User Guide

For controller on
CXAO / RTXB heat pumps
CGCM / CXCM 2 circuit units

CNT-SVU005C-GB
Original instructions

Table of contents

WARNING

Supply the unit at least 24 hours before the initial startup to heat the compressor oil. In conditions of low water temperature, the pumps could be started in order to avoid freezing conditions. In order to avoid the breaking of heat exchangers due to water hammer, be sure to keep to water valves open. Failure to follow these instructions will void the warranty.

Advanced electronics

The control logic is able to manage air/water and water/water chillers, chillers with total recovery and heat pump versions.

This control logic, according the type of the unit, is able to handle multi scroll units and screw units with a proportional step regulation according inlet water temperature or proportional + integral regulation according leaving water temperature.

.

Technical Specifications

IPG315D:

Power supply: 24V AC/DC

Digital inputs: 20 opto-insulated at 24Volt AC current on the contact

Analog inputs: 10 configurables: 0÷5V, 4÷20mA, NTC, PTC, digital input

Analog outputs Opto-Insulated: 2 configurables: 0÷10V, external relay driving, PWM signal

4 configurables: 0÷10V signal, external relay driving

Relay outputs: 10 x 5(2) A @ 250V SPST + 5 SSR type

Remote terminal N° 1 output for connection of up to two remote terminals (100M)

RTC

Serial outputs

1 USB

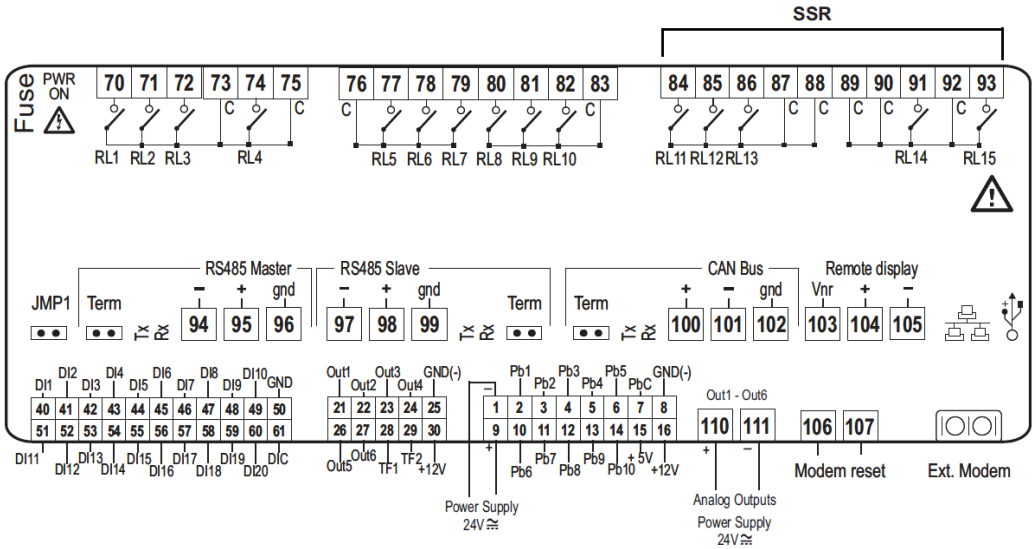
1 Ethernet with Bacnet TCP/IP communication protocol

1 connecter for/GSM modem /XWEB modem

1 RS485 master with Mod_BUS communication protocol

1 RS485 slave with Mod_BUS or Bacnet MSTP communication protocol

1 CANbus to connect I/O expansion modules



IPG108D / IPG108E:

Power supply: 24V AC/DC

Digital inputs: 11 opto-insulated at 24Volt AC current on the contact

Analog inputs : 6 configurables: 0÷5V, 4÷20mA, NTC, PTC, digital input

Analog outputs Opto-Insulated: 4 configurables: 0÷10V signal, external relay driving

Relay outputs

8 x 5(2) A @ 250V SPST

Remote terminal

N° 1 output for connection of up to two remote terminals (100M)

RTC

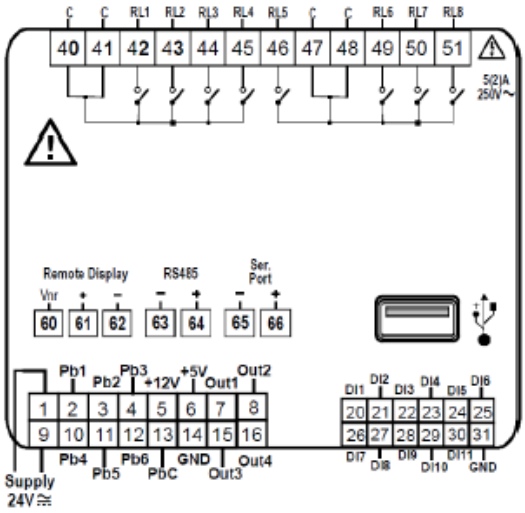
LED DISPLAY INTEGRATED (IPG108E)

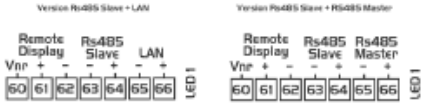
Serial outputs

1 USB; Bacnet TCP/IP using USB/Ethernet adapter

1 RS485 master with Mod_BUS communication protocol or 1 LAN to connect I/O expansion module

1 RS485 slave with Mod_BUS or with Bacnet MSTP communication protocol





Display description

Through the visual keyboard LCD display, you can monitor and change the status of the unit, using the 8 buttons positioned in the lower part of the keypad. Available information on display:

At the unit startup, the main screen will be as follows:

In case the unit is controlled by remote or during shutdown by time slot, the main screen will be:

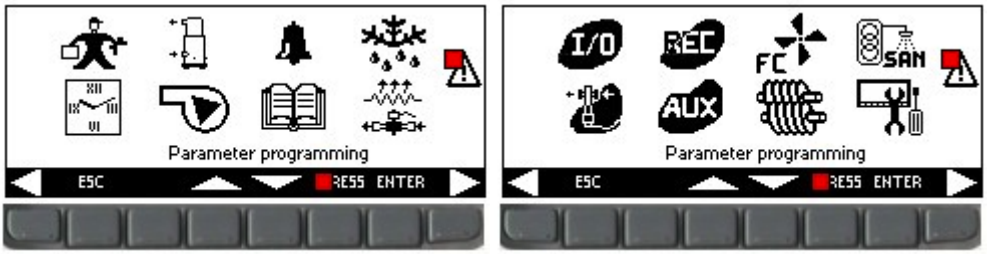
Through the selection keys you can enter in the sub-sections of the main screen, where you can view respectively:

- **“PROBES”**: displays readings of all the sensors connected to the machine;
- **“SET”**: displays set point of utilities;
- **“ALARM”**: displays of active alarms;
- **“SERVICE”**: allows entry in the menu of the instrument;
- **“CIRC”**: displays the screens of the state of circuits and working conditions of each component.

In addition to the submenus input buttons mentioned above, in the main screen there is also the key evidenced by the sun  to activate the unit in summer mode, and the button with the snow  , to activate the unit in heating mode.

Submenu

The LCD display provides a simple and immediate interaction with the unit.
Pressing the "**SERVICE**" button, you can enter in the screens dedicated to the displaying and/or to the configuration of components and user parameters of the unit.



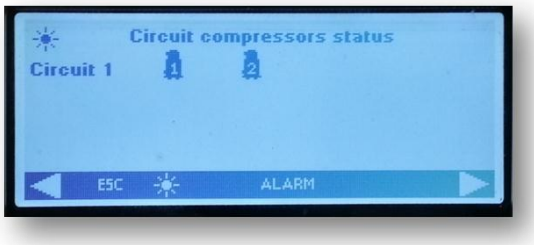
Using the arrow keys you can select the below areas reserved for displaying the features of each component. The areas used for this application are:

- Parameters programming
- Time bands programming
- Current compressors parameters display
- Fans and pumps current parameters display
- Alarm display
- Alarm history display
- Defrost status display
- Inputs and outputs status display
- Auxiliary outputs status display
- Recovery parameters display (Only for chiller with recovery)
- Display setting and di log files management

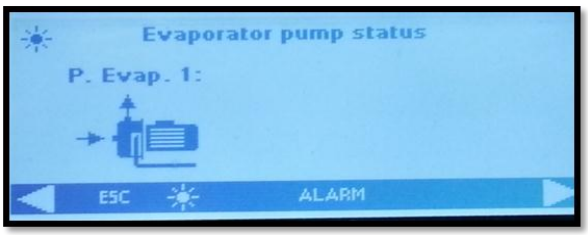
Access to the link mentioned above is carried out by pressing the "**ENTER**" key after highlighting the desired icon using the or buttons. By pressing the "**ESC**" anytime you return to the main screen.

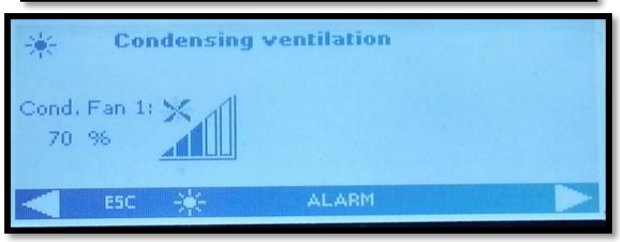
Operating Variables

Pressing the "**Circ**" button, you can see the status of all unit components and the value read by the pressure transducers.
In this way it is possible to make a quick check on how the unit is working.
In these screens, you can see, at first, the state of all the compressors, with the status indication of any capacity control or the percentage of the 0-10V signal supplied from the device to the continuous modulation with frequency and if preventive functions “**unloading**” are actives.
Using the arrow keys, you can enter in the screen where the pressure status of the unit is displayed, in order to make a check on the status of the unit and the refrigerant charge, according to refrigerant gas and the external conditions: air temperature and water temperature.



The next two screens show, respectively, the pumps and fans activation status.
If the unit is equipped with EC fans or otherwise, AC fans regulated by continuous signal is shown the percentage of the value of the 0-10V signal provided by the controller for their modulation.





Unit Startup

To activate the unit press for more than 2 seconds the button indicated by the symbol of the sun  , or with the snow  , until the label “**Unit Stand-by**” is displayed.

Following the activation, on the main screen, according to the selected mode, you will see the label “**Unit ON: Cooling**”, if you selected the summer mode, or “**Unit ON: Heating**”, if you selected the winter mode, and the button of the other mode will disappear.

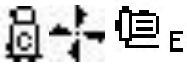
As for the activation, you can turn off the unit by simply pressing for more than 2 seconds the same button that you used for the activation.

Following the shutdown of the unit, on the main screen the label “**Unit Stand-by**” and the button of the other mode will display.

In the case that the unit is controlled by remote or during the time slot shutdown, on the main screen will display the label, respectively “**Unit Remote Off**” or “**Unit Off by Clock**”.

At the start up, first of all, the pumps will run and, at the same time, the compressor icon  “compressor enable” will begin to flash for a set time, after that, the compressor will run and the related icon will displayed fix.

The cycles are easily recognizable by the icons of the active components, which appear on the main screen, in particular for air-water versions:

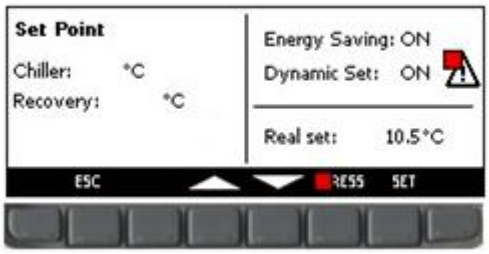
- **Chiller** 
- **Heat Pump** 
- **Defrost** 

For water-water unit, instead:

- **Chiller** 
- **Heat Pump** 

SetPoint

Pressing the "**SET**" button on the main screen, you enter in the screen shown below.



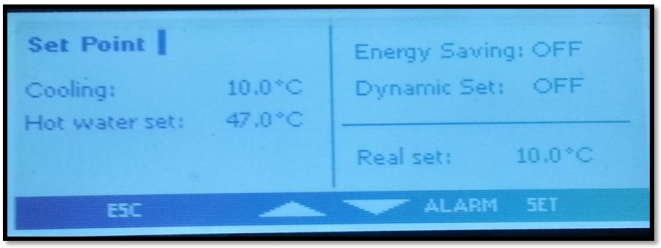
In this menu you can set the cold "**Chiller**" and the hot "**Recovery**" set point.

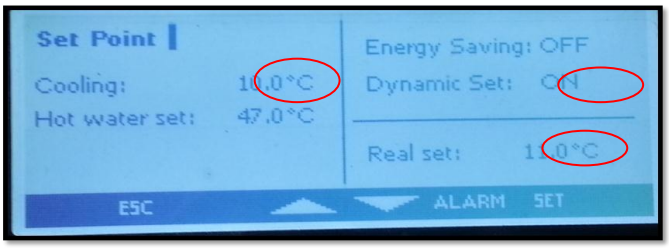
To change the value, highlight the set point to be changed using the arrow keys, press the **Set** button to enable editing, take it to the desired value using the **UP** or **Down** buttons and press **Set** again to confirm.

This screen also shows an indication of the state of activation of the functions **Energy Saving** and **Dynamic Set Point**.

During this operation, the "**Real Set**" label is displayed; if the **Energy Saving** or the **Dynamic Set Point** is active, the "**Real Set**" is the set point value including the variation for **Energy Saving** or for dynamic set; while the set point represents the real set when the **Energy Saving** or the **Dynamic Set Point** are not active.

An example below is shown in the pictures below.



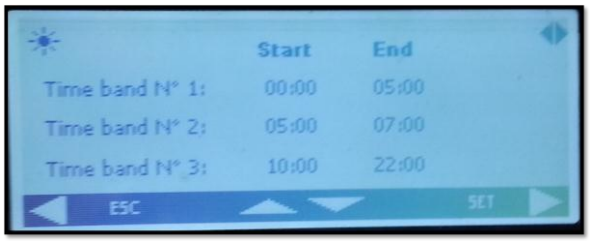


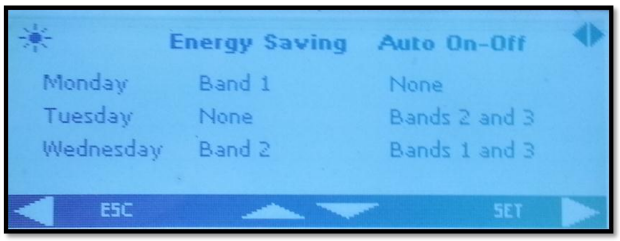
Energy Saving & Auto On/Off

Enabling the **Energy Saving** and setting the appropriate time slots within the sub-menu "**Time bands**" marked with the icon , and the parameters **ES,** table in Chapter 9, for the increase or decrease in the set point, the unit will follow a new value of "**Real Set"** calculated by an algorithm based on the parameters set according to the desired temperature curve, at the times you want.
With this function it is possible, therefore, to reduce the work of the unit during hours when the plant requires less cooling and heating capacity, or increase the operation in the hours when the electricity has a lower cost.

In the main screen the symbol will appear to indicate that the machine is operating within the band **Energy Saving**.

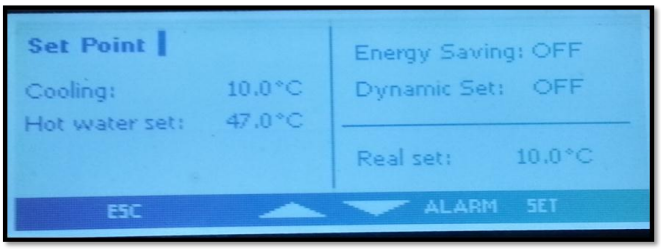
Enabling the **Auto On/Off**, always within the sub-menu marked with the icon , instead, you will force the unit in off at the times set.
The 3 time periods are unique and if both of these functions were enabled for the same time slot, the controller will give preference to automatic turn off.
Below are shown the screens as an example.





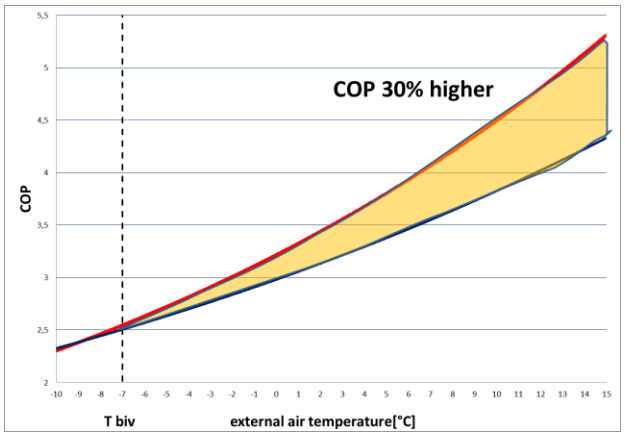
Dynamic Set Point

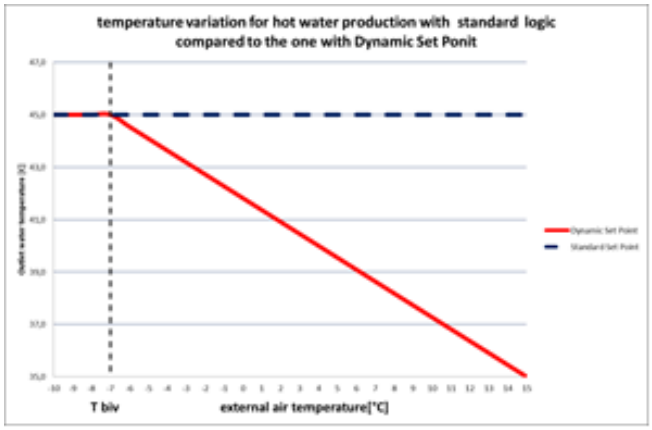
Enabling the **Dynamic Set Point** and setting the appropriate parameters for the increase or decrease of the set point and the range of outdoor temperatures in which this feature must be active, the Parameters table in under **SD** the controller will change the set point continuously according to a proportional law.



With this function you can change the set point in order to ensure, to changing external conditions, increased comfort or higher efficiency of the unit.
Below there is an example about the increase in efficiency achieved by enabling this function.

In the main screen, as for the **Energy Saving,** the  will appear if this function is enabled.
The Dynamic Set Point is available only for air-water versions.





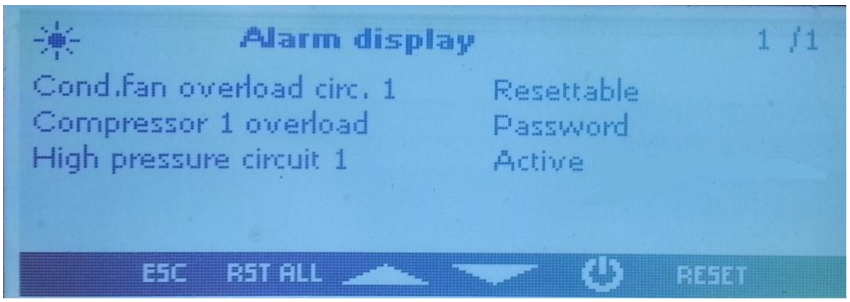
Alarm display

The system is able to identify all the alarms that may damage the unit.

When any type of fault or error on the unit occurs, the alarm symbol ⚠ flashes on the display and the buzzer will be on.

Press any key to turn the buzz off.

Press the **"Alarm"** button to view a brief description of the alarm.



Once the problem is solved, the same screen will show the steps to reset and reboot the unit.

The methodologies of alarms reset are different depending on the magnitude of the alarm, according to the sequence priority:

Resettable alarm: low priority, resettable by button;

Resettable alarm with password: high priority, resettable by service center.

To reset an alarm you must press the button identified by "**RESET**".

Pressing this button you can reset the highlighted alarm; if you want to reset all low priority alarms, you can press the key identified by "**RST ALL**".

D-Log Files Management

The controller records on a non-volatile memory, approximately the last 4 days of work.
You can download these log files directly to a USB stick, or on your PC by connecting properly to the controller.
To download these files on a USB stick, plug into the USB port and navigate through the menu functions until you see  .

In this menu select "**files log management**", and inside select "**Send all logs to a USB**" and press enter.
Finished sending, inside the key will create a folder "**ipro**" with inside three files of alarms:

- "***alarm_a***" that records all water side alarms and errors probes
- "***alarm_b***" that records all circuit alarms such as high and low pressure
- "***alarm_c***" that records all serious alarms such as overload compressors alarms.
- file "***Unit***" where the last 4 days of operation with status and main variables are recorded.

All of these files are in "*.txt*" format and inside the recording date is in the format YY/MM/DD/hh/mm/ss.
This operation is to be performed on both cards.
N.B.: Before you do this, make sure that there is no folder already named "ipro." on the USB stick.

Online Datalogger

The device is equipped with a web page where you can view and record all the main operating data with a record time that can be set from 3 to 60 seconds.

To use this feature of the microprocessor is necessary to connect the PC to the card via LAN cable cross type. For the IPG108D and IPG108E you have to use an USB/ETHERNET converter.

Set the IP address of the PC in the Internet Protocol Version 4 (TCP/IPv4) LAN connection in this way:

Address IP : 192.168.0.252

Subnet mask : 255.255.255.0

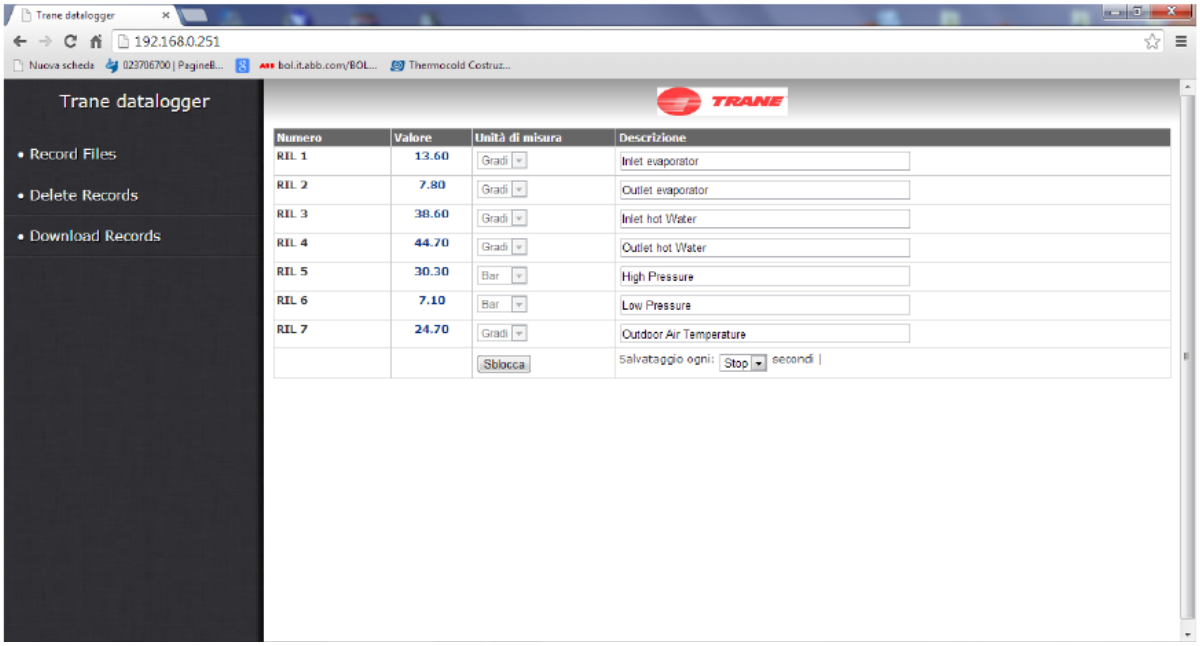
Open a browser and write the IP addresses of the devices: 192.168.0.250 default address,

This will open a Web page where you would add the following credentials:

User = admin

Password = Dixell

Example of this web page:



Remote Control

You can control the unit remotely in three different ways:

- Free contacts reported in customer terminal block (X);
- Bus protocol;
- Remote keypad

Remote Control via Free Contacts

On the customer terminal block (X) are reported free terminals where you can connect any type of thermostat able to provide a current pulse to close the relay to active the unit, and any boards to read an alarm state.

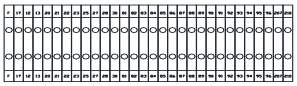
For the water-water and air-water versions without water kit on board, there are also terminals for enabling of the pumps.

These contacts are usually free contacts normally open.

Here below there is an example of the customer terminal block, however see the wiring diagram attached to the unit.

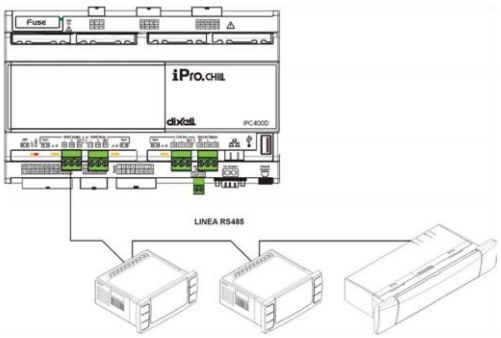
=QG
X
Customer Terminal Block

NumM	Numl	Utenza
1	F	Remote ON/OFF
2	17	Remote ON/OFF
3	12	Evaporator flow switch FLE
4	13	Evaporator flow switch FLE
5	21	Alarm general relay free voltage - circuit 1 (NO)
6	21	Alarm general relay free voltage - circuit 1 (NO)
7	22	Alarm general relay free voltage - circuit 2 (COM)
8	23	Alarm general relay free voltage - circuit 2 (NO)
9	25	Alarm failure to initiate evaporator water pumps relay free voltage
10	27	Alarm failure to initiate evaporator water pumps relay free voltage
11	28	Alarm failure to initiate recovery water pumps relay free voltage
12	30	Alarm failure to initiate recovery water pumps relay free voltage
13	81	Free volt. contact for ext. water pump evaporator 1 status (NO)
14	82	Free volt. contact for ext. water pump evaporator 1 status (NO)
15	83	Free volt. contact for ext. water pump recovery 1 status (NO)
16	84	Free volt. contact for ext. water pump recovery 1 status (NO)
17	85	Free volt. contact for ext. water pump evaporator 2 status (NO)
18	86	Free volt. contact for ext. water pump evaporator 2 status (NO)
19	87	Free volt. contact for ext. water pump recovery 2 status (NO)
20	88	Free volt. contact for ext. water pump recovery 2 status (NO)
21	89	Request evaporator pump 1
22	90	Request evaporator pump 1
23	91	Request recovery pump 1
24	92	Request recovery pump 1
25	93	Request evaporator pump 2
26	94	Request evaporator pump 2
27	95	Request recovery pump 2
28	96	Request recovery pump 2
30	207	External activation set point (analog signal)
29	210	External activation set point (analog signal)



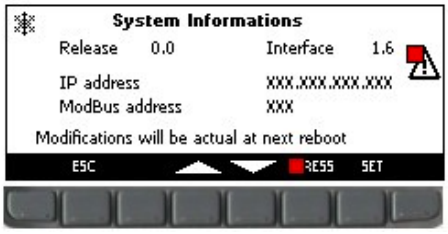
Remote Control via Bus

On the control unit device is available a serial port RS485 with MODBUS or Bacnet MSTP protocol, to use this type of connection please respect the connection diagram below, respecting a bus connection type, avoiding the creation of stars.
You can use the RS485 port Slave, depending on the position of the instrument in the network, only if you do not already committed to control the unit.



To connect the devices to check, you can use two shielded wires of 0.5 mm^2; use the input GND only if you have communication problems.
On the control unit device is available also the Bacnet TCP/IP protocol, using the Ethernet port on the IPG315. On the IPG108 for the Bacnet TCP/IP it is necessary the USB/Ethernet converter.

The device serial address is available in the "**System Information**" in the sub menu marked with the icon.



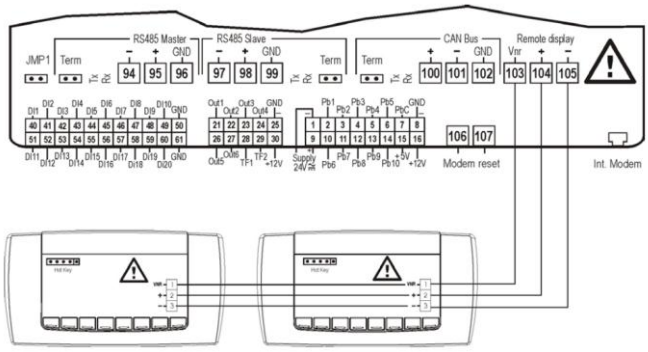
In the screen shown in the figure are indicated, as well as ModBus address, the IP address of the controller, which it is required for the activation of the online instrument data logger, the software release and the software installed on the keypad
Changing IP and mod-bus addresses of the boards must be carried out by authorized personnel only, pain of revocation of the warranty.

Remote Control via Remote Keypad

You can control the unit remotely, using a second keypad, connected in parallel to the one present on the unit.

Also for this type of connection you have to respect the connection diagram below, respecting a bus connection type, thus avoiding the creation of stars.

Wrong wiring may cause serious damage to the keypad or controller.



Once connected the second keypad, you will need to update the software of same.

With the unit off, you must navigate through the menu functions until you have highlighted the icon.

 .

Within this submenu you will need select the "**Update Visograf**" command and press "**Enter**". You will see the loading bar to indicate the progress of the update, after which the keypad will have the same functions as the one on the unit.

User Parameters Table

The parameters are organized in macro groups. Below are the areas dedicated for programming of user parameters:

ST	Thermoregulation parameters
SD	Dynamic set point parameters
ES	Energy saving parameters
SP	Remote S/W & Automatic Change Over

Thermoregulation parameters					
Parameters	Description	min	max	u.m.	Resolution
ST1	**Summer set point**	ST02	ST03	°C/°F	dec/int
ST4	**Winter set point**	ST04	ST05	°C/°F	Dec/ int
Dynamic set point					
Parameters	Description	min	max	u.m.	Resolution
Sd1	**Summer dynamic set point offset max**	-50.0	110.0	°C	Dec
Sd2	**Winter dynamic set point offset max**	-50.0	110.0	°C	Dec
Sd3	**Summer set external air temperature**	-50.0	110	°C	Dec
Sd4	**Winter set external air temperature**	-50.0	110	°C	Dec
Sd5	**Summer differential external air temperature**	-50.0	110.0	°C	Dec
Sd6	**Winter differential external air temperature**	-50.0	110.0	°C	Dec
Energy Saving					
Parameters	Description	min	max	u.m.	Resolution
ES1	**Time band 1 begin**	0	23.50	Min	10 min
ES2	**Time band 1 end**	0	23.50	Min	10 min
ES3	**Time band 2 begin**	ES2	23.50	Min	10 min
ES4	**Time band 2 end**	0	23.50	Min	10 min
ES5	**Time band 3 begin**	ES4	23.50	Min	10 min
ES6	**Time band 3 end**	0	23.50	Min	10 min

ES7	**Monday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES8	**Tuesday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES9	**Wednesday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES10	**Thursday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES11	**Friday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES12	**Saturday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES13	**Sunday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES14	**Summer increase set energy saving**	-50.0	110.0	°C	Dec

ES15	**Summer differential Energy saving**	0.1	25.0	°C	Dec
ES16	**Winter increase set energy saving**	-50.0	110.0	°C	Dec
ES17	**Winter differential Energy saving**	0.1	25.0	°C	Dec
Automatic on/off by time band					
ES18	**Monday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES19	**Tuesday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES20	**Wednesday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES21	**Thursday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES22	**Friday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		

ES23	**Saturday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
ES24	**Sunday** **0 = No time band** **1 = Time band 1** **2 = Time band 2** **3 = Time band 1 & 2** **4 = Time band 3** **5 = Time band 1 & 3** **6 = Time band 2 & 3** **7 = All time band**	0	7		
Remote S/W & Automatic Change Over					
Parameters	Description	min	max	u.m.	Resolution
SP9	**S/W Change** **0 = By Keypad** **1 = By Digital Input** **2 = By Analogic Input**	0	2		
SP10	**Set Automatic Change Over**	-50.0	110.0	°C	Dec.
SP11	**Differential Automatic Change Over**	0.1	25.0	°C	Dec.

Trane optimizes the performance of homes and buildings around the world. A business of Ingersoll Rand, the leader in creating and sustaining safe, comfortable and energy efficient environments, Trane offers a broad portfolio of advanced controls and HVAC systems, comprehensive building services, and parts.
For more information, visit www.Trane.com.

Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.

CNT-SVU005C-GB December 2015