*UM*: hour

**GC58 HPV Calibration Min Valve%**
*Range*: 0÷100
*UM*: %

**GC59 HPV Calibration Direct**
*Range*: 0÷1
0: Close
1: Open

**GC60 BY-PASS VALVE Calibration T Frame**
*Range*: 0÷12
*UM*: hour

**GC61 BY-PASS VALVE Calibration Min Valve%**
*Range*: 0÷100
*UM*: %

**GC62 BY-PASS VALVE Calibration Direct**
*Range*: 0÷1
0: Close
1: Open

### 6.1.45.7 OTHERS

**GC63 OverrideCMD:if 1, override mode, 0, normal mode** NO(0)-YES(1)
*Range*: 0÷1
0: no
1: yes

**GC64 Override time:1~30 minutes**, when OverrideCMD is from 0 to 1, timer starts running, when timer is up, set 0 to OverrideCMD
*Range*: 1÷30
*UM*: min

### 6.1.45.8 XEV20D_2: VALVE SETTINGS

****** WARNING ABOUT THE VALVE SETTING: the unique and valid reference has to be considered the datasheet made by valve manufacturer. Dixell cannot be considered responsible in case of valve damaging due to wrong settings********

**GC65 Valves types for value1 and 2 of XEV20D_2**
*Range*: 1÷4
1: Unipolar
2: Bipolar normal
3: Bipolar wave
4: Bipolar, normal mode, CV
**NOTE:** both the valve must be of the same type: unipolar or bipolar.

**GC66 Max steps for valve 1 of XEV20D**_2

*Range*: 0÷800
*UM*: 10step
**NOTE:** the resolution of this parameter is 10 steps. GC66 = 100 means the valve has 1000 steps

**GC67 Min steps for valve 1 of XEV20D_2**
*Range*: 0÷500
*UM*: step
**NOTE:** the resolution of this parameter is 1 step. With GC66 = 100 and GC67 = 30 means the valve has 1000 steps, and the regulation band is between step 30 and step 1000. The controller will consider the 30th step as "zero point" of the regulation.

**GC68 Extra steps for Valve1 close of XEV20D_2**
*Range*: 0÷500
*UM*: step
**NOTE:** controller will perform additional GC68 steps during closing phase. See documentation of valve manufacturer about the setting of this parameter.

**GC69 Step rate for valve 1 of XEV20D_2**
*Range*: 10÷600
*UM*: step/sec
**NOTE:** both the valve must have the same step rate. If the valves have different step use one XEV20D for each valve.

**GC70 Moving current for valve 1 of XEV20D_2**
*Range*: 0÷100
*UM*: 10mA
**NOTE:** the resolution of this parameter is 10mA. GC70 = 10 means the valve requires 100mA to be moved properly.

**GC71 Hold current for valve 1 of XEV20D_2**
*Range*: 0÷100
*UM*: 10mA
**NOTE:** the resolution of this parameter is 10mA. GC71 = 8 means the valve requires 80mA to hold the position.

**GC72 Max steps for valve 2 of XEV20D_2**
*Range*: 0÷800
*UM*: 10step
**NOTE:** the resolution of this parameter is 10 steps. GC72 = 100 means the valve has 1000 steps

**GC73 Min steps for valve 2 of XEV20D_2**
*Range*: 0÷500
*UM*: step
**NOTE:** the resolution of this parameter is 1 step. With GC72 = 100 and GC73 = 30 means the valve has 1000 steps, and the regulation band is between step 30 and step 1000. The controller will consider the 30th step as "zero point" of the regulation.

**GC74 Extra steps for Valve2 close of XEV20D_2**
*Range*: 0÷500
*UM*: step
**NOTE:** controller will perform additional GC74 steps during closing phase. See valve manufacturer documentation about the setting of this parameter.

**GC75 Step rate for valve 2 of XEV20D_2**
*Range*: 10÷600
*UM*: step/sec
**NOTE:** both the valve must have the same step rate. If the valves have different step use one XEV20D for each valve.

**GC76 Moving current for valve 2 of XEV20D_2**
*Range*: 0÷100
*UM*: 10mA

**NOTE:** the resolution of this parameter is 10mA. GC76 = 10 means the valve requires 100mA to be moved properly

**GC77** **Hold current for valve 2 of XEV20D_2**
*Range*: 0÷100
*UM*: 10mA
**NOTE:** the resolution of this parameter is 10mA. GC77 = 8 means the valve requires 80mA to hold the position.

**GC78** **Valve 1 of the XEV20D of XEV20D_2**
*Range*: 1÷2
**1:** Unipolar
**2:** Bipolar
**NOTE:** both the valve must be of the same type: unipolar or bipolar.

**GC79** **Valve 2 of the XEV20D of XEV20D_2**
*Range*: 1÷2
**1:** Unipolar
**2:** Bipolar
**NOTE:** both the valve must be of the same type: unipolar or bipolar.

**GC105** **DutyCycle1 Duty Cycle for Valve1 of XEV20D_2**
*Range*: 10÷100
*UM*: %

**GC106** **DutyCycle2 Duty Cycle for Valve2 of XEV20D_2**
*Range*: 10÷100
*UM*: %

### 6.1.45.9 SUBCRITICAL REGULATION

**GC80** **Gas cooler minimum pressure set point in subcritical mode with GC18 = -1**
Range 0÷100 bar, 0÷1450PSI
With GC18 = -1 the HPV valve has to maintain at list this minimum pressure in the gas cooler.
If H-R function is enabled, this minimum pressure could be override by the heat reclaim set point.

**GC81** **Proportional band in subcritical mode for PID regulation of HPV**
*Range*: 0.00÷500.00 bar; 0÷7250 PSI; 0÷50000 KPA
*UM*: according to CF26

**GC82** **Proportional band offset for HPV in subcritical mode**
*Range*: 0.00÷500.00 bar; 0÷7250 PSI; 0÷50000 KPA
*UM*: according to CF26

**GC83** **Integral time for PID regulation of HPV in subcrtical mode**
*Range*: 0÷1000
*UM*: sec

**GC84** **Derivative time for PID regulation of HPV in subcrtical mode**
*Range*: 0÷1000
*UM*: sec

**GC85** **HPV MAX variation percentage every second in subcritical mode**
*Range*: 0÷100% with 0 no limitation

**GC86** **BPV MAX variation percentage every second in subcritical mode**
*Range*: 0÷100% with 0 no limitation

**GC87** **Delta temperature for subcooling function in subcritical mode**
*Range*: 0÷12°C; 0÷24°F

### 6.1.45.10 VALVE HP DYNAMIC LIMITATION

***GC92*** **Sensibility value for HP valve limitation**
Range 0÷3
**0** = Function disabled (Default value)
**1** = Soft limitation
**2** = Medium limitation
**3** = Hard limitation

### 6.1.45.11 GAS COOLER FAN OPTIMIZATION

**GC96** **Duration of fan optimization in case of compressor starts**(100s)
*Range*: 0÷255
*UM*: sec

**GC97** **Minimum fan speed during fan optimization** (20%)
*Range*: 0÷100 with 0 no mimimum speed
*UM*: %

**GC107 Enable HPV pre-set at first compressor activation**
*Range*: 0÷1
0 : NO = function disabled;
1: YES = function enabled

**GC108 HPV opening before first compressor activation**
*Range*: GC12 ÷GC11;
*UM*: %

**GC109 Time HPV remains at GC108 before first compressor activation**
*Range*: 1÷60;
*UM*: s

**GC110 Delay for compressor activation after fan start**
*Range*: 1÷60;
*UM*: s

**GC111 Dynamic flash tank set point**
*Range*: 0÷1;
0 : NO = disabled;
1: YES = enabled

## 6.1.46 De-Superheaters (DSH1-DSH18)

**DSH1** **Minimum set point for the de-superheater 1**
is used for the de-superheat 1
*Range:* -40÷110°C/-40÷230°F
*UM:* According to CF26

**DSH2** **Differential for the de-superheater 1**
is temperature differential between external temperature and the temperature detected at the outlet of the de-superheater 1.
*Range*: 0.0÷12.0°C; 0÷24°F
*UM*: according to CF26

**DSH3** **Regulation band for the de-superheat 1**
*Range*: 0.1÷30.0 °C; 1÷50 °F;
*UM*: according to CF26

**DSH4** **Regulation activation for the de-superheat 1**
*Range*: 0÷3;
*0* ***on*** = Regulation always active if the iProRACK in on.

*1* ***Circ1*** = Regulation on if at least 1 compressor of the circuit 1 is on.
*2* ***Circ2*** = Regulation on if at least 1 compressor of the circuit 2 is on.
*3* ***PC*** = Regulation on if at least 1 Paralell compressor is on.

**DSH5 Minimum value for the analogue Output of de-superheater 1**
*Range*: 0 ÷ DSH6

**DSH6 Maximum value for the analogue Output of de-superheater 1**
*Range*: DSH5 ÷ 100

**DSH7 Minimum set point for the de-superheater 2**
is used for the de-superheat 2
*Range:* -40÷110°C/-40÷230°F
*UM:* According to CF26

**DSH8 Differential for the de-superheat 2**
is temperature differential between external temperature and the temperature detected at the outlet of the de-superheater 2.
*Range*: 0.0÷12.0°C; 0÷24°F
*UM*: according to CF26

**DSH9 Regulation band for the de-superheat 2**
*Range*: 0.1÷30.0 °C; 1÷50 °F;
*UM*: according to CF26

**DSH10 Regulation activation for the de-superheat 2**
*Range*: 0÷3;
*0* ***on*** = Regulation always active if the iProRACK in on.
*1* ***Circ1*** = Regulation on if at least 1 compressor of the circuit 1 is on.
*2* ***Circ2*** = Regulation on if at least 1 compressor of the circuit 2 is on.
*3* ***PC*** = Regulation on if at least 1 Paralell compressor is on.

**DSH11 Minimum value for the analogue Output of de-superheater 2**
*Range*: 0 ÷ DSH12

**DSH12 Maximum value for the analogue Output of de-superheater 2**
*Range*: DSH11 ÷ 100

**DSH13 Minimum set point for the de-superheater 3**
is used for the de-superheat 3
*Range:* -40÷110°C/-40÷230°F
*UM:* According to CF26

**DSH14 Differential for the de-superheat 3**
is temperature differential between external temperature and the temperature detected at the outlet of the de-superheater 3
*Range*: 0.0÷12.0°C; 0÷24°F
*UM*: according to CF26

**DSH15 Regulation band for the de-superheat 3**
*Range*: 0.1÷30.0 °C; 1÷50 °F;
*UM*: according to CF26

**DSH16 Regulation activation for the de-superheat 3**
*Range*: 0÷3;
*0* ***on*** = Regulation always active if the iProRACK in on.
*1* ***Circ1*** = Regulation on if at least 1 compressor of the circuit 1 is on.
*2* ***Circ2*** = Regulation on if at least 1 compressor of the circuit 2 is on.
*3* ***PC*** = Regulation on if at least 1 Paralell compressor is on.

**DSH17 Minimum value for the analogue Output of de-superheater 3**
*Range*: 0 ÷ DSH18

**DSH18** **Maximum value for the analogue Output of de-superheater 3**
*Range*: DSH19 ÷ 100

## 6.1.47 Oil management (OIL1-OIL28)

**OIL1** **Oil management type**
*Range*: 0÷5
- ***0*** Disabled
- ***1*** Oil management according to compressor regulation
- ***2*** Oil management according to low level digital input in oil separator
- ***3*** Oil management according to low and high level digital inputs in oil separator
- ***4*** Oil management according to differential pressure and low level digital inputs
- ***5*** Oil management according to differential pressure and low/high level digital inputs

**OIL2** **ON time Oil injection valve circuit 1**
*Range*: 0÷255
*UM*: sec

**OIL3** **OFF time Oil injection valve circuit 1**
*Range*: 0÷1500
*UM*: sec

**OIL4** **ON time Oil injection valve circuit 1 with compr. on**
*Range*: 0÷255
*UM*: sec

**OIL5** **OFF time Oil injection valve circuit 1 with compr. on**
*Range*: 0÷1500
*UM*: sec

**OIL6** **ON time Oil injection valve circuit 2**
*Range*: 0÷255
*UM*: sec

**OIL7** **OFF time Oil injection valve circuit 2**
*Range*: 0÷255
*UM*: sec

**OIL8** **ON time Oil injection valve circuit 2 with compr. on**
*Range*: 0÷255
*UM*: sec

**OIL9** **OFF time Oil injection valve circuit 2 with compr. on**
*Range*: 0÷255
*UM*: sec

**OIL10** **Activation delay of Oil injection valve circuit 1**
*Range*: 0÷255
*UM*: sec

**OIL11** **Activation delay of Oil injection valve circuit 2**
*Range*: 0÷255
*UM*: sec

**OIL12** **Alarm delay for low level oil in circuit 1**
*Range*: -1÷255;
With -1 the low oil level alarm is not signaled.
*UM*: sec

**OIL13** **Alarm delay for low level oil in circuit 2**
*Range*: 0÷255 (0 = alarm disabled)
*UM*: sec

**OIL14 Action before low oil level alarm circuit 1**
*Range*: 0÷1
*0* Only warning (no actions)
*1* Inverter to max speed (if present)

**OIL15 Action before low oil level alarm circuit 2**
*Range*: 0÷1
*0* Only warning (no actions)
*1* Inverter to max speed (if present)

**OIL16 Action during low oil level alarm circuit 1**
*Range*: 0÷1
*0* Warning plus alarm relay ON
*1* Warning plus alarm relay ON all the compressors forced OFF

**OIL17 Action during low oil level alarm circuit 2**
*Range*: 0÷1
*0* Warning plus alarm relay ON
*1* Warning plus alarm relay ON all the compressors forced OFF

**OIL18 Pressure differential for oil management**
*Range*: 0.00÷50.00 bar; 0÷725 PSI; 0÷5000 KPA
*UM*: according to CF26

**OIL19 Differential for OIL18**
*Range*: 0.10÷10.00 bar; 1÷145 PSI; 10÷1000 KPA
*UM*: according to CF26

**OIL20 Reference probe for differential pressure Circuit**
*Range*: 0÷1;
*0* ***SPC1*** = Oil receiver pressure - Suction pressure.
*1* ***FTP*** = Oil receiver pressure - Flash tank pressure.

**OIL21 Oil differential pressure override with HGV_FT on**
*Range*: 0÷1;
*0* ***no***
*1* ***yes***

**OIL22 Flash tank pressure threshold for oil differential pressure override with HGV_FT on**
*Range*: 0.10÷100.00 bar; 1÷1450 PSI; 10÷10000 KPA
*UM*: according to CF26

**OIL23 Differential for OIL22**
*Range*: 0.10÷10.00 bar; 1÷145 PSI; 10÷1000 KPA
*UM*: according to CF26

**OIL24 Number of retry for High level in oil separator**
*Range*: 0÷50;

**OIL25 Reservoir pressure threshold for activation of reservoir unloading valve**
Range: OIL27÷100.00 bar; OIL27÷1450 PSI; OIL27÷10000 KPA
UM: according to CF26

**OIL26 Differential of reservoir pressure threshold for activation of reservoir unloading valve**
Range: 0.10÷10.00 bar; 1÷145 PSI; 10÷1000 KPA
UM: according to CF26

**OIL27 Reservoir pressure threshold to stop oil injection valve circuit 1**
Range: 0.10÷OIL25 bar; 1÷ OIL25 PSI; 10÷ OIL25 KPA
UM: according to CF26

**OIL28 Differential of reservoir pressure threshold to stop oil injection valve circuit 1**

Range: 0.10÷10.00 bar; 1÷145 PSI; 10÷1000 KPA
UM: according to CF26

# 7 REGULATION

## 7.1 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 availables only for adjustment **without inverter**.
In this case the **neutral zone width is define by parameter 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)

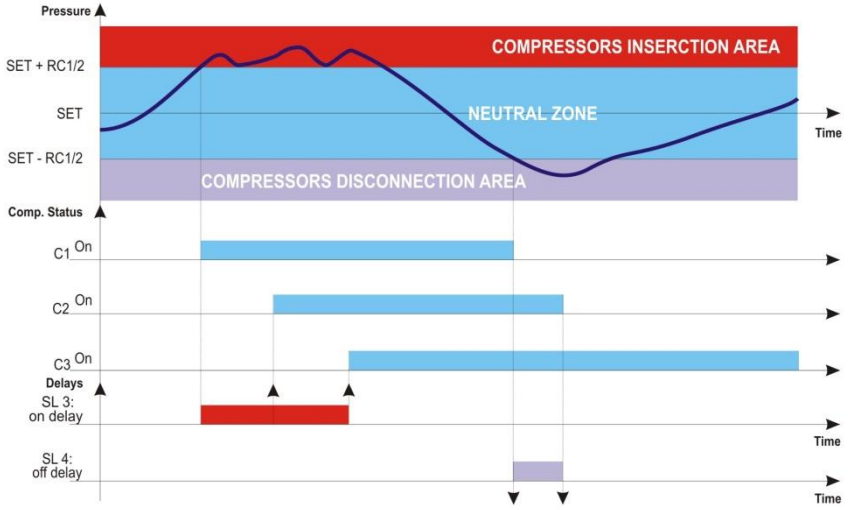
Regulation stops when the pressure (temperature) comes back into the neutral zone.
In the following a simplify example that explains the regulation in neutral zone for compressor homogeneous with 1 step for each compressors. The safety times **SL1, SL2, SL5** are not considered. In the real regulation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

**Ex**. **Neutral zone control, compressors with same capacities, 1 step for each compressor.**
**In this example:**

| **TRHESHOLD** | |
|---|---|
| **SET** | SETC1 target pressure/temperature compressors have to maintain |
| **RC1** | neutral zone width |

| **TIMERS** | |
|---|---|
| **SL3** | Time delay between the insertion of two different compressors |
| **SL4** | Time delay between switching off of two different compressors |
| **SL8 = no** | “SL3” delay not enabled at first calling after an equilibrium condition |
| **SL9 = no** | “SL4” delay not enabled at first calling after an equilibrium condition. |

| **OTHER** | |
|---|---|
| **CF18 = db** | neutral zone regulation, also called “dead band” |
| **CF22 = yES** | Compressor rotation enabled |




## 7.2 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 availables 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 ).**

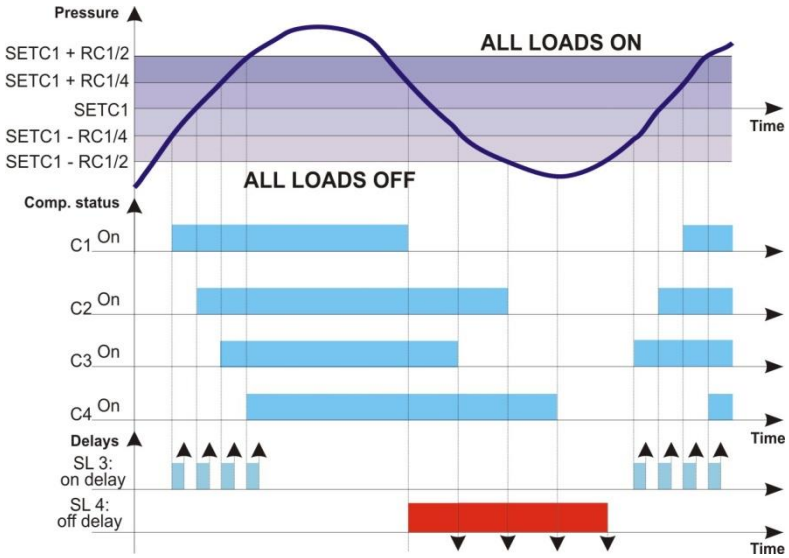
The numbers of stages switched ON is proportional to the value of the Input signal: when this distances itself from the target set point and enters the various bands, the compressors are switched ON, to be then turned OFF when the signal brings near the set point.

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

**Example**

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




# 8 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.

## 8.1 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 avctivation valve and start of the compressor.(This parameter is enabled only for Bitzer)

### 8.1.1 Relay activation

**ES**. Compressor with 4 steps:
**C1** = Scrw1; **C2** = Step; **C3** = Step; **C4** = Step; **CF1** = Btz

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

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

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

| | | | | |
|---|---|---|---|---|
| **Step 4 (100%)** | *ON* | *OFF* | *OFF* | *OFF* |

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

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

## 8.2 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.

### 8.2.1 Relay activation

**ES**. Compressor with 4 steps:
**C1** = Scrw1; **C2** = Step; **C3** = Step; **C4** = Step; **CF1** = FRSC

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

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

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

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

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

# 9 MIXED CAPACITY REGULATION

## 9.1 Parameter involved

| **Label** | **Description** | **Range** |
|---|---|---|
| **CF1** | **Kind of compressors**: | Spo, Btz, Frtz, dPO |
| **CF4-CF9** | **Power of compressor 1-6 circuit 1** for setting the capacity of single compressors. Each parameter defines the capacity of the compressor used.<br>**E.I.** 3 compressors with following capacity: 10, 20, 40 HP. The parameters have to be set in this way: CF4=10, CF5=20, CF6=40, CF7=CF8=CF9=0. | |

## 9.2 Regulation concept

If CF1 = dPO, compressors with mixed capacity are managed.
The regulation is based on neutral zone.
By parameters CF4,..CF9, the capacity of the compressors is set.
When it's requested to increase the capacity, controller will used a mix of the available capacities from the smaller one to the bigger one, trying to reduce as much as possible the difference between a capacity step and the next one.

The algorithm doesn't take care about the running hours of each single compressor, as the priority is to match the cooling request of the system with the cooling capacity of the compressors.

### 9.2.1 Instance 1. 4 compressors without steps, with following capacities: C1 = 10HP, C2 = 15HP, C3 = 30HP, C4 = 40HP

ES. CF1 = dPo.
CF4 = 10; CF5 = 15 CF6 = 30; CF7 = 40; CF8=CF9=0
Controller has to develop internal table with all the possible capacity steps that can be generated by the compressors:

| STEP | CF4 = 10; | CF5 = 15 | CF6 = 30; | CF7 = 40 | TOTAL CAPACITY |
|---|---|---|---|---|---|
| 1 | 10 | - | - | - | **10** |
| 2 | - | 15 | - | - | **15** |
| 3 | 10 | 15 | - | - | **25** |
| 4 | - | - | 30 | - | **30** |
| 5 | - | - | - | 40 | **40** |
| 6 | - | 15 | 30 | - | **45** |
| 7 | 10 | - | - | 40 | **50** |
| 8 | - | 15 | - | 40 | **55** |
| 9 | 10 | 15 | - | 40 | **65** |
| 10 | - | - | 30 | 40 | **70** |
| 11 | 10 | - | 30 | 40 | **80** |
| 12 | - | 15 | 30 | 40 | **85** |
| 13 | 10 | 15 | 30 | 40 | **95** |

NOTE: Each step can be used ONLY IF the safety timers SL1, SL2, SL5 have expired, otherwise the first next available step is used.
See below for the capacity decreasing rules.

The same algorithm is used when the capacity has to be decreased

**NOTE:** Some capacity steps can be not used if they are not available for safety timer reasons. In this case the controller jumps to the next available capacity stage.

**Instance 1:**
**E.I.** 2 Compressors with following capacities:

- **Compr. 1:** CF4 = 60 HP
- **Compr. 2:** CF5 = 70 HP

**Steps:**
**Compr. 1: 3 unloaders: DOC1 = 7C; DOC2 = 8C; DOC3 = 9C; unloaders capacity = 20HP**
**Compr. 2: 1 unloader: DOC4 = 11C; unloaders capacity = 70HP**

**Activation sequence**

| | DOC1 = 7C | DOC2 = 8C | DOC3 = 9C | DOC4 = 11C | HP |
|---|---|---|---|---|---|
| **1** | 1 | 0 | 0 | 0 | **20** |
| **2** | 1 | 1 | 0 | 0 | **40** |
| **3** | 1 | 1 | 1 | 0 | **60** |
| **4** | 1 | 0 | 0 | 1 | **90** |
| **5** | 1 | 1 | 0 | 1 | **110** |
| **6** | 1 | 1 | 1 | 1 | **130** |

**De-activation sequence**

| | DOC1 = 7C | DOC2 = 8C | DOC3 = 9C | DOC4 = 11C | HP |
|---|---|---|---|---|---|
| **1** | 1 | 1 | 1 | 1 | **130** |
| **2** | 1 | 1 | 0 | 1 | **110** |
| **3** | 1 | 0 | 0 | 1 | **90** |
| **4** | 1 | 1 | 1 | 0 | **60** |
| **5** | 1 | 1 | 0 | 0 | **40** |
| **6** | 1 | 0 | 0 | 0 | **20** |

The deactivation sequence is the opposite of the activation sequence.

**Instance 2:**

**E.I.** 3 Compressors with following capacities:

- **Compr. 1: CF4 = 60 HP,**
- **Compr. 2: CF5 = 15 HP**
- **Compr. 3: CF6 = 100HP**

**Steps:**

**Compr. 1:** 3 unloaders: DOC1 = 7C; DOC2 = 8C; DOC3 = 9C; Step capacity = 20HP
**Compr. 2:** 1 unloader: DOC4 = 11C; Step capacity = 15HP
**Compr. 3:** 2 unloaders: DOC5 = 15C; DOC6 = 16C Step capacity = 50HP

**Activation sequence**

| | DOC1 = 7C | DOC2 = 8C | DOC3 = 9C | DOC4 = 11C | DOC5 = 15C | DOC6 = 16C | HP |
|---|---|---|---|---|---|---|---|
| **1** | 0 | 0 | 0 | 1 | 0 | 0 | **15** |
| **2** | 1 | 0 | 0 | 1 | 0 | 0 | **35** |
| **3** | 1 | 1 | 0 | 1 | 0 | 0 | **55** |
| **4** | 1 | 1 | 1 | 1 | 0 | 0 | **75** |
| **5** | 1 | 0 | 0 | 1 | 1 | 0 | **85** |
| **6** | 1 | 1 | 0 | 1 | 1 | 0 | **105** |
| **7** | 1 | 1 | 1 | 1 | 1 | 0 | **125** |
| **8** | 1 | 0 | 0 | 1 | 1 | 1 | **135** |
| **9** | 1 | 1 | 0 | 1 | 1 | 1 | **155** |
| **10** | 1 | 1 | 1 | 1 | 1 | 1 | **175** |

**De-activation sequence (Normal)**

| | DOC1 = 7C | DOC2 = 8C | DOC3 = 9C | DOC4 = 11C | DOC5 = 15C | DOC6 = 16C | HP |
|---|---|---|---|---|---|---|---|
| **10** | 1 | 1 | 1 | 1 | 1 | 1 | **175** |
| **9** | 1 | 1 | 0 | 1 | 1 | 1 | **155** |
| **8** | 1 | 0 | 0 | 1 | 1 | 1 | **135** |
| **7** | 1 | 1 | 1 | 1 | 1 | 0 | **125** |
| **6** | 1 | 1 | 0 | 1 | 1 | 0 | **105** |
| **5** | 1 | 0 | 0 | 1 | 1 | 0 | **85** |
| **4** | 1 | 1 | 1 | 1 | 0 | 0 | **75** |
| **3** | 1 | 1 | 0 | 1 | 0 | 0 | **55** |
| **2** | 1 | 0 | 0 | 1 | 0 | 0 | **35** |
| **1** | 0 | 0 | 0 | 1 | 0 | 0 | **15** |

**De-activation sequence(Abnormal)**
When all the compressors on (full power), compressor 1 enters in alarm. The deactivation sequence will be modified as follow:

| | DOC1 = 7C | DOC2 = 8C | DOC3 = 9C | DOC4 = 11C | DOC5 = 15C | DOC6 = 16C | HP |
|---|---|---|---|---|---|---|---|
| **10** | 1 | 1 | 1 | 1 | 1 | 1 | **175** |
| **9** | 0 | 0 | 0 | 1 | 1 | 1 | **115** |
| **8** | 0 | 0 | 0 | 1 | 1 | 0 | **65** |
| **7** | 0 | 0 | 0 | 1 | 0 | 0 | **15** |
| **6** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |

**Instance 3:**
**E.I. 3 Compressors with following capacities (DOC4 can't be turned on, for the safety delay SL1-2 of compressor 2):**

- **Compr. 1: CF4 = 60 HP**
- **Compr. 2: CF5 = 15 HP**
- **Compr. 3: CF6 = 100HP**

**Steps:**
**Compr. 1:** 3 steps: DOC1 = 7C; DOC2 = 8C; DOC3 = 9C; Step capacity = 20HP
**Compr. 2:** 1 steps: DOC4 = 11C; Step capacity = 15HP
**Compr. 3:** 2 step: DOC5 = 15C; DOC6 = 16C Step capacity = 50HP

**Activation sequence**
Start with Compressor1, SL1-2 of Compressor 2 expired before step 3

## 9.3 Inverter + mixed capacity compressors

The algorithm to manage inverter plus mixed capacity compressors is similar to the algorithm used for the inverter + on/off compressors:

### 9.3.1 Increasing capacity

1. The inverter will reach the his max capacity,
2. If the controller requires additional capacity the step of mixed compressors with bigger capacity than the running one is activated.

### 9.3.2 Decreasing capacity

1. The inverter will reach the his minimum capacity,
2. If the controller requires less capacity the step of mixed compressors with lower capacity than the running one is activated.

## 9.4 Uneven capacity for parallel compressor

**CF35 Kind of paralle compressors**
To set the kind of compressors.
*Range*: 0÷1
0: **SPo =** compressors with the same capacity
1: **dPO =** mixed capacities

**CF36- CF~~41~~ 40 Power of parallel compressor 1-~~6~~ 5**
For setting the capacity of single compressor (insert in each parameter the capacity of the compressor used).
**E.I.** 3 compressors with following capacity: 10, 20, 40 KW. The parameters have to be set in this way: CF36=10, C37=20, CF38=40
*Range*: 0÷100; 0 = not used
*UM*: KW

# 10 ANALOG OUTPUTS FOR INVERTER

## 10.1 VSD Compressor management

The analog output can be used in a rack with VSD 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 Output with proportional regulation.

**EX. 2 compressors, 1 frequency compressor**.

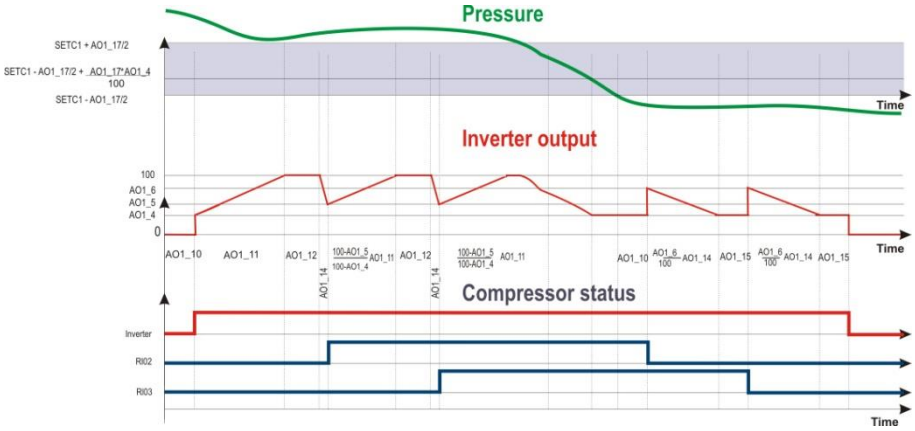
**IO_configuration**:

DOC1 = 1 " Inverter 1 Suction Circuit 1"
DOC2 = 7 " Compressor 1 Circuit 1"
DOC3 = 11 " Compressor 1 Circuit 2"

AOC1 = 2 " 0-10V Output inverter 1 Suction Circuit 1 "

**Parameters:**

**CF18 = db**
AO1_6 < 100
AO1_5 < 100
**RC1 = AO1_17**: same value for proportional band of inverter regulataion and neutral zone for fix compressor activation and de-activation




where:

| | | |
|---|---|---|
| **AO1_4** | Minimum value for analog out.1 | 0 ÷ 99 % |
| **AO1_5** | Analog Output1 value after compressor on | AO1_4 ÷ 100 % |
| **AO1_6** | Analog output1 value after compressor off | AO1_4÷ 100 % |
| **AO1_10** | Regulation delay after entering the regulation band | 0 ÷ 255 (sec) |
| **AO1_11** | Analog output 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) |
| **AO1_12** | Analog output 1 permanency at 100% before load activation | 0 ÷ 255 (sec) |
| **AO1_13** | Delay between pressure (temperature) goes down the set point and start of analog Output 1 decreasing | 0 ÷ 255 (sec) |
| **AO1_14** | Analog Output1 decreasing time, from 100% to AO1_5 when a load is switched on | 0 ÷ 255 (sec) |
| **AO1_15** | Analog Output1 permanency at AO1_4 before a load is switched off | 0 ÷ 255 (sec) |

**AO1_16** Analog Output 1 decreasing time from 100% to the AO1_4 value 0 ÷ 255 (sec)
**AO1_17** Proprotional band for inverter regulation

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

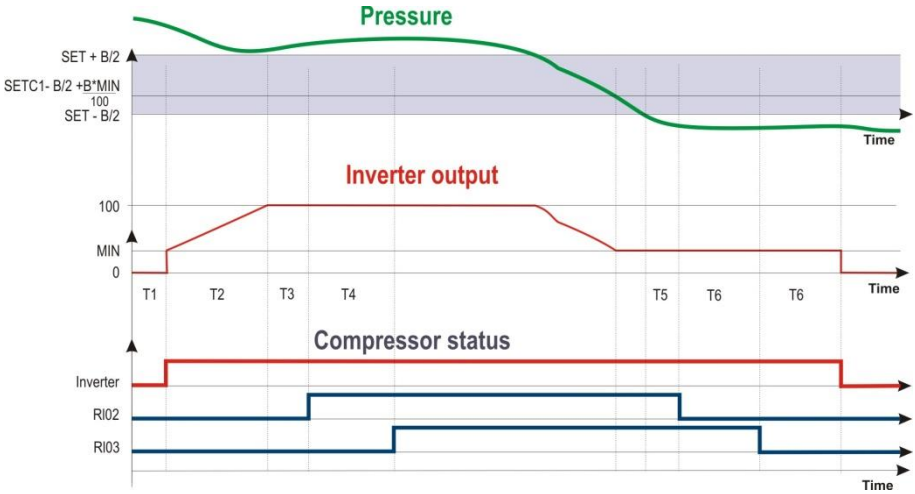
**IO_configuration**:

DOC1 = 1 " Inverter 1 Suction Circuit 1"
DOC2 = 7 " Compressor 1 Circuit 1"
DOC3 = 11 " Compressor 1 Circuit 2"

AOC1 = 2 " 0-10V Output inverter 1 Suction Circuit 1 "

**Parameters:**

CF18 = db
AO1_6 = 100 Analog Output 1 value after a compressor is switched off
AO1_5 = 100 Analog Output 1 value after compressor start




Where:

| | | |
|---|---|---|
| **B →** | **RC1** 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 Output 1 permanency at 100% before load activation | 0 ÷ 255 (sec) |
| | Delay between pressure (temperature) goes down the set point and start of analog Output 1 decreasing | 0 ÷ 255 (sec) |
| **T4 →** | **SL3** 2 different loads start delay | 1 ÷ 5990 sec |
| **T6 →** | **SL4** 2 different loads off delay | 1 ÷ 5990 sec |

## 10.2 Double inverter management for CF1 = SPo

### 10.2.1 Regulation with 2 inverter compressors

This paragraph describes the resources and the regulation with 2 inverters for circuit 1, the same rules will be applied to circuit 2 and parallel compressors.
Only the Analog outputs on the ipro, can be used to drive inverters.

iProRACK 10 DIN will managed at max 6 inverters among: suction 1, 2 parallel compressors and condenser.
iProRACK 4 DIN will managed at max 4 inverters among: suction 1, 2 parallel compressors and condenser.

Note: For the circuit2, iProRACK supports the double inverter compressor when CF33=Spo.
For the parallel compressor, iProRACK supports the double inverter compressor when CF35=Spo.
1 single inverter compressor I forced ON in circuit 1 case the booster functionality is active.

## 10.2.2 Resources

Digital outputs

| DOCxx | MEANING | Mandatory |
|---|---|---|
| 1 | Inverter compressor 1 Suction Circuit 1 | Yes |
| 2 | Inverter compressor 2 Suction Circuit 1 | Yes |
| 7 | Compressor 1 Circuit 1 | No |
| | Additional compressors or steps | No |

Digital intputs

| DICxx | MEANING | Mandatory |
|---|---|---|
| | Thermal protection Inverter 1 C1<br>Oil pressure switich Inverter 1 C1<br>Pressure switch Inverter 1 C1 | no |
| | protection Inverter 2 C1<br>Oil pressure switich Inverter 2 C1<br>Pressure switch Inverter 2 C1 | No |
| | Additional safeties of compressors | No |

Analog outputs

| AOCxx | MEANING | Mandatory |
|---|---|---|
| TAB A: 2 or 12<br>TAB B: 2 | Output inverter 1 Suction Circuit 1 | Yes |
| TAB A: 5 or 14<br>TAB B: 3 | Output inverter 2 Suction Circuit 1 | Yes |

## 10.2.3 Parameters involved

**ANALOG OUTPUT**
**For regulation ONLY** the parameters related to the analog output of the first inverter will be used.
**E.I. :**
**AOC1 = 2**, **O**utput inverter 1 Suction Circuit 1
**AOC2 = 5**, **O**utput inverter **2** Suction Circuit 1
During the regulation only the parameters of the analog output number one (AO1_1…AO1_26) will be used.

**The controller shares the running hours among the 2 inverters.**

**Regulation concept**
The VSD compressor with less running hours E.I. inverter 1, is started and if additional capacity is required, the second inverter will be started.

Once started, both inverters modulate with the same capacity.

This means that the A.O. of the inverter 2 is the copy of the analog output of the inverter 1: AO2 = AO1.

**NOTE: The parameters related to Inverter 1 are used for for the regulation of the analog output, independently from which inverter is running.**

**E.I:** if analog output for inverter 1 is AO1, the parameters of the first analog output AO1_1…. AO1_25 will be used for the regulation and the analog output of the inverter 2 will be the copy of A.O. of inverter 1.

**INCREASING CAPACITY**
If additional capacity is required and other compressors are available, both the VSD compressors go to AOx_5 speed before starting addional on/off compressors.

**DECREASING CAPACITY**
If less capacity is required, after reducing the VSD speed an on/off compressor is switched off.
If only the 2 inverters are running and less capacity is required one of them is switched.
The remaining VSD compressor modulates if the pressure is inside regulation band OR also the last inverter is switched off.

**E.I.: <u>2 VSD compressors, 1 ON/OFF compressors</u>**.

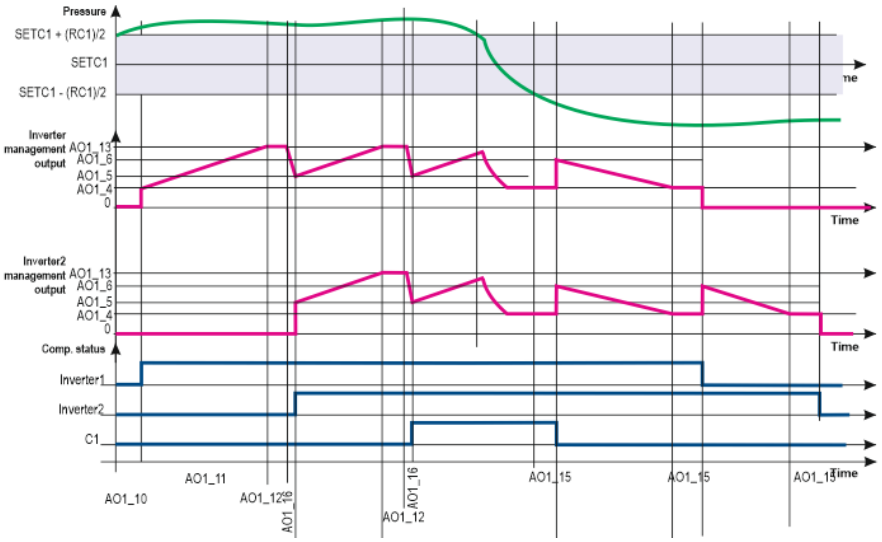
**IO_configuration**:

DOC1 = 1 “Inverter 1 Suction Circuit 1”
DOC2 = 2 “Inverter 2 Suction Circuit 1”
DOC3 = 7 “Compressor 2 Circuit 1”

AOC1 = 2 “0-10V Output inverter 1 Suction Circuit 1 “
AOC2 = 5 “0-10V Output inverter 2 Suction Circuit 1 “

**Parameters:**
CF18 = db
AO1_6 < 100
AO1_5 < 100
AO1_13 < 100
RC1 = AO1_17

The following examples shows the behaviour of the analog Output with proportional regulation.
It’s considered Inverter 1 has run less hours than 2 when is started, more hours than 2 when is switched off.



where:

**TRHESHOLD**

**AO1_4** Minimum value for analogue Output 1
**AO1_5** Analog Output 1 value BEFORE compressor start
**AO1_6** Analog Output 1 value WHEN a compressor switch off
**AO1_13** Max value analog output

**TIMERS**

**AO1_10** Regulation delay after entering the regulation band
**AO1_11** Analog Output 1 rise time from AO1_4 to AO1_13 when the pressure is above the regulation band and a load is switched on.
**AO1_12** Analog Output 1 permanency at AO1_13 before load activation
**AO1_14** Analog Output 1 decreasing time from AO1_13 to the AO1_4 value
**AO1_15** Analog Output1 permanency at AO1_4 before a load is switched off
**AO1_16** Analog Output1 decreasing time, from AO1_13 to AO1_5 when a load is switched on

**PID**

**AO1_17** Proportional band
**AO1_18** Integral time
**AO1_19** Band offset

## 10.3 Inverter by-pass

The inverter by pass function is used as back up function, in a circuit with compressor invert, allowing the compressor with inverter to run at fixed speed when an issue occurs to the inverter.

### 10.3.1 Parameter involved

| PARAMETER | VALUES |
|---|---|
| **DIC1 ÷ DIC43** | **115o** Oil of compressor with Inverter suction Circuit 1<br>**115c** Oil of compressor with Inverter suction Circuit 1<br>**116o** Safety of Compressor with Inverter Suction Circuit 1<br>**116c** Safety of Compressor with Inverter Suction Circuit 1<br>**117o** Thermal Safety of Compressor with Inverter suction Circuit 1<br>**117c** Thermal Safety of Compressor with Inverter suction Circuit 1<br>118o Oil of compressor with Inverter suction Circuit 2<br>118c Oil of compressor with Inverter suction Circuit 2<br>119o Safety of Compressor with Inverter Suction Circuit 2<br>119c Safety of Compressor with Inverter Suction Circuit 2<br>120o Thermal Safety of Compressor with Inverter suction Circuit 2<br>120c Thermal Safety of Compressor with Inverter suction Circuit 2<br><br>**138o** Inverter suction 1 safety<br>**138c** Inverter suction 1 safety<br>**139o** Inverter suction 2 safety<br>**139c** Inverter suction 2 safety |
| **DOC1 ÷DOC36** | **1o** Inverter 1 Suction Circuit 1<br>**1c** Inverter 1 Suction Circuit 1<br>**3o** Inverter 1 Suction Circuit 2<br>**3c** Inverter 1 Suction Circuit 2<br><br>**108o** Inverter suction 1 by-pass<br>**108c** Inverter suction 1 by-pass<br>**109o** Inverter suction 2 by-pass<br>**109c** Inverter suction 2 by-pass |
| **AOC 1 ÷ AOC 6** | **2** 0-10V output inverter 1 Suction Circuit 1<br>**4** 0-10V output inverter 1 Suction Circuit 2<br>**11** 4-20mA output inverter 1 Suction Circuit 1<br>**13** 4-20mA output inverter 1 Suction Circuit 2 |

### 10.3.2 Function

Circuit 1:
When the digital input set as 138: Inverter suction 1 safety is turned on, the following action are taken:

1. The digital output DOC(i) set as “1”: Inverter 1 Suction Circuit 1” is turned off.
2. The analog output AOC(i) set as “2 or 11: inverter 1 Suction Circuit 1” is set to 0V or 4mA
3. The digital output DOC(i) set as “109” : Inverter suction 1 by-pass is used as a compressor in the suction regulation. In this case, the band for regulation is AOx_17.
4. The alarm signaling is activated (see table)
5. The digital inputs set as “safety of the suction inverter of Circuit 1: 115, 116, 117 ” are referred to the DOC(i) set as 109

Circuit 2:
When the digital input set as 139: Inverter suction 2 safety is turned on, the following action are taken:

1. The digital output DOC(i) set as “3”: Inverter 1 Suction Circuit 2” is turned off.
2. The analog output AOC(i) set as “4 or 13: inverter 1 Suction Circuit 2” is set to 0V or 4mA
3. The digital output DOC(i) set as “110” : Inverter suction 2 by-pass is used as a compressor in the suction regulation. In this case, the band for regulation is AOx_17.
4. The alarm signaling is activated
5. The digital inputs set as “safety of the suction inverter of Circuit 2: 118, 119, 120 ” are referred to the DOC(i) set as 110

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

With this configuration, one analog Output can be used to drive the inverter ( AO1=6 “0-10V Output 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”).

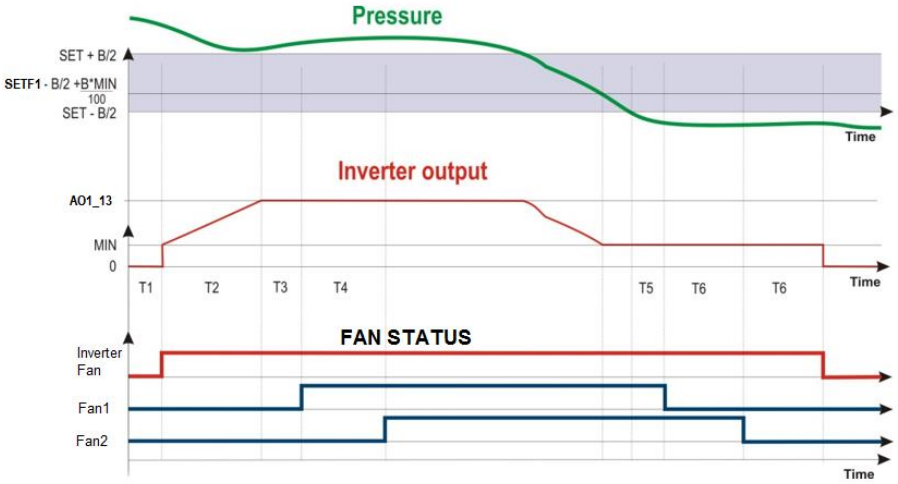
**EX: 3 fans, 1 with inverter. Analog Output 1 drives the inverter**

**IO_configuration**:

DOC1 = 5 “ Inverter Condenser Circuit 1”
DOC2 = 67 “ Fan 1 Circuit 1”
DOC3 = 68 “ Fan 2 Circuit 1”

AOC1 = 6 “0-10V Output inverter condenser Circuit 1 “

**Parameters:**
AO1_6 = 100
AO1_5 = 0



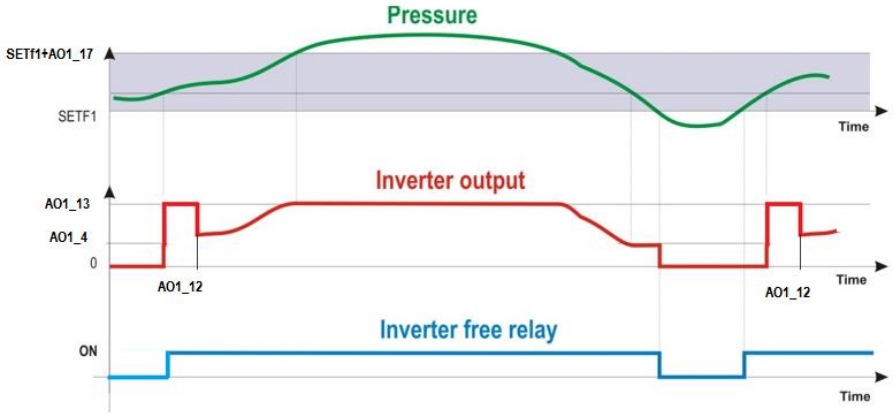

**MIN** → **AO1_4** Minimum value for analog Output 1
**T1** → **AO1_10** Regulation delay of analog Output 1 when the pressure is in the regulation band
**T2** → **AO1_11** Analog Output 1 rise time from AO1_4 to 100% when the pressure is outside the regulation band
**T3** → **AO1_12** Analog Output 1 permanency at AO1_13 (max) before load activation
**T4** → **SL3 2** different loads start delay
**T5** → **AO1_15** Analog Output 1 permanency at AO1_4 before a load is switched off
**T6**→ **SL4** Time delay between switching off of two different compressors - circuit 1

## 10.5 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 temperature/pressure value.

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

**DOCxx** = 103 " Inverter free circuit 1 ", where DOCxx is one of the relay output.
**AOC1** = 8 "Output inverter condenser free Circuit 1"
**AICxx** = 3 "NTC Temperature probe Condenser Circuit1" is the reference probe




The analog ouput is managed in proportional mode according to the temperature between the SETF1 and the SETF1 + AO1_17.
Below the SETF1 the output is OFF, above the SETF1 + AO1_17the analog output works at AO1_13..

If the delivery temperature/pressure is higher than the SETF1+ (AO1_17*AO1_4)/100 value, the relay set as inverter is ON; if the delivery temperature/pressure is lower than the SETF1 value the relay is OFF.

### 10.5.1 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, and 5 digital inputs for fan thermal protection.

DOC1 = 103 " Inverter free circuit 1 "; DOC2 = 67 " Fan 1 Circuit 1"
DOC3 = 68 " Fan 2 Circuit 1" DOC4 = 69 " Fan 3 Circuit 1"
DOC5 = 70 " Fan 4 Circuit 1"

DIC1 = 121 Safety Inverter condenser Circuit 1 DIC2 = 73 "Fan safety1 – Circuit 1"
DIC3 = 74 "Fan safety2 – Circuit 1" DIC4 = 75 "Fan safety3 – Circuit 1"
DIC5 = 76 "Fan safety4 – Circuit 1"

### 10.5.2 Anti-stuck function for fans driven by analog output

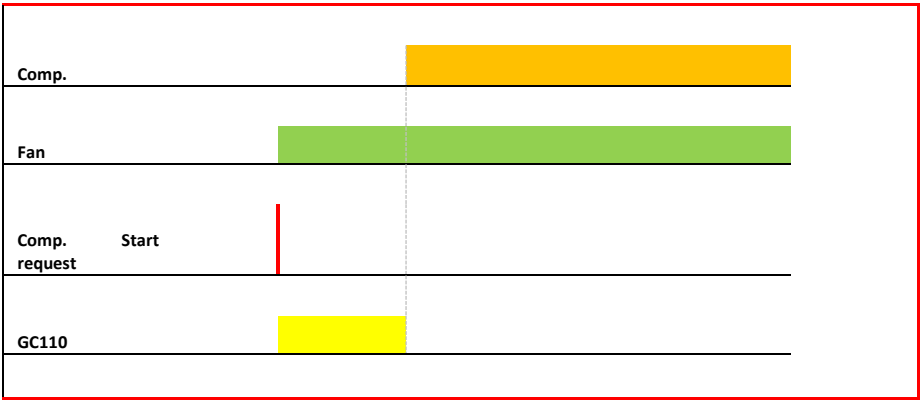
This function is used to avoid fan stuck in low temperature conditions.
The algorithm works in this way: when the fans are driven by inverter (AOCxx = 6 or 7 or 8 or 9 or 15 or 16 or 17 or 18), if they remain off for a long time (parameter AOxx_25), they are forced to run (max speed) for short period (AOCxx_26), to avoid fans stuck because of ice.

## 10.6 FAN PRE-START BEFORE FIRST COMPRESSOR ACTIVATION

This function (**SL24**) is used when the compressor has to start, while the fan is off. In this situation, first the fan is switched on, then after GC110 seconds the compressor is started. After compressor start, the fan remains on at least for 15s. If after 15s the pressure is below the fan set point, the fan is allowed to stop.

**NOTE:** in case of fan driven by analog output, the fan remains to the min value till a higher value is requested. If we only have normal fan in the regulation, switch on single one fan. If after 15s the pressure is below the fan set point, the fan is switched off.

**EG**. Request of compressor start, GC110 used, then fan is not requested to stop.




Note: If both HPV pre-set and fan pre-start at first compressor activation are enabled, and GC109 is not equal to GC110, the compressor can be started after the longer timer.

# 11 FLASH TANK: LOW AND HIGH LIQUID LEVEL MANAGEMENT

MANAGEMENT OF LOW AND HIGH LIQUID LEVEL ALARM IN FLASH TANK WITH DIGITAL INPUTS

## 11.1.1 Resources

| DICxx | MEANING | LEVEL |
|---|---|---|
| 109 | Low flash tank liquid level Circuit 1 | Mandatory to have Low liquid level alarm by d.i. in circuit 1 or flash tank |
| 110 | Low Liquid level Circuit 2 | Mandatory to have Low liquid level alarm by d.i. in circuit 2 |
| 226 | High flash tank liquid level Circuit 1 | Mandatory to have high liquid level alarm by d.i. in circuit 1 or flash tank |

## 11.1.2 Parameters involved

| | | |
|---|---|---|
| **CDI1** | Delay of Low liquid level in flash tank Circuit 1 | |
| **CDI2** | Delay of low Liquid level digital Input - Circuit 2 | |
| **CDI3** | Relay activated in case of flash tank liquid level alarm – Circuit 1 | |
| **CDI4** | Relay activated in case of liquid level alarm – Circuit 2 | |
| **AL51** | LT, MT and Parallel compressors shut down in case of High liquid level alarm in flash tank. | No – yes |
| **AL52** | High flash tank liquid level alarm delay | |

## 11.1.1 Adjustment Circuit1

**Low liquid level in Circuit 1 (LL1)**

With DICxx = 109 activated, after the CDI1 the controller signals the **Low liquid level in flash tank, Circuit 1 (LL1),** compressors keep on working

**High liquid level in Circuit 1 (HLIQ)**
With DICxx = 226 activated, after the AL52 the controller signals the **High liquid level in flash tank Circuit 1 (HLIQ)**
the status of compressors of LT (circuit 2), MT (circuit 1) and Parallel depends on parameter AL51

- With AL51 = No : compressors keep on working
- With AL51 = Yes : compressors are stopped (1 compressor every second)

### 11.1.2 Adjustment Circuit2

**Low liquid level in Circuit 2 (LL2)**
With DICxx = 110 activated, after the CDI2 the controller signals the Low **liquid level Circuit 1,** compressors keep on working

# 12 Analog ouput for fan management at reverse mode

It's possible to reverse the functionality of the analog outputs, when they are set to manage the condenser fan. This means, for instance, that with a 0-10V out, with 0 V the fan will runa at the max speed, while with 10V they will be stopped.

## 12.1 Resources

AOCx=

| | |
|---|---|
| 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 |
| 15 | 4-20mA output inverter condenser Circuit 1 |
| 16 | 4-20mA output inverter condenser Circuit |
| 17 | 4-20mA output inverter condenser free Circuit 1 |
| 18 | 4-20mA output inverter condenser free Circuit 2 |

## 12.2 Parameters

Fan condenser works in reverse mode, with RC31 = 1 and RC32 = 1

**RC31** **Inverter Fan circuit1 management mode.**
*Range:* 0÷1
*0=Direct mode*
*1=Reverse mode*

**RC32** **Inverter Fan circuit2 management mode.**
*Range:* 0÷1
*0=Direct mode*
*1=Reverse mode*

# 13 HOT GAS INJECTION VALVE MANAGEMENT

The hot gas valve for circuit 1 (DOCxx = 105 "Hot gas injection valve circuit 1") can be activated, by:

- **SH control** (see next paragraph);

- **Suction temperature control**, if it is enabled (ASH17 = YES), as described in the next paragraph.

The hot gas valve for circuit 2 (DOCxx = 106 “Hot gas injection valve circuit 2”) can be activated, by:
- **SH control** (see next paragraph);
- **Suction temperature control**, if it is enabled (ASH20 = YES), as described in the next paragraph.

**NOTE**:
As there are 2 ways to active the hot gas injection valve:
If one of above way needs to turn on the hot gas injection valve, the other way does not need to turn on the hot gas injection valve, the valve will be turned on.
The valve can be turned off only in the condition that both of the above 2 ways need to turn off the valve.

## 13.1 Activation to increase superheat with low superheat conditions

The SH of the circuit 1 (circuit 2) is calculated ONLY if at least one compressor of the circuit 1 (circuit 2) is running, since a minute

### 13.1.1 PARAMETERS INVOLVED

| LABEL | MEANING | RANGE |
|---|---|---|
| **ASH7** | Superheat value 1 at which to enable valve 1 for injecting hot gas (hot action) | 0.1 to 15.0°C/ 1 to 30°F |
| **ASH8** | Differential for ASH7 | 0.1 to 15.0°C/ 1 to 30° |
| **ASH14** | Superheat value 2 at which to enable valve 2 for injecting hot gas (hot action) | 0.1 to 15.0°C/ 1 to 30°F |
| **ASH15** | Differential for ASH14 | 0.1 to 15.0°C/ 1 to 30°F |

### 13.1.2 Configuration

**IO_configuration circuit 1**:

1) relay as injection valve:
DOCxx = 105 “Hot gas injection valve circuit 1”

2) auxiliary probe for calculating superheat:
Alxx = 17 “NTC AUX Temperature probe suction circ.1”

**IO_configuration circuit 2**:

1) relay as injection valve:
DOCxx = 106 “Hot gas injection valve circuit 2”

2) auxiliary probe for calculating superheat:
Alxx = 18 “NTC AUX Temperature probe suction circ.2”

### 13.1.3 Adjustment

**Circuit 1**
The relay configured as Valv1 works as a thermostat with inverse action (hot), using the superheat value as the control variable.
SH1 = (“NTC AUX Temperature probe suction circ.1”) – (“Probe Suction Circuit1”)

*Note*: “Probe Suction Circuit1” can be AICxx = 1 or 19 or 37 (in this case it has to be converted in temperature) or 41 (in this case it has to be converted in temperature)

if SH1 ≤ ASH7 – ASH8 → relay configured as DOC 105 on
if SH1≥ ASH7 → relay configured as DOC 105 off
if ASH7 – ASH8 < SH1 < ASH7 → maintains the previous status (it the relay was on, it stays in on; if it was in off, it stays in off).

**Circuit 2**
The relay configured as Valv2 works as a thermostat with inverse action (hot), using the superheat value as the control variable.
SH12= ("NTC AUX Temperature probe suction circ.2") – ("Probe Suction Circuit2")

*Note*: "Probe Suction Circuit2" can be AICxx = 2 or 20 or 38 (in this case it has to be converted in temperature) or 42 (in this case it has to be converted in temperature)

if SH2 ≤ ASH14 – ASH15 → relay configured as DOC 106 on
if SH2≥ ASH14 → relay configured as DOC 106 off
if ASH14 – ASH15 < SH2 < ASH14 → maintains the previous status (it the relay was on, it stays in on; if it was in off, it stays in off).

### 13.1.4 Special cases

a. If no aux probe is configured for calculating the SH1 (SH2) and a relay is set as DOCxx = 105 (106), this relay will never be enabled.
b. If the AUX probe configured for calculating the SH1 (SH2) is in error mode, the probe alarm is generated and the relay set as DOCxx = 105 (106) is not enabled.

## 13.2 Activation to increase suction temperature when it is too low

### 13.2.1 PARAMETERS INVOLVED

| LABEL | MEANING | RANGE |
|---|---|---|
| ASH17 | Hot gas valve circuit 1 activated also by temperature control | (no, yes) |
| ASH18 | Suction 1 temperature value at which the hot gas valve is enabled (hot action) | (-50÷110°C/ -58 to 230°F) |
| ASH19 | Differential for ASH18 | (0.1 to 15.0°C/ 1 to 30°F) |
| ASH20 | Hot gas valve circuit 2 activated also by temperature control | (no, yes) |
| ASH21 | Suction 2 temperature value, at which the hot gas valve is enabled (hot action) | (-50÷110°C/ -58 to 230°F) |
| ASH22 | Differential for ASH21 | (0.1 to 15.0°C/ 1 to 30°F) |

### 13.2.2 Configuration

**IO_configuration circuit 1:**

1) relay as hot gas injection valve:
DOCxx = 105 "Hot gas injection valve circuit 1"

2) The temperature control is enabled (ASH17=YES)

3) At least one tempearature probe, among the following, is set as auxiliary probe, mounted on the suction line:

AIxx = 17 "NTC AUX Temperature probe suction circ.1" or
AIxx = 45 "NTC Suction Temperature Compressor 1 Circuit 1" or
…
AIxx = 56 "NTC Suction Temperature Compressor 12 Circuit 1"

**IO_configuration circuit 2:**

1) relay as hot gas injection valve:
DOCxx = 106 "Hot gas injection valve circuit 2"

2) The temperature control is enabled (ASH20=YES)

3) At least one tempearature probe, among the following, is set as auxiliary probe, mounted on the suction line:

| | |
|---|---|
| AIxx = 18 | "NTC AUX Temperature probe suction circ. 2" or |
| AIxx = 57 | "NTC Suction Temperature Compressor 1 Circuit 2" or |
| … | |
| AIxx = 68 | "NTC Suction Temperature Compressor 12 Circuit 2" |

### 13.2.3 Adjustment

**Circuit 1**
The relay configured as hot gas injection valve circuit 1 (DOCxx = 105) works as a thermostat with inverse action (hot), using the temperature values coming from the probe sets as AIxx = 17, 45, 46, …, 56, respecting the following conditions:

If at least **one of the probes** set as **AIxx = 17, 45, 46, …, 56** ≤ ASH18 – ASH19 → relay configured as DOC 105 on
If **ALL the probes AIxx = 17, 45, 46, …, 56** ≥ ASH18 → relay configured as DOC 105 off
Else →
maintains the status.

**Circuit 2**
The relay configured as hot gas injection valve circuit 2 (DOCxx = 106) works as a thermostat with inverse action (hot), using the temperature values coming from the probe sets as AIxx = 18, 57, 58, …, 68, respecting the following conditions:

If at least **one of the probes** set as **AIxx = 18, 57, 58, …, 68** ≤ ASH21 – ASH22 → relay configured as DOC 106 on
If **ALL the probes AIxx = 18, 57, 58, …, 68** ≥ ASH21 → relay configured as DOC 106 off
Else →
maintains the status.

### 13.2.4 Particular cases

a. If no probes are configured as AIxx = 17, 45, 46, …, 56 (AIxx =18, 57, 58, …, 68) to detect the suction temperature and a relay is set as "Hot gas injection valve circuit 1" ("Hot gas injection valve circuit 2"), the "Hot gas injection valve circuit 1" ("Hot gas injection valve circuit 2") relay will never be enabled.
b. If all the probes configured as AIxx = 17, 45, 46, …, 56 (AIxx =18, 57, 58, …, 68) are in error mode, the probe alarm is generated and the "Hot gas injection valve circuit 1" ("Hot gas injection valve circuit 2") relay is not enabled.

## 14 LIQUID INJECTION VALVE MANAGEMENT

The liquid injection valve DOCxx = 123 "Liquid injection valve circuit 1" (DOCxx = 124 "Liquid injection valve circuit 2") can be activated in the following cases:

- To decrease SH, when it's too high,
- To decrease suction temperature.
- To decrease compressor discharge temperature

**NOTE**:
As there are 3 ways to active the liquid injection valve:
If one of above way needs to turn on the liquid injection valve, and the other ways do not need to turn on the liquid injection valve, the valve will be turned on,
The valve will be turned off only in condition that all of the 3 ways need to turn off the valve.

## 14.1 Activation to decrease superheat with high superheat conditions

**Preliminary consideration:**
The 2 below conditions have to be satisfied before starting the SH check and control

a. The SH of the circuit 1 (circuit 2) is calculated ONLY if at least one compressor of the circuit 1 (circuit 2) is running,

b. The SH control starts 1 minute after the start of the first compressor of the circuit 1 (circuit 2).

### 14.1.1 PARAMETERS INVOLVED

| LABEL | MEANING | RANGE |
|---|---|---|
| **ASH26** | Liquid injection valve circuit 1 activated also by SH control | no, yes |
| **ASH27** | High Superheat value of circuit 1 to enable liquid injection (cooling action) | 1 to 100°C/ 1 to 180°F |
| **ASH28** | Differential for ASH27 | 0.1 to 15.0°C/ 1 to 30°F |
| **ASH29** | Liquid injection valve circuit 2 activated also by SH | no, yes |
| **ASH30** | High Superheat value of circuit 2 to enable liquid injection (cooling action) | 1 to 100°C/ 1 to 180°F |
| **ASH31** | Differential for ASH30 | 0.1 to 15.0°C/ 1 to 30°F |
| **ASH39** | On time for liquid injection valve circuit 1 | 3-500s |
| **ASH40** | Off time for liquid injection valve circuit 1 | 0-500s |
| **ASH41** | On time for liquid injection valve circuit 2 | 3-500s |
| **ASH42** | Off time for liquid injection valve circuit 2 | 0-500s |

### 14.1.2 Configuration

**IO_configuration circuit 1**:

1) digital output set as liquid injection valve:
DOCxx =123 "Liquid injection valve Circuit 1"

2) auxiliary probe for calculating superheat:
AIxx = 17 "NTC AUX Temperature probe suction circ.1"

**IO_configuration circuit 2**:

1) digital output set as liquid injection valve:
DOCxx =124 "Liquid injection valve Circuit 2"

2) auxiliary probe for calculating superheat:
AIxx = 18 "NTC AUX Temperature probe suction circ.2"

### 14.1.3 Adjustment

**Circuit 1**
The relay configured DOCxx =123 works as a thermostat, with cooling action, using the superheat value as the control variable.
SH1 = ("NTC AUX Temperature probe suction circ.1") – ("Probe Suction Circuit1")

*Note*: "Probe Suction Circuit1" can be AICxx = 1 or 19 or 37 (in this case it has to be converted in temperature) or 41 (in this case it has to be converted in temperature)

if SH1≥ ASH24 + ASH25 → relay configured as DOC 123 or Analog output AOCxx set as: TAB A: 47 or 49 or TAB B: 24 or TAB

C: 25 or 27 or TAB D: 13 cycling according to ASH39 and ASH40.
**NOTE:** With ASH40 = 0, relay or analog output is always on independently from value of ASH39

if SH1 ≤ ASH24 → relay configured as DOC 123 or analog output off
if ASH24 < SH1 < ASH24+ASH25 → maintains the previous status (it the relay was on, it stays in on; if it was in off, it stays in off)

**Circuit 1**
The relay configured DOCxx =124 works as a thermostat, with cooling action, using the superheat value as the control variable.
SH2 = ("NTC AUX Temperature probe suction circ.2") – ("Probe Suction Circuit2")

*Note*: "Probe Suction Circuit2" can be AICxx = 2 or 20 or 38 (in this case it has to be converted in temperature) or 42 (in this case it has to be converted in temperature)

if SH2≥ ASH30 + ASH31 → relay configured as DOC 124 or Analog output AOCxx set as: TAB A: 48 or 50 or TAB B: 25 or TAB C: 26 or 28 or TAB D: 14: **cycling according to ASH41 and ASH42.**
**NOTE: With ASH42 = 0, relay or analog output is always on independently from value of ASH41**
if SH2 ≤ ASH30 → relay configured as DOC 124 or analog output is off
if ASH30 < SH2 < ASH30+ASH31 → maintains the previous status

### 14.1.4 Particular cases

a. If no aux probe is configured for calculating the SH1 (SH2) and a relay is set as DOCxx=123 "Liquid injection valve Circuit 1" (DOCxx=124 "Liquid injection valve Circuit 2"), the valve relay will never be enabled.
b. If the AUX probe configured for calculating the SH1 (SH2) is in error mode, the probe alarm is generated and the relay DOCxx=123 (DOCxx=124) is not enabled.

## 14.2 Activation to decrease suction temperature when it is too high

**Preliminary consideration:**
The 2 below conditions have to be satisfied before starting the SH check and control
a. The temperature of the circuit 1 (circuit 2) is monitored ONLY if at least one compressor of the circuit 1 (circuit 2) is running,
b. The temperature control starts after ASH30 minuts after the start of the first compressor of the circuit 1 (circuit 2).

### 14.2.1 PARAMETERS INVOLVED

| LABEL | MEANING | RANGE |
|---|---|---|
| ASH32 | Liquid injection valve, circuit 1, activated also by temperature control | no, yes |
| ASH33 | Delay after compressor start, before initiatingthe suction temperature control: This delay is used both for circuit 1 and circuit 2 | 0÷15min |
| ASH34 | Suction 1 temperature value at which the liquid injection valve is enabled (cooling action) | -50÷110°C/ -58 to 230°F |
| ASH35 | Differential for ASH34 | 0.1 to 15.0°C/ 1 to 30°F |
| ASH36 | Liquid injection valve, circuit 2, activated also by temperature control no, yes | no, yes |

| | | |
|---|---|---|
| ASH37 | Suction 2 temperature value at which the liquid injection valve is enabled (cooling action) | -50÷110°C/ -58 to 230°F |
| ASH38 | Differential for ASH37 | 0.1 to 15.0°C/ 1 to 30°F |

## 14.2.2 Configuration

**IO_configuration circuit 1**:

1) relay set as liquid injection valve:
DOCxx = 123 "Liquid injection valve circuit 1" **or**
Analog output AOCxx set as: TAB A: 47 or 49 or TAB B: 24 or TAB C: 25 or 27 or TAB D: 13

2) The temperature control is enabled (ASH29=YES)

3) At least one tempearature probe, among the following, is set as auxiliary probe, mounted on the suction line :

AIxx = 17 "NTC AUX Temperature probe suction circ.1" or
AIxx = 45 "NTC Suction Temperature Compressor 1 Circuit 1" or
…
AIxx = 56 "NTC Suction Temperature Compressor 12 Circuit 1"

**IO_configuration circuit 2**:

1) relay set as liquid injection valve:
DOCxx = 124 "Liquid injection valve circuit 2"

2) The temperature control is enabled (ASH33=YES)

3) At least one tempearature probe, among the following, is set as auxiliary probe, mounted on the suction line :

AIxx = 18 "NTC AUX Temperature probe suction circ. 2" or
AIxx = 57 "NTC Suction Temperature Compressor 1 Circuit 2" or
…
AIxx = 68 "NTC Suction Temperature Compressor 12 Circuit 2"

## 14.2.3 Adjustment

**Circuit 1**
The relay configured as DOCxx = 123 "Liquid injection valve circuit 1" works as a thermostat with direct action (cooling), using the temperature values coming from the probe sets as AIxx = 17, 45, 46, …, 56, respecting the following conditions:

If at least **one of the probes** set as **AIxx = 17, 45, 46, …, 56** ≥ ASH31 + ASH32 → relay configured as DOC 123 on
If **ALL the probes AIxx = 17, 45, 46, …, 56** ≤ ASH31 → relay configured as DOC 123 off
Else →
maintains the status.

**Circuit 2**
The relay configured as DOCxx = 124 "Liquid injection valve circuit 2" works as a thermostat with direct action (cooling), using the temperature values coming from the probe sets as AIxx = 18, 57, 58, …, 68, respecting the following conditions:

If at least **one of the probes** set as **AIxx = 18, 57, 58, …, 68** ≥ ASH34 + ASH35 → relay configured as DOC 124 on
If **ALL the probes AIxx = 18, 57, 58, …, 68** ≤ ASH34 → relay configured as DOC 124 off

Else →

maintains the status.

### 14.2.4 Special cases

a. If no probes are configured as AIxx = 17, 45, 46, …, 56 (AIxx = 18, 57, 58, …, 68) to detect the suction temperature and a relay is set as “Liquid injection valve circuit 1” (“Liquid injection valve circuit 2”), the “Liquid injection valve circuit 1” (“Liquid injection valve circuit 2”) relay will never be enabled.

b. If all the probes configured as AIxx = 17, 45, 46, …, 56 (AIxx = 18, 57, 58, …, 68) are in error mode, the probe alarm is generated and the “Liquid injection valve circuit 1” (“Liquid injection valve circuit 2”) relay is not enabled.

## 14.3 Activation to decrease discharge temperature when it is too high

**Preliminary consideration:**

The 2 below conditions have to be satisfied before starting the temperature check and control

c. The temperature of a circuit is monitored ONLY if at least one compressor of the circuit itself is running,

d. The temperature control starts after 1 minute after the start of the first compressor of the circuit.

### 14.3.1 PARAMETERS INVOLVED

| LABEL | MEANING | RANGE |
|---|---|---|
| **DSC1** | Circuit 1, Liquid injection valve activated also by discharge temperature | no, yes |
| **DSC2** | Circuit 1, discharge temperature threshold to activate the liquid injection valve | 0 to 150°C; 32 to 302°F |
| **DSC3** | Circuit 1, Differential for DSC2 and DSC4 | 0.1 to 15.0°C/ 1 to 30°F |
| **DSC4** | Circuit 1, High discharge temperature alarm, circuit 1 | 0 to 150°C; 32 to 302°F |
| **DSC5** | Circuit 1, High discharge temperature alarm delay | 0 to 60min |
| **DSC6** | Circuit 1, Delay before stopping compressors, with High discharge temperature alarm: | 0 to 255min |
| **DSC7** | Circuit 1, Interval between 2 compressors turning off in case of high discharge temperature alarm: | 0 to 255s |
| **DSC8** | Circuit 2, Liquid injection valve activated also discharge temperature | no, yes |
| **DSC9** | Circuit 2, discharge temperature threshold to activate the liquid injection valve | 0 to 150°C; 32 to 302°F |
| **DSC10** | Circuit 2, Differential for DSC9 | 0.1 to 15.0°C/ 1 to 30°F |
| **DSC11** | Circuit 2, High discharge temperature alarm | 0 to 150°C; 32 to 302°F |
| **DSC12** | Circuit 2, High discharge temperature alarm delay | 0 to 60min |
| **DSC13** | Circuit 2, Delay before stopping compressors, with high discharge temperature alarm | 0 to 255min |
| **DSC14** | Circuit 2, Interval between 2 compressors turning off in case of high discharge temperature alarm | 0 to 255s |

### 14.3.2 Configuration

**IO_configuration circuit 1**:

1) relay set as liquid injection valve:
DOCxx = 123 “Liquid injection valve circuit 1”

2) The temperature control is enabled (DSC1=YES)

3) At least one tempearature probe, among the following ones, is set as discharge temperature probe, mounted on the discharge line:

| | |
|---|---|
| AIxx = 156 | "NTC Discharge Temperature line Circuit 1" |
| AIxx = 158 | "PTC Discharge Temperature line Circuit 1" |
| AIxx = 69 | "PTC Discharge Temperature Compressor 1 Circuit 1" or |
| AIxx = 70 | "PTC Discharge Temperature Compressor 2 Circuit 1" or |
| … | |
| AIxx = 80 | "PTC Discharge Temperature Compressor 12 Circuit 1" |

**IO_configuration circuit 2**:

1) relay set as liquid injection valve:
DOCxx = 124 "Liquid injection valve circuit 2"

2) The temperature control is enabled (DSC8=YES)

3) At least one tempearature probe, among the following ones, is set as discharge temperature probe, mounted on the discharge line:

| | |
|---|---|
| AIxx = 157 | "NTC Discharge Temperature line Circuit 2" |
| AIxx = 159 | "PTC Discharge Temperature line Circuit 2" |
| AIxx = 81 | "PTC Discharge Temperature Compressor 1 Circuit 2" or |
| AIxx = 82 | "PTC Discharge Temperature Compressor 2 Circuit 2" or |
| … | |
| AIxx = 92 | "PTC Discharge Temperature Compressor 12 Circuit 2" |

## 14.3.3 Adjustment

**Circuit** 1
The relay configured as liquid injection valve, (DOCxx = 123) works as a thermostat with direct action (cooling), using of the temperature values coming from the probe sets as AIxx = 156, 158, 69, 70, …, 80, respecting the following conditions:

If at least **one of the probes** set as **AIxx = 156, 158, 69, 70, …, 80** ≥ DSC2 + DSC3 → relay configured as DOC 123 on
If **ALL the probes AIxx = 156, 158, 69, 70, …, 80** ≤ DSC2 →
relay configured as DOC 123 off
Else →
maintains the status.

**Circuit 2**
The relay configured as liquid injection valve, (DOCxx = 124) works as a thermostat with direct action (cooling), using of the temperature values coming from the probe sets as AIxx = 157, 159, 81, 82, …, 92, respecting the following conditions:

If at least **one of the probes** set as **AIxx = 157, 159, 81, 82, …, 92** ≥ DSC9 + DSC10 → relay configured as DOC 124 on
If **ALL the probes AIxx = 157, 159, 81, 82, …, 92** ≤ DSC9 →
relay configured as DOC 124 off
Else →
maintains the status.

## 14.3.4 Special cases

a. If no probes are configured as AIxx = 156, 158, 69,70, …, 80 (AIxx = 157, 159, 81, 82, …, 92) to detect the discharge temperature and a relay is set as "Liquid injection valve circuit 1" ("Liquid injection valve circuit 2"), the "Liquid injection valve circuit 1" ("Liquid injection valve circuit 2") relay will never be enabled.
b. If all the probes configured as AIxx = 156, 158, 69,70, …, 80 (AIxx = 157, 159, 81, 82, …, 92) are in error mode, the probe alarm is generated and the "Liquid injection valve circuit 1" ("Liquid injection valve circuit 2") relay is not enabled.

# 15 Low Temperature/pressure value to turn off the compressors (electronic low 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.

## 15.1.1 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.

# 16 High pressure alarm in gas cooler

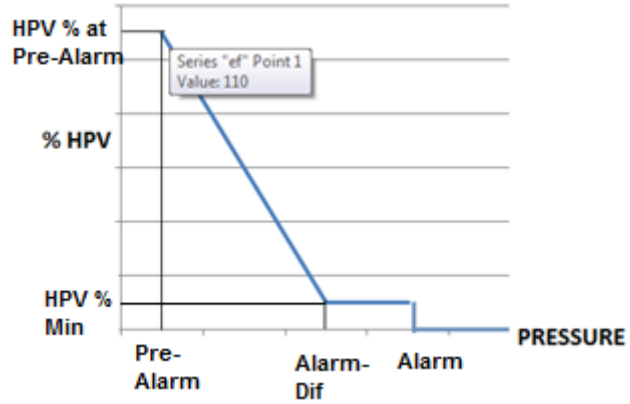
This alarm works in parallel with pressure alarm for fan given by the parameter AL25.
If the condenser 1 pressure probe reaches the value GC19 and AL27 = YES, the compressors of the circuit 1 (medium temperature), and Circuit 2 (low temperature) and Parallel compressors (if present) are switched off every AL28 sec, while the fans are running at maximum speed.

Alarms recovers when the pressure go below GC19 -5bar (72.5PSI).

# 17 Flash tank management

## 17.1 High pressure in flash tank

**To avoid high pressure alarm conditions in flash tank, there is a pre-alarm area where HP valve is closed a proportionally to the flash tank pressure.**
If the flash tank pressure increseas and raises the high pre-alarm threshold, (GC29), the opeining percentage of HP valve will be updated according to the following chart:




**Where**
**Pre-Alarm = GC29**
**Alarm = GC28**
**Alarm-Dif = GC28-GC30**
**HPV % Min = GC12**

## 17.2 Low pressure in flash tank

### 17.2.1 HP and By pass valves management

The controller monitors and manages the pressure inside the flash tank.
If the pressure in the flash tanks decreases and goes below the alarm value (GC31= Flash tank Low pressure setpoint) the by pass valve is closed and the high pressure valve is open at GC36 (HPV % openeing during low pressure safety mode).
Standard operation will be restored as soon as flash tank pressure rises above the GC31+GC32 threshold.

### 17.2.2 Hot gas injection in flash tank

In addition to the above action, hot gas can be injected in flash tank, by a pass between medium temp discharge line and flash tank.
To do this a relay has to be set as Hot Gas injection valve into Flash tank (DOCxx = 117), and a pressure cut in (GC31 = Flash tank Low pressure setpoint) and cut out (GC31+ GC32) have to be properly set.
The regulation is the following:
If flash tank pressure is less than GC31 the hot gas by-pass valve is energized.
If flash tank pressure is higher than GC31+GC32 the hot gas by-pass valve is de-energized.
When the pressure is between GC31 and GC31+GC32 the hot gas by-pass valve maintains its status.

In case of pressure probe fault, the the function is disabled

## 17.3 Flash tank liquid level monitoring

### 17.3.1 Min and max analog liquid level in % and delay

Controller manages the flash tank liquid level and can signal the low or high liquid level warning.
With high liquid level condition, compressors can be stopped to allow the liquid to flow through the system.

To manage the liquid level an analot input must be set as liquid level (AICxx = 135: 0-5V), then by the following parameters the Max and min level warnings can be managed:

- **AL47** Low Liquid level alarm set point in flash tank
- **AL48** High Liquid level alarm set point in flash tank**.**
- **AL49** Delay to signal Low or High Liquid level alarm**.**
- **AL50** Differential for liquid level alarm recovery**.**
- **AL51** LT, MT and Parallel compressors shut down in case of HIhg Liquid level alarm in flash tank**.**

# 18 OFF FUNCTION

## 18.1 RELATION BETWEEN DIGITAL INPUT AND KEYBOARD

About On/Off function, please refer to the sequence on the next table:
The status of DI will affect the ON/Off function, when it is configured as below:

**107o ON/OFF Circuit 1**
**107c ON/OFF Circuit 1**
**108o ON/OFF Circuit 2**
**108c ON/OFF Circuit 2**

From Visograph, user can also switch the controller on/off by keyboard; it will combine with DI status if configured to control On/Off function.

| IPRO-STATUS | DI change status | BUTTON | NEXT IPROSTATUS |
|---|---|---|---|
| OFF | Off | OFF | **OFF** |
| OFF | OFF→ON | OFF | **ON,**<br>**and also the status of the button is forced to on** |
| OFF | OFF | OFF → ON | **ON**<br>**TO be switched off again by digital input, the following cycle has to be done:** |

| | | | |
|---|---|---|---|
| | | | **DI: off→on→off** |
| ON | Off → on | ON | **ON** |
| On | On → off | On | **Off,**<br>**and also the status of the button is forced to off** |
| On | On | On → off | **Off**<br>**To be switched on again by digital input, the following cycle has to be done:**<br>**DI: on→off→on** |

In case of power failure, the iProRACK has to resume the status before the power failure.
In OFF status, all the loads are switched OFF without waiting any delay and all the analog outputs are zero. Also the iProRACK does not manage any alarm.

## 18.2 OFF FUNCTION AND GAS COOLER VALVES

If one of the circuit is in "off mode" the HPV and BY-PASS valves have to be closed

# 19 ENERGY SAVING FUNCTION

## 19.1 RELATION BETWEEN DIGITAL INPUT AND KEYBOARD

About Energy saving function, please refer to the sequence on the next table:
The status of DI will affect the ON/Off function, when it is configured as below:

**105o Energy saving Circuit 1**
**105c Energy saving Circuit 1**
**106o Energy saving Circuit 2**
**106c Energy saving Circuit 2**

From Visograph, user can also enable/disable ES function by keyboard.
It will combine with DI status if DIs are configured as ES function.

| IPRO-STATUS | DI change status | BUTTON | NEXT IPROSTATUS |
|---|---|---|---|
| **OFF** | **Off** | **OFF** | **OFF** |
| **OFF** | **OFF→ON** | **OFF** | **ON,**<br>**"ES" status on Viso is forced to "ON" and "SET" is blinking.** |
| **OFF** | **OFF** | **OFF → ON** | **ON**<br>**TO be switched off again by digital input, the following cycle has to be done:**<br>**DI: off→on→off**<br>**After this operation, "ES" status on Viso is forced to "OFF" and "SET" stop blinking.** |
| **ON** | **OFF → ON** | **ON** | **ON** |
| **ON** | **ON → OFF** | **ON** | **OFF,**<br>**"ES" status on Viso is forced to "OFF" and "SET" stop blinking.** |
| **ON** | **ON** | **ON → OFF** | **OFF**<br>**To be switched on again by digital input, the following cycle has to be done:**<br>**DI: on→off→on**<br>**after this operation,**<br>**"ES" status on Viso is forced to "ON" and "SET" is blinking.** |

# 20 AUXILIARY RELAYS ACTIVATED BY DIGITAL INPUTS

The relays set as AUX1 … AUX8 can be activated by digital input set as AUX1 … AUX8.

## 20.1 Parameters involved

| Label | Description | Range |
|---|---|---|
| DIC1 …DIC43 | Digital input 1 …43 configuration | 1o÷144c |

## 20.2 Activation

There are 3 ways to activate the relays set as AUX1… AUX8:

1. By digital input set as 142o ….149c
2. By serial command
3. By thermostat probe set as AUX Probe.

NOTE: follows the number 1..3 for the priority.

## 20.3 Action

When the digital input set for activate an AUX output is on, the corresponding output is activated.

# 21 HVAC cooling control

## 21.1 Resources

**Digital outputs:** DOCxx =

| | |
|---|---|
| 151o | Solenoid valve for HVAC control |
| 151c | Solenoid valve for HVAC control |
| 152o | Pump for HVAC control |
| 152c | Pump for HVAC control |

**Digital inputs:** DICxx =

| | |
|---|---|
| 189o | HVAC control request |
| 189c | HVAC control request |
| 190o | HVAC pump flow switch |
| 190c | HVAC pump flow switch |
| 191o | HVAC pump thermal protection |
| 191c | HVAC pump thermal protection |

**Analog inputs:** AICxx =

| | | |
|---|---|---|
| 203/ 204 | NTC/NTC CPC Temperature Probe Evaporator in HVAC cooling control | **Option**, if the probe is not enabled the temperature regulation is not performed and the pump will be activated or de-activated after Solenoid valve according to CC01 and CC02 delay times. |

## 21.2 Parameters

CC01 Activation delay between Pump and Solenoid valve
Range 0÷600 sec

CC02 De-activation delay between Solenoid valve and Pump
Range 0÷600 sec

CC03 Set point for Pump for HVAC control
Range -50.0°C ÷ 100.0°C

CC04 Differential for CC03
Range 0.1 ÷ 30.0

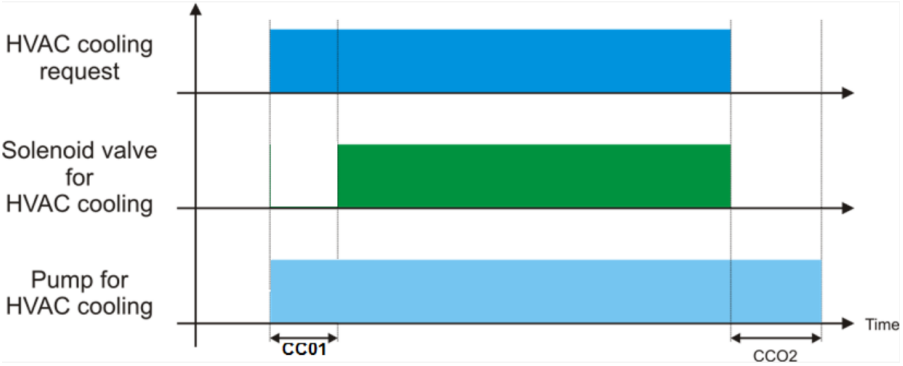
## 21.3 Regulation

### 21.3.1 Activation:

#### 21.3.1.1 Pump regulation without "NTC Temperature Probe Evaporator in HVAC cooling control"

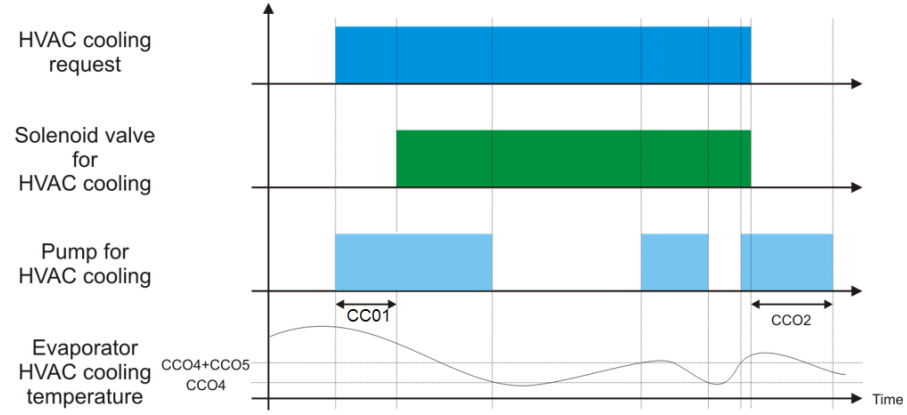
When the controller receives the signal to activate the HAVC, it switches ON the Pump and if there are not alarms after CC01 delay the controller switches ON the Solenoid valve .
In case of flow switch alarms, iProRACK tries 3 times to start the system after that an alarm is given.

See below the activation sequence:




### 21.3.1.2 Pump regulation according to “NTC Temperature Probe Evaporator in HVAC cooling control”

If the temperature probe is present, the control of the temperature is added to previous control as shown in the following picture:



## 21.4 HVAC DEACTIVATION IN CASE OF HIGH EXTERNAL TEMPERATURE

It's possible to stop HVAC in case of high external temperature and refrigeration call always activated.

### 21.4.1 Parameters

**CC05** **Gascooler outlet temperature threshold to enable the HVAC stop**

**CC06** **HVAC stop delay with suction temperature > SETC1 + differential + parallel compr. at 100% + gas cooler outlet temperature > CC05**

**CC07** **HVAC enabling delay after stop for high temperature conditions**

### 21.4.2 Regulation

In case of high external temperature, and if medium temperature and parallel compressor running at full speed for a long time (CC=6) the HVAC is switched off.
HAVAC can restart after a set time (par. CC07)

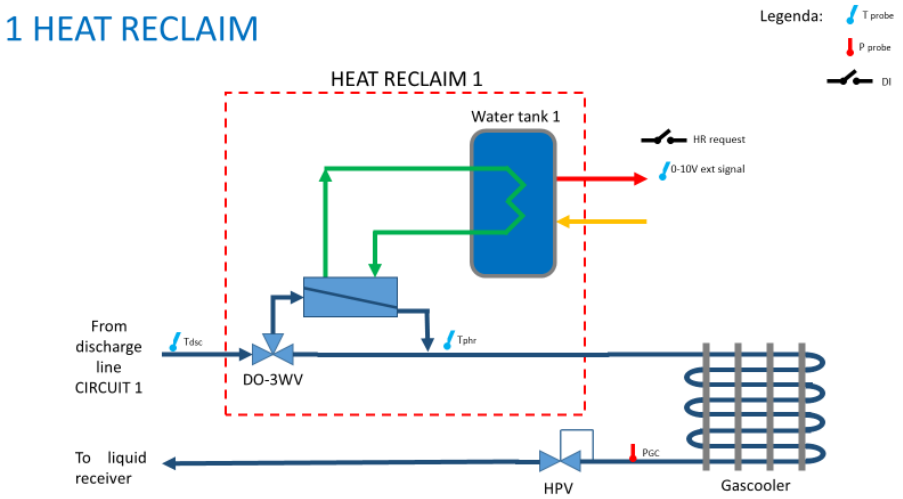
# 22 HEAT RECLAIM FOR TRANSCRITICAL CO2 RACK

Controller manages up to 2 heatreclaims for tap water and building heaters.
The system is flexible, see below different possibilities.

## 22.1 SINGLE HEAT RECLAIM WITHOUT PUMP

### 22.1.1 Case 1: single heat reclaim with external signal 0-10V or 4-20mA

**MAIN PARAMETERS**:
**HTRC0 = 0**; Type of input signal for heat reclaim_1: Voltage



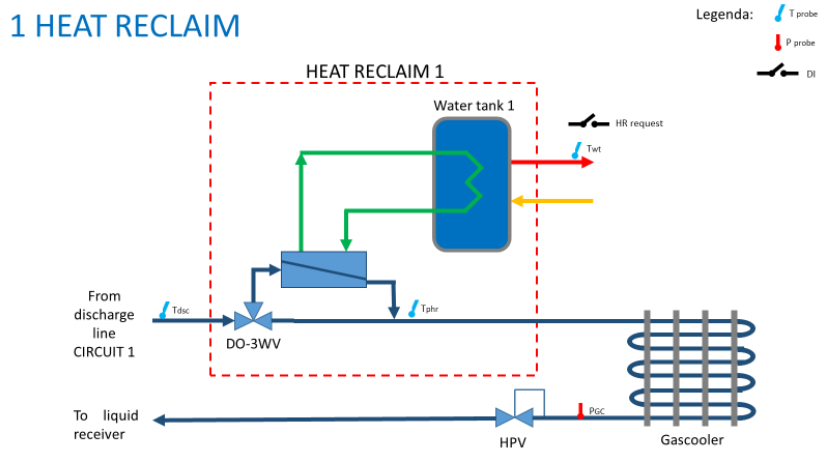

**Resouces**

| LABEL | RESOURCE | VALUE | DESCRIPTION | MANDATORY |
|---|---|---|---|---|
| HR request | DICxx | 97 | Heat reclaim Circuit 1 | YES |

| | | | | |
|---|---|---|---|---|
| | AICxx | 171 or 172 | 0-10V or 4-20mA H-R signal | YES |
| Tdsc | AICxx | 158 | PTC Discharge line circuit 1 | YES |
| Tphr | AICxx | 166 | NTC CO2 Temperature post heat reclaim | YES |
| Pgc | AICxx | 169 or 170 | Gas Cooler pressure | YES |
| Tgc | AICxx | 154 or 155 | Gas Cooler outlet temperature | YES |
| DO-3WV | DOCxx | 125 | 3 way valve HR1 | YES |

### 1.1.1 CASE 2: single heat reclaim with water tank temperature

**MAIN PARAMETERS**:
**HTRC0 = 1**
**HTRC36 = 0**

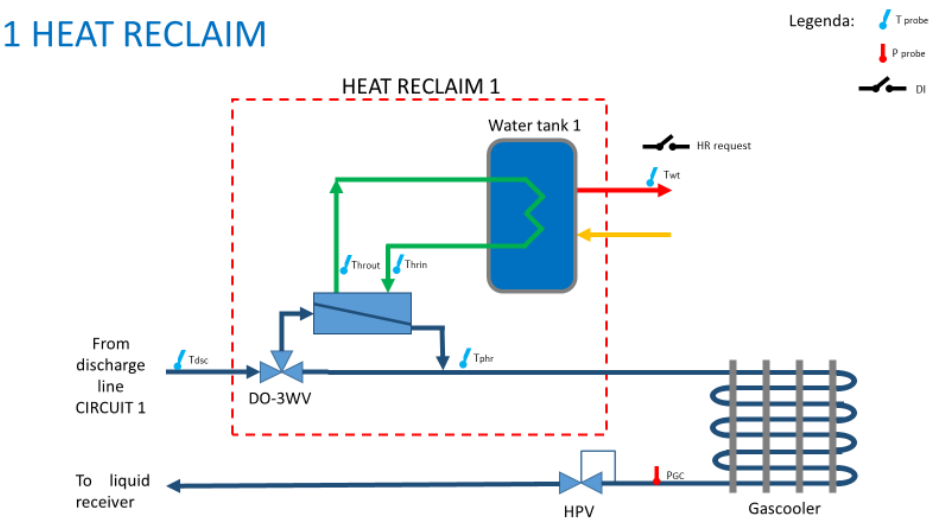



**Resouces**

| Label | Resource | Value | Description | Presence |
|---|---|---|---|---|
| HR request | DICxx | 97 | Heat reclaim Circuit 1 | OPTION |
| | AICxx | 171 or 172 | 0-10V or 4-20mA H-R signal | NO |
| Twt | AICxx | 164 | NTC H-R tank water temperature | YES |
| Tdsc | AICxx | 158 | PTC Discharge line circuit 1 | YES |
| Tphr | AICxx | 166 | NTC CO2 Temperature post heat reclaim | YES |
| Pgc | AICxx | 169 or 170 | Gas Cooler pressure | YES |
| Tgc | AICxx | 154 or 155 | Gas Cooler outlet temperature | YES |
| DO-3WV | DOCxx | 125 | 3 way valve HR1 | YES |

### 22.1.2 Case 3: single heat reclaim with differntial regulation

**MAIN PARAMETERS**:
**HTRC0 = 1**
**HTRC36 = 1**




**Resources**

| Label | Resource | Value | Description | Presence |
|---|---|---|---|---|
| HR request | DICxx | 97 | Heat reclaim Circuit 1 | OPTION |
| | AICxx | 171 or 172 | 0-10V or 4-20mA H-R signal | NO |
| Twt | AICxx | 164 | NTC H-R tank water temperature | YES |
| Thrin | AICxx | 162 | NTC H-R secondary fluid inlet temperature | YES |
| Throut | AICxx | 160 | NTC H-R secondary fluid outlet temperature | YES |
| Tdsc | AICxx | 158 | PTC Discharge line circuit 1 | YES |
| Tphr | AICxx | 166 | NTC CO2 Temperature post heat reclaim | OPTION |
| Pgc | AICxx | 169 or 170 | Gas Cooler pressure | YES |
| Tgc | AICxx | 154 or 155 | Gas Cooler outlet temperature | YES |
| DO3WV | DOCxx | 125 | 3 way valve HR1 | YES |

## 22.2 Adjustment Heat reclaim 1 for Case 1, 2, 3

### 22.2.1 Enabling conditions

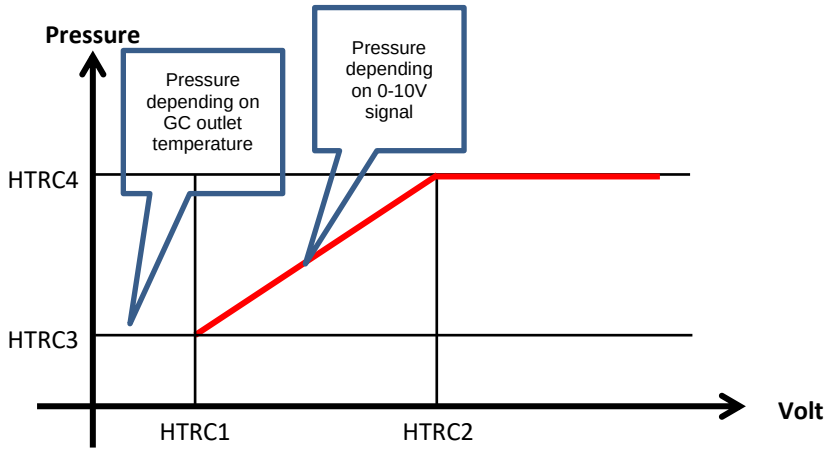
To enable the heat reclaim we need that all the 3 conditions are true, otherwise the standard regulation keeps on running.

a. The digital input is active or the water temperature is below the set point
b. The external voltage signal is above the activation threshold
c. At least least 1 compressor of Circuit 1 is running,

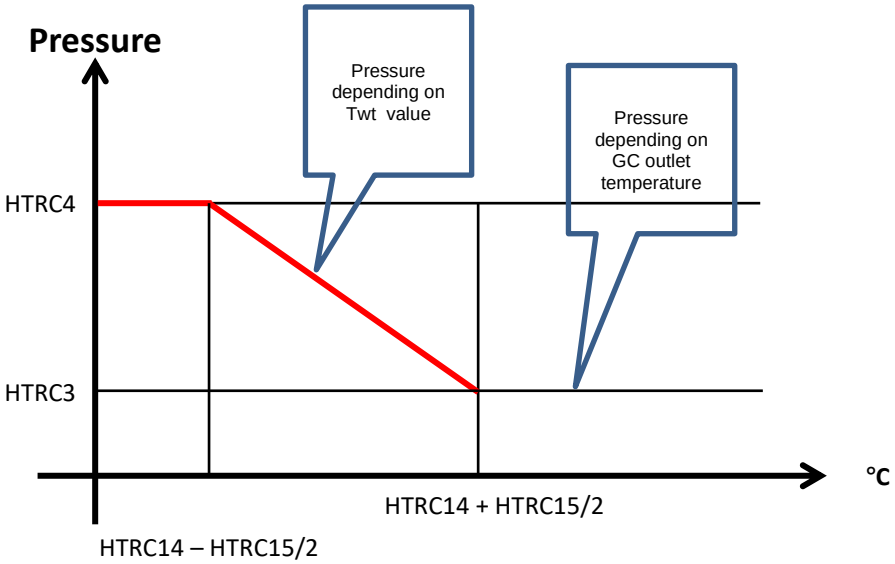
### 22.2.2 Gas cooler pressure modulation

With the heat reclaim enabled the pressure on the gascooler depends on the external signal ot water tank temperature according to the following diagrams:

### 22.2.3 Case 1: single heat reclaim with external signal 0-10V or 4-20mA

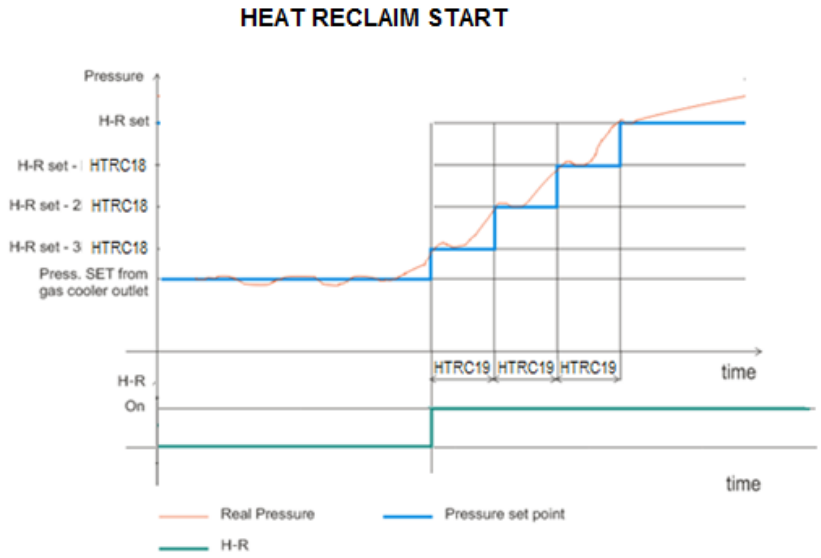



### 22.2.4 Case 2 and Case 3:




### 22.2.5 From standard regulation to heat reclaim

The controller doesn't move the pressure from gas cooler pressure set point to the value resquested by the HR regulation immediately, but it's possible to increse the pressure from the current values of HTRC18 bar every HTRC19 min as shown in the below graph




## 22.2.6 Safety conditions

### 22.2.6.1 Discharge temperature control

To assure a good HR operation mode the discharge temperature has to be higher than the minimimum temperature set in the parameter HTRC7.
If the temperature detected by discharge AICxx = 157 remains below HRTC7 thereshold for the HRT9 time the HR is witched off and normal regulation restarts.
If enabling conditions are met, it can restart after HTRC13 timer

### 22.2.6.2 Post heat reclaim temperature control

To assure a good HR operation mode the post heat reclaim temperature has to be higher than the minimimum temperature set in the parameter HTRC10.
Once this condition is not satisfied for the HRT12 time, the HR is witched off and normal regulation restarts. If enabling conditions are met, it can restart after HTRC13 timer

## 22.2.7 From heat reclaim to standard regulation

When the Heat Reclaim is disabled controller moves from HR to standard regulation.
The HR recover function is used.
In this case, the pressure set point is decreased of HTRC5 every HTRC6 mins till the pressure set point value, requested by the regulation is matched.

# HEAT RECLAIM RECOVER

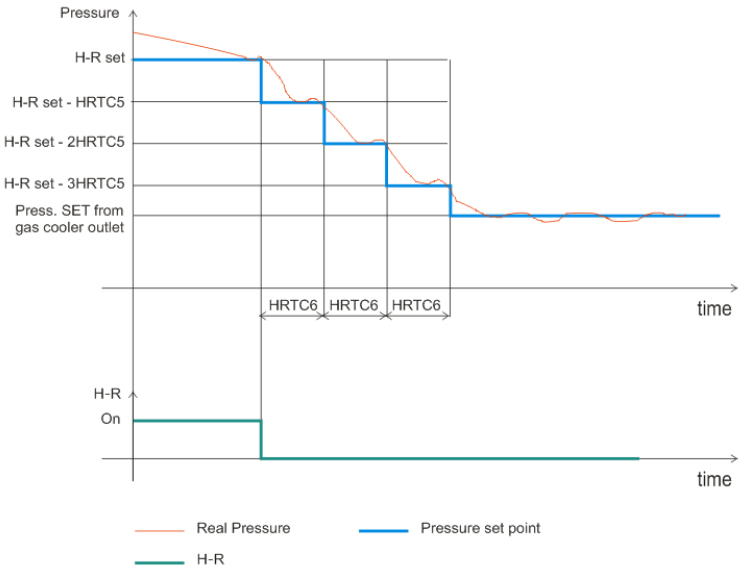
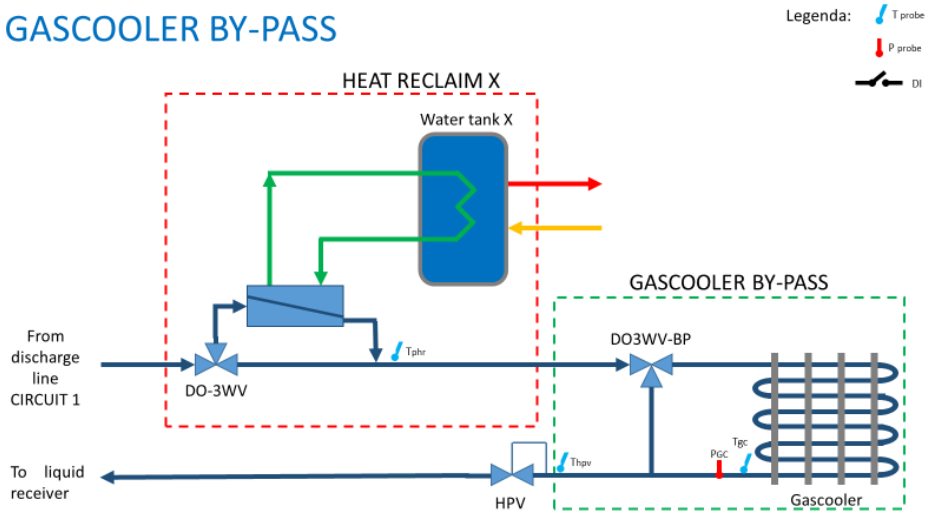



Fig. 1,

## 22.3 Single heat reclaim with gas cooler by-pass

### 22.3.1 Schema and resources




**Resources**

| | | | | |
|---|---|---|---|---|
| **Tgc** | AICxx | 154 (or 155) | NTC (or NTC CPC) Gas cooler outlet temperature | **YES** |
| **Thpv** | AICxx | 167 (or 168) | NTC (or NTC CPC) temperature before HPV | **YES** |
| **Tphr** | AICxx | 166 | NTC CO2 Temperature post heat reclaim | **YES** |
| **DO3WV-BP** | DOCxx | 138 | 3way valve gas cooler by-pass relay | **YES** |
| **Pgc** | AICxx | 169 or 170 | Gas Cooler pressure | **YES** |

#### 22.3.1.1 By pass valve management

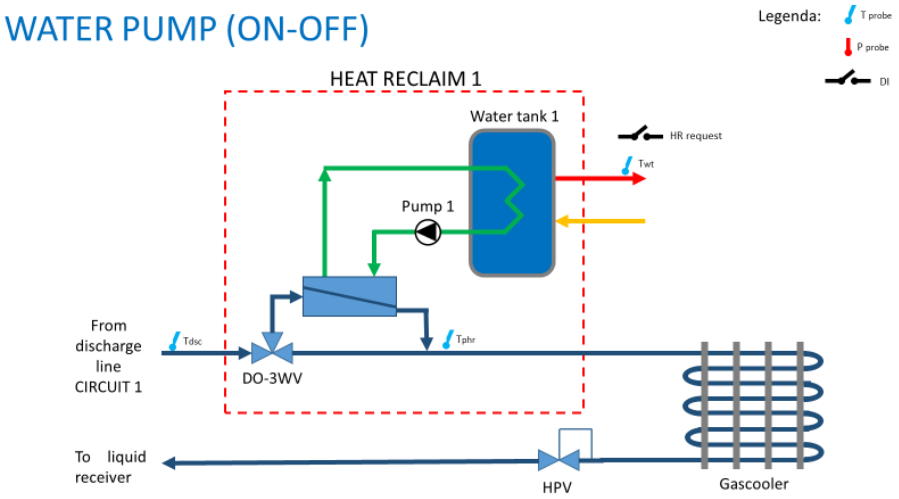
The gas cooler by-pass is enabled by parameter HTRC38, with HTRC38 = yes, the controller managed properly the fans to have them off, before activating the 3way valve relay to by-pass the gas cooler.

Once the controller has matched the condition to de-activate the fans, the 3WV-BP, by pass valve relay, is activated and the gas cooler outlet temperature reference moves from Tgc to Thpv probe
If it's necessary to restart the functionality of the gas cooler the 3WV-BP by pass valve relay is de-activated and the gas cooler outlet temperature reference probe dmove from Thpv to Tgc

## 22.4 Pump regulation – this is valid for both the HRs when the pump is present

### 22.4.1 On/off pump with regulation based on the water tank temperature

**The pump is present only with HTRC0 = 1**




| Label | Resource | Value | Description | Presence |
|---|---|---|---|---|
| **HR request** | DICxx | 97 | Heat reclaim Circuit 1 | **OPTION** |
| | AICxx | 171 | 0-10V H-R signal | **NO** |
| **Twt** | AICxx | 164 | NTC H-R tank water temperature | **YES** |
| **Tdsc** | AICxx | 158 | PTC Discharge line circuit 1 | **YES** |
| **DO3WV** | DOCxx | 125 | 3 way valve HR1 | **YES** |
| **DOpump1** | DOCxx | 126 | H-R water pump1 output | **YES** |
| **DIpfs** | DICxx | 171 | H-R pump1 flow switch alarm | **YES** |
| **DIpth** | DICxx | 172 | H-R pump1 thermal protection alarm | **YES** |

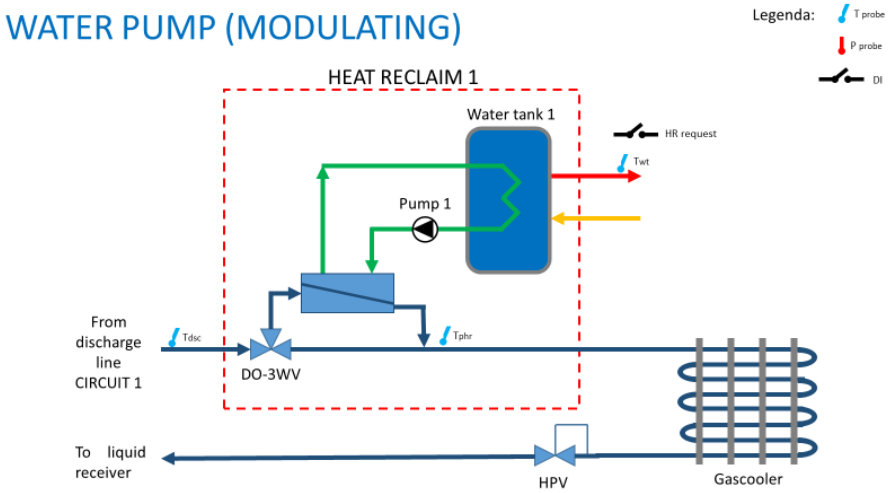
**HR activation**
The HR is activated if the HR digital input, if present, is enabled, and the temperature of the water is below the set point (Twt < HTRC14).
Controller switches on the pump and verifies the status of the flow switch.
In case the flow swtich signals an issue, the pump will be turned off and the Flow switch alarm is signalled. Manual reset is required to make the pump available again. See also Alarm table.

**HR de-activation**
The regulation remains on till or the HR digital input is disabled or water temperature is above the set plus half differential (Twt > HTRC14+ HTRC15/2),
When the HR is disabled, the 3 way valve relay (3WV) is switched off and after HTRC34 timer tne pump is switched off:

**Safety conditions**
The following safety conditions are taken in account when the HR is activated:

Tank water temperature: it must be below the max water temperature threshold HTRC41
Pump safeties (thermal and flow switches)
Compressor discharge temperature; it has to be higher than HTRC/ threshold.

### 22.4.2 Modulating pump regulation, based on the temperature of the water at the tank outlet enabled with HTRC36 = 0

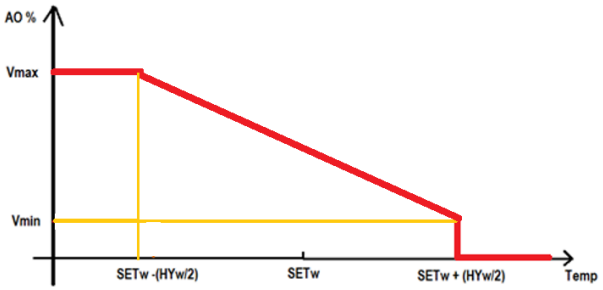



**Resources**

| Label | Resource | Value | Description | Presence |
|---|---|---|---|---|
| HR request | DICxx | 97 | Heat reclaim Circuit 1 | OPTION |
| | AICxx | 171 | 0-10V H-R signal | NO |
| Twt | AICxx | 164 | NTC H-R tank water temperature | YES |
| Tdsc | AICxx | 158 | PTC Discharge line circuit 1 | YES |
| Tphr | AICxx | 166 | NTC CO2 Temperature post heat reclaim | **YES** |
| Pgc | AICxx | 169 or 170 | Gas Cooler pressure | YES |
| DO3WV | DOCxx | 125 | 3 way valve HR1 | YES |
| DOpump | DOCxx | 126 | H-R water pump output | YES |
| 0-10VPump | AOCxx | 19 | 0-10V H-R water pump output | YES |
| DIpfs | DICxx | 171 | H-R pump flow switch | YES |
| DIpth | DICxx | 172 | H-R pump thermal protection | YES |

**HR activation**
The HR is activated if the HR digital input, if present, is enabled, and the temperature of the water is below the set point (Twt < HTRC14).
Controller switches on the pump and verifies the status of the flow switch.
In case the flow swtich signals an issue, the pump will be turned off and the Flow switch alarm is signalled. Manual reset is required to make the pump available again. See also Alarm table.

**HR regulation**
When the HR is activated, the pump speed is modulated by Ao_pmp according to diagram below




**Where:**

**Temp = Twt**
**SETw = HTRC14** for Heat Reclaim 1
**HYw = HTRC15** for Heat Reclaim 1
**Vmin** = **HTRC26** for Heat Reclaim 1
**Vmax** = **HTRC27** for Heat Reclaim 1

**Temp = Twt2**
**HTRC22** for Heat Reclaim 2
**HTRC23** for Heat Reclaim 2
**HTRC29** for Heat Reclaim 2
**HTRC30** for Heat Reclaim 2

till or the HR digital input is disabled or water temperature is above the set plus half differential (Twt > HTRC14+ HTRC15/2),
When the HR is disabled, the 3 way valve relay (3WV) is switched off and after HTRC34 timer tne pump is switched off:

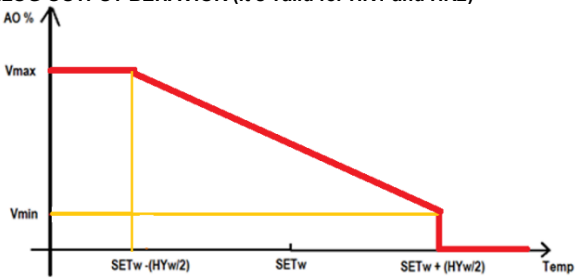
If

THEN:

4. Pump 1 is activated + AO_pmp at min speed
5. Flow switch status verification after delay timer (HTRC32)
6. If the flow alarm has not been activated

   THEN the relay 3WV is activated and the pump speed is modulated by Ao_pmp (proportional band see diagram below) with Max % variation/s HTRC31.
   OTHERWISE the pump is switched off.
   In this case, if the activation conditions 1. 2. 3. remains true, after 5mins the pump is switched on again and we restart from point 4,
   After 3 consecutive times that the flow switch alarm is activated, the pump will be turned off and the Flow switch alarm is signalled. Manual reset is required to make the pump available again. See also Alarm table

**ANALOG OUTPUT BEHAVIOR (it's valid for HR1 and HR2)**




**Where:**

**Temp = Twt**
**SETw = HTRC14** for Heat Reclaim 1

**Temp = Twt2**
**HTRC22** for Heat Reclaim 2

**HYw = HTRC15** for Heat Reclaim 1 **HTRC23** for Heat Reclaim 2
**Vmin** = **HTRC26** for Heat Reclaim 1 **HTRC29** for Heat Reclaim 2
**Vmax** = **HTRC27** for Heat Reclaim 1 **HTRC30** for Heat Reclaim 2

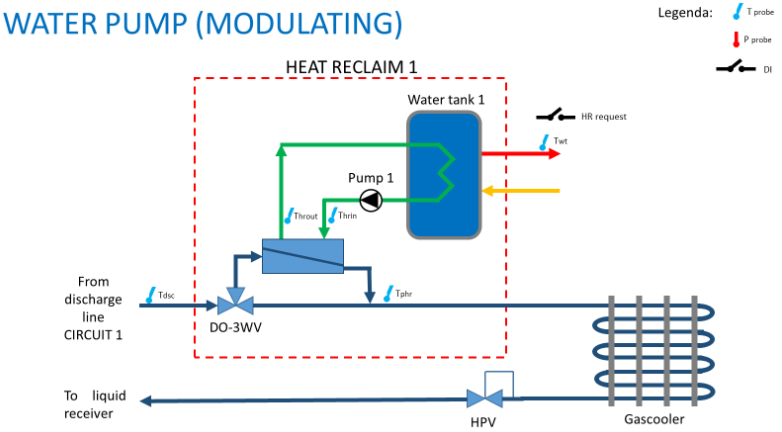
**Regulation: de-activation conditions**
The regulation remains on till one of the follwing conditions happen:

1. DI_hr is disabled
2. Twt > HTRC14+ HTRC15/2
3. Twt > = HTRC41-High temperature alarm of tank water
4. Pump 1 (DIpth) thermal switch alarrm is activated
5. Flow swtich DIpfs is disabled for more than (HTRC32/2)
6. Temp. TdSc < HTRC7 - enabling threshold for HR1 when HR2 is not running or not present for HTRC9 time-,
   or
   Tphr2 < HTRC20 - enabling threshold for HR1 when HR2 is running for HTRC21 time-.
   or
   AICxx = 166 < HTRC10 - enabling threshold for HR1 when HR2 is not running or not present for the time HTRC12.
   (AICxx = 185 < HRTC10 - enabling threshold for HR2 when HR1 is not running for time HTRC12.)
7. .All the compressor of the circuit 1 are switched off.

**Regulation: de-activation actions**

1. 3 way valve relay (3WV) relay is switched off
2. After HTRC34 pump relay (DOpump) is switched off if the points 4. And 5. are false
3. After HTRC34 Analog. Output (AO_pmp) is set to zero off if the points 4. And 5. are false
4. If point 4 or point5 alarm is active, the pump DO and AO will be stopped immediately without considering HTRC34.

### 22.4.3 Modulating pump regulation, based on the temperature differential at outlet and inlet of heat exchanger enabled only when HTRC36 = 1




**Resources**

| Label | Resource | Value | Description | Presence |
|---|---|---|---|---|
| HR request | DICxx | 97 | Heat reclaim Circuit 1 | OPTION |
| | AICxx | 171 | 0-10V H-R signal | NO |
| Twt | AICxx | 164 | NTC H-R tank water temperature | YES |
| Tdsc | AICxx | 158 | PTC Discharge line circuit 1 | YES |
| Tphr | AICxx | 166 | NTC CO2 Temperature post heat reclaim | OPTION |
| Pgc | AICxx | 169 or 170 | Gas Cooler pressure | YES |
| DO3WV | DOCxx | 125 | 3 way valve HR1 | YES |
| DOpump | DOCxx | 126 | H-R water pump output | YES |
| 0-10VPump | AOCxx | 19 | 0-10V H-R water pump output | YES |
| DIpfs | DICxx | 171 | H-R pump flow switch | YES |
| DIpth | DICxx | 172 | H-R pump thermal protection | YES |
| Thrin | AICxx | 162 | NTC H-R secondary fluid inlet temperature | YES |
| Throut | AICxx | 160 | NTC H-R secondary fluid outlet temperature | YES |

**Regulation: activation conditions**

If
1. DI_hr (DICxx=97), is present and active
2. ANDTwt < HTRC14
3. HTRC13 is over
4. AND all the following conditions are true:
   a. Pump Thermal protection (DIpth) is not active
   b. Temp. TdSc > HTRC7 - enabling threshold for HR1 when HR2 is not running or not present -,
      or
      Tphr2 > HTRC20 - enabling threshold for HR1 when HR2 is running -.

c. At least one compressor of circuit 1 is active

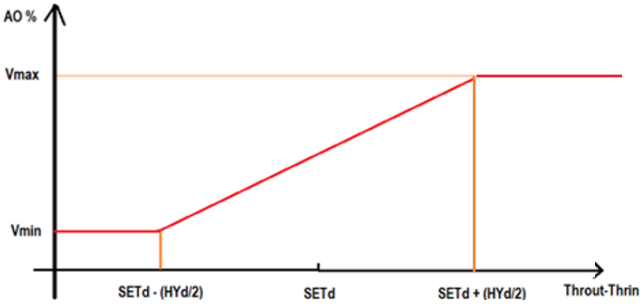
d. AICxx = 166 ≥ HRTC10 (2) for HR1 when HR2 is not running or not present and AICxx = 185 ≥ HRTC10 (2) for HR2 when HR1 is not running

THEN:

7. Pump 1 is activated + AO_pmp at min speed
8. Flow switch status verification after delay timer (HTRC32)
9. If the flow alarm has not been activated

   THEN the relay 3WV is activated and the pump speed is modulated by Ao_pmp (proportional band see diagram below) with Max % variation/s HTRC31. Target is to maintain the differential temperature Throut-Thrin to the set SETd value HTRC16.
   OTHERWISE the pump is switched off, the relay 3WV keeps its status.
   In this case, if the activation conditions 1. 2. 3. remains true, after 5mins the pump is switched on again and we restart from point 4,
   After 3 consecutive times that the flow switch alarm is activated, the pump will be turned off and the Flow switch alarm is signalled. Manual reset is required to make the pump available again. See also Alarm table

**ANALOG OUTPUT BEHAVIOR (it's valid for HR1 and HR2)**




**Where:**

**SETd = HTRC16** for Heat Reclaim 1
**HYd = HTRC17** for Heat Reclaim 1
**Vmin** = **HTRC26** for Heat Reclaim 1
**Vmax** = **HTRC27** for Heat Reclaim 1

**HTRC24** for Heat Reclaim 2
**HTRC25** for Heat Reclaim 2
**HTRC29** for Heat Reclaim 2
**HTRC30** for Heat Reclaim 2

**Regulation: de-activation conditions**

The regulation remains on till one of the follwing conditions happen:

1. DI_hr is disabled
2. Twt > HTRC14+ HTRC15/2)
3. Twt > = HTRC41-High temperature alarm of tank water
4. Pump 1 (DIpth) thermal switch alarrm is activated
5. Flow swtich DIpfs is active for more than (HTRC32/2)
6. Temp. TdSc < HTRC7 - enabling threshold for HR1 when HR2 is not running or not present for the time HTRC9 -,

   or

   Tphr2 < HTRC20 - enabling threshold for HR1 when HR2 is running for the time HTRC21 -.

   or

   AICxx = 166 < HTRC10 - enabling threshold for HR1 when HR2 is not running or not present for the time HTRC12.

(AICxx = 185 < HRTC10 - enabling threshold for HR2 when HR1 is not running for time HTRC12.)

7. .All the compressor of the circuit 1 are switched off.

**Regulation: de-activation actions**

1. 3 way valve relay (3WV) relay is switched off
2. After HTRC34 pump relay (DOpump) is switched off if the points 4. And 5. are false
3. After HTRC34 Analog. Output (AO_pmp) is set to zero if the points 4. And 5. are false
4. If point 4 or point5 alarm is active, the pump DO and AO will be stopped immediately without considering HTRC34.

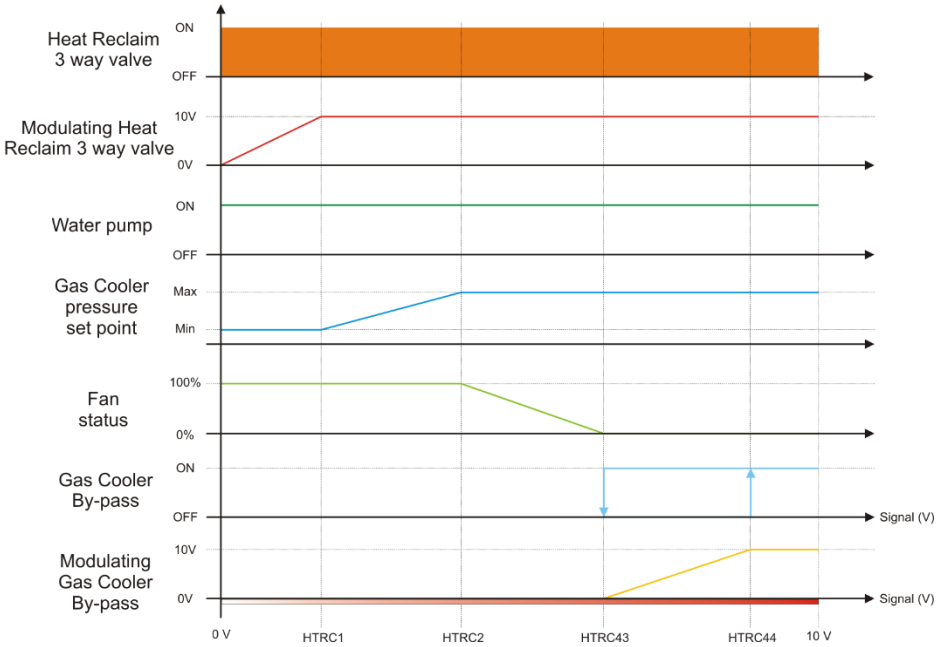
## 22.5 SINGLE HEAT RECLAIM WITHOUT PUMP

### 22.5.1 Case 1: SINGLE HEAT RECLAIM WITH EXTERNAL SIGNAL 0-10V

**MAIN PARAMETERS**:
**HTRC0 = 0**;
**HTRC36 = not used** if HTRC0 = 0

## 22.6 HEAT RECLAIM with 0-10V input

### 22.6.1 HEAT RECLAIM SCHEMA




Notes: The modulating 3way valve and modulating gas cooler by-pass are not managed in case HTRC0=1 by temperature.

### 22.6.2 HEAT RECLAIM FUNCTIONALITY

For the Heat Reclaim 1 (**only** for HR1. Not for the Heat Reclaim 2 HR2) we should follow the below schema, in case of:

- 0-10V signal (i.e. if HTRC0 = 0 Voltage) and
- *Heat reclaim 1* (DICx = 97) active:

#### 22.6.2.1 Zone 1: 0<HR Voltage signal<HTRC1

If all the starting conditions are respected::

1. Pump 1 is activated
2. The condenser pressure set point is not modified.

#### 22.6.2.2 Zone 2: HTRC1<HR Voltage signal<HTRC2

In addition to zone 1, the pressure is increased between HTRC3 (MIN) and HTRC4 (MAX)

#### 22.6.2.3 Zone 3: HTRC2<HR Voltage signal<HTRC43

in addition to Zone 1 and Zone 2, increase the fan set point with a RC33 offset (at HTRC2 the fan set point increment is 0. Proportionally from HTRC2 to HTRC43 the set point is increased from 0 to the offset RC33) this will lead the fan to stop.

#### 22.6.2.4 Zone 4: HTRC43<HR Voltage signal<HTRC44

In addition to #1 and #2. and #3, If HTRC38=Yes, the by-pass of the gas cooler is done.
The by-pass valve is on if signal is higher than HTRC44.
The by-pass valve is OFF if signal is lower than HTRC43.

With HTRC43<HR Voltage signal<HTRC44 the by-pass valve maintains is status.

**NOTE**: If HTRC43=HTRC44 We disable gas coole by pass.

#### 22.6.2.5 Safety check during gas cooler by-pass

When the gas cooler by-pass is active, if the pressure is above HTRC4+HTRC45 bar the gas cooler by-pass relay is de-activated.
It will be activated again when pressure is below HTRC4, and the safety timer HTRC40 is over.
HTRC40 timer is activated when the pressure is below HTRC4.

# 23 PARALLEL COMPRESSION FOR TRANSCRITICAL CO2 RACK

## 23.1 INPUTS – OUTPUTS TABLE

| Detailed description | Setting | Value |
|---|---|---|
| Gas Cooler outlet temperature | AICxx | 154 |
| Gas cooler pressure | AICxx | 169 or 170 |
| Flash tank Pressure | AICxx | 152 |
| Suction temperature of parallel compressors | AICxx | 175 |
| Discharge temperature of parallel compressors | AICxx | |
| Parallel compressor Inverter digital output | DOCxx | 127 |
| 0-10V signal for inverter of parallel compressor | AOCxx | 25 |
| Parallel compressor – Compress. 1 | DOCxx | 128 |

## 23.2 Parameters

| LABEL | DETAILED DESCRIPTION | SETTING |
|---|---|---|
| **SETPC** | Parallel compression 1 Set Point | GC20-PC3 |
| **RC57** | Regulation band width for parallel compressors | 0.10÷10.00 bar; 0.1÷25.0 °C; 1÷80 PSI; 1÷50 °F; 10÷1000 KPA |
| **PC1** | BY-PASS Valve percentage to activate parallel compression | 0÷99% |
| **PC2** | Time with BY-PASS VALVE > = at PC1 to activate parallel compression | 0÷255s |
| **PC3** | Pressure setpoint for BY-PASS VALVE when the parallel compression is activated | SETPC÷500.00 bar; SETPC÷7250 PSI; SETPC÷50000 KPA |
| **PC4** | Minimum time between 2 following switching ON of the same parallel compressor | 0÷1000min |
| **PC5** | Minimum time between the switching off of a parallel compressor and the following switching on | 0÷1000min |
| **PC6** | Time delay between the insertion of two different parallel compressors | 0÷5990s |
| **PC7** | Time delay between switching off of two different parallel compressors | 0÷5990s |
| **PC8** | Minimum time parallel compressor on | 0÷5990s |
| **PC11** | IF HTRC0 = 0, voltage AND PC11 = YES: disable Parallel compression with heat reclaim ON AND 0-10V HR signal > HTRC1<br>IF HTRC0 = 1, temperature PC11 = YES: disable Parallel compression with Heat reclaim ON | 0÷1 (NO÷YES) |

## 23.3 Configuration

### 23.3.1 IO_configuration – mandatory

- At least **1 digital output DOCx** configured as:
  - Inverter for parallel compression (**DOCx = 127**). In this case, the DO is not enough, in fact **1 analog output AOCx** has to be configured as**:**
    - 0-10V Inverter parallel compression **(AOCx = 25)** or

- 4-20mA Inverter parallel compression **(AOCx = 26)**

- Compressor for parallel compression (**DOCx = 128**). Like the standard compressors, the 2nd compressor has sense only if the 1st one is configured; etc.

✓ **1 analog input** configured as:
Pressure Probe of CO2 flash tank (**AICx = 152** or **153)**

If the mandatory configuration is not respected, the parallel compression function cannot be activated.

### 23.3.2 IO_configuration – optional

**DIGITAL OUTPUTS**
Up to 6 addition digital outputs DOCx configured as parallel compressors with/without steps:

Ex: With 1 frequency compressor (inverter) and 2 compressors with 1 step each the configuration is:
- Inverter for parallel compression (DOCx = 127)
- Compressor 1 for parallel compression (DOCx = 128)
- Step of Compressor 1 for parallel compression (DOCx = 129)
- Compressor 2 for parallel compression (DOCx = 130)
- Step of Compressor 2 for parallel compression (DOCx = 131)

**DIGITAL INTPUTS**
Each compressor can have up to 3 safety digital inputs (Oil pressostate, Safety pressure switch, Thermal Safety).

Ex: With the previous configuration: 1 frequency compressor (inverter) and 2 compressors with 1 step each, each of them with 3 safety inputs the digital input configuration is:
DICx = 173 Parallel compression- Compressor 1 oil pressostate
DICx = 174 Parallel compression- Compressor 1 Safety pressostat
DICx = 175 Parallel compression- Compressor 1 Thermal Safety
DICx = 176 Parallel compression- Compressor 2 oil pressostate
DICx = 177 Parallel compression- Compressor 2 Safety pressostat
DICx = 145 Parallel compression- Compressor 2 Thermal Safety
DICx = 182 Parallel compression- Frequency compressor, oil pressostate
DICx = 183 Parallel compression- Frequency compressor, Safety pressostat
DICx = 184 Parallel compression- Frequency compressor, Thermal Safety
DICx = 185 Parallel compression– Inverter Safety

**ANALOG INPUTS**
Up 2 additional analog inputs for monitoring.

Ex: With the previous configuration: 1 temperature sensor on the suction line and 1 temperature sensor on the discharge line:
AICx = 175 NTC Suction line temperature parallel compressor
AICx = 177 PTC Discharge line temperature parallel compressor

## 23.4 Adjustment

### 23.4.1 Enabling conditions

If the By pass valve is operating with a percentage ≥ PC1 for the PC2 time, the first parallel compressor is switched on.

## 23.4.2 Adjustment

a. If the **inverter** is present, it uses the same kind of regulation of the standard inverter and it follows the setting of the parameters of the analog output used for Inverter parallel compression.
   E.g. If AOC3 = 25, the parameters used for the inverter of parallel compressions are: AO3_1…AO3_26, and the exception to this is: instead use AO3_17, PC9 is used, instead use AO3_19, PC10 is used. While the standard compressors follow the PC4…PC9 parameters.
b. If the **standard compressors** are used a dead band regulation is used, and the main parameters are: SETPC, RC57, PC4…PC9.
   B. The BY-PASS valve set point will move from **GC20** to **PC3** (it keeps on working with this set point).

*Note*: The parallel compressors safeties can switch off compressors (if activated). In this case the compressors are considered not available and flash tank pressure is maintained by the BY-PASS valve
*Note*: In case of probe error of CO2 flash tank (AICx = 152 or 153), the regulation of the full rack is stopped.

## 23.4.3 Disabling conditions

If the flash tank pressure falls below set point minus differential the parallel compressors are switched off

In this situation, the bypass valve set point will move from PC3 to GC20 and the by pass valve will act to maintain this pressure.

## 23.4.4 Safety conditions

### 23.4.4.1 Pressure of flash tank

During heat reclaim the parallel compressors are swhitched on, independently from the setting of PC11 (Disable Parallel compression with heat reclaim ON) if the pressure in flash tank is above the safety value GC29

### 23.4.4.2 Circuit 2 compressors not working

If the circuit 1 (Circuit 1 is the circuit for the medium temperature MT) compressors are locked by:

a. Safety digital inputs or off by core sense alarm.
b. Manually disabled from Visograph.
c. Safety timers

and they are not allowed to start even there is a turn on request from regulation, the by-pass valve is closed (minimum opening percentage) and parallal compressor will follow its regulation.

### 23.4.4.3 Parallel compressors not available due to safety conditions

If the parallel compressors are not available the by pass valve is used to maintain the set point in the flash tank.

# 24 Oil management

iProRACK can manage the solenoid valve connect oil separator with reservoir.
There are 5 types possible configuration, depending on the type of oil separator and reservoir used in the rack. Look at the below schema to set properly the kind of management:

1. Oil separator and reservoir without Low or High level inputs: the solenoid valve is managed according to the compressor status. **(OIL1 = 1)**
2. Oil separator with low level signal: the solenoid valve is managed according to the low level status. **(OIL1 = 2)**
3. Oil separator with low and high level signal: the solenoid valve is managed according to the status of both levels. **(OIL1 = 3)**
4. Oil management according to differential pressure betwenn reservoir and medium temperature compressors or parallel compressors and low level digital input in reservoir **(OIL1 = 4)**
5. oil management according to differential pressure betwenn reservoir and medium temperature compressors or parallel compressors and low and high level digital inputs in reservoir **(OIL1 = 5)**

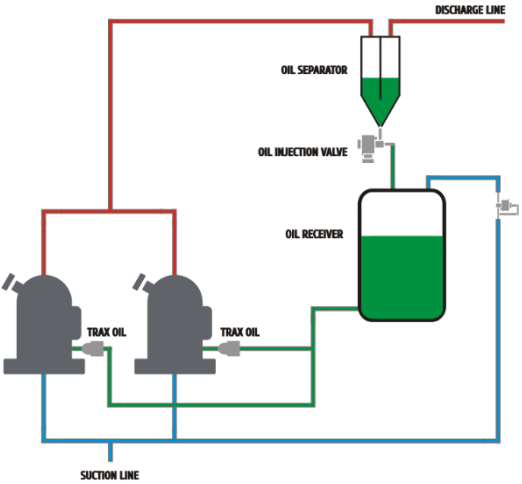
****** WARNING******

**Because off the number of possible cycles, a SSR external relay should be used. In this case set an analog output to drive this SSR relay: See analog output configuration about this.**

******WARNING ******

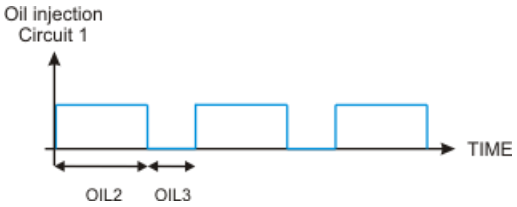
## 24.1 Solution 1, Oil management according to compressor status (OIL1=1)

### 24.1.1 Operation mode with compressors off




When all the compressors in circuit 1 are OFF the “Oil injection valve of circuit 1” works in duty cycle mode according to the following timers:

- OIL2 (ON valve)
- OIL3 (OFF valve)

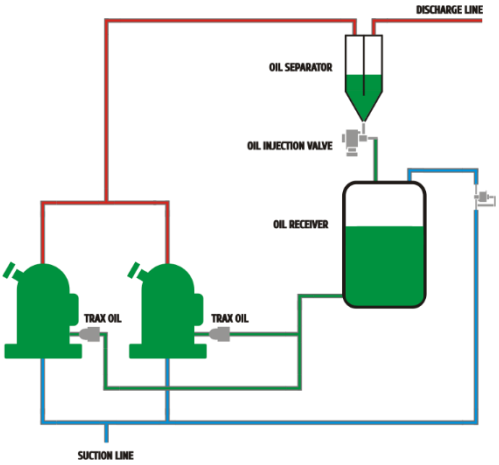


**NOTE**

- With OIL2 =0 no injection is done.
- Because off the number of possible cycles, a SSR external relay can be used. In this case set an analog output to drive this SSR relay: See analog output configuration about this.

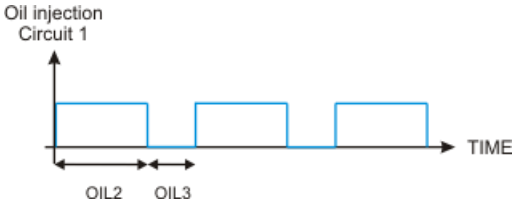
The same considerations and settings are available for circuit 2 (low temperature compressors)

## 24.1.2 Operation mode with compressors on




When at least one compressor in circuit 1 is ON the “Oil injection valve of circuit 1” works in duty cycle mode according to the following timers:

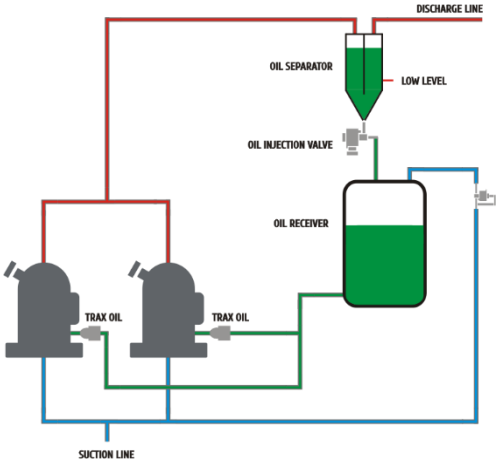
- OIL2 (ON valve)
- OIL3 (OFF valve)




**See the above notes about SSR and settings**

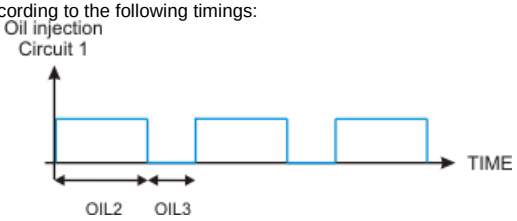
## 24.2 Solution 2, oil management according to low level digital input in oil separator (OIL1=2)

### 24.2.1 Operation mode with low level switch not active




If digital input of low oil level in oil separator is not activated AND OIL10 timer is over the “Oil injection valve circuit 1” works in duty cycle mode according to the following timings:

- OIL2 (ON valve)
- OIL3 (OFF valve)

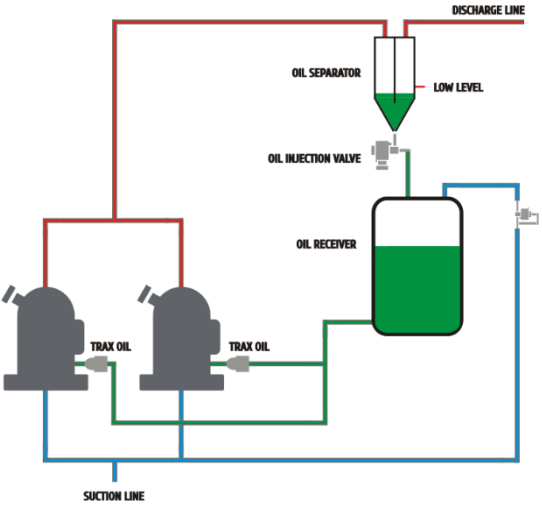



**NOTE**

- With OIL2 =0 no injection is done.
- Because off the number of possible cycles, a SSR external relay can be used. In this case set an analog output to drive this SSR relay: See analog output configuration about this.

The same considerations and settings are available for circuit 2 (low temperature compressors)

## 24.2.2 Operation mode with low level switch active




With low oil level switch in oil separator **ON** the “Oil injection valve circuit 1” is switched **OFF**.
When low oil level input is deactivated: controller wait the OIL10 timer is over, then the oil injection valve can cycle with OIL2 (ON valve) and OIL3 (OFF valve)

NOTE: the same regulation is available for circuit 2

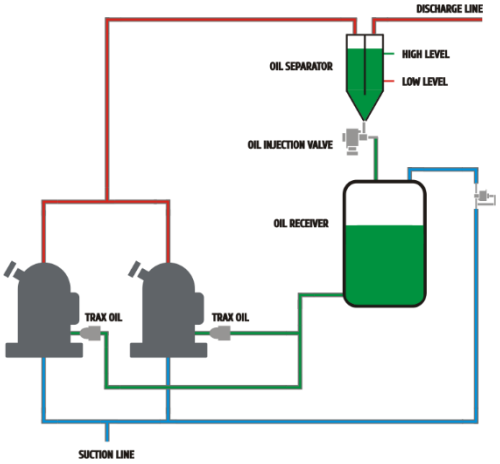
## 24.2.3 Actions in case of low oil level

iProRACK can try to improve oil quantity in the oil sepator when it reaches low level.
With low oil level signal, if OIL14 = 1 the inverter, if present and running, is forced to run at max speed for the the OIL12 time.

After OIL12 time, if the low level switch is still on, the “Low level oil warning” is signalled and the “Low oil level in circuit 1” relay is activated. Additioanally compressors can be stopped by setting OIL16=1.

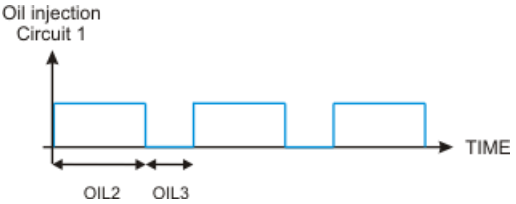
## 24.3 Solution 3: oil management according to low and high level digital inputs in oil separator (OIL1=3)

### 24.3.1 Operation mode with low level switch not active




If digital input of low oil level in oil separator is not activated independently from the status of high level switch AND OIL10 timer is over the “Oil injection valve circuit 1” works in duty cycle mode according to the following timings:

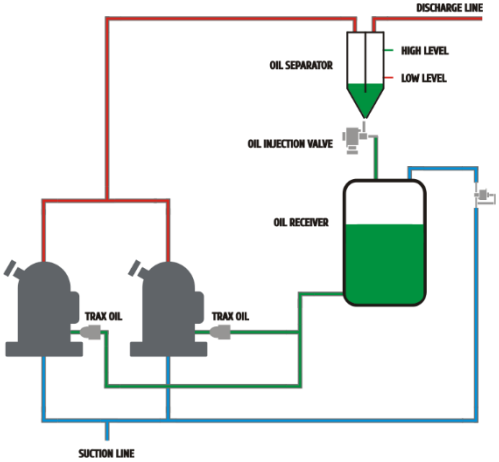
- OIL2 (ON valve)
- OIL3 (OFF valve)




If High level switch in the oil separator is ON, after OIL24 cycles of oil injection we the follow warning si given: “Full oil separator alarm”.
NOTE: If OIL24=0 none warning is signalled.

NOTE: the same regulation is available for circuit 2

## 24.3.2 Operation mode with low level switch active




With low oil level switch in oil separator **ON** the “Oil injection valve circuit 1” is switched **OFF**.
When low oil level input is deactivated: controller wait the OIL10 timer is over, then the oil injection valve can cycle with OIL2 (ON valve) and OIL3 (OFF valve)

NOTE: the same regulation is available for circuit 2

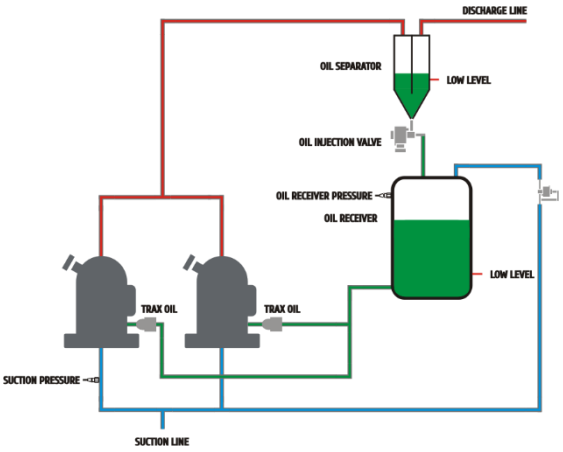
## 24.3.3 Actions in case of low oil level

iProRACK can try to improve oil quantity in the oil sepator when it reaches low level.
With low oil level signal, if OIL14 = 1 the inverter, if present and running, is forced to run at max speed for the OIL12 time.

After OIL12 time, if the low level switch is still on, the “Low level oil warning” is signalled and the “Low oil level in circuit 1” relay is activated. Additioanally compressors can be stopped by setting OIL16=1.

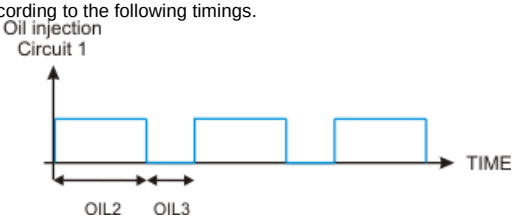
## 24.4 Solution 4: oil management according to differential pressure and low level digital switch in oil separator (OIL1=4)

### 24.4.1 Operation mode




**Normal function: presence of oil in the oil separator.**
With the low oil level digital switch not active in the oil separator, and OIL10 timer over, the “Oil injection valve circuit 1” works in duty cycle mode according to the following timings.

- OIL2 (ON valve)
- OIL3 (OFF valve)




**Differential pressure regulation**
With OIL20 = SPC1 (Oil receiver pressure - Suction pressure), if the differential pressure is not satisfied: (**Oil receiver pressure - Suction pressure** lower than OIL 18) the “Oil injection valve circuit 1” works in duty cycle mode according to the following timers:
OIL2 (ON valve)
OIL3 (OFF valve)
**independently** from the status of low oil level switch.

If the low level switch is on, the “Oil injection valve circuit 1” is stopped only if the differential pressure is above OIL18 + OIL19.

### 24.4.2 Actions in case of low oil level

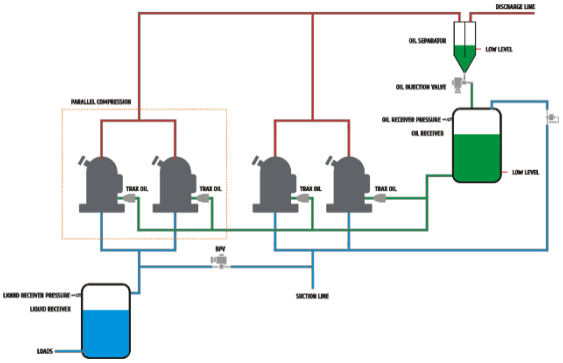
iProRACK can try to improve oil quantity in the oil sepator when it reaches low level.
With low oil level signal, if OIL14 = 1 the inverter, if present and running, is forced to run at max speed for the OIL12 time.

After OIL12 time, if the low level switch is still on, the “Low level oil warning” is signalled and the “Low oil level in circuit 1” relay is activated. Additioanally compressors can be stopped by setting OIL16=1.

## 24.4.3 Operation mode with low level switch active

**Differential pressure regulation**
With OIL20 = SPC1, if the differential pressure is not satisfied: (**Oil receiver pressure - Suction pressure** lower than OIL 18) the “Oil injection valve circuit 1” works in duty cycle mode according to the following timings:
OIL2 (ON valve); OIL3 (OFF valve)

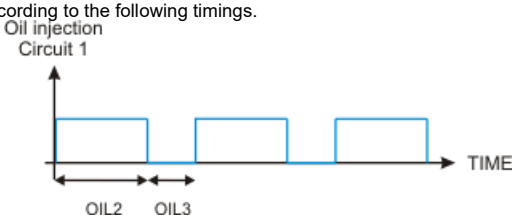
## 24.4.4 Oil management with parallel compressors




**Differential pressure regulation**
With parallel compressors, set parameter **OIL20 = FTP:** Oil receiver pressure - Flash tank pressure, in this way controller takes in account this differential pressure as refeence for regulation.

**Normal function: presence of oil in the oil separator.**
With the low oil level digital switch not active in the oil separator, and OIL10 timer over, the “Oil injection valve circuit 1” works in duty cycle mode according to the following timings.

- OIL2 (ON valve)
- OIL3 (OFF valve)




**Differential pressure regulation**
With OIL20 = **FTP:** (Oil receiver pressure - Flash tank pressure), if the differential pressure is not satisfied: (**Oil receiver pressure – flash tank pressure** lower than OIL 18) the “Oil injection valve circuit 1” works in duty cycle mode according to the following timers:
OIL2 (ON valve)
OIL3 (OFF valve)
**independently** from the status of low oil level switch.

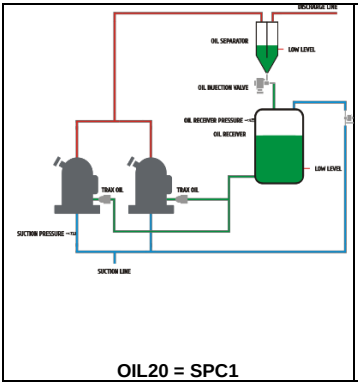
## 24.4.5 Actions in case of low oil level

iProRACK can try to improve oil quantity in the oil sepator when it reaches low level.
With low oil level signal, if OIL14 = 1 the inverter, if present and running, is forced to run at max speed for the OIL12 time.

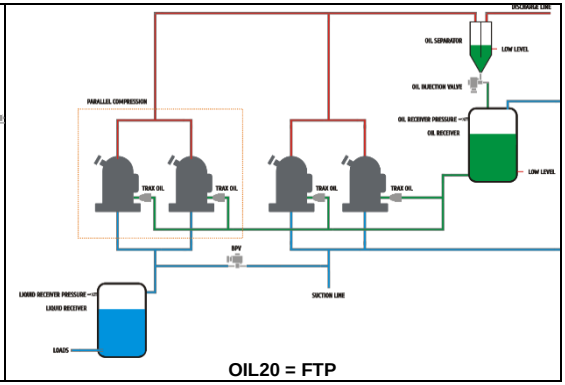
After OIL12 time, if the low level switch is still on, the “Low level oil warning” is signalled and the “Low oil level in circuit 1” relay is activated. Additioanally all the compressors can be stopped by setting OIL16=1.

## 24.5 Solution 5: oil management according to differential pressure and with high and low level digital switches in oil separator and low level switch in reservoir (OIL1=5)

Both the configuration with (**OIL20 = FTP)** or without parallel compressors (**OIL20 = SPC1**) of previous paragraph can be set. Regulation is like in previous paragraph.




**OIL20 = SPC1**




**OIL20 = FTP**

In addition, the high oil level switch in oil separator can be set and considered (DICxx = 162: High oil level in oil seperator circuit 1).
With this input active, the controller performs OIL24 oil injection cycles, if after these cycles the high oil switch is still active, the alarm “Oil separator full” is given.

### 24.5.1 Low level in oil receiver alarm

With low level digital input in the oil **receiver ON**, is possible to try to ricover the oil by parameter OIL14 = 1.
In this case the inverter, if present and running, is forced to run at max speed for the the OIL12 time.

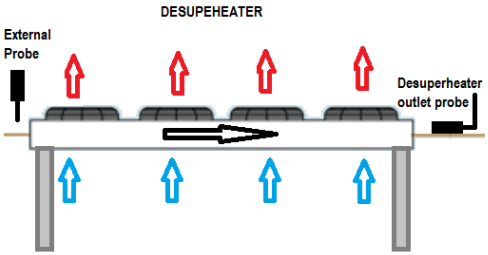
After OIL12 time, if the low-level switch is still on, the “Low level oil warning” is signalled and the “Low oil level in circuit 1” relay is activated. Additioanally compressors can be stopped by setting OIL16=1.

NOTE: the same regulation is available for circuit 2

# 25 DE-SUPERHEATER MANAGEMENT

## 25.1 Circuit Principle

The de-superheater is small condenser used to cool the hot gas coming from the discharge line of compressors to increase the system performance




## 25.2 Inputs – Outputs Table

| Description | Setting | Value | Function | Mandatory |
|---|---|---|---|---|
| External probe | AICxx | 13 or 14 or 31 or 32 | Temperature probe used to detect external temperature This probe can be shared between the de-superheater | NO |
| De-superheat outlet temperature | AICxx | 95 or 95 for De-SH 1<br>97 or 98 for De-SH 2<br>99 or 100 for De-SH 3 | Temperature probe placed on the outlet of de-superheater to detect the outlet temperature | YES |
| Analog output for desupeheater | AOCxx | It depends on the analog output type and where it is placed for instace for A.O. of TAB. A<br>27 or 28 for De-SH 1<br>28 or 29 for De-SH 2<br>30 or 31 for De-SH 3 | To drive the fan speed | YES |
| Relay output | DOCxx | 134 for De-SH 1<br>135 for De-SH 2<br>136 for De-SH 3 | To enable the fan (optional) | NO |
| Safety Thermal input | DICxx | 158 Thermal safety De-Superheater 1<br>159 Thermal safety De-Superheater 2<br>160 Thermal safety De-Superheater 3 | Stope the correspondent de-superheater when enabled | NO |

## 25.3 Parameters

For each desuperheat there is a set of parameters with the following meaning

| | | |
|---|---|---|
| **DSH1** | Minimum set point for the de-superheater 1 | -40÷110°C/-40÷230°F |
| **DSH2** | Differential for the de-superheater 1 | 0.0÷12.0°C; 0÷24°F |

| | | |
|---|---|---|
| **DSH3** | Regulation band for the de-superheater 1 | 0.1÷30.0 °C; 1÷50 °F; |
| **DSH4** | Regulation activation for the de-superheater 1 | *on* = Regulation always active if the iProRACK in on;<br>*Circ1* = Regulation on if at least 1 compressor of the circuit 1 is on;<br>*Circ2* = Regulation on if at least 1 compressor of the circuit 2 is on.<br>*PC* = Regulation on if at least 1 Paralell compressor is on. |
| **DSH5** | Minimum value for the analogue Output of de-superheater 1 | 0 ÷ DSH6 |
| **DSH6** | Maximum value for the analogue Output of de-superheater 1 | DSH5 ÷ 100 |

## 25.4 Configuration

Mandatory conditions:

- ✓ **1 analog output AOCxx** has to be configured to drive the desuperheatre fan speed:

for instace for A.O. of TAB. A **AOCxx =** 27 or 28 for De-SH 1; 28 or 29 for De-SH 2; 30 or 31 for De-SH 3.

- ✓ **1 analog input** configured as its de-superheat outlet temperature

**AICxx** = 95 or 95 for De-SH 1; 97 or 98 for De-SH 2; 99 or 100 for De-SH 3

If the mandatory configuration is not respected, the de-superheater function cannot be activated.

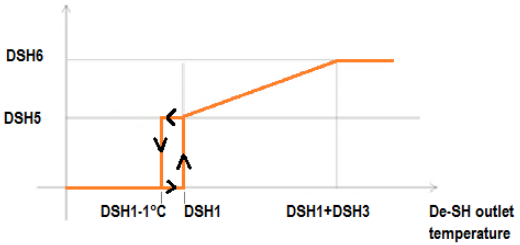
## 25.5 Adjustment

### 25.5.1 CASE 1: WITH DE-SUPERHEATER OUTLET TEMPERATURE + ANALOG OUTPUT FOR DESUPEHEATER

In this case the de-superheater (De-SH) 1 (same consideration for De-SH 2 e De-SH 3) will use the following parameters:

DeSH set point = DSH1
Regulation band: DSH3
Min out = DSH5
Max out = DSH6

The behaviour of the analog output is shown in the picture below



### 25.5.2 CASE 2: WITH DE-SUPERHEATER OUTLET TEMPERATURE + ANALOG OUTPUT FOR DESUPEHEATER + EXTERNAL TEMPERATURE (EX-T) AND RELAY

In this case the de-superheater (De-SH) 1 (same considerations for De-SH 2 e De-SH 3) will use the following parameters:

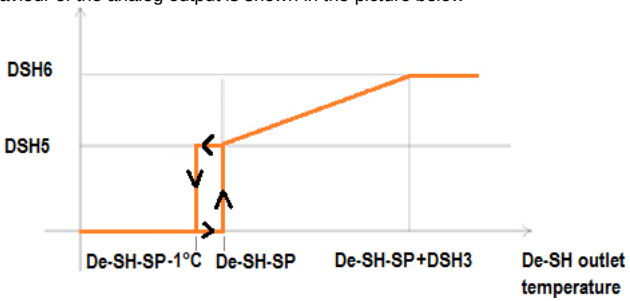
DeSH set point (**DeSH-SP)** =

a. **External temperature (EX-T) + DSH2** if it is > = DSH1

b. **DSH1** with EX-T+DSH2 <DSH1

Regulation band: DSH3
Min out = DSH5
Max out = DSH6

The behaviour of the analog output is shown in the picture below




### 25.5.3 Safety conditions

a. **Extenal probe failure**

The controller moves regulation from case: 25.5.2 to case 25.5.1.

b. **De-SH outlet probe failure**

The analog output will be set to zero, the relay, if present, is switched off.

c. **D.I. of thermal Safety De-Superheater x activation**

The analog output will be set to zero, the relay, if present, is switched off.
The Visograph shows the alarm in the menu De-SHx (Thermal Safety De-Superheater x alarm) See alarm. table

# 26 Adiabatic spray function

## 26.1 General principles

The gas cooler is normally designed to operate correctly at maximum thermal load at maximum ambient temperature. However, these severe working conditions could be encreased for a brief period of the year, whilst for the remainder of the year - in less severe conditions – the machine works normally. This is why an adiabatic spray system is applied to the gas cooler, where air crossing the coils can be cooled, obtaining an increase in capacity of the gas coolers and an temperature extension of operating conditions.

## 26.2 Resources

A relay **DOCxx = 150** (Adiabatic spray valve) has to be configured and the
The external temperature probe **AICxx = 13 or 31 or 140** has to be configured.
The fan should be managed by analog output to control fan speed: **AOCx = 6 or 8 or 15 or 17**: output inverter for condenser – Circuit 1

## 26.3 Parameters

**RC49 Analog output setting for condenser fan management with adiabatic spray enabled**
*Range*: 0÷2
0: **No limitation**
1: **Analog output limited to AOx_20**
2: **Fix at AOx_20**

**RC50 Tempearature Set point (to stop) adiabatic spray**
*Range*: 0.0÷50°C; 32.0÷122 °F;
*UM*: according to CF26

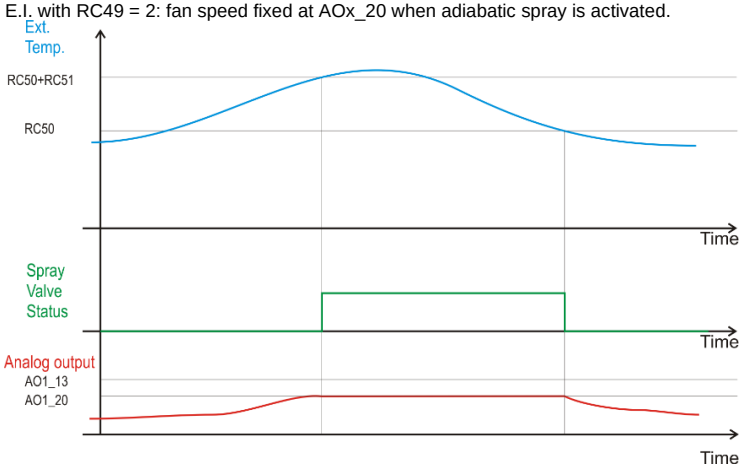
**RC51 Differential for adiabatic spray regulation**
It is added to the set point RC50
*Range:* 0.1÷25.0°C; 1÷50°F
*UM:* according to CF26

**AOx_20 (Maximum) value of A.o.x during adiabatic spray**

**RC52 Adiabatic function disabled during heat reclaim**
*0=NO,* adiabatic function is enabled also during heat reclaim
1=YES, adiabatic function is disabled in case of heat reclaim

## 26.4 Regulation

E.I. with RC49 = 2: fan speed fixed at AOx_20 when adiabatic spray is activated.




**NOTE**: With AICxx = 13 or 31 or 140 in error the function is disabled (DOCxx = 150 is turned off)

### 26.4.1 Analog output for condenser fan with adiabatic spray on

According RC49 the analog output for condenser fan (AOCx = 6 or 8 or 15 or 17) will work as described below:

**RC49 = 0**
The condenser fans follow the standard regulation.

**RC49 = 1**
The maximum condenser fans speed is limited from AOx_13 to AOx_20.

**RC49 = 2**
The condenser fans speed is fixed at AOx_20.
**NOTE1.**
In case of:

- HP1: High pressure switch for Circuit 1 alarm
- HAF1: Maximum pressure (temperature) alarm fans section for Circuit 1
- HP Gas Cooler: High pressure in the gas cooler

The fan must run at max speed AOx_13, and Aox_20 can be used only when the alarm recovers

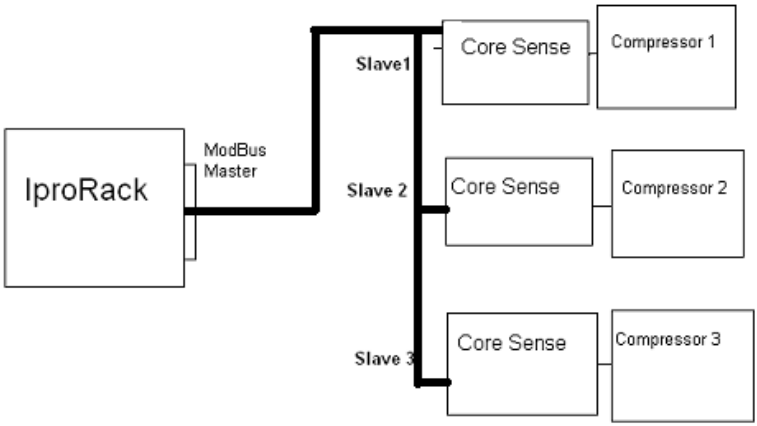
**NOTE2.**
In case of silent mode and adiabatic spray functions enabled at the same time, and RC49 ≠ 0, the controller will use as max analog output for fan the min between AOx_20 and AOx_21.

# 27 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.

## 27.1 CONNECTION

CONNECTION DIAGRAM




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

### 27.1.1 Description of the connections

Connect the Coresenses to the

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

## 27.1.2 How to configure the CORESENSE communication

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

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

**Example to configure a circuit 1 with 3 compressors:**

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

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

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

# 28 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**

## 28.1 Alarm management

The IProRACK reads from the coresense the following alarms:
There are 3 type of the alarms:

1) **LOCKOUT ALARMS→** The lockout alarms are showed in the visograph alarm stage and after the description of the alarm is showed a label **L** to indicate the type of this alarm.

- Alarm management: **Compressor switch off.**
- Status: It is required a **manual reset** (on the core sense) or a **remote reset** to restore the compressor.
- Remote reset: To consider this Alarm like a manual alarm in the IProRACK. (the remote reset means to send a reset command to the coresense.

2) **TRIP→ →** The trip alarms are showed in the visograph alarm stage and after the description of the alarm is showed a label **T** to indicate the type of this alarm.

- Alarm management: **Compressor switch off.**
- Status: The compressor is unavailable until it is true the condition of the alarm.
- Auto reset: To consider this Alarm like an automatic alarm in the IProRACK. (see as to manage the automatic Alarms). When the alarm returns OFF the compressor are restored.

3) **WARNING→** The warning alarms are showed in the visograph alarm stage and after the description of the alarm is showed a label **W** to indicate the type of this alarm. This kind of Alarm is only a WARNING.

- Alarm management: The compressor will go on working
- Status : The compressor will go on working
- Auto reset.

**SUMMARY TABLE**

| Type | ACTION | RESET |
|---|---|---|
| LOCKOUT | COMPRESSOR SWITCH OFF<br>BUZZER ON<br>LOG OF THE ALARM | REMOTE RESET (COMMAND)<br>MANUAL RESET (CORE SENSE) the compressor will return available after the reset. |
| TRIP | COMPRESSOR SWITCH OFF<br>BUZZER ON<br>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 |

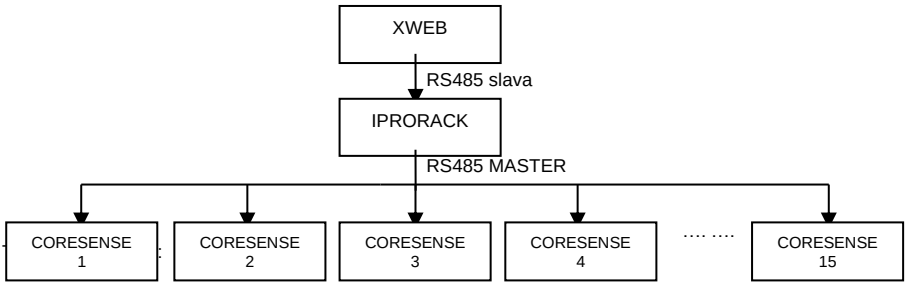
### 28.1.1 List of the Alarms

| Type | Visograph Description | Code of Alarm |
|---|---|---|
| Lockout | Insufficient Oil Pressure L | 37 - Low Oil Pressure Lockout |
| Lockout | Missing Phase L | 42 - Phase Loss Lockout |
| Lockout | Locked Rotor L | 41 - Locked Rotor Lockout |
| Lockout | High Discharge Temp L | 39 - Discharge Temperature Lockout |
| Lockout | Low Voltage L | 54 - Low Voltage Lockout |
| Lockout | Module Failure L | 43 - P470 Module Failure Lockout |
| Trip | Low Voltage T | 21 - Compressor Low Voltage Trip |
| Trip | Locked rotor T | 31 - Locked rotor Trip |
| Trip | Missing Phase T | 28 - Phase Loss Trip |
| Trip | Voltage Imbalance T | 24 - Voltage Imbalance Trip |
| Trip | High Discharge Temp T | 19 - Discharge Temp Trip |
| Trip | Motor Temp. T | 32 - Motor Temperature Trip |
| Warning | Communication Error (to SM) W | 16 - Communication Error to SM |
| Warning | Current sensor fault W | 12 - Connection lost between sensor |

| | | |
|---|---|---|
| Warning | Comunication Error to Ipro W | 18 - Comunication Error to E2 |
| Warning | No.run & Fault Temp Probe W | 7 - Normal Running & Fault Temp Probe |
| Warning | Hw Conf. Mismatch W | 17 - E2/P470 Configuration Mismatch |
| Normal | Normal Off | 44 - Normal OFF |
| Normal | Normal On | 45 - Normal Running |

# 29 CONNECTION BETWEEN XWEB– IPRORACK – CORENSENSE

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




1) Connect the Xweb RS485 line to the SLAVE serial line of iProRACK


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

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


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

3) **Address setup among iProRACK and Coresenses**:
The Coresenses will be seen by the X-WEB at the address immediately following the iProRACK address If IProRACK has address "n", Coresenses will have the consecutive addresses to IProRACK address: **n+ coresense Address**.

**Example: IProRACK + 5 coresense**

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

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

# 30 ALARM LIST

Usually alarm conditions are signalled by means of:
1. Activation of alarm relays
2. Buzzer activation
3. Message on proper display

## 30.1 Alarm conditions – summary table

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **ALARMS CIRCUIT 1** | | | | |
| **LP1** | Low pressure-switch alarm for Circuit 1 | Low pressure switch Input 1 (the Input is configured as DICxx=101 Low pressure Circuit 1) | All compressors of Circuit 1 are turned off. Fans unchanged. | **Automatically** if the number of activation are less than AL12 in the AL13 time when the Input is disable.<br>- The compressors restart working according to the working algorithm.<br><br>**Manually** (if AL12 activation happened in the AL13 time) When the Input is disable:<br>- Turn off and on the instrument/or rest the alarm manually from the Visograph<br><br>- The compressors restart working according to the working algorithm. |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **HP1** | High pressure switch for Circuit 1 alarm | High pressure switch Input 1 (the Input is configured as DICxx=99 High pressure Circuit 1) | • All compressors of Circuit 1 are turned off.<br>• All fans are of Circuit 1 turned on. | **Automatically** if the number of activation are less than AL29 in AL30 time when the Input is disable.<br>- Compressors and fans restart working according to the working algorithm.<br><br>**Manually** if AL29 activation happened in the AL30 time When the Input is disable:<br>1. Turn off and on the instrument /or rest the alarm manually from the Visograph.<br><br>2. Compressors and fans restart working according to the working algorithm. |
| **LAC1** | Minimum pressure (temperature) alarm compressors for Circuit 1 | IfAC1 = REL:<br>Suction pressure or temperature< = SETC1-AL3<br><br>IfAC1 = ABS:<br>Suction pressure or temperature< = AL3 | Only signalling | **Automatically:** as soon as the pressure or temperature reaches:<br>IfAC1 =REL:<br>SETC1-AL3 + differential value.<br>(differential = 0.3bar or 1°C)<br><br>IfAC1 =ABS:<br>AL3 + differential value.<br>(differential = 0.3bar or 1°C) |
| **LAF1** | Minimum pressure (temperature) alarm fans section for Circuit 1 | IfAC2 = REL:<br>Condenser pressure or temperature ≤ SETF1-AL24<br>for timer AL26<br><br>IfAC2 = ABS:<br>Condenser pressure or temperature ≤ AL24<br>for timer AL26 | Only signalling | **Automatically:** as soon as the pressure or temperature reaches:<br>IfAC2 =REL:<br>SETF1-AL24 + differential value.<br>(differential = 0.3bar or 1°C)<br><br>IfAC2 =ABS:<br>AL24 + differential value.<br>(differential = 0.3bar or 1°C) |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **HAC1** | Maximum pressure (temperature) alarm compressors for Circuit 1 | IfAC1 = REL:<br>Suction pressure or temperature ≥ SETC1+AL4<br><br>IfAC1 = ABS:<br>Suction pressure or temperature ≥ AL4 | Only signalling | **Automatically:**<br>the pressure or temperature ≤ IfAC1 =REL:<br>SETC1+AL4 - differential value.<br>(differential = 0.3bar or 1°C)<br><br>IfAC1 =ABS:<br>AL4 - differential value.<br>(differential = 0.3bar or 1°C) |
| **HAF1** | Maximum pressure (temperature) alarm fans section for Circuit 1 | IfAC2 = REL:<br>Condenser pressure or temperature > = SETF1+AL25<br>for AL26 delay<br><br>IfAC2 = ABS:<br>Condenser pressure or temperature > = AL25<br>for AL26 delay | If AL27 = yes<br>The compressors Circuit 1 switch off with AL28 delay from 2 different steps | **Automatically:**<br>the pressure or temperature ≤ IfAC2 =REL:<br>SETF1+AL25 - differential value.<br>(differential = 0.3bar or 1°C)<br><br>IfAC2 =ABS:<br>AL25 - differential value.<br>(differential = 0.3bar or 1°C) |
| **LL1** | Liquid level alarm for Circuit 1 | Proper digital Input enabled (the Input is configured as DICxx=109<br>Liquid level Circuit 1)<br>After delay CDI1 | Only signalling | **Automatically** as soon as the Input is disabled |
| **PrSH1** | Pre-alarm for superheat Circuit 1 | Superheat 1<br>is ≤ ASH1 + ASH2 **and** ≥ ASH2 | Only signalling | **Automatic:** when superheat exceeds ASH1 + ASH2 +hysteresis |
| **ALSH1** | Alarm for superheat Circuit 1 | Superheat 1 is ≤ ASH2 | Depends on ASH4 | **Automatic:** when superheat exceeds ASH5 + ASH2 |
| **LPC1** | Electronic pressure switch for low temperature/ pressure of Circuit 1 | Pressure/temperature < AL21 | Disable the compressors | **Automatic:** when the pressure/temperature exceeds AL21+differential |
| **PR1** | **Suction probe Circuit 1 failure alarm** | Suction Probe failure or out of range (e.g. the probe is configured as<br>AICxx=1<br>NTC probe regulation suction Circuit 1) | The compressors are activated according to the AL14/AL15 parameters. | **Automatically** as soon as the probe restarts working. |
| **PR3** | **Condensing probe Circuit 1 failure alarm** | Condensing Probe failure or out of range (e.g. the probe is configured as<br>AICxx=3<br>NTC probe regulation condensing Circuit 1) | The fans are activated according to the AL31 parameters". | **Automatically** as soon as the probe restarts working. |
| **Floodback 1** | **Floodback alarm Circuit 1** | ASH2 >superheat (Suction pressure & Suction temperature) for 90 minutes | Only a warning: buzzer ON and alarm relay (91-Alarm) ON | Clear automatically superheat > ASH2 |
| **Booster alarm** | Booster configuration alarm | No compressor of Circ. 1 available | Signalling only | **Automatically** as soon as a compressor of circuit 1 is available |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **Circuit 1 alarm** | Circuit 1 alarm | There is a serious alarm in circuit 1 | Relay set as 115 is activated | **Automatically** as soon as as the serious alarm condition is no longer present |
| **LOIL1** | Low oil level alarm circuit 1 | For solution 1~3, if DIC(i) = 161-Low oil level in oil seperator circuit1 activation for delay OIL12;<br>For solution 4~5, if DIC(i) = 186-Low oil level in oil receiver circuit 1 activation for delay OIL12 | During OIL12, according to OIL14 value<br>=> inverter to max speed (if present).<br>Once alarm active, If OIL16=1, all the compressors including parallel compressors in circuit 1 off. | **Automatically**: as soon as the Input is disabled.<br>All the compressors restart working according to regulation. |
| **HOIL1** | Hi oil level alarm circuit 1 | DIC(i) = 162-Hi oil level in oil seperator circuit1 active after OIL24 cycles. If OIL24=0 we don't manage any warning. | signalling only | **Manually**: When the Input is disable:<br>- Turn off and on the instrument<br>/or reset the alarm manually from the Visograph. |
| **ALARMS CIRCUIT 2** | | | | |
| **LP2** | Low pressure-switch alarm for Circuit 2 | Low pressure switch Input (the Input is configured as DICxx=102 Low pressure Circuit 2) | All compressors of Circuit 2 are turned off. Fans unchanged. | **Automatically** if the number of activation are less than AL16 in the AL17 time when the Input is disable.<br>- The compressors restart working according to the working algorithm.<br><br>**Manually** (if AL16 activation happened in the AL17 time When the Input is disable:<br>- Turn off and on the instrument /or rest the alarm manually from the Visograph.<br><br>- The compressors restart working according to the working algorithm. |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **HP2** | High pressure switch for Circuit 2 alarm | High pressure switch Input (the Input is configured as DICxx=100 High pressure Circuit 2) | - All compressors of Circuit 2 are turned off.<br>- All fans are of Circuit 2 turned on. | **Automatically** if the number of activation are less than AL37 in AL38 time when the Input is disable.<br>- Compressors and fans restart working according to the working algorithm.<br><br>**Manually** if AL37 activation happened in the AL38 time When the Input is disable:<br>- Turn off and on the instrument /or rest the alarm manually from the Visograph.<br><br>- Compressors and fans restart working according to the working algorithm. |
| **LAC2** | **Minimum pressure (temperature) alarm compressors for Circuit 2** | IfAC1 = REL:<br>Suction pressure or temperature< =<br>SETC2-AL6<br><br>IfAC1 = ABS:<br>Suction pressure or temperature< =<br>AL6 | Only signalling | **Automatically:** as soon as the pressure or temperature reaches:<br>IfAC1 =REL:<br>SETC2-AL6 + differential value.<br>(differential = 0.3bar or 1°C)<br><br>IfAC1 =ABS:<br>AL6 + differential value.<br>(differential = 0.3bar or 1°C) |
| **LAF2** | **Minimum pressure (temperature) alarm fans section for Circuit 2** | IfAC2 = REL:<br>Condenser pressure or temperature < =<br>SETF2-AL32<br>for timer AL34<br><br>IfAC2 = ABS:<br>Condenser pressure or temperature ≤ AL32<br>for timer AL34 | Only signalling | **Automatically:** as soon as the pressure or temperature reaches:<br>IfAC2 =REL:<br>SETF2-AL32 + differential value.<br>(differential = 0.3bar or 1°C)<br><br>IfAC2 =ABS:<br>AL32 + differential value.<br>(differential = 0.3bar or 1°C) |
| **HAC2** | **Maximum pressure (temperature) alarm compressors for Circuit 2** | IfAC1 = REL:<br>Suction pressure or temperature > =<br>SETC2+AL7<br><br>IfAC1 = ABS:<br>Suction pressure or temperature > = AL7 | Only signalling | **Automatically:**<br>the pressure or temperature ≤<br>IfAC1 =REL:<br>SETC2+AL7 - differential value.<br>(differential = 0.3bar or 1°C)<br><br>IfAC1 =ABS:<br>AL7 - differential value.<br>(differential = 0.3bar or 1°C) |

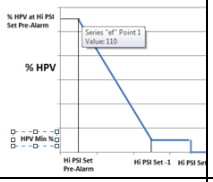
| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **HAF2** | **Maximum pressure (temperature) alarm fans section for Circuit 2** | IfAC2 = REL:<br>Condenser pressure or temperature > =<br>SETF2+AL33<br>for AL34 delay<br><br>IfAC2 = ABS:<br>Condenser pressure or temperature > = AL33<br>for AL34 delay | If AL35 = yes<br>The compressors Circuit 2 switch off with a delay from 2 different steps<br>AL36<br><br>In case of parallel compression enabled(at least one of parallel compressor is working):<br>- All the parallel compressors are forced to stop with safety delays respected.<br>- The BY-PASS follows the parallel compression regulation (set point GC20). | **Automatically:**<br>the pressure or temperature ≤<br>IfAC2 =REL:<br>SETF2+AL33 - differential value.<br>(differential = 0.3bar or 1°C)<br><br>IfAC2 =ABS:<br>AL33 - differential value.<br>(differential = 0.3bar or 1°C) |
| **LL2** | **Liquid level alarm for Circuit 2** | Proper digital Input enabled (the Input is configured as DICxx=110<br>Liquid level Circuit 2)<br>After delay CDI2 | Only signalling | **Automatically** as soon as the Input is disabled |
| **PrSH2** | Pre-alarm for superheat Circuit 2 | Superheat2<br>is ≤ ASH1 + ASH9 **and** ≥ ASH9 | Only signalling | **Automatic:** when superheat exceeds ASH1 + ASH9 +hysteresis |
| **ALSH2** | Alarm for superheat Circuit 2 | Superheat2 is ≤ ASH9 | Depends on ASH11 | **Automatic:** when superheat exceeds ASH12 + ASH9 |
| **LPC2** | **Electronic pressure switch for low temperature/pressure of Circuit 2** | Pressure/temperature < AL23 | disables the compressors | **Automatic:** when the pressure/temperature exceeds AL23+differential |
| **PR2** | **Suction probe Circuit 2 failure alarm** | Suction Probe failure or out of range (e.g. the probe is configured as<br>AICxx=2<br>NTC probe regulation suction Circuit 2) | The compressors are activated according to the AL18 parameters. | **Automatically** as soon as the probe restarts working. |
| **PR4** | **Condensing probe Circuit 2 failure alarm** | Condensing Probe failure or out of range (e.g. the probe is configured as<br>AICxx=4<br>NTC probe regulation condensing Circuit 2) | The fans are activated according to the AL39 parameters. | **Automatically** as soon as the probe restarts working. |
| **Floodback 2** | **Floodback alarm Circuit 2** | ASH9 >superheat (Suction pressure & Suction temperature) for 90 minutes | Only a warning: buzzer ON and alarm relay (91-Alarm) ON | Clear automatically<br>superheat > ASH9 |
| **Circuit 2 alarm** | | There is a serious alarm in circuit 2 | Relay set as 116 is activated | **Automatically** as soon as the serious alarm condition is no longer present |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **LOIL2** | Low oil level alarm circuit 2 | For solution 1~3, if DIC(i) = 163-Low oil level in oil seperator circuit2 activation for delay OIL13 ;<br>For solution 4~5, if DIC(i) = 187-Low oil level in oil receiver circuit 2 activation for delay OIL13 | During OIL13, according to OIL15 value<br>=> inverter to max speed (if present).<br>Once alarm active, If OIL17=1, all the compressors in circuit 2 off. | **Automatically**: as soon as the Input is disabled.<br>All the compressors restart working according to regulation. |
| **HOIL2** | Hi oil level alarm circuit 2 | DIC(i) = 168-Hi oil level in oil seperator circuit2 active after OIL24 cycles. If OIL24=0 we don't manage any warning. | signalling only | **Manually**: When the Input is disable:<br>- Turn off and on the instrument<br>/or reset the alarm manually from the Visograph. |
| **Compressor Alarms** | | | | |
| **EAO1... EAO24 (for each compressor)** | Compressor safeties alarm for Oil switch load | Oil switch load Input activation.<br>(the Input is configured as DICxx=1<br>Compressor oil pressostate compressor 1 Circuit 1)<br>NOTE: with step compressors Input for each compressor has to be used. | The corresponding compressor is turned off (with step compressors all relays referred to the Input are disabled). | **Automatically** as soon as the Input is disabled. |
| **ETO1... ETO24 (for each compressor)** | Compressor safeties alarm for Thermal switch load | Thermal switch load Input activation.<br>(the Input is configured as DICxx=3<br>Thermal Safety Compressor Circuit 1)<br>NOTE: with step compressors Input for each compressor has to be used. | The corresponding compressor is turned off (with step compressors all relays referred to the Input are disabled). | **Automatically** as soon as the Input is disabled. |
| **EPO1...EPO24 (for each compressor)** | Compressor safeties alarm for Pressure switch load | Pressure switch load Input activation.<br>(the Input is configured as DICxx=2<br>Compressor safety pressostate Circuit 1)<br>NOTE: with step compressors Input for each compressor has to be used. | The corresponding compressor is turned off (with step compressors all relays referred to the Input are disabled). | **Automatically** as soon as the Input is disabled. |
| **MANT** | **Compressors maintenance alarm** | A compressor has worked for the time set in the AL10 parameter | Only signalling | **Manually:** reset the running hour of the compressor (see par 6.1) |
| **Comp start[1~15]** | Compressor cycle limit | Compressor CT cycle counter > SL14<br>The CT cycle counter will come from Coresense by reading register address "007E" (compressor start times)<br>When this value > SL14 individual compressor is locked out until cycle count is reset. | Lockout individual compressor | No reset. |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **OIL DIFF L/O** | **High separator differential switch alarm** | contact closure from hi oil separator lockout input | Lockout all compressors when DI true > 5 min | **Automatically** when DI true < 5 min<br>As soon as the Input is disabled the alarm is reset. The compressors restart working according to the working algorithm.<br>**Manually** when DI true ≥ 5 min<br>When the Input is disable, it also need turn off and on the instrument /or rest the alarm manually from the Visograph or remote.<br>The compressors restart working according to the working algorithm. |
| **GENERIC ALARMS** | | | | |
| **P1** | probe failure alarm | Probe 1 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P2** | probe failure alarm | Probe 2 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P3** | probe failure alarm | Probe 3 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P4** | probe failure alarm | Probe 4 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P5** | probe failure alarm | Probe 5 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P6** | probe failure alarm | Probe 6 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P7** | probe failure alarm | Probe 7 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P8** | probe failure alarm | Probe 8 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P9** | probe failure alarm | Probe 9 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P10** | probe failure alarm | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P11** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P12** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P13** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P14** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P15** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P16** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P17** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P18** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P19** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P20** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **P21** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P22** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P23** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P24** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P25** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P26** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P27** | **probe failure alarm** | Probe 10 failure | signalling only | **Automatically** as soon as the probe restarts working. |
| **P28** | **probe failure alarm** | Probe 28 failure | Only signalling | **Automatically** as soon as the probe restarts working. |
| **P29** | **probe failure alarm** | Probe 29 failure | Only signalling | **Automatically** as soon as the probe restarts working. |
| **P30** | **probe failure alarm** | Probe 30 failure | Only signalling | **Automatically** as soon as the probe restarts working. |
| **P31** | **probe failure alarm** | Probe 31 failure | Only signalling | **Automatically** as soon as the probe restarts working. |
| **P32** | **probe failure alarm** | Probe 32 failure | Only signalling | **Automatically** as soon as the probe restarts working. |
| **P33** | **probe failure alarm** | Probe 33 failure | Only signalling | **Automatically** as soon as the probe restarts working. |
| **P34** | **probe failure alarm** | Probe 34 failure | Only signalling | **Automatically** as soon as the probe restarts working. |
| **P35** | **probe failure alarm** | Probe 35 failure | Only signalling | **Automatically** as soon as the probe restarts working. |
| **BURST** | **Burst disc alarm** | DIC(i) = 150 activation | Only a warning: buzzer ON and alarm relay (91-Alarm) ON | DIC(i) = 150 deactivation |
| **PHASE** | **Phase fail alarm** | DIC(i) = 151 activation | Only a warning: buzzer ON and alarm relay (91-Alarm) ON | DIC(i) = 151 deactivation |
| **EXT[i]** | **External alarm [i]** | DIC(i) = 152 (or 153-154-155) activation | Only a warning: buzzer ON and alarm relay (91-Alarm) ON | DIC(i) = 152 (or 153-154-155) deactivation |
| **GLeak1 [2-3-4]-PreAlr** | **Gas Leak pre-alarm 1 [2-3-4]** | If value of Gas leak detector 1 [2-3-4] probe > GLD1 [GLD6-GLD11-GLD16] and Gas leak detector 1 [2-3-4] probe < GLD2 [GLD7-GLD12-GLD17]. | Relay set in GLD4 [GLD9-GLD14-GLD19] on | When value of Gas leak detector 1 [2-3-4] probe ≤ GLD1- GLD3[GLD6-GLD8;GLD11-GLD13;GLD16-GLD18] |
| **GLeak1 [2-3-4]-Alarm** | **Gas Leak alarm 1 [2-3-4]** | If value of Gas leak detector 1 [2-3-4] probe > GLD2 [GLD7-GLD12-GLD17] | Relay set in GLD5 [GLD10-GLD15-GLD20] on | When value of Gas leak detector 1 [2-3-4] probe ≤ GLD2- GLD21 [GLD7-GLD22;GLD12-GLD23;GLD17-GLD24] |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **EMOA-106D** | **Expansion module offline alarm-IPX106D** | The expansion module IPX106D is used and loses communication by can bus. | Only signalling | The communication is recovered automatically. |
| **EMOA-215D** | **Expansion module offline alarm-IPX215D** | The expansion module IPX215D is used and loses communication by can bus. | Only signalling | The communication is recovered automatically. |
| **Fan Alarm** | | | | |
| **AL_AO (for each fan)** | Fan safeties alarm | Safety switch load Input activation.<br>(the Input is configured as DICxx=73<br>Fan 1 safety Circuit 1) | The corresponding fan is turned off. | **Automatically** as soon as the Input is disabled. |
| **Compressor with Inverter Alarms** | | | | |
| **INVO (for Suction inverter)** | **Inverter safeties alarm for Oil switch load** | Oil switch load Input activation.<br>(the Input is configured as DICxx=115<br>Compressor oil Inverter suction Circuit 1) | The corresponding inverter is turned off. | **Automatically** as soon as the Input is disabled. |
| **INVT (for Suction inverter)** | **Inverter safeties alarm for Thermal switch load** | Thermal switch load Input activation.<br>(the Input is configured as DICxx=117<br>Thermal Safety Inverter suction Circuit 1) | The corresponding inverter is turned off. | **Automatically** as soon as the Input is disabled. |
| **INVP (for suction inverter)** | **Inverter safeties alarm for Pressure switch load** | Pressure switch load Input activation.<br>(the Input is configured as DICxx=116<br>Safety Inverter Suction Circuit 1) | The corresponding inverter is turned off. | **Automatically** as soon as the Input is disabled. |
| **MANTINV1 [2] (for suction inverter)** | **Inverter 1 [2] maintenance alarm** | The inverter1 [2] has worked for the time set in the AL10 parameter | Only signalling | **Manually:** reset the running hour of the inverter1 [2] (see par 6.1) |
| **Inverter 2 (for Suction 1 and 2 inverters)** | **Suction 1 [2] Inverter 2 alarm** | DIC(i) = 140 [141] activation | DOC(i) = 2 [4] is turned off.<br>AOC (I) = 3 or 12, [5] or [14] to 0V or 4mA | **Automatically** as soon as the Input is disabled. |
| **Warnings** | | | | |
| **LIQ LVL** | **Reciever level alarm** | 80%<Liquid level input <15% for 45min | Only a warning: buzzer ON and alarm relè ON | Automatially when 15%<Liquid level<89% |
| **REC FLOAT** | **Flash tank high pressure** | contact closure from reciever rupture disc | Only a warning: buzzer ON and alarm relè ON | Must be manually cleared onsite |
| **OIL DIFF HI** | **Change separator element switch alarm** | contact closeure from change oil separator input >1 minute | Only a warning: buzzer ON and alarm relè ON | Clear automatically when DI is false |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **Floodback** | **Floodback alarm** | 10 DDF >superheat (Suction pressure & Suction temperature) for 90 minutes | Only a warning: buzzer ON and alarm relè ON | Clear automatically superheat > 10 DDF |
| **Gas cooler** | | | | |
| **PreHP Rec** | **High pressure on CO2 flash tank pre-alarm** | GC28 > AI152 (AI153) > GC29 | The % of the valve is updating every second in order to reach the correct percentage.<br>If the flash tank pressure value is between the values GC29 and GC28 – 1 (bar), the % of valve opening is the following one:<br>  | **Automatically** as soon as the HP REC is active or as soon as AI152 (AI153) < GC29 – GC30 |
| **HP REC** | **High pressure on CO2 flash tank alarm** | AI152 (AI153) > GC28 | The HPV will close (0%).<br>The BY-PASS will open to a user definable % set by the BY-PASS % Open parameter GC37.<br><br>In case of parallel compression enabled(At least one of parallel compressor is working):<br>-All the parallel compressors are forced to run with safety delays respected.<br>-The BY-PASS valve is opened at GC26. | **Automatically** as soon as AI152 (AI153) < GC28 – GC30 |
| **LP REC** | **Low pressure on CO2 flash tank alarm** | AI152 (AI153) < GC31 | The HPV will have a minimum opening of the HPV valve to a user definable % set by GC36.<br>If the PID % is greater than GC36, then the PID % will be the valve % output.<br>The BY-PASS will close. | **Automatically** as soon as AI152 (AI153) > GC31 + GC32 |
| **OA-XEV20D_1** | **XEV20D_1 offline alarm** | The XEV20D_1 is used and loses communication. | Only signalling | The communication is recovered automatically. |
| **OA-XEV20D_2** | **XEV20D_2 offline alarm** | The XEV20D_2 is used and loses communication. | Only signalling | The communication is recovered automatically. |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **High discharge temperature** | | | | |
| **HDi-T-1** | **High discharge temperature – Circuit 1** | one of the probes set as AIxx = 156, 158, 69,70, …, 80 >DSC4 && DSC5 timer exhausted | With DSC6 running: only warning<br>With DSC6 exhausted: 1 compressors off every DSC7 sec | Automatically as soon as ALL the probes set as AIxx = 156, 158, 69,70, …, 80Aixx < DSC4 – DSC3 |
| **HDi-T-2** | **High discharge temperature – Circuit 2** | one of the probes set as AIxx = 157, 159, 81,82, …, 92 >DSC11 && DSC12 timer exhausted | With DSC13 running: only warning<br>With DSC13 exhausted: 1 compressors off every DSC14 sec | Automatically as soon as AIxx = 157, 159, 81,82, …, 92 < DSC11 – DSC10 |
| **Compressor Alarms – Parallel compression** | | | | |
| **PC_Oil_x (for each compressor)** | Compressor safeties alarm for Oil switch load | Oil switch load Input activation.<br>(the Input is configured as Parallel compression-Compressor x oil pressostate)<br>NOTE: with step compressors Input for each compressor has to be used. | The corresponding compressor is turned off (with step compressors all relays referred to the Input are disabled). | **Automatically** as soon as the Input is disabled. |
| **PC_Th_x (for each compressor)** | Compressor safeties alarm for Thermal switch load | Thermal switch load Input activation.<br>(the Input is configured as Parallel compression-Compressor x Thermal Safety)<br>NOTE: with step compressors Input for each compressor has to be used. | The corresponding compressor is turned off (with step compressors all relays referred to the Input are disabled). | **Automatically** as soon as the Input is disabled. |
| **PC_Pr_x (for each compressor)** | Compressor safeties alarm for Pressure switch load | Pressure switch load Input activation.<br>(the Input is configured as Parallel compression-Compressor x Safety pressostate)<br>NOTE: with step compressors Input for each compressor has to be used. | The corresponding compressor is turned off (with step compressors all relays referred to the Input are disabled). | **Automatically** as soon as the Input is disabled. |
| **PC_INV_Oil** | Parallel compressor inverter safeties alarm for Oil switch load | Oil switch load Input activation.<br>(the Input is configured as Parallel compression-Frequency compressor, oil pressostate) | The inverter parallel compressor is turned off. | **Automatically** as soon as the Input is disabled. |
| **PC_INV_Th** | Parallel compressor inverter safeties alarm for Thermal switch load | Thermal switch load Input activation.<br>(the Input is configured as Parallel compression-Frequency compressor, Thermal Safety) | The inverter parallel compressor is turned off. | **Automatically** as soon as the Input is disabled. |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **PC_INV_Pr** | Parallel compressor inveryer safeties alarm for Pressure switch load | Pressure switch load Input activation.<br>(the Input is configured as Parallel compression-Frequency compressor, Safety pressostate) | The inverter parallel compressor is turned off. | **Automatically** as soon as the Input is disabled. |
| **Pc_INV** | Parallel compressor inverter fault | Parallel compression– Inverter Safety (DI185) ON | The inverter parallel compressor becomes not available for the regulation (use the other parallel compressors resources, if available. Otherwise, come back to BY-PASS regulation) | **Automatically** as soon as parallel compression– Inverter Safety (DI185) OFF |
| **INVO2 (for Suction inverter 2)** | **Inverter 2 safeties alarm for Oil switch load** | Oil switch load Input activation.<br>(the Input is configured as DICxx=227 Compressor oil Inverter 2 suction Circuit 1) | The corresponding inverter is turned off. | **Automatically** as soon as the Input is disabled. |
| **INVT2 (for Suction inverter 2)** | **Inverter 2 safeties alarm for Thermal switch load** | Thermal switch load Input activation.<br>(the Input is configured as DICxx=229 Thermal Safety Inverter 2 suction Circuit 1) | The corresponding inverter is turned off. | **Automatically** as soon as the Input is disabled. |
| **INVP2 (for suction inverter 2)** | **Inverter 2 safeties alarm for Pressure switch load** | Pressure switch load Input activation.<br>(the Input is configured as DICxx=228 Safety Inverter 2 Suction Circuit 1) | The corresponding inverter is turned off. | **Automatically** as soon as the Input is disabled. |
| **MANTINV1 [2] (for suction inverter)** | **Inverter 1 [2] maintenance alarm** | The inverter1 [2] has worked for the time set in the AL10 parameter | Only signalling | **Manually:** reset the running hour of the inverter1 [2] (see par 6.1) |
| **PC_INV2_Oil** | Parallel compressor inverter 2 safeties alarm for Oil switch load | Oil switch load Input activation.<br>(the Input is configured as Parallel compression- Inverter 2 compressor, oil pressostate) | The inverter 2 parallel compressor is turned off. | **Automatically as soon as the Input is disabled.** |
| **PC_INV2_Th** | Parallel compressor inverter 2 safeties alarm for Thermal switch load | Thermal switch load Input activation.<br>(the Input is configured as Parallel compression- Inverter compressor, Thermal Safety) | The inverter 2 parallel compressor is turned off. | **Automatically as soon as the Input is disabled.** |
| **PC_INV2_Pr** | Parallel compressor inverter 2 safeties alarm for Pressure switch load | Pressure switch load Input activation.<br>(the Input is configured as Parallel compression- Inverter compressor, Safety pressostate) | The inverter 2 parallel compressor is turned off. | **Automatically as soon as the Input is disabled.** |

| Code | Description | Cause | Action | Reset |
|---|---|---|---|---|
| **Pc_INV 2** | Parallel compressor inverter 2 fault | Parallel compression– Inverter 2 Safety (DI236) ON | The inverter 2 parallel compressor becomes not available for the regulation (use the other parallel compressors resources, if available. Otherwise, come back to BGV regulation) | **Automatically as soon as parallel compression– Inverter Safety (DI238) OFF** |
| **FLASH TANK ALARMS** | | | | |
| **LLIQ** | Low liquid level alarm | Liquid level probe AICxx 135, <=AL47 for delay AL49, there will be Low level alarm | Only signalling | **Automatically** when liquid level probe >= AL47+AL50 |
| **HLIQ** | Hi liquid level alarm | Liquid level probe AICxx 135, >=AL48 for delay AL49, there will be high level alarm | Depneding on AL51: AL51 = YES, the compressor of the circuit 1 and parallel are switched off every 1 sec at the same time, the compr. of circuit 2 swtiched off every 1 after all the compressor of circuit 1 are off | **Automatically** when liquid level probe <= AL48-AL50<br>All the compressors restart working according to regulation. |

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