



# REFRA CONTROLLER MANUAL

## R290 (Propane) Heat Pumps

Siemens Climatix



## Contents

|        |                                                       |    |
|--------|-------------------------------------------------------|----|
| 1.     | BASIC CONCEPT .....                                   | 2  |
| 1.1.   | UNIT .....                                            | 2  |
| 1.2.   | HOW IT WORKS .....                                    | 2  |
| 2.     | USER GUIDE .....                                      | 3  |
| 2.1.   | CONNECTING TO USER PROFILE .....                      | 3  |
| 2.2.   | HEAT PUMP START UP .....                              | 4  |
| 2.3.   | TEMPERATURE SETPOINT .....                            | 4  |
| 2.4.   | ALARM ACKNOWLEDGEMENT .....                           | 4  |
| 2.5.   | INSTALL/REPLACE BATTERY FOR REAL TIME CLOCK .....     | 4  |
| 3.     | SERVICE GUIDE .....                                   | 6  |
| 3.1.   | CONNECTING TO SERVICE PROFILE .....                   | 6  |
| 3.2.   | MENU MAP .....                                        | 6  |
| 3.3.   | BSP AND BUS LED MEANING .....                         | 10 |
| 4.     | HEAT PUMP WORKING LOGIC AND COMMUNICATIONS .....      | 11 |
| 4.1.   | CONDENSER .....                                       | 11 |
| 4.2.   | DEFROST .....                                         | 11 |
| 4.3.   | FLOATING SETPOINT .....                               | 12 |
| 4.4.   | SYSTEM COMMUNICATIONS .....                           | 14 |
| 4.4.1. | HOW TO CONNECT SIEMENS CONTROLLER TO ClimatixIC ..... | 14 |
| 5.     | ALARM LIST .....                                      | 18 |
| 6.     | MODBUS RTU LIST .....                                 | 20 |
| 7.     | BACnet .....                                          | 26 |
| 8.     | I/O MAPPING .....                                     | 32 |

## 1. BASIC CONCEPT

### 1.1. UNIT

The Heat pump has two modes Cooling and Heating. Conditional a heat pump can be divided into two parts, outdoor (contact with outside air) and indoor (contact with building). One part contains a coil and a fan. The coil operates as either a condenser (in cooling mode) or an evaporator (in heating mode). The fan blows outside air over the coil to facilitate the heat exchange. The second part also contains a coil, the coil acts as an evaporator (in cooling mode) or a condenser (in heating mode).

Also heat pump contains the next parts: refrigerant, compressor, reversing valve and expansion valve.

**Refrigerant:** the refrigerant is the substance that absorbs and rejects heat as it circulates throughout the heat pump system.

**Compressor:** the compressor pressurizes the refrigerant and moves it throughout the system.

**Reversing valve:** the part of the heat pump system that reverses the flow of refrigerant, allowing the system to operate in the opposite direction and switch between heating and cooling.

**Expansion valve:** the expansion valve acts as a metering device, regulating the flow of the refrigerant as it passes through the system, allowing for a reduction of pressure and temperature of the refrigerant.

### 1.2. HOW IT WORKS

Heat pumps do not create heat. They redistribute heat from the air or water and use a refrigerant that circulates between evaporator and condenser to transfer the heat.

In cooling mode, a heat pump absorbs heat inside a building and releases it outdoors. In heating mode, the heat pump absorbs heat from outside air (even cold air) and releases it indoors.

One of the most important things to understand about heat pump operation and the process of transferring heat is that heat energy naturally wants to move to areas with lower temperatures and less pressure. Heat pumps rely on this physical property, putting heat in contact with cooler, lower pressure environments so that the heat can naturally transfer. This is how a heat pump works.

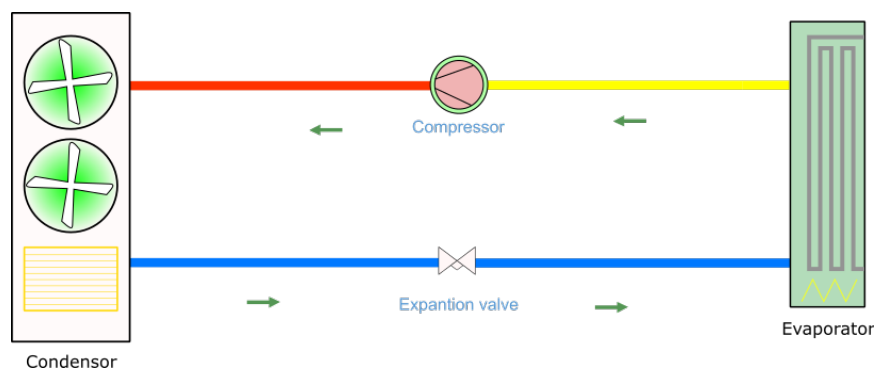
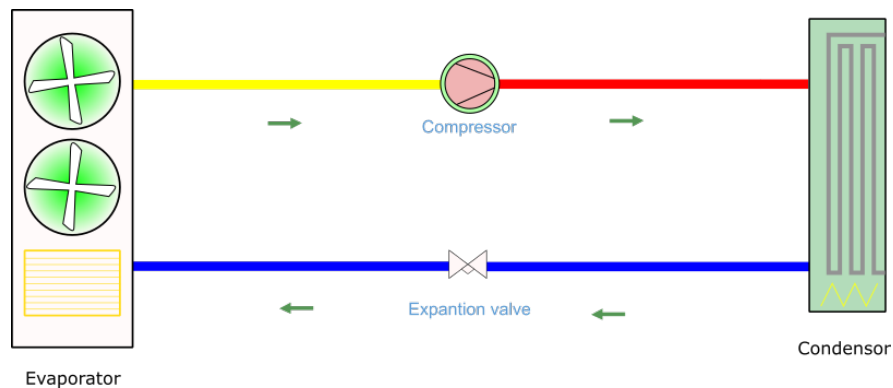


Figure no. 1 Cooling mode

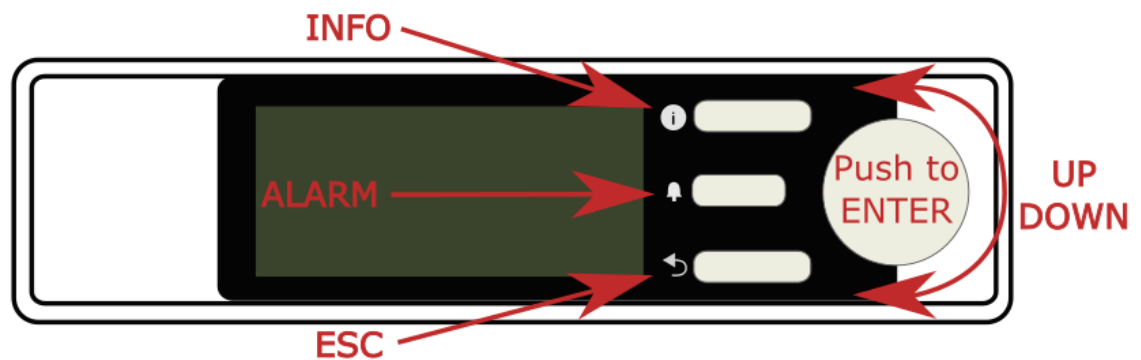


**Figure no. 2 Heating mode**

## 2. USER GUIDE

### 2.1. CONNECTING TO USER PROFILE

Connect to "User" profile. Hold "Enter" button for 3 seconds.



**Figure no. 3 Button placement**



**Figure no. 4 Login screen**

User password is 1000 and it can be entered by "Up" and "Down" buttons and confirm selection press "Enter". When the correct password is entered in the right corner one key icon will be shown.

## 2.2. HEAT PUMP START UP

To start up the system user must change "Unit status On/Off" from "Off" -> "On" and check if "Remote On/Off" status is "On".

## 2.3. TEMPERATURE SETPOINT

The Heat pump has two setpoints Cooling and Heating. The heat pump will run until one of the setpoints is reached. To change setpoint find parameter "Cooling setpoint / Heating setpoint" press "Enter" and change to the desired temperature, confirm with "Enter".

## 2.4. ALARM ACKNOWLEDGEMENT

All alarms are listed in history. To see active alarms and accrued alarms press "Alarm" button, if there are active alarms firstly, they will be shown, and "Alarm" button will blink red. By pressing button "Alarm" for couple of time screen will change to history.



Figure no. 5 Alarm list

To acknowledge alarm, select "Acknowledge" and press "Enter" press "Execute". All alarms will be reset if conditions are right, all other will be left in alarm conditions.

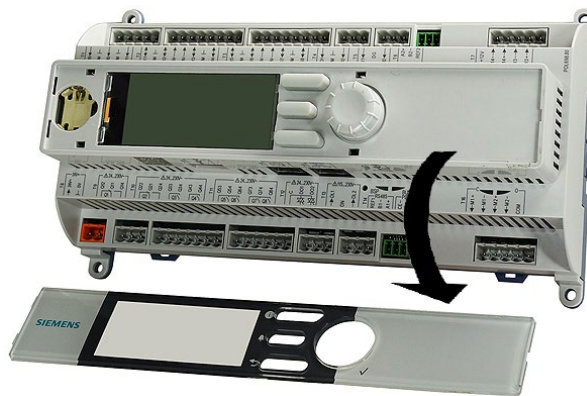
## 2.5. INSTALL/REPLACE BATTERY FOR REAL TIME CLOCK

|                                 |                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Clock function                  | The real-time clock integrated in the controller is required for time-based functions such as schedules, alarm timestamps, or the time base for data acquisition.                                                 |
| Backup battery                  | Backup battery for the real-time clock is <ul style="list-style-type: none"> <li><input type="checkbox"/> 3 days without battery backup</li> <li><input type="checkbox"/> 4 years with battery backup</li> </ul>  |
| Install/replace back-up battery | <p>→ In preparation, pay attention to the safety notes at the conclusion of this section.</p> <p>→ Use only BR2032 button cell Lithium batteries.</p> <p>→ The battery holder has space for a backup battery.</p> |

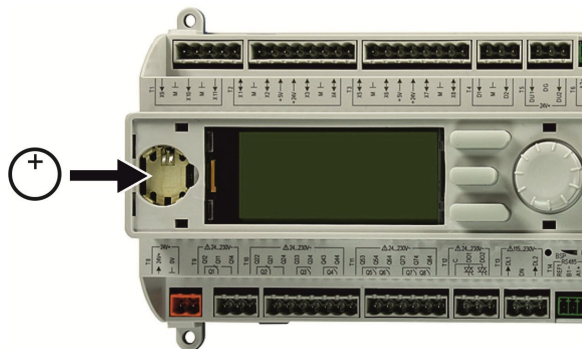
1. Disconnect all power to the controller.



2. Remove the plastic front cover using a narrow flat head screwdriver.



3. Insert the BR2032 battery or replace it. NOTICE! Pay attention to polarity! The plus faces up and is visible after inserting.



4. Remount the plastic front cover by mounting the left side and then gently clicking the right side in place.

## 3. SERVICE GUIDE

### 3.1. CONNECTING TO SERVICE PROFILE

Connect to "Service" profile. Hold "Enter" button for 3 seconds.

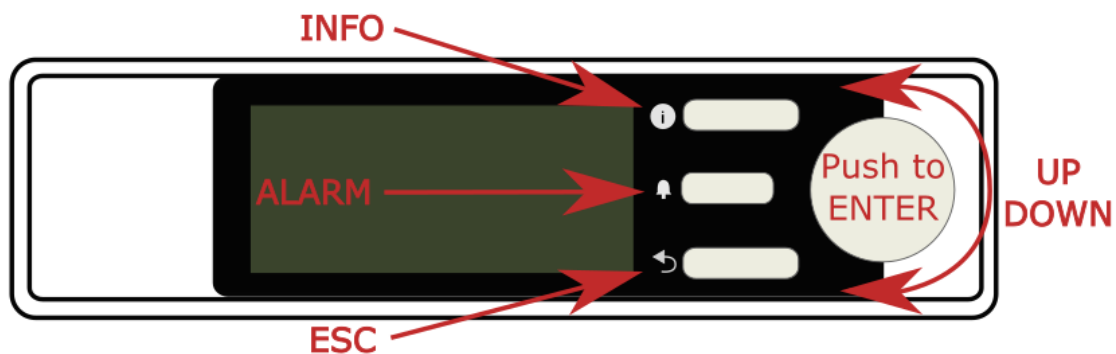


Figure no. 6 Button placement



Figure no. 7 Login screen

User password is 2000 and it can be entered by "Up" and "Down" buttons and confirm selection press "Enter". When the correct password is entered in the right corner two key icons will be shown.

### 3.2. MENU MAP

#### MAIN OVERVIEW

|                  |                                               |
|------------------|-----------------------------------------------|
| Plant status     | Plant status: Off*Cooling*Heating             |
| Present request  | Power request                                 |
| Present capacity | Real power output                             |
| Outlet t.        | Unit outlet liquid temperature                |
| Inlet t.         | Unit inlet liquid temperature                 |
| Control temp.    | Control temperature: Inlet temp.*Outlet temp. |
| Cooling setpoint | Cooling setpoint                              |
| Heating setpoint | Heating setpoint                              |

|               |                               |
|---------------|-------------------------------|
| Supply pump   | Supply pump: On*Off           |
| Flow detector | Flow detector                 |
| Circuit 1     |                               |
| Evap. press.  | Evaporator pressure Circuit 1 |
| Cond. press.  | Condenser pressure Circuit 1  |
| Circuit 2     |                               |
| Evap.press.   | Evaporator pressure Circuit 2 |
| Cond.press.   | Condenser pressure Circuit 2  |
| Outdoor t.    | Outdoor temperature           |
| Unit On/Off   | Display on/off                |
| Remote On/Off | Remote switch on/off          |
| Cool/Heat     | Operating mode: Cool*Heat     |
| Emergency Off | Emergency Off                 |
| Main menu     |                               |

#### CIRCUIT 1/2

|                  |                                               |
|------------------|-----------------------------------------------|
| Evap. press.     | Evaporator pressure                           |
| Evaporator temp. | Temperature converted from pressure           |
| Cond. press.     | Condenser pressure                            |
| Condenser temp.  | Temperature converted from pressure           |
| Capacity request | Capacity request                              |
| Present capacity | Present capacity                              |
| Suct. gas temp.  | Suction gas temperature                       |
| Superheat        | Real superheat                                |
| Exp. valve       | Expansion valve position                      |
| Compressor1      | Compressor 1 status                           |
| Pos. Comp.1      | Position of compressor 1 inverter 0-100 power |
| Total SH comp.   | Total superheat for compressor.               |
| Reversing valve  | Reversing valve: On(heating)*Off(cooling)     |
| Dcrg. gas temp.  | Compressor discharge gas temperature          |
| Superheat valve  | Additional superheat valve position           |
| Condenser fan    | Fan power                                     |
| Circuit control  | Circuit parameters                            |
| Compr. manager   | Compressors management                        |
| Expansion        | Expansion control                             |
| Condenser        | Condenser control                             |

#### I. CIRCUIT CONTROL

|                |                                                                |
|----------------|----------------------------------------------------------------|
| Operating mode | Operating mode status: Off*Cooling*Heating*Defrost             |
| Control reason | Capacity control*Lock in-/decrease*Lock increase*Lock decrease |
| Envelop        | Startup delay prevention envelopes                             |

## II. COMPRESSOR MANAGER

|                  |                                                    |
|------------------|----------------------------------------------------|
| Operating mode   | Operating mode status: Off*Cooling*Heating*Defrost |
| Cap. Request     | Capacity request                                   |
| Present Capacity | Present Capacity                                   |
| Next compr. On   | The compressor number to be switched on            |
| Next compr. Off  | The compressor number to be switched off           |
| Settings         | Compressor manager settings                        |

### II-1. COMPRESSOR MANAGER SETTINGS

|                               |                                                                    |
|-------------------------------|--------------------------------------------------------------------|
| Max. starts/h c.              | Maximal compressor starts per hour                                 |
| Minimal on                    | Minimal compressor working time                                    |
| Minimal off                   | Minimal compressor off time                                        |
| Time between same comp. start | Time between same compressor starts                                |
| Capacity min. for FI* comp.   | Minimal capacity for Frequency Inverter compressor                 |
| Heating Cap. max. for FI Comp | Maximal capacity for Frequency Inverter compressor in heating mode |
| Cooling Cap. max. for FI Comp | Maximal capacity for Frequency Inverter compressor in cooling mode |
| Cap. st. up comp. 1           | Capacity which compressor 1 start-up                               |
| FI ramp step-up size          | Frequency Inverter ramp step-up size                               |
| FI ramp step-down size        | Frequency Inverter ramp step-down size                             |
| FI ramp change delay          | Frequency Inverter ramp change delay                               |
| FI startup time               | Frequency Inverter startup time                                    |
| Disabled Circuit 1/2 comp. 1  | Disabled Circuit 1/2 compressor 1                                  |

\* FI - Frequency inverter

## III. CONDENSER

|                                   |                                                              |
|-----------------------------------|--------------------------------------------------------------|
| Operating mode                    | Operating mode status: Off*Cooling*Heating*Defrost           |
| Control request                   | Control request                                              |
| Control reason                    | Control reason: Off*Action forced*Manual*Pressure controlled |
| Press. cooling setpoint           | Pressure cooling setpoint                                    |
| Press. heating setpoint           | Pressure heating setpoint                                    |
| Present floating setpoint Cooling | Present floating setpoint Cooling                            |
| Cond. press.                      | Condensing pressure                                          |
| Condenser                         | Condenser speed                                              |
| Settings                          |                                                              |

### III-1. CONDENSER SETTINGS

|                           |                           |
|---------------------------|---------------------------|
| Press. cooling setpoint   | Cooling setpoint pressure |
| Kp                        | P value for PID control   |
| Ti                        | I value for PID control   |
| Shift floating setpoint   | Shift floating setpoint   |
| Minimum floating setpoint | Minimum floating setpoint |

|                           |                             |
|---------------------------|-----------------------------|
| Maximum floating setpoint | Maximum floating setpoint   |
| Press. heating setpoint   | Pressure heating setpoint   |
| Kp                        | P value for PID control     |
| Ti                        | I value for PID control     |
| Shift enve.               | Shift envelopment           |
| Fan min. pwr              | Minimal fans start up power |

#### IV. DEFROST

|                  |                        |
|------------------|------------------------|
| Coil temp. 1     | Coil 1 temperature     |
| Coil temp. 2     | Coil 2 temperature     |
| Defrost heater   | Defrost heater: On*Off |
| Defrost settings | Settings               |
| Valve settings   | Settings               |

##### IV-1. DEFROST SETTINGS

|                                                   |                                                           |
|---------------------------------------------------|-----------------------------------------------------------|
| Min. heating time go to defrost                   | Min. heating time go to defrost                           |
| Min. time in heating to go defrost after start-up | Minimal time in heating to go into defrost after start-up |
| Min. time for defrost                             | Minimal time for defrost                                  |
| Max. time for defrost                             | Maximum time for defrost                                  |
| Temp. go in to defrost                            | Temperature on which goes in to defrost                   |
| Temp. go out to defrost                           | Temperature on which goes out to defrost                  |
| Dripping time                                     | Dripping time                                             |
| Coil drying time                                  | Coil drying time                                          |
| Min. temp. evap.                                  | Minimal temperature evaporator                            |
| Max. temp. evap.                                  | Maximal temperature evaporator                            |
| Min. temp outs.                                   | Minimal temperature outside                               |
| Max. temp outs.                                   | Maximal temperature outside                               |
| Temp. evap. def. hys.                             | Temperature evaporator defrost hysteresis                 |
| Temp. evap. def. time                             | Temperature evaporator defrost time                       |
| Setp. for evap. temp. for defrost                 | Setpoint for evaporating temperature for defrost          |

##### IV-2. REVERSING VALVE SET

|                        |                        |
|------------------------|------------------------|
| Time before valve move | Time before valve move |
| Time after valve move  | Time after valve move  |

#### V. SUPERHEAT VALVE

|                              |                                      |
|------------------------------|--------------------------------------|
| Enable extra superheat valve | Enable extra superheat valve         |
| Superheat valve              | Superheat valve opened               |
| Dcrg. gas temp.              | Discharge gas temperature            |
| Superheat valve setpoint     | Superheat valve temperature setpoint |
| Total SH comp. 1             | Total SH compressor 1                |

|                                    |                           |
|------------------------------------|---------------------------|
| Superheat valve Kp                 | P for PID Superheat valve |
| Superheat valve Tv                 | I for PID Superheat valve |
| After modification of control type | <b>Restart required!</b>  |

## MAIN MENU

### VI. SYSTEM OBJECT

|                     |                                   |
|---------------------|-----------------------------------|
| Current time        | Time adjustment                   |
| Date /Time settings | Time adjustment                   |
| Restart             | Controller restart                |
| Communications      | Communication controller settings |

### VI.1. SYSTEM COMMUNICATIONS

|                      |                                                                     |
|----------------------|---------------------------------------------------------------------|
| Comm.module overview | Communication module overview                                       |
| Communic.config.     | Communication config (Modbus slave RS485, TCP/IP, BACnet RS485/ IP) |
| IP-Config            | IP config                                                           |
| >                    | IP                                                                  |
| >                    | Unique controller name                                              |
| WLAN                 | WIFI stick settings                                                 |
| >                    | IP WIFI stick                                                       |
| Modbus RTU (RS485)   | Modbus parameters                                                   |
| Climatix IC          | Cloud parameters                                                    |
| BACnet               | BACnet settings                                                     |
| Process bus          | Process bus settings                                                |

### VII. OVERVIEWS

|                 |                                   |
|-----------------|-----------------------------------|
| Operating hours | Operating hours of the aggregates |
|-----------------|-----------------------------------|

### 3.3. BSP AND BUS LED MEANING

| LED | Color                                                                                                      | Flash response                   | Function                                                   |
|-----|------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------|
| BSP | Red/green                                                                                                  | Changes at 1 Hz                  | Software update mode: Download application or new firmware |
|     | Green                                                                                                      | Continuous                       | Application loaded and operational                         |
|     | Orange                                                                                                     | Continuous                       | Application loaded but is not operational                  |
|     | Orange                                                                                                     | Flashing, 50 ms on / 1000 ms off |                                                            |
|     | Red                                                                                                        | Flashing at 2 Hz                 | Firmware error                                             |
|     | Red                                                                                                        | Continuous                       | Hardware fault                                             |
| BUS | The application sets the response and functional. Additional notes are available in the SAPRO online help. |                                  |                                                            |

Additional BSP LED meaning:

|                           |                        |
|---------------------------|------------------------|
| BUS (On controller)       | BUS                    |
| Alarm is not acknowledged | 500 ms On / 500 ms Off |
| Alarm is acknowledged     | ON                     |
| No Alarm                  | OFF                    |

## 4. HEAT PUMP WORKING LOGIC AND COMMUNICATIONS

### 4.1. CONDENSER

The condenser drives the PID regulator separate of cooling and heating mods, Kp proportional component, Ti integral component.

Fan min. pwr. can't be less than 15% to protect the modulating fan from low voltage start.

### 4.2. DEFROST

Defrost request: defrost mode start when evaporating temperature is lower than calculated value "**Setp. for evap. temp. for defrost**" °C and stay below for "Temp. evap. def. times. time delay and not increase "Temp. evap. def. hys." °C.

Start: if a heat pump has more than one refrigerant circuit, heating mode stops in that circuit which needs to defrost.

- The compressor stops.
- After "Time before valve move" delay 4-way valve is activating in cooling mode.
- After "Time after valve move" delay compressor on and start defrosting.
- Defrost heater is on.

Defrosting: compressor will work at minimum speed "Capacity min. for FI comp." % for time "FI start up time" s., After that time delay, compressor will increase speed % "Cap. st.up comp. 1", delay FI ramp change delay.

- Compressor will stop when "Min. time for defrost" delay and reach "Coil temp1" °C and "Coil Temp2" °C set point "Temp. go out of defrost" °C. Or unit will have generated critical alarm.
- Defrost heater is off.
- Dripping time: "Dripping time" s. delay when compressor is off condenser fan is off to let water drops dripped out from coil by gravity.
- Coil drying: "Coil drying time" delay when compressor is off, fan is on for 100% to remove all water from coil.
- After successful defrost 4-way valve switch back to heating mode, and heating mode will be continued.

## HOW DEFROST START SETPOINT IS CALCULATED

Defrost start set point is floating, according to evaporating temperature and outside temperature values. It can be adjusted in two different points:

- High temperature B and D points: D point is 15, B point is 0, when outside is 15 °C set point is 0°C, so difference between outside and evaporating temperature is 15°C.
- Low temperature A and C points: C point is -15, A point is -25, When outside is -15 °C set point is -25°C, so the difference between outside and evaporating temperature is -10°C.

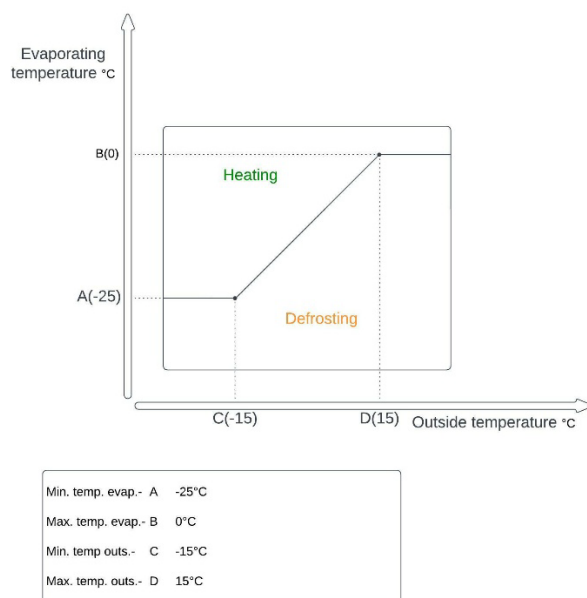


Figure no. 8

### Example:

- If the outside temperature is 15 °C, evaporating temperature is 3 °C, unit does not need to defrost because defrost set point is 0°C.
- If the outside temperature is 10 °C, evaporating temperature is -10 °C, then unit starts to defrost, because set point for defrost start is about -5. If evaporating temperature is not increasing more "Temp. evap. def. hys." 3 °C For a "Temp. evap. def. time" 60s delay. And defrost will start.

Always can check what actual set point is for start defrost "Setp. for evap. temp. for defrost".

### 4.3. FLOATING SETPOINT

Floating heating setpoint regulation according to two setpoints: one for cold outdoor temperatures and one for hot outdoor temperatures. System calculating linear characteristic by ambient temperature, floating limit and setpoint shift, the result affects the setpoint.

At night, when the site is empty, to save energy, you can change temperature according to schedule.

**Example 1:** Cold outdoor temperature. See figure no. 9

Manual heating setpoint = 20 °C

Ambient temperature = -10 °C

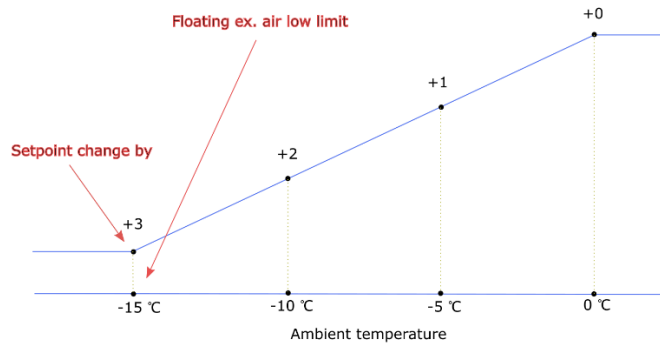
Floating ex. Air low limit = -15 °C

Setpoint change by = 3 K

Time 11:00 pm. Setpoint change by = -3 K

Then real setpoint will be 20 + 2 = 22 °C

**Cold outdoor temperature**



**Figure no. 9**

**Example 2:** Cold outdoor temperature. See figure no. 10

Manual heating setpoint = 20 °C

Ambient temperature = 10 °C

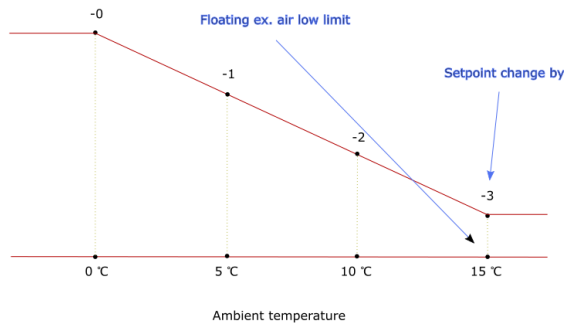
Floating ex. air low high = 15 °C

Setpoint change by = -3 K

Time 1:00 pm. Setpoint change by = -3 K

Then real setpoint will be 20 - 2 - 3 = 15 °C

**Hot outdoor temperature**



**Figure no. 10**

## 4.4. SYSTEM COMMUNICATIONS

Connection to the internet: for this, there is an RJ 45 port (T-IP Ethernet) on the underside of the controller. After connecting the cable, you will check IP address in IP config, DHCP can be *Active* or *Passive*.

Connection to the [www.climatixic.com](http://www.climatixic.com): for this go to Climatix IC in system communications and check:

1. Enable → Yes
2. Communication → Ok
3. Cloud server → Connected
4. Tenant key → -84?T-q,f3

### 4.4.1. HOW TO CONNECT SIEMENS CONTROLLER TO ClimatixIC

1. Connect Ethernet cable to Ethernet Port (see figure no. 11).

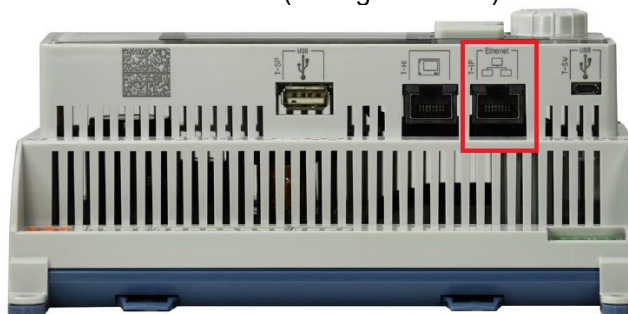


Figure no. 11

2. Power on the controller if it was off. Press and hold round button for 3 seconds to enter the menu. (see figure no. 12).



Figure no. 12

For navigation use the diagram below figure no. 13.

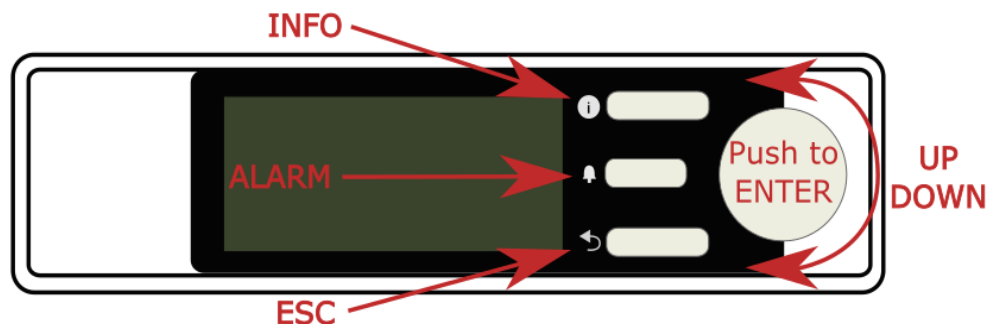


Figure no. 13

- After holding the Enter button for 3 seconds you will see figure no. 14 as shown below. Press **Enter** one more time.

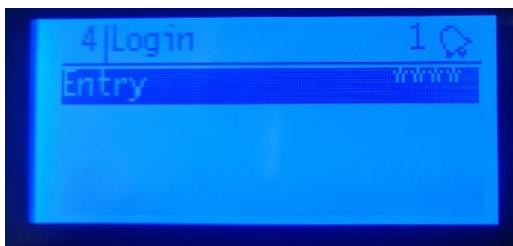


Figure no. 14

- Enter service password: **2000** by rotating control wheel and pressing Enter after each number you entered. (see figure no. 15)

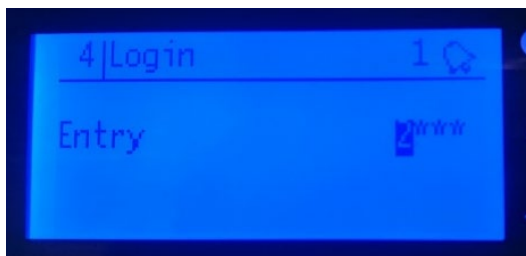


Figure no. 15

- By rotating control wheel go down and select **Main menu**. (see figure no. 16)

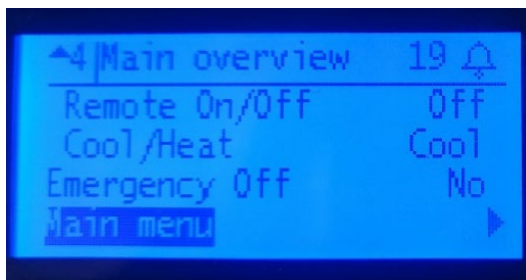


Figure no. 16

6. Select **System objects**. (see figure no. 17)

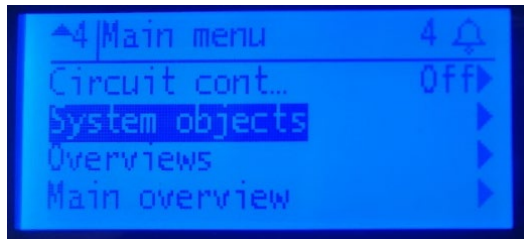


Figure no. 17

7. Select **Communications**. (see figure no. 18)

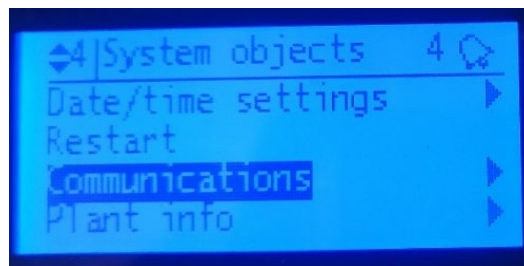


Figure no. 18

8. Select **IP Config** and check if **DHCP** status is set as **active**. (see figure no. 19)

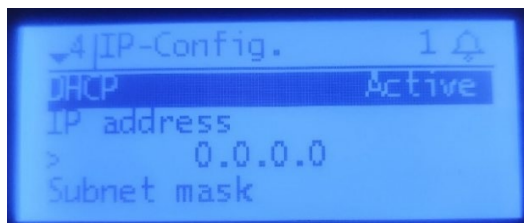


Figure no. 19

9. Go back and select **Climatix IC**. (see figure no. 20)

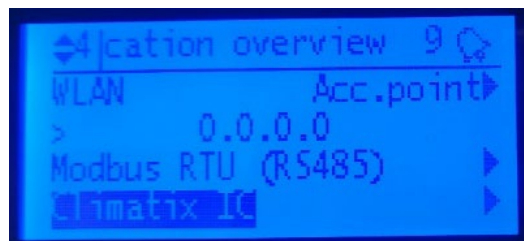


Figure no. 20

10. Check if **Enable** set to **Yes**. (see figure no. 21)

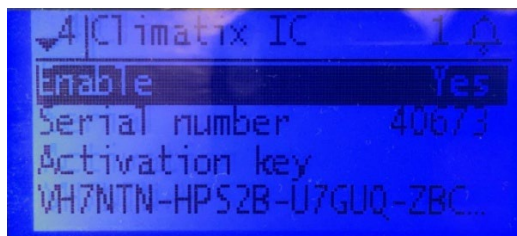


Figure no. 21

11. Write down or take a photo of the last 5 to 10 symbols of **Activation key** (you might need it later). (see figure no. 22)

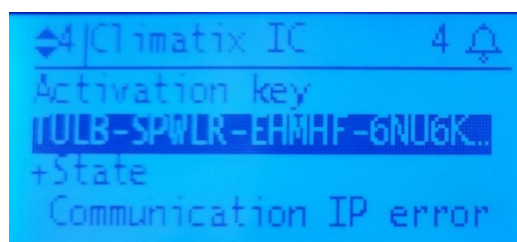


Figure no. 22

12. Using the navigation wheel go down to **Tenant key** (key sensitive) and check if key is set to: **-84?T-q,f3** (see figure no. 23)

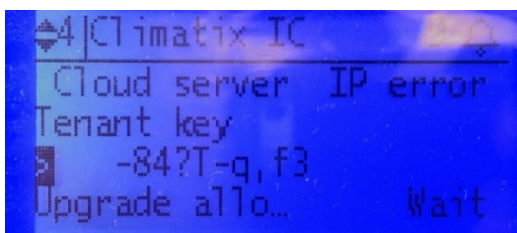


Figure no. 23

13. Using navigation wheel go up the menu and see if status of **Communication** is **OK** and **Cloud server** is **Connect**. (see figure no. 24)

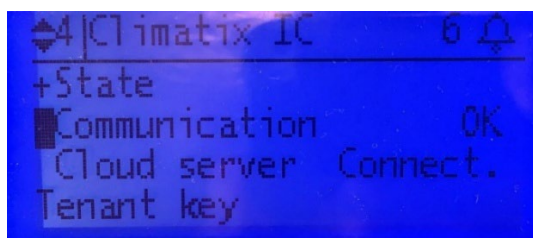


Figure no. 24

## 5. ALARM LIST

| Water side                                                    | Meaning                                                                                       | Stops                     | Alarm reset |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------|-------------|
| Evap. out t. Fault: no sens.                                  | Probe disconnected                                                                            | All plant                 | Manual      |
| Evap. out t. HighLimitActive: 8889 °C                         | Probe value reached high limit alarm                                                          | -                         | -           |
| Evap. in t. Fault: no sens.                                   | Probe disconnected                                                                            | All plant                 | Manual      |
| Evap. in t. HighLimitActive: 8889 °C                          | Probe value reached high limit alarm                                                          | -                         | -           |
| Fault Supply pump OffNormal: Alarm                            | Overload pump                                                                                 | All plant                 | Automatic   |
| Fault Supply pump 1,2 OffNormal: Alarm                        | Overload pump                                                                                 | All plant                 | Automatic   |
| Flow det. OffNormal: No                                       | Pump single or twin no flow alarm                                                             | All plant                 | Manual      |
| Warn.frost prot. exchanger                                    | Warning freeze alarm for exchanger                                                            | -                         | Automatic   |
| Frost protection exchanger                                    | Freeze alarm for exchanger pump                                                               | All plant                 | Manual      |
| Warn.frost prot. medium                                       | Warning freeze alarm for medium                                                               | -                         | Automatic   |
| Frost protection medium                                       | Freeze alarm for medium pump                                                                  | All plant                 | Manual      |
| <b>Refrigerant side</b>                                       |                                                                                               |                           |             |
| Low pr. detect. Circuit X OffNormal: Alarm                    | Low pressure alarm by digital input, relay of circuit X                                       | Circuit X                 | Automatic   |
| Low pr. detect. counter Circuit X LowLimitActive: -56 min     | Low pressure alarm counter by digital input, relay of circuit X                               | Circuit X                 | Manual      |
| High pr. detect. Circuit X OffNormal: Alarm                   | High pressure alarm by digital input, relay of circuit X                                      | Circuit X                 | Automatic   |
| High pr. detect. counter Circuit X LowLimitActive: -56 min    | High pressure alarm counter by digital input, relay of circuit X                              | Circuit X                 | Manual      |
| Fault comp. Y Circuit X OffNormal: Alarm                      | Overload compressor Y of circuit X                                                            | Circuit X<br>Compressor Y | Automatic   |
| Fault comp. Y counter Circuit X LowLimitActive: -56 min       | Overload compressor Y of circuit X fault counter for number of 3 times in 1-hour locked alarm | Circuit X<br>Compressor Y | Manual      |
| St-up counter comp. Y Circuit X LowLimitActive: -30min        | More compressors start then allowed of circuit X compressor Y                                 | Circuit X<br>Compressor Y | Manual      |
| All compr. In al. Circuit X OffNormal: Alarm                  | All compressors in circuit X is in alarm/overload                                             | Circuit X                 | Automatic   |
| No compr.avail. (No compr.avail. Circuit X-OffNormal): Normal | Compressors in circuit X not ready to start because of the timers                             | Circuit X                 | Automatic   |
| Suct gas temp. Circuit x OffNormal: Alarm                     | Probe disconnected                                                                            | Circuit X                 | Manual      |
| Suct gas temp. Circuit x HighLimitActive: 8889 °C             | Probe value reached high limit alarm of circuit X                                             | Circuit X                 | Manual      |

|                                                                              |                                                                               |           |                             |
|------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------|-----------------------------|
| Evap. press. Circuit x OffNormal: op.loop                                    | Probe disconnected                                                            | Circuit X | Manual                      |
| Evap. press. Circuit x HighLimitActive: 8889 bar                             | Probe value reached high limit alarm of circuit X                             | Circuit X | Manual                      |
| Cond. press. Circuit x OffNormal: op.loop                                    | Probe disconnected                                                            | Circuit X | Manual                      |
| Cond. press. Circuit x HighLimitActive: 8889 bar                             | Probe value reached high limit alarm of circuit X                             | Circuit X | Manual                      |
| Fault Condenser fan Circuit X OffNormal: Alarm                               | Fan alarm of circuit X                                                        | Circuit X | -                           |
| Max.high press Circuit X OffNormal: Alarm                                    | To high condensing pressure of circuit X                                      | Circuit X | Automatic                   |
| Min.high press Circuit X OffNormal: Alarm                                    | To low condensing pressure of circuit X                                       | Circuit X | Automatic                   |
| Superheat Circuit X LowLimitActive: 2K                                       | Low superheat alarm of circuit X                                              | Circuit X | Automatic                   |
| Superheat Fault counter Circuit X LowLimitActive: -30min                     | Low superheat alarm of circuit X for number of 3 times in 1-hour locked alarm | Circuit X | Manual                      |
| Evd comm. Error OffNormal: Alarm                                             | Carel EVD communication alarm                                                 | Circuit X | Automatic                   |
| Evd alarm Circuit x OffNormal:Alarm                                          | Carel EVD Alarm                                                               | Circuit X | Automatic                   |
| Condenser temp. Circuit X HighLimitActive: 1026 C                            | Value reached high limit alarm of circuit X                                   | Circuit X | Automatic                   |
| Dcrg. gas temp. Circuit X                                                    | Probe value reached high limit alarm of circuit X                             | Circuit X | Automatic                   |
| Coil temp. 1/2 Circuit X                                                     | Probe value reached high limit alarm of circuit X                             | Circuit X | Automatic                   |
| <b>General</b>                                                               |                                                                               |           |                             |
| Al.brute force de. (Al.brute force de.-HighLimitActive): 1                   | Indication that a brute force attack.<br>1: external HMI (HMI DM/TM)          | None      | By login with good password |
| Invalid time: Alarm                                                          | Alarm that time in controller is wrong                                        | None      | By entering right time      |
| Fault Ext.IO-m.Fault Ext.IO-m. (Fault Ext.IO-m.Fault Ext.IO-m.-OffNormal): X | Extension module X is disconnected                                            | Plant     | Automatic                   |
| Gas leak OffNormal: Alarm                                                    | Gas leak alarm                                                                | Plant     | Automatic                   |

## 6. MODBUS RTU LIST

Modbus RTU default: Baud rate 19200, parity Even, bit stop One. Modbus TPC/IP default port 502.

| Parameter                             | Address | Read/Write | Gain | Value               |
|---------------------------------------|---------|------------|------|---------------------|
| <b>Operation mode</b>                 |         |            |      |                     |
| Common operation mode                 | H100    | R          |      | 0 - Off 1 - Cooling |
| Operation mode HMI                    | H102    | R/W        |      | 0 - Off 1 - On      |
| Alarm acknowledge                     | H103    | R/W        |      | 0 - No 1 - Yes      |
| Operation mode Remote On/Off (DI)     | H104    | R          |      | 0 - Off 1 - On      |
| Emergency mode                        | H106    | R          |      | 0 - Off 1 - On      |
| Present request                       | H142    | R          |      |                     |
| Present capacity                      | H107    | R          |      |                     |
| Cooling setpoint return               | H108    | R/W        | 0.1  |                     |
| Heating setpoint return               | H110    | R/W        | 0.1  |                     |
| <b>Supply pump parameters</b>         |         |            |      |                     |
| Evap. out t. temperature value        | H222    | R          | 0.1  |                     |
| Evap. out t. temperature sensor fault | H223    | R          |      | 0 - OK 1 - Alarm    |
| Evap. in t. temperature value         | H224    | R          | 0.1  |                     |
| Evap. in t. temperature sensor fault  | H225    | R          |      | 0 - OK 1 - Alarm    |
| Single pump status                    | H206    | R          |      | 0 - Off 1 - On      |
| Single pump work hours                | H207    | R          |      |                     |
| Supply pump\Twin pump 1 alarm         | H208    | R          |      |                     |
| Twin pump 2 alarm                     | H209    | R          |      |                     |
| Twin pump 1 status                    | H210    | R          |      | 0 - Off 1 - On      |
| Twin pump 1 work hours                | H211    | R          |      |                     |
| Twin pump 2 status                    | H212    | R          |      | 0 - Off 1 - On      |
| Twin pump 2 work hours                | H213    | R          |      |                     |
| Twin pump 1 flow alarm                | H214    | R          |      | 0 - OK 1 - Alarm    |
| Twin pump 2 flow alarm                | H215    | R          |      | 0 - OK 1 - Alarm    |
| Supply pump flow status               | H216    | R          |      |                     |
| Supply pump flow alarm                | H217    | R          |      | 0 - OK 1 - Alarm    |
| Twin pump flow status                 | H218    | R          |      |                     |
| Twin pump flow alarm                  | H219    | R          |      | 0 - OK 1 - Alarm    |
| Frost waring                          | H220    | R          |      | 0 - OK 1 - Alarm    |
| Frost alarm                           | H221    | R          |      | 0 - OK 1 - Alarm    |
| <b>Circuit 1 parameters</b>           |         |            |      |                     |
| Condensing pressure value             | H300    | R          | 0.1  |                     |
| Condensing pressure alarm             | H301    | R          |      | 0 - OK 1 - Alarm    |
| Evaporating pressure value            | H302    | R          | 0.1  |                     |

|                                         |      |   |     |                  |
|-----------------------------------------|------|---|-----|------------------|
| Evaporating pressure alarm              | H303 | R |     | 0 - OK 1 - Alarm |
| High pressure alarm                     | H304 | R |     | 0 - OK 1 - Alarm |
| High pressure alarm counter alarm       | H305 | R |     | 0 - OK 1 - Alarm |
| Low pressure alarm                      | H306 | R |     | 0 - OK 1 - Alarm |
| Low pressure alarm counter alarm        | H307 | R |     | 0 - OK 1 - Alarm |
| Condensing max pressure                 | H308 | R |     | 0 - OK 1 - Alarm |
| Condensing min pressure                 | H309 | R |     | 0 - OK 1 - Alarm |
| Evaporating temperature                 | H316 | R | 0.1 |                  |
| Condensing temperature                  | H317 | R | 0.1 |                  |
| Circuit 1 supply temp. value            | H318 | R | 0.1 |                  |
| Circuit 1 supply temp. sensor alarm     | H319 | R |     | 0 - OK 1 - Alarm |
| Suction temperature value               | H320 | R | 0.1 |                  |
| Suction temperature sensor fault        | H321 | R |     | 0 - OK 1 - Alarm |
| Superheat value                         | H322 | R | 0.1 |                  |
| Superheat alarm                         | H323 | R |     | 0 - OK 1 - Alarm |
| Superheat alarm counter alarm           | H324 | R |     | 0 - OK 1 - Alarm |
| Expansion valve value                   | H325 | R |     |                  |
| Expansion valve alarm                   | H326 | R |     | 0 - OK 1 - Alarm |
| Circuit 1 frost warning                 | H327 | R |     | 0 - OK 1 - Alarm |
| Circuit 1 frost alarm                   | H328 | R |     | 0 - OK 1 - Alarm |
| Defrost end temp. 1 value               | H333 | R | 0.1 |                  |
| Defrost end temp. 1 sensor alarm        | H334 | R |     | 0 - OK 1 - Alarm |
| Defrost end temp. 2 value               | H335 | R | 0.1 |                  |
| Defrost end temp. 2 sensor alarm        | H336 | R |     | 0 - OK 1 - Alarm |
| Defrost heater                          | H337 | R |     | 0 - Off 1 - On   |
| Reverse valve                           | H338 | R |     | 0 - Off 1 - On   |
| High discharger gas temp. warning       | H339 | R |     | 0 - OK 1 - Alarm |
| High discharger gas temp. alarm         | H340 | R |     | 0 - OK 1 - Alarm |
| Common discharge gas temp.              | H341 | R | 0.1 |                  |
| Common discharge gas temp. sensor alarm | H342 | R |     |                  |
| Low evaporating temp. alarm             | H343 | R |     | 0 - OK 1 - Alarm |
| Low evaporating pressure alarm          | H344 | R |     | 0 - OK 1 - Alarm |
| High condensing pressure alarm          | H345 | R |     | 0 - OK 1 - Alarm |
| No compressor is available alarm        | H346 | R |     | 0 - OK 1 - Alarm |
| All compressor in alarm                 | H347 | R |     | 0 - OK 1 - Alarm |
| Compressor 1 fault                      | H348 | R |     | 0 - OK 1 - Alarm |
| Compressor 1 position                   | H349 | R |     |                  |
| Compressor 1 fault counter alarm        | H350 | R |     | 0 - OK 1 - Alarm |
| Discharge temp. comp. 1 value           | H351 | R | 0.1 |                  |
| Discharge temp. comp. 1 alarm           | H352 | R |     | 0 - OK 1 - Alarm |

|                                                      |      |   |     |                  |
|------------------------------------------------------|------|---|-----|------------------|
| Discharge temp. comp. 1 alarm                        | H353 | R |     | 0 - OK 1 - Alarm |
| Suct. temp. comp. 1 value                            | H354 | R | 0.1 |                  |
| Suct. temp. comp. 1 alarm                            | H355 | R |     | 0 - OK 1 - Alarm |
| Superheat temp. comp. 1 value                        | H356 | R | 0.1 |                  |
| Superheat temp. comp. 1 alarm                        | H357 | R |     | 0 - OK 1 - Alarm |
| Compressor 1 status                                  | H376 | R |     | 1 - Off 2 - On   |
| Compressor 1 work hours                              | H377 | R |     |                  |
| Compressor 1 start up counter alarm                  | H378 | R |     | 0 - OK 1 - Alarm |
| Condenser fan speed                                  | H391 | R |     | 0 - OK 1 - Alarm |
| Fan overload                                         | H392 | R |     | 0 - OK 1 - Alarm |
| Evap. low temp. alarm counter                        | H393 | R |     | 0 - OK 1 - Alarm |
| Suction low-pressure counter                         | H394 | R |     | 0 - OK 1 - Alarm |
| Discharge high pressure counter                      | H395 | R |     | 0 - OK 1 - Alarm |
| Superheat setpoint circuit 1 from Carel Evd          | H433 | R |     | 0 - OK 1 - Alarm |
| St-up opening setpoint circuit 1 from Carel Evd      | H434 | R |     | 0 - OK 1 - Alarm |
| Evaporating pressure circuit 1 from Carel Evd        | H435 | R |     | 0 - OK 1 - Alarm |
| Suction gas temperature circuit 1 from Carel Evd     | H436 | R |     | 0 - OK 1 - Alarm |
| Actual superheat circuit 1 from Carel Evd            | H437 | R |     | 0 - OK 1 - Alarm |
| Actual opening of eev circuit 1 from Carel Evd       | H438 | R |     | 0 - OK 1 - Alarm |
| Evaporating temperature circuit 1 from Carel Evd     | H439 | R |     | 0 - OK 1 - Alarm |
| Evaporation pressure sensor alarm from EVD circuit 1 | H440 | R |     | 0 - OK 1 - Alarm |
| Suction gas temp. sensor alarm from EVD circuit 1    | H441 | R |     | 0 - OK 1 - Alarm |
| MOP alarm from EVD circuit 1                         | H442 | R |     | 0 - OK 1 - Alarm |
| LOP alarm from EVD circuit 1                         | H443 | R |     | 0 - OK 1 - Alarm |
| Low superheat alarm from EVD circuit 1               | H444 | R |     | 0 - OK 1 - Alarm |
| Expansion valve alarm from EVD circuit 1             | H445 | R |     | 0 - OK 1 - Alarm |
| Carel EVD communication error circuit 1              | H446 | R |     | 0 - OK 1 - Alarm |
| <b>Circuit 2 parameters</b>                          |      |   |     |                  |
| Condensing pressure value                            | H500 | R | 0.1 |                  |
| Condensing pressure alarm                            | H501 | R |     | 0 - OK 1 - Alarm |
| Evaporating pressure value                           | H502 | R | 0.1 |                  |
| Evaporating pressure alarm                           | H503 | R |     | 0 - OK 1 - Alarm |
| High pressure alarm                                  | H504 | R |     | 0 - OK 1 - Alarm |
| High pressure alarm counter alarm                    | H505 | R |     | 0 - OK 1 - Alarm |
| Low pressure alarm                                   | H506 | R |     | 0 - OK 1 - Alarm |
| Low pressure alarm counter alarm                     | H507 | R |     | 0 - OK 1 - Alarm |
| Condensing max pressure                              | H508 | R |     | 0 - OK 1 - Alarm |
| Condensing min pressure                              | H509 | R |     | 0 - OK 1 - Alarm |
| Evaporating temperature                              | H516 | R | 0.1 |                  |

|                                         |      |   |     |                  |
|-----------------------------------------|------|---|-----|------------------|
| Condensing temperature                  | H517 | R | 0.1 |                  |
| Circuit 2 supply temp. value            | H518 | R | 0.1 |                  |
| Circuit 2 supply temp. sensor alarm     | H519 | R |     | 0 - OK 1 - Alarm |
| Suction temperature value               | H520 | R | 0.1 |                  |
| Suction temperature sensor fault        | H521 | R |     | 0 - OK 1 - Alarm |
| Superheat value                         | H522 | R | 0.1 |                  |
| Superheat alarm                         | H523 | R |     | 0 - OK 1 - Alarm |
| Superheat alarm counter alarm           | H524 | R |     | 0 - OK 1 - Alarm |
| Expansion valve value                   | H525 | R |     |                  |
| Expansion valve alarm                   | H526 | R |     | 0 - OK 1 - Alarm |
| Circuit 2 frost warning                 | H527 | R |     | 0 - OK 1 - Alarm |
| Circuit 2 frost alarm                   | H528 | R |     | 0 - OK 1 - Alarm |
| Defrost end temp. 1 value               | H533 | R | 0.1 |                  |
| Defrost end temp. 1 sensor alarm        | H534 | R |     | 0 - OK 1 - Alarm |
| Defrost end temp. 2 value               | H535 | R | 0.1 |                  |
| Defrost end temp. 2 sensor alarm        | H536 | R |     | 0 - OK 1 - Alarm |
| Defrost heater                          | H537 | R |     | 0 - Off 1 - On   |
| Reverse valve                           | H538 | R |     | 0 - Off 1 - On   |
| High discharger gas temp. warning       | H539 | R |     | 0 - OK 1 - Alarm |
| High discharger gas temp. alarm         | H540 | R |     | 0 - OK 1 - Alarm |
| Common discharge gas temp.              | H541 | R | 0.1 |                  |
| Common discharge gas temp. sensor alarm | H542 | R |     |                  |
| Low evaporating temp. alarm             | H543 | R |     | 0 - OK 1 - Alarm |
| Low evaporating pressure alarm          | H544 | R |     | 0 - OK 1 - Alarm |
| High condensing pressure alarm          | H545 | R |     | 0 - OK 1 - Alarm |
| No compressor is available alarm        | H546 | R |     | 0 - OK 1 - Alarm |
| All compressor in alarm                 | H547 | R |     | 0 - OK 1 - Alarm |
| Compressor 1 fault                      | H548 | R |     | 0 - OK 1 - Alarm |
| Compressor 1 position                   | H549 | R |     |                  |
| Compressor 1 fault counter alarm        | H550 | R |     | 0 - OK 1 - Alarm |
| Discharge temp. comp. 1 value           | H551 | R | 0.1 |                  |
| Discharge temp. comp. 1 alarm           | H552 | R |     | 0 - OK 1 - Alarm |
| Discharge temp. comp. 1 alarm           | H553 | R |     | 0 - OK 1 - Alarm |
| Suct. temp. comp. 1 value               | H554 | R | 0.1 |                  |
| Suct. temp. comp. 1 alarm               | H555 | R |     | 0 - OK 1 - Alarm |
| Superheat temp. comp. 1 value           | H556 | R | 0.1 |                  |
| Superheat temp. comp. 1 alarm           | H557 | R |     | 0 - OK 1 - Alarm |
| Compressor 1 status                     | H576 | R |     | 1 - Off 2 - On   |
| Compressor 1 work hours                 | H577 | R |     |                  |
| Compressor 1 start up counter alarm     | H578 | R |     | 0 - OK 1 - Alarm |

|                                                      |      |   |     |                  |
|------------------------------------------------------|------|---|-----|------------------|
| Condenser fan speed                                  | H591 | R |     | 0 - OK 1 - Alarm |
| Fan overload                                         | H592 | R |     | 0 - OK 1 - Alarm |
| Evap. low temp. alarm counter                        | H593 | R |     | 0 - OK 1 - Alarm |
| Suction low-pressure counter                         | H594 | R |     | 0 - OK 1 - Alarm |
| Discharge high pressure counter                      | H595 | R |     | 0 - OK 1 - Alarm |
| Superheat setpoint circuit 2 from Carel Evd          | H633 | R |     | 0 - OK 1 - Alarm |
| St-up opening setpoint circuit 2 from Carel Evd      | H634 | R |     | 0 - OK 1 - Alarm |
| Evaporating pressure circuit 2 from Carel Evd        | H635 | R |     | 0 - OK 1 - Alarm |
| Suction gas temperature circuit 2 from Carel Evd     | H636 | R |     | 0 - OK 1 - Alarm |
| Actual superheat circuit 2 from Carel Evd            | H637 | R |     | 0 - OK 1 - Alarm |
| Actual opening of eev circuit 2 from Carel Evd       | H638 | R |     | 0 - OK 1 - Alarm |
| Evaporating temperature circuit 2 from Carel Evd     | H639 | R |     | 0 - OK 1 - Alarm |
| Evaporation pressure sensor alarm from EVD circuit 2 | H640 | R |     | 0 - OK 1 - Alarm |
| Suction gas temp. sensor alarm from EVD circuit 2    | H641 | R |     | 0 - OK 1 - Alarm |
| MOP alarm from EVD circuit 2                         | H642 | R |     | 0 - OK 1 - Alarm |
| LOP alarm from EVD circuit 2                         | H643 | R |     | 0 - OK 1 - Alarm |
| Low superheat alarm from EVD circuit 2               | H644 | R |     | 0 - OK 1 - Alarm |
| Expansion valve alarm from EVD circuit 2             | H645 | R |     | 0 - OK 1 - Alarm |
| Carel EVD communication error circuit 2              | H646 | R |     | 0 - OK 1 - Alarm |
| <b>Circuit 3 parameters</b>                          |      |   |     |                  |
| Condensing pressure value                            | H700 | R | 0.1 |                  |
| Condensing pressure alarm                            | H701 | R |     | 0 - OK 1 - Alarm |
| Evaporating pressure value                           | H702 | R | 0.1 |                  |
| Evaporating pressure alarm                           | H703 | R |     | 0 - OK 1 - Alarm |
| High pressure alarm                                  | H704 | R |     | 0 - OK 1 - Alarm |
| High pressure alarm counter alarm                    | H705 | R |     | 0 - OK 1 - Alarm |
| Low pressure alarm                                   | H706 | R |     | 0 - OK 1 - Alarm |
| Low pressure alarm counter alarm                     | H707 | R |     | 0 - OK 1 - Alarm |
| Condensing max pressure                              | H708 | R |     | 0 - OK 1 - Alarm |
| Condensing min pressure                              | H709 | R |     | 0 - OK 1 - Alarm |
| Evaporating temperature                              | H716 | R | 0.1 |                  |
| Condensing temperature                               | H717 | R | 0.1 |                  |
| Circuit 2 supply temp. value                         | H718 | R | 0.1 |                  |
| Circuit 2 supply temp. sensor alarm                  | H719 | R |     | 0 - OK 1 - Alarm |
| Suction temperature value                            | H720 | R | 0.1 |                  |
| Suction temperature sensor fault                     | H721 | R |     | 0 - OK 1 - Alarm |
| Superheat value                                      | H722 | R | 0.1 |                  |
| Superheat alarm                                      | H723 | R |     | 0 - OK 1 - Alarm |
| Superheat alarm counter alarm                        | H724 | R |     | 0 - OK 1 - Alarm |

|                                                 |      |   |     |                  |
|-------------------------------------------------|------|---|-----|------------------|
| Expansion valve value                           | H725 | R |     |                  |
| Expansion valve alarm                           | H726 | R |     | 0 - OK 1 - Alarm |
| Circuit 2 frost warning                         | H727 | R |     | 0 - OK 1 - Alarm |
| Circuit 2 frost alarm                           | H728 | R |     | 0 - OK 1 - Alarm |
| Defrost end temp. 1 value                       | H733 | R | 0.1 |                  |
| Defrost end temp. 1 sensor alarm                | H734 | R |     | 0 - OK 1 - Alarm |
| Defrost end temp. 2 value                       | H735 | R | 0.1 |                  |
| Defrost end temp. 2 sensor alarm                | H736 | R |     | 0 - OK 1 - Alarm |
| Defrost heater                                  | H737 | R |     | 0 - Off 1 - On   |
| Reverse valve                                   | H738 | R |     | 0 - Off 1 - On   |
| High discharger gas temp. warning               | H739 | R |     | 0 - OK 1 - Alarm |
| High discharger gas temp. alarm                 | H740 | R |     | 0 - OK 1 - Alarm |
| Common discharge gas temp.                      | H741 | R | 0.1 |                  |
| Common discharge gas temp. sensor alarm         | H742 | R |     |                  |
| Low evaporating temp. alarm                     | H743 | R |     | 0 - OK 1 - Alarm |
| Low evaporating pressure alarm                  | H744 | R |     | 0 - OK 1 - Alarm |
| High condensing pressure alarm                  | H745 | R |     | 0 - OK 1 - Alarm |
| No compressor is available alarm                | H746 | R |     | 0 - OK 1 - Alarm |
| All compressor in alarm                         | H747 | R |     | 0 - OK 1 - Alarm |
| Compressor 1 fault                              | H748 | R |     | 0 - OK 1 - Alarm |
| Compressor 1 position                           | H749 | R |     |                  |
| Compressor 1 fault counter alarm                | H750 | R |     | 0 - OK 1 - Alarm |
| Discharge temp. comp. 1 value                   | H751 | R | 0.1 |                  |
| Discharge temp. comp. 1 alarm                   | H752 | R |     | 0 - OK 1 - Alarm |
| Discharge temp. comp. 1 alarm                   | H753 | R |     | 0 - OK 1 - Alarm |
| Suct. temp. comp. 1 value                       | H754 | R | 0.1 |                  |
| Suct. temp. comp. 1 alarm                       | H755 | R |     | 0 - OK 1 - Alarm |
| Superheat temp. comp. 1 value                   | H756 | R | 0.1 |                  |
| Superheat temp. comp. 1 alarm                   | H757 | R |     | 0 - OK 1 - Alarm |
| Compressor 1 status                             | H776 | R |     | 1 - Off 2 - On   |
| Compressor 1 work hours                         | H777 | R |     |                  |
| Compressor 1 start up counter alarm             | H778 | R |     | 0 - OK 1 - Alarm |
| Condenser position                              | H791 | R |     | 0 - OK 1 - Alarm |
| Fan overload                                    | H792 | R |     | 0 - OK 1 - Alarm |
| Evap. low temp. alarm counter                   | H793 | R |     | 0 - OK 1 - Alarm |
| Suction low-pressure counter                    | H794 | R |     | 0 - OK 1 - Alarm |
| Discharge high pressure counter                 | H795 | R |     | 0 - OK 1 - Alarm |
| Superheat setpoint circuit 3 from Carel Evd     | H833 | R |     | 0 - OK 1 - Alarm |
| St-up opening setpoint circuit 3 from Carel Evd | H834 | R |     | 0 - OK 1 - Alarm |
| Evaporating pressure circuit 3 from Carel Evd   | H835 | R |     | 0 - OK 1 - Alarm |

|                                                  |      |   |  |                  |
|--------------------------------------------------|------|---|--|------------------|
| Suction gas temperature circuit 3 from Carel Evd | H836 | R |  | 0 - OK 1 - Alarm |
| Actual superheat circuit 3 from Carel Evd        | H837 | R |  | 0 - OK 1 - Alarm |
| Actual opening of eev circuit 3 from Carel Evd   | H838 | R |  | 0 - OK 1 - Alarm |
| Evaporating temperature circuit 3 from Carel Evd | H839 | R |  | 0 - OK 1 - Alarm |
| Evaporation pressure sensor from EVD circuit 3   | H840 | R |  | 0 - OK 1 - Alarm |
| Suction gas temp. sensor from EVD circuit 3      | H841 | R |  | 0 - OK 1 - Alarm |
| MOP alarm from EVD circuit 3                     | H842 | R |  | 0 - OK 1 - Alarm |
| LOP alarm from EVD circuit 3                     | H843 | R |  | 0 - OK 1 - Alarm |
| Low superheat alarm from EVD circuit 3           | H844 | R |  | 0 - OK 1 - Alarm |
| Expansion valve alarm from EVD circuit 3         | H845 | R |  | 0 - OK 1 - Alarm |
| Carel EVD communication error circuit 3          | H846 | R |  | 0 - OK 1 - Alarm |

## 7. BACnet

Enable BACnet in Main menu -> System -> Communic. Config select BACnet over MS/TP (T6 connector) or BACnet over IP (T-IP connector).

BACnet settings are in Main menu -> System -> Communications -> BACnet. For MS/TP set correct address.

| Object                            | Member ID              | Description                   |
|-----------------------------------|------------------------|-------------------------------|
| <b>Operation mode</b>             |                        |                               |
| 0x2302 'Cmn\OpModHMI'             | OpMModHMI=20000        | Operation mode HMI            |
| 0x230B 'Cmn\CmnOpMod'             | CmnOpMod=20001         | Common operation mode         |
| 0x2204 'Itf\Cmn.RemOn'            | RemOn=20002            | Remote On/Off                 |
| 0x2302 'Cmn\OpModHMIEmgOff'       | OpModHMIEmgOff=20003   | Emergency off                 |
| 0x2301 'Cmn\CapCtlSet.TRt'        | CapCtlSetTRt=20004     | Cooling setpoint return       |
| 0x2203 'Itf\Cmn.TOa'              | TOa=20005              | Outdoor temp.                 |
| 0x2207 'Itf\Cmn.Alarm'            | Alarm=20006            | Alarm output                  |
| 0x2204 'Itf\Cmn.GasAlarm'         | GasAlarm=20007         | Gas leak alarm                |
| <b>Dispatcher</b>                 |                        |                               |
| 0x2203 'Itf\Dsp.TFI'              | DspTFI=21000           | Supply temperature value      |
| 0x2203 'Cmn\CapCtlSet.TRtH'       | CapCtlSetTRtH=20008    | Heating setpoint              |
| 0x2203 'Itf\Dsp.TRt'              | DspTRt=21001           | Return temperature value      |
| 0x2207 'Itf\Dsp.SuPuTwin.Cmd1'    | DspSuPuTwin.Cmd1=21002 | Twin pump 1 status            |
| 0x2207 'Itf\Dsp.SuPuTwin.Cmd2'    | DspSuPuTwin.Cmd2=21003 | Twin pump 2 status            |
| 0x2204 'Itf\Dsp.FltSuPu'          | DspFltSuPu=21004       | Supply pump\Twin pump 1 alarm |
| 0x2204 'Itf\Dsp.FltSuPu2'         | DspFltSuPu2=21005      | Twin pump 2 alarm             |
| 0x2204 'Itf\Dsp.FIDet'            | DspFIDet=21006         | Supply pump flow status       |
| 0x2204 'Itf\Dsp.FIDetTwinPu'      | DspFIDetTwin=21007     | Twin pump flow status         |
| 0x2204 'Itf\Dsp.FIDetTwinPu.Cmd1' | DspFIDetTwinCmd1=21008 | Twin pump flow status         |

|                                   |                        |                                      |
|-----------------------------------|------------------------|--------------------------------------|
| 0x2204 'Itf\Dsp.FIDetTwinPu.Cmd2' | DspFIDetTwinCmd2=21009 | Twin pump flow alarm                 |
| 0x2204 'Itf\Dsp.FrPrtWarn'        | DspFrPrtWarn=21010     | Frost warning                        |
| 0x2204 'Itf\Dsp.FrPrt'            | DspFrPrt=21011         | Frost alarm                          |
| 0x2207 'Itf\Dsp.SuPu'             | DspSuPu=21012          | Supply pump                          |
| <b>Circuit 1</b>                  |                        |                                      |
| 0x2203 'Itf\Pdc.PCdn'             | PdcPCnd=22000          | Condensing pressure                  |
| 0x2203 'Itf\Pdc.PEvP'             | PdcPEvp=22001          | Evaporating pressure                 |
| 0x2204 'Itf\Pdc.HPDet'            | PdcHPDet=22002         | High pressure switch                 |
| 0x2200 'Itf\Pdc.HPDet(Cnt)'       | PdcHPDetCnt=22003      | High pressure switch counter         |
| 0x2204 'Itf\Pdc.LPDet'            | PdcLPDet=22004         | Low pressure switch                  |
| 0x2200 'Itf\Pdc.LPDet(Cnt)'       | PdcLPDetCnt=22005      | Low pressure switch counter          |
| 0x2204 'Itf\Pdc.HPmax'            | PdcHPmax=22006         | Condensing max pressure              |
| 0x2204 'Itf\Pdc.HPmin'            | PdcHPmin=22007         | Condensing min pressure              |
| 0x2204 'Itf\Pdc.MOP'              | PdcMOP=22008           | MOP alarm                            |
| 0x2200 'Itf\Pdc.MOP(Cnt)'         | PdcMOPCnt=22009        | MOP alarm counter                    |
| 0x2204 'Itf\Pdc.LOP'              | PdcLOP=22010           | LOP alarm                            |
| 0x2200 'Itf\Pdc.LOP(Cnt)'         | PdcLOPCnt=22011        | LOP alarm counter                    |
| 0x2204 'Itf\Pdc.PRmax'            | PdcPRmax=22012         | Pressure ratio max alarm             |
| 0x2204 'Itf\Pdc.PRmin'            | PdcPRmin=22013         | Pressure ratio min alarm             |
| 0x2203 'Itf\Pdc.TEvP'             | PdcTEvp=22014          | Evaporating temperature              |
| 0x2203 'Itf\Pdc.TCdn'             | PdcTCnd=22015          | Condensing temperature               |
| 0x2203 'Itf\Pdc.SH'               | PdcSH=22016            | Superheat value                      |
| 0x2206 'Itf\Pdc.EEV'              | PdcEEV=22017           | Expansion valve value                |
| 0x2204 'Itf\Pdc.NoCprAvl'         | PdcNoCprAvl=22018      | No compressor is available alarm     |
| 0x2204 'Itf\Pdc.AllCprAlm'        | PdcAllCprAlm=22019     | All compressor in alarm              |
| 0x2208 'Itf\Pdc.CmdCpr1'          | PdcCmdCpr1=22020       | Compressor 1 status                  |
| 0x2204 'Itf\Pdc.FltCpr1'          | PdcFltCpr1=22021       | Compressor 1 fault                   |
| 0x2208 'Itf\Pdc.CmdCpr2'          | PdcCmdCpr2=22022       | Compressor 2 status                  |
| 0x2204 'Itf\Pdc.FltCpr2'          | PdcFltCpr2=22023       | Compressor 2 fault                   |
| 0x2208 'Itf\Pdc.CmdCpr3'          | PdcCmdCpr3=22024       | Compressor 3 status                  |
| 0x2204 'Itf\Pdc.FltCpr3'          | PdcFltCpr3=22025       | Compressor 3 fault                   |
| 0x2206 'Itf\Pdc.SrcFanPos'        | PdcSrcFanPos=22026     | Condenser position                   |
| 0x2207 'Itf\Pdc.SrcFan1'          | PdcSrcFan1=22027       | Fan 1 status                         |
| 0x2207 'Itf\Pdc.SrcFan2'          | PdcSrcFan2=22028       | Fan 2 status                         |
| 0x2204 'Itf\Pdc.FltSrcFan'        | PdcFltSrcFan=22029     | Fan overload                         |
| 0x2203 'Itf\Pdc.TFI'              | PdcTFI=22030           | Supply temperature                   |
| 0x2203 'Itf\Pdc.TDcrgCpr1'        | PdcTDcrgCpr1=22031     | Discharge gas compressor 1           |
| 0x2204 'Itf\Pdc.TDcrgAlrmCpr1'    | PdcTDcrgAlrmCpr1=22032 | Discharge gas compressor 1 alarm     |
| 0x2203 'Itf\Pdc.TSuctR290Cpr1'    | PdcTSuctR290Cpr1=22033 | Suction gas temperature compressor 1 |

|                                 |                         |                                         |
|---------------------------------|-------------------------|-----------------------------------------|
| 0x2203 'Itf\Pdc.SHR290Cpr1'     | PdcSHR290Cpr1=22034     | Superheat compressor 1                  |
| 0x2203 'Itf\Pdc.TDcrgCpr2'      | PdcTDcrgCpr2=22035      | Discharge gas compressor 2              |
| 0x2204 'Itf\Pdc.TDcrgAlrmCpr2'  | PdcTDcrgAlrmCpr2=22036  | Discharge gas compressor 2 alarm        |
| 0x2203 'Itf\Pdc.TSuctR290Cpr2'  | PdcTSuctR290Cpr2=22037  | Suction gas temperature compressor 2    |
| 0x2203 'Itf\Pdc.SHR290Cpr2'     | PdcSHR290Cpr2=22038     | Superheat compressor 2                  |
| 0x2203 'Itf\Pdc.TDcrgCpr3'      | PdcTDcrgCpr3=22039      | Discharge gas compressor 3              |
| 0x2204 'Itf\Pdc.TDcrgAlrmCpr3'  | PdcTDcrgAlrmCpr3=22040  | Discharge gas compressor 3 alarm        |
| 0x2203 'Itf\Pdc.TSuctR290Cpr3'  | PdcTSuctR290Cpr3=22041  | Suction gas temperature compressor 3    |
| 0x2203 'Itf\Pdc.SHR290Cpr3'     | PdcSHR290Cpr3=22042     | Superheat compressor 3                  |
| 0x2204 'Itf\Pdc.SuctLP'         | PdcSuctLP=22043         | Suction gas alarm                       |
| 0x2204 'Itf\Pdc.DschHP'         | PdcDschHP=22044         | Discharge gas alarm                     |
| 0x2204 'Itf\Pdc.FcAlCpr1'       | PdcFcAlCpr1=22045       | Vacon FC alarm                          |
| 0x2204 'Itf\Pdc.FcAlFBCpr1'     | PdcFcAlFBCpr1=22046     | Vacon FC feedback alarm                 |
| 0x2204 'Itf\Pdc.FcAlComCpr1'    | PdcFcAlComCpr1=22047    | Vacon FC communication alarm            |
| 0x2204 'Itf\Pdc.AbbFcAlFBCpr1'  | PdcAbbFcAlFBCpr1=22048  | ABB FC alarm                            |
| 0x2204 'Itf\Pdc.AbbFcAlCpr1'    | PdcAbbFcAlFBCpr1=22049  | ABB FC feedback alarm                   |
| 0x2204 'Itf\Pdc.AbbFcAlComCpr1' | PdcAbbFcAlComCpr1=22050 | ABB FC communication alarm              |
| 0x2203 'Itf\Pdc.TSuct'          | PdcTSuct=22051          | Suction gas temperature                 |
| 0x2200 'Itf\Pdc.SH(Cnt)'        | PdcSHCnt=22052          | Superheat alarm counter                 |
| 0x2200 'Itf\Pdc.SuctLP(Cnt)'    | PdcSuctLP(Cnt)=22053    | Suction gas alarm counter               |
| 0x2200 'Itf\Pdc.DschHP(Cnt)'    | PdcDschLP(Cnt)=22054    | Discharge gas alarm counter             |
| 0x2200 'Itf\Pdc.Flt(Cnt)Cpr1'   | PdcFlt(Cnt)Cpr1=22055   | Compressor 1 fault counter              |
| 0x2200 'Itf\Pdc.Flt(Cnt)Cpr2'   | PdcFlt(Cnt)Cpr2=22056   | Compressor 2 fault counter              |
| 0x230A 'Itf\Pdc.VcnFC1Cur'      | PdcVcnFC1Cur=22057      | Vacon current                           |
| 0x230A 'Itf\Pdc.VcnFC1Temp'     | PdcVcnFC1Temp=22058     | Vacon temperature                       |
| 0x2200 'Itf\Pdc.RsttCntCpr1'    | PdcRsttCntCpr1=22059    | Start-up compressor 1 counter alarm     |
| 0x2200 'Itf\Pdc.RsttCntCpr2'    | PdcRsttCntCpr2=22060    | Start-up compressor 2 counter alarm     |
| 0x230A 'Itf\Itf.A_SH_R'         | ASHR=22061              | Superheat setpoint read                 |
| 0x230A 'Itf\Itf.A_ST_OP_R'      | ASTOPR=22062            | St-up opening setpoint read             |
| 0x230A 'Itf\Itf.S1'             | S1=22063                | Evap. press. Circuit 1                  |
| 0x230A 'Itf\Itf.S2'             | S2=22064                | Suction gas temperature Circuit 1       |
| 0x230A 'Itf\Itf.A_SH_AC'        | ASHAC=22065             | Actual superheat Circuit 1              |
| 0x230A 'Itf\Itf.A_EEV_OP'       | AEEVOP=22066            | Expansion valve Circuit 1               |
| 0x230A 'Itf\Itf.A_TEvp'         | ATEvp=22067             | Evaporator temperature Circuit 1        |
| 0x2204 'Itf\Cmn.Probe_1_AL'     | Probe1AL=22068          | Evaporator pressure alarm Circuit 1     |
| 0x2204 'Itf\Cmn.Probe_2_AL'     | Probe2AL=22069          | Suction gas temperature alarm Circuit 1 |
| 0x2204 'Itf\Pdc.MOP_AL'         | MOPAL=22070             | MOP alarm Circuit 1                     |

|                              |                     |                                                            |
|------------------------------|---------------------|------------------------------------------------------------|
| 0x2204 'Itf\Pdc.LOP_AL'      | LOPAL=22071         | LOP alarm Circuit 1                                        |
| 0x2204 'Itf\Pdc.LOWSH_AL'    | LOWSHAL=22072       | Superheat alarm Circuit 1                                  |
| 0x2204 'Itf\Pdc.EEV_AL'      | EEVAL=22073         | Exp. Valve alarm Circuit 1                                 |
| 0x2204 'Itf\Pdc.AL_Evd_Com'  | ALEvdCom=22074      | Evd comm. error                                            |
| 0x2204 'Itf\Pdc.FcAlCpr1'    | FcAlCpr1=22076      | Frequency inverter Compressor 1 alarm                      |
| 0x2204 'Itf\Pdc.FcAlComCpr1' | FcAlComCpr1=22077   | Frequency inverter Compressor 1 modbus communication alarm |
| 0x2204 'Itf\Pdc.FcAlFBCpr1'  | FcAlFBCpr1=22078    | Frequency inverter Compressor 1 feedback alarm             |
| <b>Circuit 2</b>             |                     |                                                            |
| 0x2203 'Itf\Pdc2.PCdn'       | Pdc2PCnd=23000      | Condensing pressure                                        |
| 0x2203 'Itf\Pdc2.PEvp'       | Pdc2PEvp=23001      | Evaporating pressure                                       |
| 0x2204 'Itf\Pdc2.HPDet'      | Pdc2HPDet=23002     | High pressure switch                                       |
| 0x2200 'Itf\Pdc2.HPDet(Cnt)' | Pdc2HPDetCnt=23003  | High pressure switch counter                               |
| 0x2204 'Itf\Pdc2.LPDet'      | Pdc2LPDet=23004     | Low pressure switch                                        |
| 0x2200 'Itf\Pdc2.LPDet(Cnt)' | Pdc2LPDetCnt=23005  | Low pressure switch counter                                |
| 0x2204 'Itf\Pdc2.HPmax'      | Pdc2HPmax=23006     | Condensing max pressure                                    |
| 0x2204 'Itf\Pdc2.HPmin'      | Pdc2HPmin=23007     | Condensing min pressure                                    |
| 0x2204 'Itf\Pdc2.MOP'        | Pdc2MOP=23008       | MOP alarm                                                  |
| 0x2200 'Itf\Pdc2.MOP(Cnt)'   | Pdc2MOPCnt=23009    | MOP alarm counter                                          |
| 0x2204 'Itf\Pdc2.LOP'        | Pdc2LOP=23010       | LOP alarm                                                  |
| 0x2200 'Itf\Pdc2.LOP(Cnt)'   | Pdc2LOPCnt=23011    | LOP alarm counter                                          |
| 0x2204 'Itf\Pdc2.PRmax'      | Pdc2PRmax=23012     | Pressure ratio max alarm                                   |
| 0x2204 'Itf\Pdc2.PRmin'      | Pdc2PRmin=23013     | Pressure ratio min alarm                                   |
| 0x2203 'Itf\Pdc2.TEvp'       | Pdc2TEvp=23014      | Evaporating temperature                                    |
| 0x2203 'Itf\Pdc2.TCdn'       | Pdc2TCnd=23015      | Condensing temperature                                     |
| 0x2203 'Itf\Pdc2.SH'         | Pdc2SH=23016        | Superheat value                                            |
| 0x2206 'Itf\Pdc2.EEV'        | Pdc2EEV=23017       | Expansion valve value                                      |
| 0x2204 'Itf\Pdc2.NoCprAvl'   | Pdc2NoCprAvl=23018  | No compressor is available alarm                           |
| 0x2204 'Itf\Pdc2.AllCprAlm'  | Pdc2AllCprAlm=23019 | All compressor in alarm                                    |
| 0x2208 'Itf\Pdc2.CmdCpr1'    | Pdc2CmdCpr1=23020   | Compressor 1 status                                        |
| 0x2204 'Itf\Pdc2.FltCpr1'    | Pdc2FltCpr1=23021   | Compressor 1 fault                                         |
| 0x2208 'Itf\Pdc2.CmdCpr2'    | Pdc2CmdCpr2=23022   | Compressor 2 status                                        |
| 0x2204 'Itf\Pdc2.FltCpr2'    | Pdc2FltCpr2=23023   | Compressor 2 fault                                         |
| 0x2208 'Itf\Pdc2.CmdCpr3'    | Pdc2CmdCpr3=23024   | Compressor 3 status                                        |
| 0x2204 'Itf\Pdc2.FltCpr3'    | Pdc2FltCpr3=23025   | Compressor 3 fault                                         |
| 0x2206 'Itf\Pdc2.SrcFanPos'  | Pdc2SrcFanPos=23026 | Condenser position                                         |
| 0x2207 'Itf\Pdc2.SrcFan'     | Pdc2SrcFan1=23027   | Fan 1 status                                               |
| 0x2207 'Itf\Pdc2.SrcFan2'    | Pdc2SrcFan2=23028   | Fan 2 status                                               |
| 0x2204 'Itf\Pdc2.FltSrcFan'  | Pdc2FltSrcFan=23029 | Fan overload                                               |

|                                  |                          |                                               |
|----------------------------------|--------------------------|-----------------------------------------------|
| 0x2203 'Itf\Pdc2.TFI'            | Pdc2TFI=23030            | Supply temperature                            |
| 0x2203 'Itf\Pdc2.TDcrgCpr1'      | Pdc2TDcrgCpr1=23031      | Discharge gas compressor 1                    |
| 0x2204 'Itf\Pdc2.TDcrgAlrmCpr1'  | Pdc2TDcrgAlrmCpr1=23032  | Discharge gas compressor 1 alarm              |
| 0x2203 'Itf\Pdc2.TSuctR290Cpr1'  | Pdc2TSuctR290Cpr1=23033  | Suction Gas temperature compressor 1          |
| 0x2203 'Itf\Pdc2.SHR290Cpr1'     | Pdc2SHR290Cpr1=23034     | Superheat compressor 1                        |
| 0x2203 'Itf\Pdc2.TDcrgCpr2'      | Pdc2TDcrgCpr2=23035      | Discharge gas compressor 2                    |
| 0x2204 'Itf\Pdc2.TDcrgAlrmCpr2'  | Pdc2TDcrgAlrmCpr2=23036  | Discharge gas compressor 2 alarm              |
| 0x2203 'Itf\Pdc2.TSuctR290Cpr2'  | Pdc2TSuctR290Cpr2=23037  | Suction gas temperature compressor 2          |
| 0x2203 'Itf\Pdc2.SHR290Cpr2'     | Pdc2SHR290Cpr2=23038     | Superheat compressor 2                        |
| 0x2203 'Itf\Pdc2.TDcrgCpr3'      | Pdc2TDcrgCpr3=23039      | Discharge gas compressor 3                    |
| 0x2204 'Itf\Pdc2.TDcrgAlrmCpr3'  | Pdc2TDcrgAlrmCpr3=23040  | Discharge gas compressor 3 alarm              |
| 0x2203 'Itf\Pdc2.TSuctR290Cpr3'  | Pdc2TSuctR290Cpr3=23041  | Suction gas temperature compressor 3          |
| 0x2203 'Itf\Pdc2.SHR290Cpr3'     | Pdc2SHR290Cpr3=23042     | Superheat compressor 3                        |
| 0x2204 'Itf\Pdc2.SuctLP'         | Pdc2SuctLP=23043         | Suction gas alarm                             |
| 0x2204 'Itf\Pdc2.DschHP'         | Pdc2DschHP=23044         | Discharge gas alarm                           |
| 0x2204 'Itf\Pdc2.FcAlCpr1'       | Pdc2FcAlCpr1=23045       | Vacon Frequency converter alarm               |
| 0x2204 'Itf\Pdc2.FcAlFBCpr1'     | Pdc2FcAlFBCpr1=23046     | Vacon Frequency converter feedback alarm      |
| 0x2204 'Itf\Pdc2.FcAlComCpr1'    | Pdc2FcAlComCpr1=23047    | Vacon Frequency converter communication alarm |
| 0x2204 'Itf\Pdc2.AbbFcAlFBCpr1'  | Pdc2AbbFcAlFBCpr1=23048  | ABB Frequency converter alarm                 |
| 0x2204 'Itf\Pdc2.AbbFcAlCpr1'    | Pdc2AbbFcAlFBCpr1=23049  | ABB Frequency converter feedback alarm        |
| 0x2204 'Itf\Pdc2.AbbFcAlComCpr1' | Pdc2AbbFcAlComCpr1=23050 | ABB Frequency converter communication alarm   |
| 0x2203 'Itf\Pdc2.TSuct'          | Pdc2TSuct=22051          | Suction Gas temperature                       |
| 0x2200 'Itf\Pdc2.SH(Cnt)'        | Pdc2SHCnt=22052          | Superheat alarm counter                       |
| <b>Circuit 3</b>                 |                          |                                               |
| 0x2203 'Itf\Pdc3.PCdn'           | Pdc3PCnd=24000           | Condensing pressure                           |
| 0x2203 'Itf\Pdc3.PEvP'           | Pdc3PEvp=24001           | Evaporating pressure                          |
| 0x2204 'Itf\Pdc3.HPDet'          | Pdc3HPDet=24002          | High pressure switch                          |
| 0x2200 'Itf\Pdc3.HPDet(Cnt)'     | Pdc3HPDetCnt=24003       | High pressure switch counter                  |
| 0x2204 'Itf\Pdc3.LPDet'          | Pdc3LPDet=24004          | Low pressure switch                           |
| 0x2200 'Itf\Pdc3.LPDet(Cnt)'     | Pdc3LPDetCnt=24005       | Low pressure switch counter                   |
| 0x2204 'Itf\Pdc3.HPmax'          | Pdc3HPmax=24006          | Condensing max pressure                       |
| 0x2204 'Itf\Pdc3.HPmin'          | Pdc3HPmin=24007          | Condensing min pressure                       |
| 0x2204 'Itf\Pdc3.MOP'            | Pdc3MOP=24008            | MOP alarm                                     |
| 0x2200 'Itf\Pdc3.MOP(Cnt)'       | Pdc3MOPCnt=24009         | MOP alarm counter                             |
| 0x2204 'Itf\Pdc3.LOP'            | Pdc3LOP=24010            | LOP alarm                                     |
| 0x2200 'Itf\Pdc3.LOP(Cnt)'       | Pdc3LOPCnt=24011         | LOP alarm counter                             |

|                                 |                         |                                               |
|---------------------------------|-------------------------|-----------------------------------------------|
| 0x2204 'Itf\Pdc3.PRmax'         | Pdc3PRmax=24012         | Pressure ratio max alarm                      |
| 0x2204 'Itf\Pdc3.PRmin'         | Pdc3PRmin=24013         | Pressure ratio min alarm                      |
| 0x2203 'Itf\Pdc3.TEvP'          | Pdc3TEvp=24014          | Evaporating temperature                       |
| 0x2203 'Itf\Pdc3.TCdn'          | Pdc3TCnd=24015          | Condensing temperature                        |
| 0x2203 'Itf\Pdc3.SH'            | Pdc3SH=24016            | Superheat value                               |
| 0x2206 'Itf\Pdc3.EEV'           | Pdc3EEV=24017           | Expansion valve value                         |
| 0x2204 'Itf\Pdc3.NoCprAvl'      | Pdc3NoCprAvl=24018      | No compressor is available alarm              |
| 0x2204 'Itf\Pdc3.AllCprAlm'     | Pdc3AllCprAlm=24019     | All compressor in alarm                       |
| 0x2208 'Itf\Pdc3.CmdCpr1'       | Pdc3CmdCpr1=24020       | Compressor 1 status                           |
| 0x2204 'Itf\Pdc3.FltCpr1'       | Pdc3FltCpr1=24021       | Compressor 1 fault                            |
| 0x2208 'Itf\Pdc3.CmdCpr2'       | Pdc3CmdCpr2=24022       | Compressor 2 status                           |
| 0x2204 'Itf\Pdc3.FltCpr2'       | Pdc3FltCpr2=24023       | Compressor 2 fault                            |
| 0x2208 'Itf\Pdc3.CmdCpr3'       | Pdc3CmdCpr3=24024       | Compressor 3 status                           |
| 0x2204 'Itf\Pdc3.FltCpr3'       | Pdc3FltCpr3=24025       | Compressor 3 fault                            |
| 0x2206 'Itf\Pdc3.SrcFanPos'     | Pdc3SrcFanPos=24026     | Condenser position                            |
| 0x2207 'Itf\Pdc3.SrcFan'        | Pdc3SrcFan1=24027       | Fan 1 status                                  |
| 0x2207 'Itf\Pdc3.SrcFan2'       | Pdc3SrcFan2=24028       | Fan 2 status                                  |
| 0x2204 'Itf\Pdc3.FltSrcFan'     | Pdc3FltSrcFan=24029     | Fan overload                                  |
| 0x2203 'Itf\Pdc3.TFI'           | Pdc3TFI=24030           | Supply temperature                            |
| 0x2203 'Itf\Pdc3.TDcrgCpr1'     | Pdc3TDcrgCpr1=24031     | Discharge gas compressor 1                    |
| 0x2204 'Itf\Pdc3.TDcrgAlrmCpr1' | Pdc3TDcrgAlrmCpr1=24032 | Discharge gas compressor 1 alarm              |
| 0x2203 'Itf\Pdc3.TSuctR290Cpr1' | Pdc3TSuctR290Cpr1=24033 | Suction gas temperature compressor 1          |
| 0x2203 'Itf\Pdc3.SHR290Cpr1'    | Pdc3SHR290Cpr1=24034    | Superheat compressor 1                        |
| 0x2203 'Itf\Pdc3.TDcrgCpr2'     | Pdc3TDcrgCpr2=24035     | Discharge gas compressor 2                    |
| 0x2204 'Itf\Pdc3.TDcrgAlrmCpr2' | Pdc3TDcrgAlrmCpr2=24036 | Discharge gas compressor 2 alarm              |
| 0x2203 'Itf\Pdc3.TSuctR290Cpr2' | Pdc3TSuctR290Cpr2=24037 | Suction gas temperature compressor 2          |
| 0x2203 'Itf\Pdc3.SHR290Cpr2'    | Pdc3SHR290Cpr2=24038    | Superheat compressor 2                        |
| 0x2203 'Itf\Pdc3.TDcrgCpr3'     | Pdc3TDcrgCpr3=24039     | Discharge gas compressor 3                    |
| 0x2204 'Itf\Pdc3.TDcrgAlrmCpr3' | Pdc3TDcrgAlrmCpr3=24040 | Discharge gas compressor 3 alarm              |
| 0x2203 'Itf\Pdc3.TSuctR290Cpr3' | Pdc3TSuctR290Cpr3=24041 | Suction Gas temperature compressor 3          |
| 0x2203 'Itf\Pdc3.SHR290Cpr3'    | Pdc3SHR290Cpr3=24042    | Superheat compressor 3                        |
| 0x2204 'Itf\Pdc3.SuctLP'        | Pdc3SuctLP=24043        | Suction gas alarm                             |
| 0x2204 'Itf\Pdc3.DschHP'        | Pdc3DschHP=24044        | Discharge gas alarm                           |
| 0x2204 'Itf\Pdc3.FcAlCpr1'      | Pdc3FcAlCpr1=24045      | Vacon Frequency converter alarm               |
| 0x2204 'Itf\Pdc3.FcAlFBCpr1'    | Pdc3FcAlFBCpr1=24046    | Vacon Frequency converter feedback alarm      |
| 0x2204 'Itf\Pdc3.FcAlComCpr1'   | Pdc3FcAlComCpr1=24047   | Vacon Frequency converter communication alarm |
| 0x2204 'Itf\Pdc3.AbbFcAlFBCpr1' | Pdc3AbbFcAlFBCpr1=24048 | ABB Frequency converter alarm                 |

|                                  |                          |                                             |
|----------------------------------|--------------------------|---------------------------------------------|
| 0x2204 'Itf\Pdc3.AbbFcAlCpr1'    | Pdc3AbbFcAlFBCpr1=24049  | ABB Frequency converter feedback alarm      |
| 0x2204 'Itf\Pdc3.AbbFcAlComCpr1' | Pdc3AbbFcAlComCpr1=24050 | ABB Frequency converter communication alarm |
| 0x2203 'Itf\Pdc3.TSuct'          | Pdc3TSuct=24051          | Suction Gas temperature                     |
| 0x2200 'Itf\Pdc3.SH(Cnt)'        | Pdc3SHCnt=24052          | Superheat alarm counter                     |
| <b>Water condenser</b>           |                          |                                             |
| 0x2203 'Itf\SrcW.TFICnd'         | SrcWTFICnd=25000         | Condenser supply temperature to user        |
| 0x2203 'Itf\SrcW.TRtCnd'         | SrcWTRtCnd=25001         | Condenser return temperature from user      |
| 0x2207 'Itf\SrcW.SuPuCnd'        | SrcWSuPuCnd=25002        | Condenser pump status                       |

## 8. I/O MAPPING

## I/O Legend

|      |                                |
|------|--------------------------------|
| DO   | Normally Open                  |
| DO-S | Normally Open - Normally Close |
| DO-T | Triac Output                   |
| SM   | Bipolar Step Motor Outputs     |

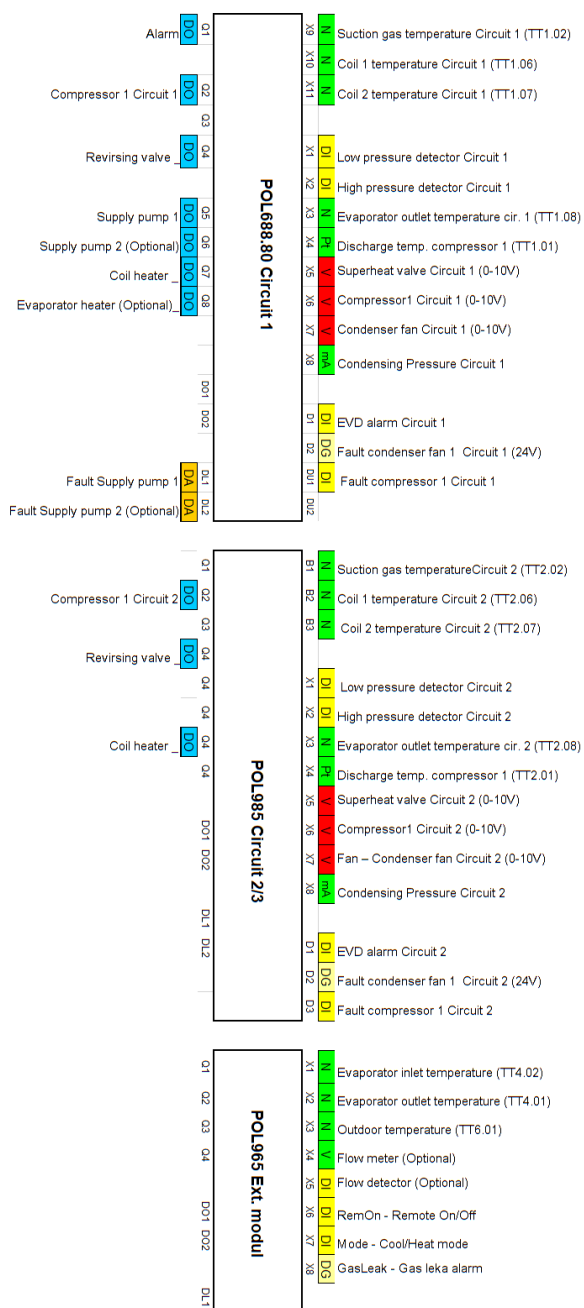
|    |                 |
|----|-----------------|
| N  | NTC 10-100k     |
| DI | DI Voltage Free |
| DG | DI 24Vac        |
| DA | DI 230Vac       |
| N  | NTC 10-100k     |
| Ni | Ni1000          |
| Pt | Pt1000          |
| V  | 0-10V           |
| mA | 4-20mA          |
| R  | Ratiom.         |
| DI | Dig. In.        |
| V  | 0-10V           |
| mA | 4-20mA          |
| VM | PWM             |
| DV | DO 24Vdc        |

|               |  |                |                |                 |
|---------------|--|----------------|----------------|-----------------|
| Analog Inputs |  | Digital Inputs | Analog Outputs | Digital Out 24V |
|---------------|--|----------------|----------------|-----------------|

**Figure no. 25**

The controller POL688.80 and extension module POL965 are permanent. Circuit 2 and 3 optional.



**Figure no. 26**