MITSUBISHI ELECTRIC | MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.

MANUAL CODE:
SM_W3000+_TA17_00_05_24_EN

W3000+ Version 17

EN

INTERFACE MANUAL

Italian is the original language. The other languages versions are translation of the original.

For safe and correct use, carefully read the installation, use and maintenance manual of the unit.

Before carrying out any operation on the machine,

you must carefully read this manual

and make sure you understand

all the instructions and information given

Keep this manual in a known and easily accessible place to refer to as necessary during the entire life-span of the unit.

Contents

CAUTION:
The W3000+ controller software is protected by a digital signature.
This means that it can only work on boards supplied by MEHITS S.p.A., and not on boards supplied by other dealers.
Additionally, the plastic elements and screen prints on the installed hardware are exclusive to MEHITS S.p.A..

SYMBOLS:

A number of symbols are used to highlight some parts of the text that are of particular importance. These are described below.

CAUTION:
Information on the occurrence of situations/operations which, if ignored or not duly acted upon, could put not only the Unit but also the functions of the Software and the various electronic parts at risk.

OBLIGATION:
Indicates the need to take appropriate precautions/perform specific operations to avoid compromising protection of the points of access reserved for authorised operators and/or operators who guarantee the proper operation of the Unit.

INFORMATION:
Indicates technical/functional information of particular importance which should not be overlooked.

NOTICE:
This is used to address practices not connected with possible physical injury.

1 INTRODUCTION

This document may only be used for the MEHITS S.p.A. units managed by the W3000+ electronic controller running on TA10 software or later versions.
Information on the revision of the electronic controller is shown in the unit menu which can be accessed as shown below.

Press the **"PRG"** key to access the main menu.

Main Menu Manuf. Unit Setpoint In/Out Clock	Main menu access screen. Press **[UP]** or **[DOWN]** to scroll, **[ENTER]** to access.
Unit	Access mask to unit menu. Press **[UP]** or **[DOWN]** to scroll through the other masks and **[ESC]** to return to the submenu.
W 3000 + Code TA 17.00 EN HW pCO5 L NAND 32MB Flash 2MB + 2MB Ram 512KB Boot 5.01 Bios 6.49	Mask indicating the installed software version. (The example shows version TA17r00).

The electronic controller may only be installed and programmed by adequately trained technical staff.

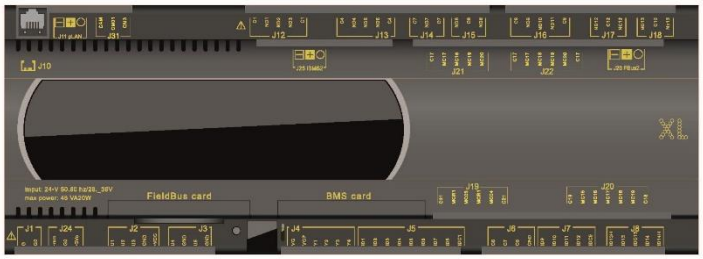
2 INSTALLING THE SERIAL BOARD

There are various types of communication protocols. A serial board connected to the controller on board of the unit must be used for each one of them.

Even if the serial board differ according to the supervisor to connect, the installation procedure on the controller is the same and comprises the following steps to be performed in order.

This procedure is not necessary if the serial board is already on board the unit.
IMPORTANT: The boards must not be powered during these operations.

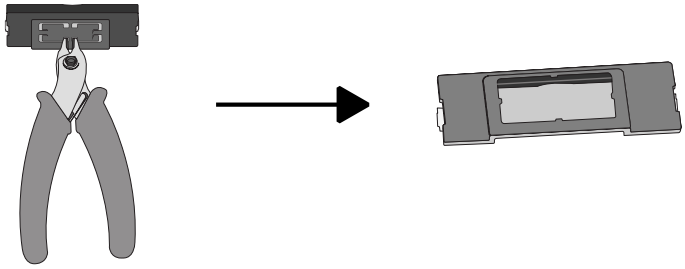
1. Identify the electronic controller on board the unit.
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



2. Remove the “BMS Card” cover from the controller using a screwdriver.

3. Push the interface board into its dedicated slot making sure it correctly engages the dedicated comb connector mounted in the controller.

4. If necessary, remove the perforated plastic element with a pair of nippers to allow the serial board connector to pass through.



5. Put back the cover making sure to match the hole in the cover with the engaged serial board connector.

For units fitted with the +2P module, a dual serial board is required, one for the main control and the other for the remote control of the +2P module.
The interface database is identical for both controls.
Different ID's must be allocated to the 2 controls in order to prevent conflicts in the BMS network.

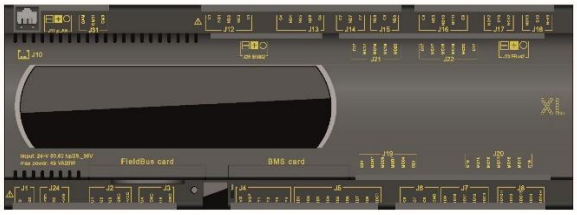
Note:
The connection to the Manager3000 systems is unavailable on this type of unit.

3 INTERFACING WITH THE SEQUENCER

3.1 Components required

MODBUS serial interface board.
For the correct installation of the serial board, see the documentation supplied with the same.

Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



3.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the MODBUS serial board into the controller.

3.3 Setting serial line configuration parameters

To communicate with the Sequencer, set the parameters as shown below.

You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Sequencer	It is necessary to enable communication with the Sequencer.
En. from superv.: On/Off: S Operating mode: S	Enabling communication with the Sequencer automatically sets the following parameters: ▪ Enable on/off from supervisor: **Yes** ▪ Enable operating mode change from supervisor: **Yes** The user cannot edit these settings because they ensure correct operation of the Sequencer.
Serial line setting Standard Protocol Speed 19200 baud Unit ID 001	The Sequencer connection parameters must be set as follows: ▪ Protocol: **Standard** ▪ Communication speed: **19200 baud** ▪ Identification number of the unit: each unit connected to the Sequencer must be assigned a different ID number between **001** and **005 (default 001)**. Refer to the Sequencer Installation Manual for further information.

3.4 Setting up the supervisor network

The supervisor network must be set up as shown below:

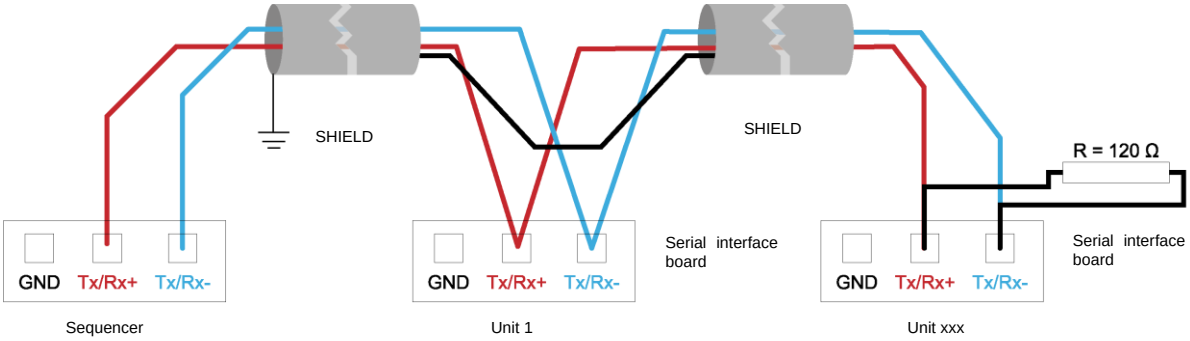


***Figure 3-1*:** diagram showing a possible network layout with the Sequencer.

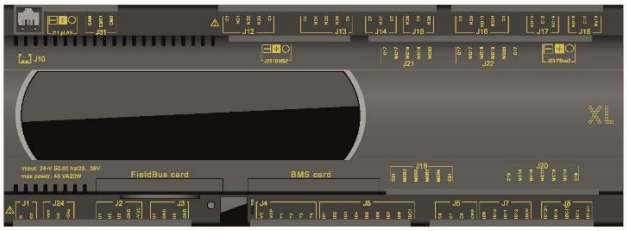
Take great care when connecting the serial line to the units. This is an RS485 serial line, based on a balanced differential communication line with a characteristic impedance of 120 ohm.
The maximum length of the connection depends on the Baud-rate, background electrical noise, and the type and quality of the cable. Operation is generally guaranteed up to 1000 m.
Use a shielded and twisted 3 x AWG 20/22 cable for the network.
If the reference signal must be equalised use the third wire.
The Sequencer and the units are normally connected together in a chain configuration, with derivations from the line limited to about two metres. Star derivations with multiple connections to the devices must be avoided.
It is important, particularly in long connections, for the last device to “close” the line, thus preventing reflection phenomena: to achieve this, simply add a 120 ohm resistance in parallel to the last unit.
The shield of each connection cable must be connected to the shield of the previous derivation. The ground connection must be made in just one point.
A maximum of 5 units can be connected to the Sequencer.

4 INTERFACING WITH THE MANAGER 3000

4.1 Components required

MODBUS serial interface board.
For the correct installation of the serial board, see the documentation supplied with the same

Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



4.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the MODBUS serial board into the controller.

4.3 Setting serial line configuration parameters

To communicate with the Manager 3000, set the parameters as shown below.

You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Manager 3000	Communication towards the Manager 3000 must be enabled.
En. from superv.: On/Off: S Operating mode: S	When communication with Manager 3000 is enabled, the following parameters are automatically set: ▪ Enable on/off from supervisor: **Yes** ▪ Enable operating mode change from supervisor: **Yes** These settings cannot be modified by the user as they are required for the correct operation of Manager 3000.
Serial line setting ModBus Protocol Speed 9600 baud Unit ID 011	The Manager 3000 connection parameters must be set as follows: ▪ Protocol: **Modbus** ▪ Communication speed: **9600 baud** ▪ Unit ID: from **011** to **018 (default 11)**, each unit connected to Manager 3000 must have a different identification number. For further details, consult the Manager 3000 Installation Manual.

4.4 Setting up the supervisor network

The supervisor network must be set up as shown below:

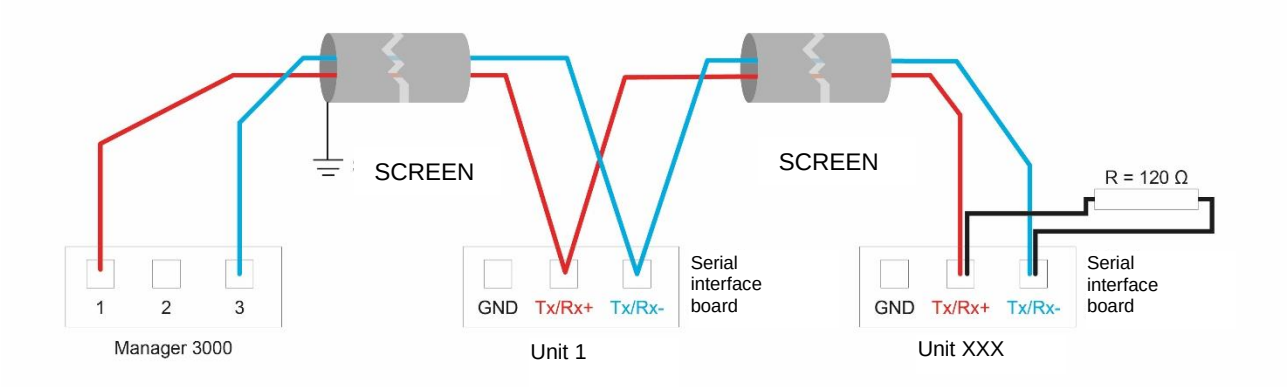


***Figure 4-1**: diagram showing a possible network layout with the Manager 3000.*

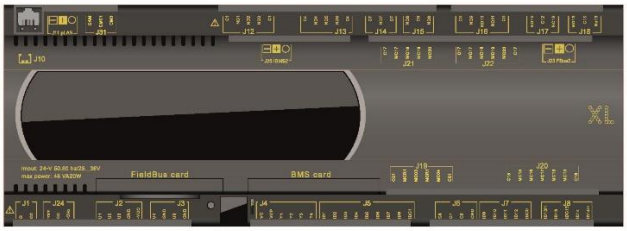
Take great care when connecting the serial line to the units. This is an RS485 serial line, based on a balanced differential communication line with a characteristic impedance of 120 ohm.
The maximum length of the connection depends on the Baud-rate, background electrical noise, and the type and quality of the cable. Operation is generally guaranteed up to 1000 m.
Use a shielded and twisted 3 x AWG 20/22 cable for the network.
If the reference signal must be equalised use the third wire.
The Manager 3000 and the units must be connected together in a chain configuration, with derivations from the line limited to about two metres. Star derivations with multiple connections to the devices must be avoided.
It is important, particularly in long connections, for the last device to “close” the line, thus preventing reflection phenomena: to achieve this, simply add a 120 ohm resistance in parallel to the last unit.
The shield of each connection cable must be connected to the shield of the previous derivation. The ground connection must be made in just one point.
A maximum of 8 units can be connected to the Manager 3000.

5 INTERFACING WITH THE MANAGER 3000+

5.1 Components required

MODBUS serial interface board.
For the correct installation of the serial board, see the documentation supplied with the same

Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



5.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the MODBUS serial board into the controller.

5.3 Setting serial line configuration parameters

To communicate with the Manager 3000+, set the parameters as shown below.

You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Manager 3000+	Communication towards the Manager 3000+ must be enabled.
En. from superv.: On/Off: S Operating mode: S	When communication with Manager 3000+ is enabled, the following parameters are automatically set: ▪ Enable on/off from supervisor: **Yes** ▪ Enable operating mode change from supervisor: **Yes** These settings cannot be modified by the user as they are required for the correct operation of Manager 3000+.
Serial line setting ModBus Protocol Speed 19200 baud Unit ID 011	The Manager 3000+ connection parameters must be set as follows: ▪ Protocol: **Modbus** ▪ Communication speed: **19200 baud** ▪ Unit ID: from **011** to **018 (default 11)**, each unit connected to Manager 3000+ must have a different identification number. For further details, consult the Manager 3000+ Installation Manual.

5.4 Setting up the supervisor network

The supervisor network must be set up as shown below:

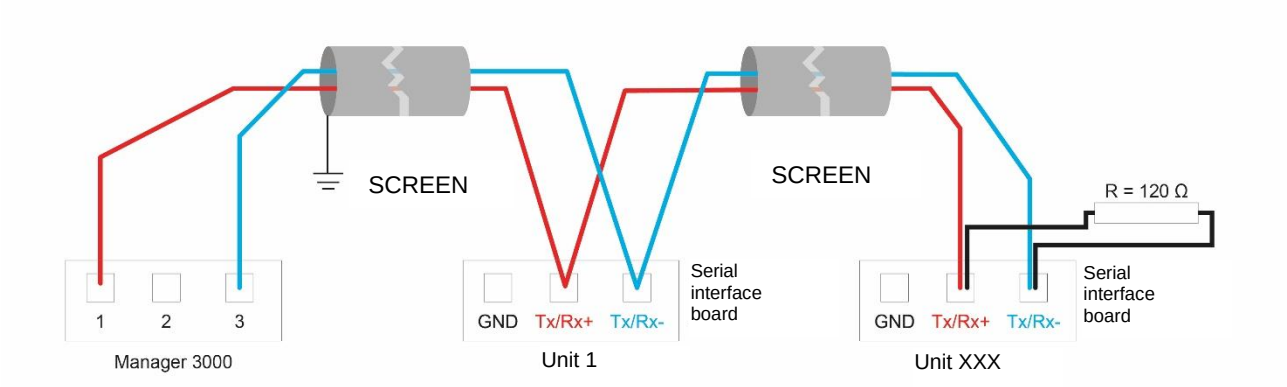


***Figure 5-1**: diagram showing a possible network layout with the Manager 3000+.*

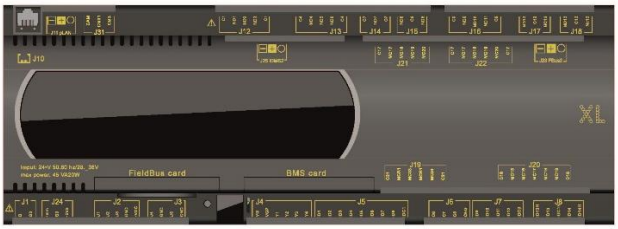
Take great care when connecting the serial line to the units. This is an RS485 serial line, based on a balanced differential communication line with a characteristic impedance of 120 ohm.
The maximum length of the connection depends on the Baud-rate, background electrical noise, and the type and quality of the cable. Operation is generally guaranteed up to 1000 m.
Use a shielded and twisted 3 x AWG 20/22 cable for the network.
If the reference signal must be equalised use the third wire.
The Manager 3000+ and the units must be connected together in a chain configuration, with derivations from the line limited to about two metres. Star derivations with multiple connections to the devices must be avoided.
It is important, particularly in long connections, for the last device to “close” the line, thus preventing reflection phenomena. Simply add a 120 ohm resistor in parallel to the last unit.
The shield of each connection cable must be connected to the shield of the previous derivation. The ground connection must be made in just one point.
A maximum of 8 units can be connected to the Manager 3000+.

6 CLIMAPRO INTERFACE

6.1 Components required

MODBUS serial interface board.
For the correct installation of the serial board, see the documentation supplied with the same.

Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



6.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the MODBUS serial board into the controller.

6.3 Setting serial line configuration parameters

To communicate with ClimaPRO, set the parameters as shown below.

You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: ClimaPRO	It is necessary to enable communication with ClimaPRO
En. from superv.: On/Off: S Operating mode: S	When communication with ClimaPRO is enabled, the following parameters are automatically set: ▪ Enable on/off from supervisor: **Yes** ▪ Enable operating mode change from supervisor: **Yes** The user cannot edit these settings, because they are necessary to ensure correct operation of ClimaPRO.
Serial line setting ModBus Protocol Speed 19200 baud Unit ID 011	Set the ClimaPRO connection parameters as follows: ▪ Protocol: **Modbus** ▪ Communication speed: **19200 baud** ▪ Unit ID: each unit connected to ClimaPRO must be assigned a different ID number, starting from **011**.

6.4 Setting up the supervisor network

The supervisor network must be set up as shown below:

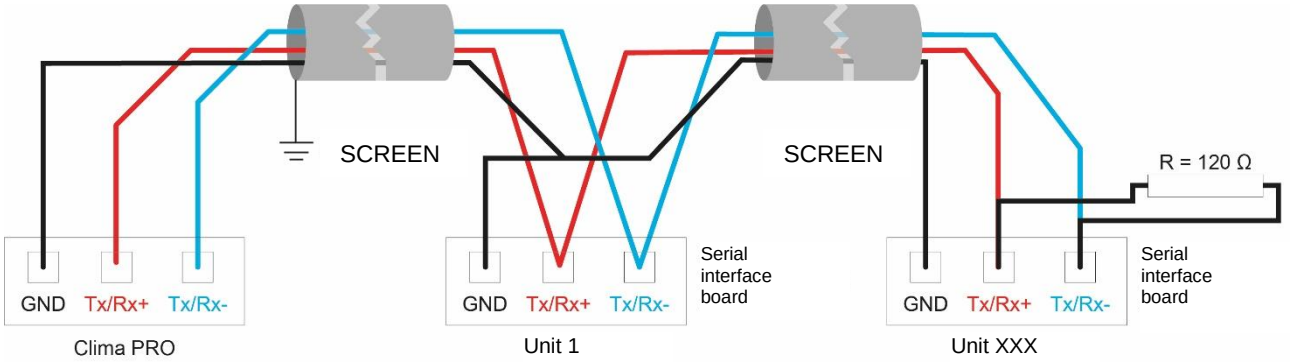


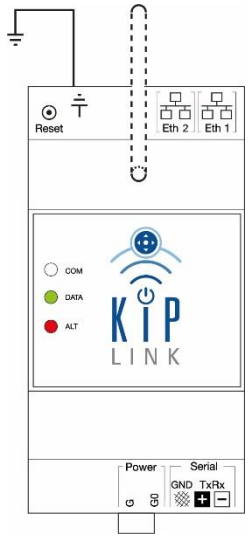
***Figure 6-1**: diagram showing a possible network layout with the ClimaPRO.*

Take great care when connecting the serial line to the units. This is an RS485 serial line, based on a balanced differential communication line with a characteristic impedance of 120 ohm.
The maximum length of the connection depends on the Baud-rate, background electrical noise, and the type and quality of the cable. Operation is generally guaranteed up to 1000 m.
Use a shielded and twisted 3 x AWG 24 cable for the network.
The ClimaPRO and the units are normally connected together in a chain configuration, with derivations from the line limited to about two metres. Star derivations with multiple connections to the devices must be avoided.
It is important, particularly in long connections, for the last device to “close” the line, thus preventing reflection phenomena: to achieve this, simply add a 120 ohm resistance in parallel to the last unit.
The shield of each connection cable must be connected to the shield of the previous derivation. The ground connection must be made in just one point.

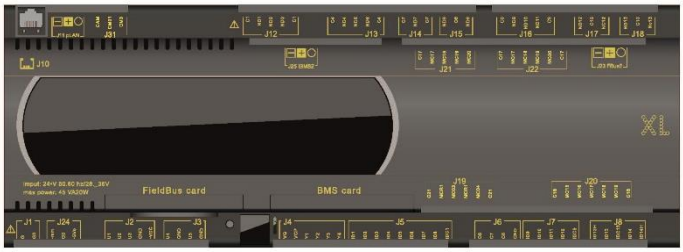
7 INTERFACING WITH THE KIPLINK LOCAL MONITORING DEVICE

7.1 Components required

KIPLink device.
(Already fitted on the machine).



Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



7.2 Setting the configuration parameters for the KIPlink Local Monitoring device

The parameters for communication with the KIPlink Local Monitoring device must be set as shown below.

If the KIPlink is mounted in the unit, this function requires the KIPlink module to be enabled. To check this at the traditional keyboard:

- Access the “Service” menu;
- Enter the correct password;
- Select the Settings 2 section;

Scroll through the screens to the ones shown below:

KIPLink Enable module: N	The KIPlink module needs to be enabled to permit use of the KIPlink Local Monitoring device.
KIPLink Enable module: Y Type of module: Master-EthON-WifiON	After enabling the KIPlink module, set both the type of Ethernet module and the Wi-Fi module **ON**.
KIPLink ETHERNET channel: IP :172.21.51.001 SUB:255.255.255.000 GW :000.000.000.000	Next, access the screen with the description of the IP address in order to connect to the KIPlink Local Monitoring device on the Web. The set IP must be a free IP on the LAN network to which the KIPLink is to be connected.
Send data to KIPlink: N Default reset readwrite password KIPLink Local Monitoring: N	Scroll through the masks and send the data to KIPlink; it will then be possible to use the KIPlink Local Monitoring device.

This device has two different access profiles for these types of use:

- **Only Read;**
- **Read&Write.**

A password is required which, if forgotten, can be retrieved as follows:

- For the **Only Read** profile, access the User menu and scroll through the masks to find:

Default reset only read password KIPLink Local Monitoring: N	Select YES to retrieve the default Password for the Only Read profile.
Default reset only read password KIPLink Local Monitoring: Y Please wait…	The screen shown here appears, and the change is implemented within a few seconds.

- For the **Read&Write** profile, access the Service menu in the Settings 2 section to find:

Send data to KIPlink: N Default reset readwrite password KIPLink Local Monitoring: Y	Select “YES” to retrieve the default Password for the Read&Write profile.
Send data to KIPlink: N Default reset readwrite password KIPLink Local Monitoring: Y Please wait…	The screen shown here appears, and the change is implemented within a few seconds.

7.3 Setting up the network for connecting the KIPlink Local Monitoring device

The supervisor network must be set up as shown below:

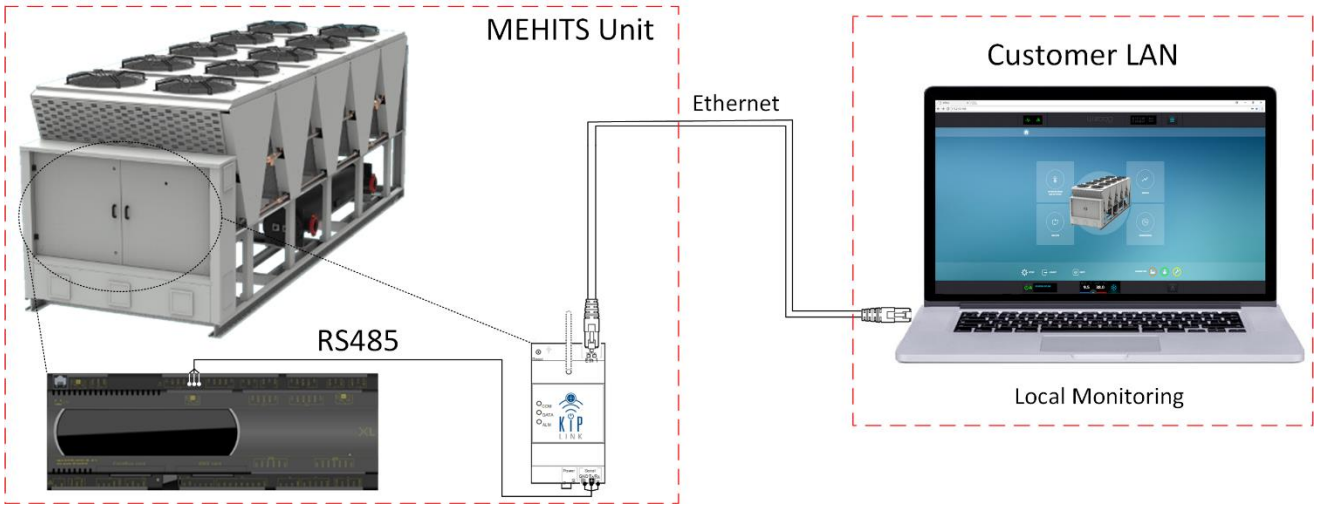


Figure 7-1: *diagram showing a possible network layout with KIPLink Local Monitoring.*

The electrical connections must be made with particular care:

- **Connection between the controller and the KIPlink device:**
  If the KIPlink is not already mounted in the unit, set up a RS485 serial connection with the controller using a 2×AWG22 twisted and shielded cable and following the instructions in the KIPlink installation manual.

- **Connection between the KIPlink and Personal Computer:**
  Connect the KIPlink device to the client LAN network using a Cat5e Ethernet cable or one of a higher category. Although it is possible to add a Switch (to be fitted by the customer) for extending the signal to 200m, the connection should preferably not cover more than 100m.

The maximum number of simultaneous connections to the KIPlink Local Monitoring device is 3. Any more can reduce the speed and web performance.

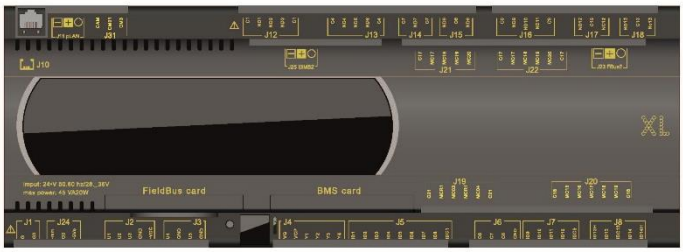
Refer to the KIPlink technical manual for further information.

8 INTERFACING WITH BMS (MODBUS RTU)

8.1 Components required

MODBUS serial interface board.
For the correct installation of the serial board, see the documentation supplied with the same.

Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



8.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the MODBUS serial board into the controller.

8.3 Setting serial line configuration parameters

The parameters for communication with the BMS must be set as shown below.

You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Supervision	Communication towards a supervisor system must be enabled.
En. from superv.: On/Off: S Operating mode: S	Allows the on/off status and the operating mode change of the unit to be selected from a supervision system. Enabling from supervisor must be set as indicated alongside: ▪ Enable on/off: **Yes** ▪ Operating mode enable **Yes**
Serial line setting ModBus Protocol Speed 19200 baud Unit ID 011	The supervisor connection parameters must be set as follows: ▪ Protocol: **Modbus** ▪ Communication speed: **from 1200 baud 19200 baud** ▪ Unit ID: from **001** to **200 (default 11, …)**

8.4 Setting up the supervisor network

The supervisor network must be set up as shown below.

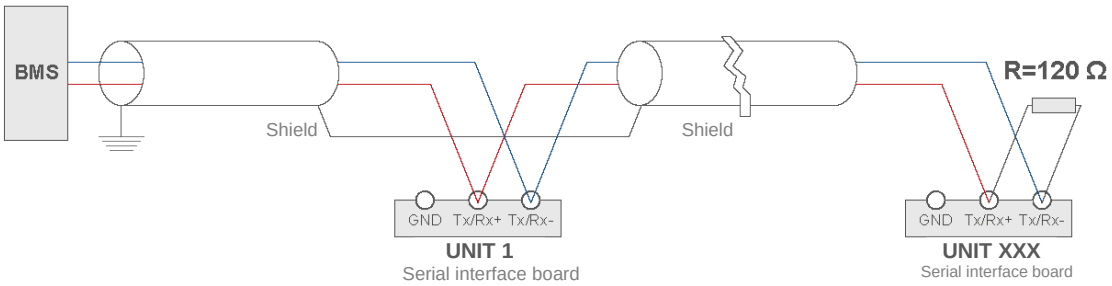


***Figure 8-1**: summary diagram showing a possible BMS supervision network layout.*

Take great care when connecting the serial line to the units. This is an RS485 serial line, based on a balanced differential communication line with a characteristic impedance of 120 ohm.
The maximum length of the connection depends on the Baud-rate, background electrical noise, and the type and quality of the cable. Operation is generally guaranteed up to 1000 m.
Use a shielded and twisted 3 x AWG 20/22 cable for the network.
If the reference signal must be equalised use the third wire.
The serial connection is made with a single cable running from the BMS to the first unit (the closest), then continuing to connect with the next ones (in order of distance).
The serial cable must be kept separate from the power cables.

The shield of each connection cable must be connected to the shield of the previous derivation. The ground connection must be made in just one point.
A maximum of 200 units can be connected to the network; the polling time of the entire system is proportional to the number of units monitored by the BMS.

8.5 Interface database (software versions TA17 and higher)

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
0	C				NOT MANAGED	
1	C	OUT			Unit status (0:Off - 1:On)	Always
3	C	OUT			Evaporator pump 1 status (0:Off - 1:On)	Note 1
4	C	OUT			Evaporator pump 2 status (0:Off - 1:On)	Note 1
5	C	OUT			Recuperator pump status (0:Off - 1:On)	Note 1
6	C	OUT			Condenser pump status (0:Off - 1:On)	Note 1
8	C	IN			On/off command from supervisor (0:Off - 1:On)	Note 2
		OUT				
9	C	IN			Modify date/time and confirmation (see date and time read/write section)	Always
		OUT				
10	C	IN			Enable time bands setting from supervisor	Always
		OUT				
11	C	OUT			Enable operating mode change from supervisor	Always
15	C	IN			Enable consent for autonomous operation in case of disconnection of the supervisor (only for serial line configured in "Supervision with watchdog" mode)	Note 2
		OUT				
31	C	IN			System adjustment on/off command (only for units with DHW)	Note 1
		OUT				
32	C	IN			DHW adjustment on/off command (only for units with DHW)	Note 1
		OUT				
33	C	IN			Temperature controller limitation command from supervisor for Demand Limit, Capacity Cap and Smart Current Limit (0:Off - 1:On)	Note 2
		OUT				
34	C	OUT			Energy meter electricity value reading enable	Note 1 and 2
35	C	OUT			Energy meter configuration for 3-phase electric line connection	Note 1 and 2
36	C	OUT			Energy meter configuration for connection of electric line with neutral	Note 1 and 2
37	C	OUT			Possibility of neutral current reading	Note 1 and 2
39	C	OUT			Changing the status of unit alarms	Always
40	C	OUT			ATS enable	Always
41	C	OUT			ATS 1 power supply detected	Always
42	C	OUT			ATS 1 power supply connected	Always
43	C	OUT			ATS 2 power supply detected	Always
44	C	OUT			ATS 2 power supply connected	Always
0	R				NOT MANAGED	
1	R	IN	valuex10	°C	Chiller temperature setpoint	Note 1
		OUT	value/10			
2	R	IN	valuex10	°C	Heat pump temperature setpoint	Note 1
		OUT	value/10			
3	R	IN	valuex10	°C	Recovery/DHW setpoint	Note 1
		OUT	value/10			
4	R	OUT	value/10	°C	Main active setpoint	Note 1
5	R	OUT	value/10	°C	Recovery setpoint active	Note 1
6	R	OUT	value/10	°C	Inlet temperature of evaporator	Note 1
7	R	OUT	value/10	°C	Evaporator outlet temperature (average)	Note 1
8	R	OUT	value/10	°C	Condenser inlet temperature	Note 1
9	R	OUT	value/10	°C	Condenser outlet temperature (average)	Note 1
10	R	OUT	value/10	°C	Recuperator inlet temperature / DHW storage tank temperature	Note 1
11	R	OUT	value/10	°C	Recuperator outlet temperature	Note 1
12	R	OUT	value/10	bar	High pressure transducer 1	Note 1
13	R	OUT	value/10	bar	High pressure transducer 2	Note 1
14	R	OUT	value/10	bar	High pressure transducer 3	Note 1
15	R	OUT	value/10	bar	High pressure transducer 4	Note 1
16	R	OUT	value/10	bar	Low pressure transducer 1	Note 1
17	R	OUT	value/10	bar	Low pressure transducer 2	Note 1
18	R	OUT	value/10	bar	Low pressure transducer 3	Note 1
19	R	OUT	value/10	bar	Low pressure transducer 4	Note 1
20	R	OUT	value/10	°C	External air temperature	Note 1
21	R	OUT	value/10	°C	Optional probe temperature	Note 1
22	R	OUT	value/10	°C	Free Cooling input temperature	Note 1
23	R	OUT	value/10	kPa	Differential pressure transducer on hydraulic side of evaporator	Note 1
24	R	OUT	value/10	kPa	Differential pressure transducer on recuperator water side	Note 1
25	R	OUT	value/10	°C	Compressor 1 discharge temperature	Note 1

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
26	R	OUT	value/10	°C	Compressor 2 discharge temperature	Note 1
27	R	OUT	value/10	°C	Compressor 3 discharge temperature	Note 1
28	R	OUT	value/10	°C	Compressor 4 discharge temperature	Note 1
29	R	OUT	value/10	°C	Compressor 5 discharge temperature	Note 1
30	R	OUT	value/10	°C	Compressor 6 discharge temperature	Note 1
31	R	OUT	value/10	°C	Compressor 7 discharge temperature	Note 1
32	R	OUT	value/10	°C	Compressor 8 discharge temperature	Note 1
33	R	OUT	value/10	°C	Plant storage tank setpoint enabled	Note 1
34	R	OUT	value/10	°C	Plant storage tank temperature	Note 1
35	R	OUT	value/10	kPa	Differential pressure transducer on hydraulic side of condenser	Note 1
36	R	OUT	value/10	-	Compression ratio in absolute bar of Centrifuge comp. 8	Note 1
40	R	OUT	value/10	%	Power demand to centrifuge comp. 1	Note 1
			valuex1	rpm	Revs demand to inverter 1	Note 1
41	R	OUT	value/10	%	Power demand to centrifuge comp. 2	Note 1
			valuex1	rpm	Revs demand to inverter 2	Note 1
42	R	OUT	value/10	%	Power demand to centrifuge comp. 3	Note 1
			valuex1	rpm	Revs demand to inverter 3	Note 1
43	R	OUT	value/10	%	Power demand to centrifuge comp. 4	Note 1
			valuex1	rpm	Revs demand to inverter 4	Note 1
44	R	OUT	value/10	kW	Power demand to centrifuge comp. 1	Note 1
45	R	OUT	value/10	kW	Power demand to centrifuge comp. 2	Note 1
46	R	OUT	value/10	kW	Power demand to centrifuge comp. 3	Note 1
47	R	OUT	value/10	kW	Power demand to centrifuge comp. 4	Note 1
48	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 1	Note 1
49	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 2	Note 1
50	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 3	Note 1
51	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 4	Note 1
52	R	OUT	value/10	%	IGV position of centrifugal comp. 1	Note 1
53	R	OUT	value/10	%	IGV position of centrifugal comp. 2	Note 1
54	R	OUT	value/10	%	IGV position of centrifugal comp. 3	Note 1
55	R	OUT	value/10	%	IGV position of centrifugal comp. 4	Note 1
56	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 1	Note 1
57	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 2	Note 1
58	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 3	Note 1
59	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 4	Note 1
60	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 1	Note 1
61	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 2	Note 1
62	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 3	Note 1
63	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 4	Note 1
64	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 1	Note 1
65	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 2	Note 1
66	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 3	Note 1
67	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 4	Note 1
68	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 1	Note 1
69	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 2	Note 1
70	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 3	Note 1
71	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 4	Note 1
72	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 1	Note 1
73	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 2	Note 1
74	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 3	Note 1
75	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 4	Note 1
76	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 1	Note 1
77	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 2	Note 1
78	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 3	Note 1
79	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 4	Note 1
80	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 1	Note 1
81	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 2	Note 1
82	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 3	Note 1
83	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 4	Note 1
84					Confidential	
85	R	OUT	value/10	%	Power demand to centrifuge comp. 5	Note 1
86	R	OUT	value/10	%	Power demand to centrifuge comp. 6	Note 1
87	R	OUT	value/10	%	Power demand to centrifuge comp. 7	Note 1
88	R	OUT	value/10	%	Power demand to centrifuge comp. 8	Note 1
89	R	OUT	value/10	kW	Power demand to centrifuge comp. 5	Note 1
90	R	OUT	value/10	kW	Power demand to centrifuge comp. 6	Note 1
91	R	OUT	value/10	kW	Power demand to centrifuge comp. 7	Note 1
92	R	OUT	value/10	kW	Power demand to centrifuge comp. 8	Note 1

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
93	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 5	Note 1
94	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 6	Note 1
95	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 7	Note 1
96	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 8	Note 1
97	R	OUT	value/10	%	IGV position of centrifugal comp. 5	Note 1
98	R	OUT	value/10	%	IGV position of centrifugal comp. 6	Note 1
99	R	OUT	value/10	%	IGV position of centrifugal comp. 7	Note 1
100	R	OUT	value/10	%	IGV position of centrifugal comp. 8	Note 1
101	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 5	Note 1
102	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 6	Note 1
103	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 7	Note 1
104	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 8	Note 1
105	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 5	Note 1
106	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 6	Note 1
107	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 7	Note 1
108	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 8	Note 1
109	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 5	Note 1
110	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 6	Note 1
111	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 7	Note 1
112	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 8	Note 1
113	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 5	Note 1
114	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 6	Note 1
115	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 7	Note 1
116	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 8	Note 1
117	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 5	Note 1
118	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 6	Note 1
119	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 7	Note 1
120	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 8	Note 1
121	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 5	Note 1
122	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 6	Note 1
123	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 7	Note 1
124	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 8	Note 1
125	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 5	Note 1
126	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 6	Note 1
127	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 7	Note 1
128	R				NOT MANAGED	
131	R	OUT	valuex1	-	Software version	Always
132	R	OUT	valuex1	-	Software version (revision)	Always
133	R	OUT	valuex1	-	Unit type configuration (00:Chiller - 01:Chiller+recovery - 02:Chiller + Free Cooling- 10:Heat pump - 11:Heat pump+recovery - 14 Heat pump+DHW - 15: +2P module - 21:Energy raiser - 25:Energy raiser and +2P module)	Always
134	R	OUT	valuex1	-	N° circuits	Always
135	R	OUT	valuex1	-	N° compressors	Always
136	R	OUT	valuex1	-	N° separation stages per compressor	Always
137	R	OUT	valuex1	-	Type of compressors (0:Centrifuge - 1:Hermetic - 2:Alternative - 3:Screw*) * To identify if and which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter	Always
138	R	OUT	valuex1	-	Unit configuration status [1] (Bit0: 0:Heat pump disabled, 1:Heat pump enabled Bit1: 0:Quick Mind disabled, 1:Quick Mind enabled Bit2: 0:Inlet, 1:Outlet Bit3: 0:Free Cooling not enabled, 1:Free Cooling enabled Bit4 - Bit10: Not significant Bit11: 0:Recovery disabled, 1:Recovery enabled Bit12 - Bit15: Not significant)	Always
139	R	OUT	valuex1	-	Unit configuration status [2] (Bit0: 0:Time bands disabled, 1:Time bands enabled Bit1: 0:Pumpdown disabled, 1:Pumpdown enabled Bit2: 0:Setpoint modification disabled, 1:Setpoint modification enabled Bit3: 0:Air cooling, 1:Water cooling Bit4: 0:Sequencer disabled, 1:Sequencer enabled Bit5: 0:DHW disabled, 1:DHW enabled	Always

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
					Bit6: 0:anti-legionellosis disabled, 1:anti-legionellosis enabled	
					Bit7: 0: +2P module disabled, 1: +2P module enabled	
					Bit8 - Bit15: Not significant)	
140	R	OUT	valuex1	-	Unit status (0:ON from keyboard - 1:ON from digital input - 2:ON from time bands - 3:ON from supervisor - 4:OFF from alarm - 5:OFF from supervisor - 6:OFF from time bands - 7:OFF from digital input - 8:OFF from keyboard - 9:OFF with deselection of compressors - 10:OFF)	Always
141	R	OUT	valuex1	-	Unit timing status (0:Unit off - 1:Unit timing - 3:Unit at full power - 4:Switching off - 5: Timing of compressors - 6:Pump timing - 8:Unit OFF from alarm)	Always
142	R	IN / OUT	valuex1	-	Operating mode	Always
					Chiller unit (3:chiller)	
					Chiller + freecooling (7:chiller - 8:chiller+fc)	
					Chiller + recovery (2:chiller+rec - 3:chiller)	
					Heat pump (3:chiller 4:heatpump)	
					Energy raisers (0:auto -1:recovery - 2:chiller+rec - 3:chiller)	
					Heat pump with recovery (10:summer auto - 11:summer rec - 12:summer ch+rec - 13:summer ch - 14:winter hp - 15:winter rec - 16:winter auto)	
143	R	OUT	valuex1	-	Compressor 1 status	Always
					(Bit0: 0:Configured, 1:Not configured	
					Bit1: 0:Disabled, 1:Enabled	
					Bit2: 0:OFF, 1:ON	
					Bit3: 0:Pump-down inactive, 1:Pump-down active	
					Bit4: 0:Alarm not active, 1:Alarm active	
					Bit5: 0:--- ,1:ON with 3 steps active; start for screw and centrifuge compressors	
					Bit6: 0:--- ,1:ON with 2 steps active	
					Bit7: 0:--- ,1:ON with 1 step active	
					Bit8: 0:--- ,1:ON entire	
					Bit9: 0:--- ,1:chiller	
					Bit10: 0:--- ,1:heat pump	
					Bit11: 0:--- ,1:recovery	
					Bit12: 0:--- ,1:defrost	
					Bit13: 0:--- ,1:freecooling	
					Bit14: 0:--- ,1:dripping	
					Bit15: 0:--- ,1:request)	
144	R	OUT	valuex1	-	Compressor 2 status (see compressor 1 status)	Note 1
145	R	OUT	valuex1	-	Compressor 3 status (see compressor 1 status)	Note 1
146	R	OUT	valuex1	-	Compressor 4 status (see compressor 1 status)	Note 1
147	R	OUT	valuex1	-	Compressor 5 status (see compressor 1 status)	Note 1
148	R	OUT	valuex1	-	Compressor 6 status (see compressor 1 status)	Note 1
149	R	OUT	valuex1	-	Compressor 7 status (see compressor 1 status)	Note 1
150	R	OUT	valuex1	-	Compressor 8 status (see compressor 1 status)	Note 1
151	R	OUT	valuex1	-	Average hours compressors (thousands)	Always
152	R	OUT	valuex1	-	Average hours compressors (units)	Always
153	R	IN	valuex1	-	Year / Month (see date and time read/write section)	Always
		OUT	valuex1	-		
154	R	IN	valuex1	-	Day / Hour / Minutes (see date and time read/write section)	Always
		OUT	valuex1	-		
155	R	OUT	valuex1	-	Pump code	Always
					(Bit0: 0: --- , 1:Enable pump 1	
					Bit1: 0: --- , 1:Enable pump 2	
					Bit2: 0: --- , 1:Recovery pump enabled	
					Bit3: 0: --- , 1:DHW pump enabled	
					Bit4: 0: --- , 1:Condenser pump enabled	
					Bit5: 0: --- ,	
					Bit6: 0: --- , 1:Pumps 1 and 2 stopped for machine or hydraulic circuit alarms	
					Bit7: 0: --- , 1:Recovery pump stopped due to machine or hydraulic circuit alarms	
					Bit8: 0: --- , 1:Pump 1 alarm	
					Bit9: 0: --- , 1:Pump 2 alarm	
					Bit10: 0: --- , 1:Recovery pump alarm	
					Bit11: 0: --- , 1:DHW pump alarm	
					Bit12: 0: --- , 1:Condenser pump alarm	
					Bit13: 0: --- , 1:Condenser flow or antifreeze alarm	

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
					Bit14: 0: --- , 1:Unit no longer available -stop_by_alarm-	
					Bit15: 0: --- , 1:Unit in alarm status but with requested pumps -no_stop_pump-)	
156	R	OUT	valuex1	-	Flash operating mode	Always
					(Bit0: 0:--- , 1:Anti-legionellosis function active	
					Bit1: 0:--- , 1:Sniffer function on pumps enabled	
					Bit2: 0:--- , 1:Unit start delay after power failure	
					Bit3: 0:--- , 1:Thermoregulator on hold/timing	
					Bit4: 0:--- , 1:Fast Restart function enabled	
					Bit5: 0:--- , 1:+2P module enabled	
					Bit6: Not significant	
					Bit7: 0:--- , 1:Unit with power limitation enabled	
					Bit8: 0: --- , 1:Unit with antifreeze limitation enabled	
					Bit9: 0: --- , 1:high temperature pressure switch control enabled	
					Bit10: 0: --- , 1:Defrosting on	
					Bit11: 0: --- , 1:Energy storage	
					Bit12: 0: --- , 1:Drip phase active in at least one circuit	
					Bit13: 0: --- , 1:Override at maximum in at least one circuit	
					Bit14: 0: --- , 1:Override at minimum in at least one circuit	
					Bit15: 0: --- , 1:The unit is producing DHW	
158	R	OUT	valuex1	-	Unit status (0: ON from keyboard - 1: ON from digital input - 2: ON from time bands - 3: ON from KIPlink - 4: ON from supervisor - 5: ON from sequencer - 6: ON from Manager 3000 - 7: ON from ClimaPRO - 8: ON from LAN - 9: ON from manager + - 20: OFF from alarm - 21: OFF from ClimaPRO - 22: OFF from Manager 3000 - 23: OFF from sequencer - 24: OFF from supervisor - 25: OFF from KIPlink - 26: OFF from time bands - 27: OFF from digital input - 28: OFF from keyboard - 29: OFF with deselection of compressors - 30: OFF - 31: Standby - 32: OFF from LAN - 33: OFF from manager +)	Always
160	R	OUT	valuex1	-	Active alarm code (with greater priority)	Always
161	R	OUT	valuex1	-	Screw compressor model (0: Bitzer/Bitzer CSC - 1:Hitachi - 2:Fu-Sheng - 3:Bitzer inverter - 10:Hybrid*)	Note 1
					* To identify which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter	
162	R	OUT	valuex1	%	Chiller thermoregulator demand (not available for units with output adjustment)	Note 1
163	R	OUT	valuex1	%	Active power of chiller thermoregulator	Note 1
164	R	OUT	valuex1	%	Available power of chiller thermoregulator	Note 1
165	R	OUT	valuex1	%	Heat pump thermoregulator demand (not available for units with output adjustment)	Note 1
166	R	OUT	valuex1	%	Active power of heat pump thermoregulator	Note 1
167	R	OUT	valuex1	%	Available power of heat pump thermoregulator	Note 1
168	R	OUT	valuex1	%	Recovery thermoregulator demand (not available for units with output adjustment)	Note 1
169	R	OUT	valuex1	%	Active power of recovery thermoregulator	Note 1
170	R	OUT	valuex1	%	Available power of recovery thermoregulator	Note 1
171	R	IN	valuex1	%	Temperature controller limitation in chiller (for Demand Limit and Capacity Cap)	Note 1
		OUT	valuex1			
172	R	IN	valuex1	%	Temperature controller limitation in heat pump (for Demand Limit and Capacity Cap)	Note 1
		OUT	valuex1			
173	R	IN	valuex1	%	Temperature controller limitation in recovery (for Demand Limit and Capacity Cap)	Note 1
		OUT	valuex1			
174	R	OUT	valuex10	rpm	RPM centrifuge comp. 1	Note 1
			valuex1		RPM inverter comp.1	Note 1
175	R	OUT	valuex10	rpm	RPM centrifuge comp. 2	Note 1
			valuex1		RPM inverter comp.2	Note 1
176	R	OUT	valuex10	rpm	RPM centrifuge comp. 3	Note 1
			valuex1		RPM inverter comp.3	Note 1
177	R	OUT	valuex10	rpm	RPM centrifuge comp. 4	Note 1
			valuex1		RPM inverter comp.4	Note 1
178	R	OUT	valuex10	rpm	RPM centrifuge comp. 5	Note 1
179	R	OUT	valuex10	rpm	RPM centrifuge comp. 6	Note 1
180	R	OUT	valuex10	rpm	RPM centrifuge comp. 7	Note 1
181	R	OUT	valuex10	rpm	RPM centrifuge comp. 8	Note 1
182	R	OUT	valuex1	hx1000	Compressor 1 hours (thousands)	Always

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
183	R	OUT	valuex1	h	Compressor 1 hours (units)	Always
184	R	OUT	valuex1	hx1000	Compressor 2 hours (thousands)	Note 1
185	R	OUT	valuex1	h	Compressor 2 hours (units)	Note 1
186	R	OUT	valuex1	hx1000	Compressor 3 hours (thousands)	Note 1
187	R	OUT	valuex1	h	Compressor 3 hours (units)	Note 1
188	R	OUT	valuex1	hx1000	Compressor 4 hours (thousands)	Note 1
189	R	OUT	valuex1	h	Compressor 4 hours (units)	Note 1
190	R	OUT	valuex1	hx1000	Compressor 5 hours (thousands)	Note 1
191	R	OUT	valuex1	h	Compressor 5 hours (units)	Note 1
192	R	OUT	valuex1	hx1000	Compressor 6 hours (thousands)	Note 1
193	R	OUT	valuex1	h	Compressor 6 hours (units)	Note 1
194	R	OUT	valuex1	hx1000	Compressor 7 hours (thousands)	Note 1
195	R	OUT	valuex1	h	Compressor 7 hours (units)	Note 1
196	R	OUT	valuex1	hx1000	Compressor 8 hours (thousands)	Note 1
197	R	OUT	valuex1	h	Compressor 8 hours (units)	Note 1
198	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 1	Note 1
199	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 2	Note 1
200	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 3	Note 1
201	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 4	Note 1
202	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 1	Note 1
203	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 2	Note 1
204	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 3	Note 1
205	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 4	Note 1
206	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 1	Note 1
207	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 2	Note 1
208	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 3	Note 1
209	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 4	Note 1
210	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 1	Note 1
211	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 2	Note 1
212	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 3	Note 1
213	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 4	Note 1
214	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 5	Note 1
215	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 6	Note 1
216	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 7	Note 1
217	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 8	Note 1
218	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 5	Note 1
219	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 6	Note 1
220	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 7	Note 1
221	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 8	Note 1
222	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 5	Note 1
223	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 6	Note 1
224	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 7	Note 1
225	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 8	Note 1
226	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 5	Note 1
227	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 6	Note 1
228	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 7	Note 1
239	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 8	Note 1
241	R	OUT	valuex1	%	Opening of freecooling valve as a percentage	Note 1
242	R	IN	Value x1	-	Watchdog	Note 2
		OUT	Value x1	-		
249	R	OUT	value/10	%	Main pump speed % with VPF management	Note 1
252	R	OUT	value/10	%	Recovery pump speed % with VPF management	Note 1
254	R	OUT	valuex1	V	Network analyser: Line 1 - N voltage	Note 1 and 2
255	R	OUT	valuex1	V	Network analyser: Line 2 - N voltage	Note 1 and 2
256	R	OUT	valuex1	V	Network analyser: Line 3 - N voltage	Note 1 and 2
257	R	OUT	valuex1	V	Network analyser: Line 1 - line 2 voltage	Note 1 and 2
258	R	OUT	valuex1	V	Network analyser: Line 2 - line 3 voltage	Note 1 and 2
259	R	OUT	valuex1	V	Network analyser: Line 3 - line 1 voltage	Note 1 and 2
260	R	OUT	value/10	A	Network analyser: Line 1 current	Note 1 and 2
261	R	OUT	value/10	A	Network analyser: Line 2 current	Note 1 and 2
262	R	OUT	value/10	A	Network analyser: Line 3 current	Note 1 and 2

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
263	R	OUT	value/10	A	Network analyser: Neutral current	Note 1 and 2
264	R	OUT	value/1000	-	Network analyser: Power factor	Note 1 and 2
265	R	OUT	value/10	kW	Network analyser: Line 1 power	Note 1 and 2
266	R	OUT	value/10	kW	Network analyser: Line 2 power	Note 1 and 2
267	R	OUT	value/10	kW	Network analyser: Line 3 power	Note 1 and 2
268	R	OUT	value/10	kW	Network analyser: Total capacity	Note 1 and 2
269	R	OUT	valuex1	kWh	Network analyser: Energy (millions)	Note 1 and 2
270	R	OUT	valuex1	kWh	Network analyser: Energy (thousands)	Note 1 and 2
271	R	OUT	valuex1	kWh	Network analyser: Energy (units)	Note 1 and 2
272	R	OUT	valuex1	h	Network analyser: Time (millions)	Note 1 and 2
273	R	OUT	valuex1	h	Network analyser: Time (thousands)	Note 1 and 2
274	R	OUT	valuex1	h	Network analyser: Time (units)	Note 1 and 2
283	R	IN OUT	valuex1 valuex1	A	Setpoint from BMS of the maximum permitted input current for the unit	Note 1 and 2
284	R	OUT	value/10	m^3/h	Thermal power analyser: evaporator flow rate	Note 1 and 2
285	R	OUT	value/10	°C	Thermal power analyser: temperature T1 connected to the evaporator input	Note 1 and 2
286	R	OUT	value/10	°C	Thermal power analyser: temperature T2 connected to the evaporator output	Note 1 and 2
287	R	OUT	value/10	°C	Thermal power analyser: temperature difference calculated as T1 - T2	Note 1 and 2
288	R	OUT	valuex1	kW	Thermal power analyser: calculated thermal power	Note 1 and 2
289	R	OUT	value/10	VA	Network analyser: Apparent power line 1	Note 1 and 2
290	R	OUT	value/10	VA	Network analyser: Apparent power line 2	Note 1 and 2
291	R	OUT	value/10	VA	Network analyser: Apparent power line 3	Note 1 and 2
292	R	OUT	value/10	VA	Network analyser: Total apparent power	Note 1 and 2
293	R	OUT	value/10	VAR	Network analyser: Reactive power line 1	Note 1 and 2
294	R	OUT	value/10	VAR	Network analyser: Reactive power line 2	Note 1 and 2
295	R	OUT	value/10	VAR	Network analyser: Reactive power line 3	Note 1 and 2
296	R	OUT	value/10	VAR	Network analyser: Total reactive power	Note 1 and 2
297	R	OUT	valuex1	%	Percentage ventilation of circuit 1 / opening of modulating valve disposal circuit 1	Note 1 and 2
298	R	OUT	valuex1	%	Percentage ventilation of circuit 2 / opening of modulating valve disposal circuit 2	Note 1 and 2
299	R	OUT	valuex1	%	Percentage ventilation of circuit 3 / opening of modulating valve disposal circuit 3	Note 1 and 2
300	R	OUT	valuex1	%	Percentage ventilation of circuit 4 / opening of modulating valve disposal circuit 4	Note 1 and 2
345	R	OUT	valuex1	-	[01] 10 simultaneously active alarms with priority from 1 to 10	Always
346	R	OUT	valuex1	-	[02] 10 simultaneously active alarms with priority from 1 to 10	Always
347	R	OUT	valuex1	-	[03] 10 simultaneously active alarms with priority from 1 to 10	Always
348	R	OUT	valuex1	-	[04] 10 simultaneously active alarms with priority from 1 to 10	Always
349	R	OUT	valuex1	-	[05] 10 simultaneously active alarms with priority from 1 to 10	Always
350	R	OUT	valuex1	-	[06] 10 simultaneously active alarms with priority from 1 to 10	Always
351	R	OUT	valuex1	-	[07] 10 simultaneously active alarms with priority from 1 to 10	Always
352	R	OUT	valuex1	-	[08] 10 simultaneously active alarms with priority from 1 to 10	Always
353	R	OUT	valuex1	-	[09] 10 simultaneously active alarms with priority from 1 to 10	Always
354	R	OUT	valuex1	-	[10] 10 simultaneously active alarms with priority from 1 to 10	Always
355	R	OUT	valuex1	A	Active permitted input current setpoint	Always
356	R	OUT	valuex1	-	Information on bit-coded residential functions: Bit0: 0:--- , 1:HT zone configured Bit1: 0:--- , 1:HT zone active Bit2: 0:--- , 1:HT zone alarm Bit3: 0:--- , 1:LT zone configured Bit4: 0:--- , 1:LT zone active Bit5: 0:--- , 1:LT zone alarm Bit6: 0:--- , 1:DHW recirculation configured Bit7: 0:--- , 1:DHW recirculation active Bit8: 0: --- , 1:Dehumidifier configured Bit9: 0: --- , 1:Dehumidifier active	Note 1 and 2

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
					Bit10: 0: --- , 1:Auxiliary source in system delivery active Bit11: 0: --- , 1:Auxiliary source in system storage active Bit12: 0: --- , 1:Auxiliary source in DHW storage active Bit13: 0: --- , 1:System auxiliary source block alarm Bit14: 0: --- , 1: not used Bit15: 0: --- , 1: not used	
357	R	OUT	value/10	°C	Mixed water temperature	Note 1 and 2
358	R	OUT	value/10	°C	LT active setpoint	Note 1 and 2
359	R/W	IN OUT	value/10	°C	Mixed water temperature summer setpoint	Note 1 and 2
360	R/W	IN OUT	value/10	°C	Mixed water temperature winter setpoint	Note 1 and 2
361	R/W	IN OUT	valuex1	-	Operating mode automatic change for external air temperature: 0 = disabled 1 = enabled	Note 1 and 2
362	R/W	IN OUT	valuex1	-	Start priority: 0 = system 1 = DHW	Note 1 and 2
363	R	OUT	value x1	-	Unit 1 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
364	R	OUT	value x1	-	Unit 2 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
365	R	OUT	value x1	-	Unit 3 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
366	R	OUT	value x1	-	Unit 4 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
367	R	OUT	value x1	%	Percentage of power delivered unit 1	Note 1, 2 and 3
368	R	OUT	value x1	%	Percentage of power delivered unit 2	Note 1, 2 and 3
369	R	OUT	value x1	%	Percentage of power delivered unit 3	Note 1, 2 and 3
370	R	OUT	value x1	%	Percentage of power delivered unit 4	Note 1, 2 and 3
371	R	OUT	value x1	%	Percentage of power delivered to the plant by the group	Note 1, 2 and 3
372	R	OUT	value x1	%	Percentage of power delivered to DHW by the group	Note 1, 2 and 3
373	R	OUT	value x1	-	Group status (0: ON from keyboard - 1: ON from a digital input - 2:ON KIPLink – 3: ON from supervision, 10: OFF from keyboard - 11: OFF from digital input – 12: OFF from KIPLink – 13: OFF from supervision	Note 1, 2 and 3
374	R	OUT	value x1	-	Group operating mode (0: OFF - 1/2: Cooling+DHW - 3: Cooling - 4/5: Heating+DHW – 6: Heating – 7:DHW)	Note 1, 2 and 3
375	R	OUT	valuex1	MW	Unit power produced	Note 1 and 2
376	R	OUT	value/10	kW	Unit power produced	Note 1 and 2
377	R	OUT	valuex1	MW	Unit power absorbed	Note 1 and 2
378	R	OUT	value/10	kW	Unit power absorbed	Note 1 and 2
379	R	OUT	value/100	-	Instantaneous efficiency (EER/COP/DHW COP)	Note 1 and 2
380	R	OUT	valuex1	MWh	Current day: energy produced in chiller (MWh)	Note 1 and 2
381	R	OUT	value/10	kWh	Current day: energy produced in chiller (kWh)	Note 1 and 2
382	R	OUT	valuex1	MWh	Current day: energy absorbed in chiller (MWh)	Note 1 and 2
383	R	OUT	value/10	kWh	Current day: energy absorbed in chiller (kWh)	Note 1 and 2
384	R	OUT	valuex1	MWh	Current day: energy produced in heatpump (MWh)	Note 1 and 2
385	R	OUT	value/10	kWh	Current day: energy produced in heatpump (kWh)	Note 1 and 2
386	R	OUT	valuex1	MWh	Current day: energy absorbed in heatpump (MWh)	Note 1 and 2
387	R	OUT	value/10	kWh	Current day: energy absorbed in heatpump (kWh)	Note 1 and 2
388	R	OUT	valuex1	MWh	Current day: energy produced in DHW (MWh)	Note 1 and 2
389	R	OUT	value/10	kWh	Current day: energy produced in DHW (kWh)	Note 1 and 2
390	R	OUT	valuex1	MWh	Current day: energy absorbed in DHW (MWh)	Note 1 and 2
391	R	OUT	value/10	kWh	Current day: energy absorbed in DHW (kWh)	Note 1 and 2
392	R	OUT	valuex1	MWh	Current day: total energy produced (MWh)	Note 1 and 2
393	R	OUT	value/10	kWh	Current day: total energy produced (kWh)	Note 1 and 2
394	R	OUT	valuex1	MWh	Current day: total absorbed energy (MWh)	Note 1 and 2
395	R	OUT	value/10	kWh	Current day: total absorbed energy (kWh)	Note 1 and 2
396	R	OUT	value/100	-	Current day: Integrated efficiency in chiller	Note 1 and 2
397	R	OUT	value/100	-	Current day: Integrated efficiency in heatpump	Note 1 and 2
398	R	OUT	value/100	-	Current day: Integrated efficiency in DHW	Note 1 and 2
399	R	OUT	value/100	-	Current day: Total integrated efficiency	Note 1 and 2
400	R	OUT	valuex1	MWh	Previous day: energy produced in chiller (MWh)	Note 1 and 2
401	R	OUT	value/10	kWh	Previous day: energy produced in chiller (kWh)	Note 1 and 2

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
402	R	OUT	valuex1	MWh	Previous day: energy absorbed in chiller (MWh)	Note 1 and 2
403	R	OUT	value/10	kWh	Previous day: energy absorbed in chiller (kWh)	Note 1 and 2
404	R	OUT	valuex1	MWh	Previous day: energy produced in heatpump (MWh)	Note 1 and 2
405	R	OUT	value/10	kWh	Previous day: energy produced in heatpump (kWh)	Note 1 and 2
406	R	OUT	valuex1	MWh	Previous day: energy absorbed in heatpump (MWh)	Note 1 and 2
407	R	OUT	value/10	kWh	Previous day: energy absorbed in heatpump (kWh)	Note 1 and 2
408	R	OUT	valuex1	MWh	Previous day: energy produced in DHW (MWh)	Note 1 and 2
409	R	OUT	value/10	kWh	Previous day: energy produced in DHW (kWh)	Note 1 and 2
410	R	OUT	valuex1	MWh	Previous day: energy absorbed in DHW (MWh)	Note 1 and 2
411	R	OUT	value/10	kWh	Previous day: energy absorbed in DHW (kWh)	Note 1 and 2
412	R	OUT	valuex1	MWh	Previous day: total energy produced (MWh)	Note 1 and 2
413	R	OUT	value/10	kWh	Previous day: total energy produced (kWh)	Note 1 and 2
414	R	OUT	valuex1	MWh	Previous day: total absorbed energy (MWh)	Note 1 and 2
415	R	OUT	value/10	kWh	Previous day: total absorbed energy (kWh)	Note 1 and 2
416	R	OUT	value/100	-	Previous day: Integrated efficiency in chiller	Note 1 and 2
417	R	OUT	value/100	-	Previous day: Integrated efficiency in heatpump	Note 1 and 2
418	R	OUT	value/100	-	Previous day: Integrated efficiency in DHW	Note 1 and 2
419	R	OUT	value/100	-	Previous day: Total integrated efficiency	Note 1 and 2
420	R	OUT	valuex1	MWh	Current month: energy produced in chiller (MWh)	Note 1 and 2
421	R	OUT	value/10	kWh	Current month: energy produced in chiller (kWh)	Note 1 and 2
422	R	OUT	valuex1	MWh	Current month: energy absorbed in chiller (MWh)	Note 1 and 2
423	R	OUT	value/10	kWh	Current month: energy absorbed in chiller (kWh)	Note 1 and 2
424	R	OUT	valuex1	MWh	Current month: energy produced in heatpump (MWh)	Note 1 and 2
425	R	OUT	value/10	kWh	Current month: energy produced in heatpump (kWh)	Note 1 and 2
426	R	OUT	valuex1	MWh	Current month: energy absorbed in heatpump (MWh)	Note 1 and 2
427	R	OUT	value/10	kWh	Current month: energy absorbed in heatpump (kWh)	Note 1 and 2
428	R	OUT	valuex1	MWh	Current month: energy produced in DHW (MWh)	Note 1 and 2
531	R	OUT	value/10	kWh	Current month: energy produced in DHW (kWh)	Note 1 and 2
532	R	OUT	valuex1	MWh	Current month: energy absorbed in DHW (MWh)	Note 1 and 2
533	R	OUT	value/10	kWh	Current month: energy absorbed in DHW (kWh)	Note 1 and 2
534	R	OUT	valuex1	MWh	Current month: total energy produced (MWh)	Note 1 and 2
535	R	OUT	value/10	kWh	Current month: total energy produced (kWh)	Note 1 and 2
536	R	OUT	valuex1	MWh	Current month: total absorbed energy (MWh)	Note 1 and 2
537	R	OUT	value/10	kWh	Current month: total absorbed energy (kWh)	Note 1 and 2
538	R	OUT	value/100	-	Current month: Integrated efficiency in chiller	Note 1 and 2
539	R	OUT	value/100	-	Current month: Integrated efficiency in heatpump	Note 1 and 2
540	R	OUT	value/100	-	Current month: Integrated efficiency in DHW	Note 1 and 2
541	R	OUT	value/100	-	Current month: Total integrated efficiency	Note 1 and 2
542	R	OUT	valuex1	MWh	Previous month: energy produced in chiller (MWh)	Note 1 and 2
543	R	OUT	value/10	kWh	Previous month: energy produced in chiller (kWh)	Note 1 and 2
544	R	OUT	valuex1	MWh	Previous month: energy absorbed in chiller (MWh)	Note 1 and 2
545	R	OUT	value/10	kWh	Previous month: energy absorbed in chiller (kWh)	Note 1 and 2
546	R	OUT	valuex1	MWh	Previous month: energy produced in heatpump (MWh)	Note 1 and 2
547	R	OUT	value/10	kWh	Previous month: energy produced in heatpump (kWh)	Note 1 and 2
548	R	OUT	valuex1	MWh	Previous month: energy absorbed in heatpump (MWh)	Note 1 and 2
549	R	OUT	value/10	kWh	Previous month: energy absorbed in heatpump (kWh)	Note 1 and 2
550	R	OUT	valuex1	MWh	Previous month: energy produced in DHW (MWh)	Note 1 and 2
551	R	OUT	value/10	kWh	Previous month: energy produced in DHW (kWh)	Note 1 and 2
552	R	OUT	valuex1	MWh	Previous month: energy absorbed in DHW (MWh)	Note 1 and 2
553	R	OUT	value/10	kWh	Previous month: energy absorbed in DHW (kWh)	Note 1 and 2
554	R	OUT	valuex1	MWh	Previous month: total energy produced (MWh)	Note 1 and 2
555	R	OUT	value/10	kWh	Previous month: total energy produced (kWh)	Note 1 and 2
556	R	OUT	valuex1	MWh	Previous month: total absorbed energy (MWh)	Note 1 and 2
557	R	OUT	value/10	kWh	Previous month: total absorbed energy (kWh)	Note 1 and 2
558	R	OUT	value/100	-	Previous month: Integrated efficiency in chiller	Note 1 and 2
559	R	OUT	value/100	-	Previous month: Integrated efficiency in heatpump	Note 1 and 2
560	R	OUT	value/100	-	Previous month: Integrated efficiency in DHW	Note 1 and 2
561	R	OUT	value/100	-	Previous month: Total integrated efficiency	Note 1 and 2
562	R	OUT	valuex1	GWh	Current year: energy produced in chiller (GWh)	Note 1 and 2
563	R	OUT	valuex1	MWh	Current year: energy produced in chiller (MWh)	Note 1 and 2
564	R	OUT	value/10	kWh	Current year: energy produced in chiller (kWh)	Note 1 and 2
565	R	OUT	valuex1	GWh	Current year: energy absorbed in chiller (GWh)	Note 1 and 2
566	R	OUT	valuex1	MWh	Current year: energy absorbed in chiller (MWh)	Note 1 and 2
567	R	OUT	value/10	kWh	Current year: energy absorbed in chiller (kWh)	Note 1 and 2
568	R	OUT	valuex1	GWh	Current year: energy produced in heatpump (GWh)	Note 1 and 2
569	R	OUT	valuex1	MWh	Current year: energy produced in heatpump (MWh)	Note 1 and 2
570	R	OUT	value/10	kWh	Current year: energy produced in heatpump (kWh)	Note 1 and 2
571	R	OUT	valuex1	GWh	Current year: energy absorbed in heatpump (GWh)	Note 1 and 2
572	R	OUT	valuex1	MWh	Current year: energy absorbed in heatpump (MWh)	Note 1 and 2

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
573	R	OUT	value/10	kWh	Current year: energy absorbed in heatpump (kWh)	Note 1 and 2
574	R	OUT	valuex1	GWh	Current year: energy produced in DHW (GWh)	Note 1 and 2
575	R	OUT	valuex1	MWh	Current year: energy produced in DHW (MWh)	Note 1 and 2
576	R	OUT	value/10	kWh	Current year: energy produced in DHW (kWh)	Note 1 and 2
577	R	OUT	valuex1	GWh	Current year: energy absorbed in DHW (GWh)	Note 1 and 2
578	R	OUT	valuex1	MWh	Current year: energy absorbed in DHW (MWh)	Note 1 and 2
579	R	OUT	value/10	kWh	Current year: energy absorbed in DHW (kWh)	Note 1 and 2
580	R	OUT	valuex1	GWh	Current year: total energy produced (GWh)	Note 1 and 2
581	R	OUT	valuex1	MWh	Current year: total energy produced (MWh)	Note 1 and 2
582	R	OUT	value/10	kWh	Current year: total energy produced (kWh)	Note 1 and 2
583	R	OUT	valuex1	GWh	Current year: total absorbed energy (GWh)	Note 1 and 2
584	R	OUT	valuex1	MWh	Current year: total absorbed energy (MWh)	Note 1 and 2
585	R	OUT	value/10	kWh	Current year: total absorbed energy (kWh)	Note 1 and 2
586	R	OUT	value/100	-	Current year: Integrated efficiency in chiller	Note 1 and 2
587	R	OUT	value/100	-	Current year: Integrated efficiency in heatpump	Note 1 and 2
588	R	OUT	value/100	-	Current year: Integrated efficiency in DHW	Note 1 and 2
589	R	OUT	value/100	-	Current year: Total integrated efficiency	Note 1 and 2
590	R	OUT	valuex1	GWh	Previous year: energy produced in chiller (GWh)	Note 1 and 2
591	R	OUT	valuex1	MWh	Previous year: energy produced in chiller (MWh)	Note 1 and 2
592	R	OUT	value/10	kWh	Previous year: energy produced in chiller (kWh)	Note 1 and 2
593	R	OUT	valuex1	GWh	Previous year: energy absorbed in chiller (GWh)	Note 1 and 2
594	R	OUT	valuex1	MWh	Previous year: energy absorbed in chiller (MWh)	Note 1 and 2
595	R	OUT	value/10	kWh	Previous year: energy absorbed in chiller (kWh)	Note 1 and 2
596	R	OUT	valuex1	GWh	Previous year: energy produced in heatpump (GWh)	Note 1 and 2
597	R	OUT	valuex1	MWh	Previous year: energy produced in heatpump (MWh)	Note 1 and 2
598	R	OUT	value/10	kWh	Previous year: energy produced in heatpump (kWh)	Note 1 and 2
599	R	OUT	valuex1	GWh	Previous year: energy absorbed in heatpump (GWh)	Note 1 and 2
600	R	OUT	valuex1	MWh	Previous year: energy absorbed in heatpump (MWh)	Note 1 and 2
601	R	OUT	value/10	kWh	Previous year: energy absorbed in heatpump (kWh)	Note 1 and 2
602	R	OUT	valuex1	GWh	Previous year: energy produced in DHW (GWh)	Note 1 and 2
603	R	OUT	valuex1	MWh	Previous year: energy produced in DHW (MWh)	Note 1 and 2
604	R	OUT	value/10	kWh	Previous year: energy produced in DHW (kWh)	Note 1 and 2
605	R	OUT	valuex1	GWh	Previous year: energy absorbed in DHW (GWh)	Note 1 and 2
606	R	OUT	valuex1	MWh	Previous year: energy absorbed in DHW (MWh)	Note 1 and 2
607	R	OUT	value/10	kWh	Previous year: energy absorbed in DHW (kWh)	Note 1 and 2
608	R	OUT	valuex1	GWh	Previous year: total energy produced (GWh)	Note 1 and 2
609	R	OUT	valuex1	MWh	Previous year: total energy produced (MWh)	Note 1 and 2
610	R	OUT	value/10	kWh	Previous year: total energy produced (kWh)	Note 1 and 2
611	R	OUT	valuex1	GWh	Previous year: total energy absorbed (GWh)	Note 1 and 2
612	R	OUT	valuex1	MWh	Previous year: total absorbed energy (MWh)	Note 1 and 2
613	R	OUT	value/10	kWh	Previous year: total absorbed energy (kWh)	Note 1 and 2
614	R	OUT	value/100	-	Previous year: Integrated efficiency in chiller	Note 1 and 2
615	R	OUT	value/100	-	Previous year: Integrated efficiency in heatpump	Note 1 and 2
616	R	OUT	value/100	-	Previous year: Integrated efficiency in DHW	Note 1 and 2
617	R	OUT	value/100	-	Previous year: Total integrated efficiency	Note 1 and 2
618	R	OUT	valuex1	GWh	Year -2: energy produced in chiller (GWh)	Note 1 and 2
619	R	OUT	valuex1	MWh	Year -2: energy produced in chiller (MWh)	Note 1 and 2
620	R	OUT	value/10	kWh	Year -2: energy produced in chiller (kWh)	Note 1 and 2
621	R	OUT	valuex1	GWh	Year -2: energy absorbed in chiller (GWh)	Note 1 and 2
622	R	OUT	valuex1	MWh	Year -2: energy absorbed in chiller (MWh)	Note 1 and 2
623	R	OUT	value/10	kWh	Year -2: energy absorbed in chiller (kWh)	Note 1 and 2
624	R	OUT	valuex1	GWh	Year -2: energy produced in heatpump (GWh)	Note 1 and 2
628	R	OUT	valuex1	MWh	Year -2: energy produced in heatpump (MWh)	Note 1 and 2
629	R	OUT	value/10	kWh	Year -2: energy produced in heatpump (kWh)	Note 1 and 2
630	R	OUT	valuex1	GWh	Year -2: energy absorbed in heatpump (GWh)	Note 1 and 2
631	R	OUT	valuex1	MWh	Year -2: energy absorbed in heatpump (MWh)	Note 1 and 2
632	R	OUT	value/10	kWh	Year -2: energy absorbed in heatpump (kWh)	Note 1 and 2
633	R	OUT	valuex1	GWh	Year -2: energy produced in DHW (GWh)	Note 1 and 2
634	R	OUT	valuex1	MWh	Year -2: energy produced in DHW (MWh)	Note 1 and 2
635	R	OUT	value/10	kWh	Year -2: energy produced in DHW (kWh)	Note 1 and 2
636	R	OUT	valuex1	GWh	Year -2: energy absorbed in DHW (GWh)	Note 1 and 2
637	R	OUT	valuex1	MWh	Year -2: energy absorbed in DHW (MWh)	Note 1 and 2
638	R	OUT	value/10	kWh	Year -2: energy absorbed in DHW (kWh)	Note 1 and 2
639	R	OUT	valuex1	GWh	Year -2: total energy produced (GWh)	Note 1 and 2
640	R	OUT	valuex1	MWh	Year -2: total energy produced (MWh)	Note 1 and 2
641	R	OUT	value/10	kWh	Year -2: total energy produced (kWh)	Note 1 and 2
642	R	OUT	valuex1	GWh	Year -2: total absorbed energy (GWh)	Note 1 and 2
643	R	OUT	valuex1	MWh	Year -2: total absorbed energy (MWh)	Note 1 and 2
644	R	OUT	value/10	kWh	Year -2: total absorbed energy (kWh)	Note 1 and 2

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
645	R	OUT	value/100	-	Year -2: Integrated efficiency in chiller	Note 1 and 2
646	R	OUT	value/100	-	Year -2: Integrated efficiency in heatpump	Note 1 and 2
647	R	OUT	value/100	-	Year -2: Integrated efficiency in DHW	Note 1 and 2
648	R	OUT	value/100	-	Year -2: Total integrated efficiency	Note 1 and 2

***Type:** C =Coil, R=Register

Note 1: availability of the variable to the supervisor system depends on the type of unit and optional devices used.
Note 2: the possibility of using the variable depends on enabling of a parameter on the controller.
Note 3: Only available for multi-unit Master-Client control.

8.6 Reading/writing the date and time

The date and time are read and written using bit coding. A settings acceptance command is also used for writing.

Example of reading the date and time:

Reading the **YEAR/MONTH** variable

153	R	valuex1	-	Year / Month (see date and time read/write section)

The value read is: 38877

Value converted into boolean (16 bit): 38877 → 1001011111011101

Note:

If the read number is negative the complement to 1 must be performed, that is, sum **65536** before performing binary conversion.

Bit to bit decoding (using the database):

MONTH	Bit 15: Bit 14: Bit 13: Bit 12:	1 0 0 1	1001 → 09 (September)
YEAR	Bit 11: Bit 10: Bit 9: Bit 8: Bit 7: Bit 6: Bit 5: Bit 4: Bit 3: Bit 2: Bit 1: Bit 0:	0 1 1 1 1 1 0 1 1 1 0 1	011111011101 → 2013

Reading the **DAY/HOUR/MINUTES** variable

154	R	valuex1	-	Day / Hour / Minutes (see date and time read/write section)

The value read is: 15675

Value converted into boolean (16 bit): 15675 → 11110100111011
Bit to bit decoding (using the database):

MINUTES	Bit 15: Bit 14: Bit 13: Bit 12: Bit 11: Bit 10:	0 0 1 1 1 1	001111 → 15
HOUR	Bit 9: Bit 8: Bit 7: Bit 6: Bit 5:	0 1 0 0 1	01001 → 9
DAY	Bit 4: Bit 3: Bit 2: Bit 1: Bit 0:	1 1 0 1 1	11011 → 27

The relative date and time is therefore *27/09/2013 time 09.15*

Example of writing the date and time:

The date and time are written in 3 phases.

- setting a boolean variable to allow the whole variables to be written.
- writing the required value in the 2 whole variables to protocol using the reverse procedure to reading.
- resetting a boolean variable to give final confirmation.

Example:
To write the date and time: ***15/06/2016 time 18.54***

1. Take the boolean to 1:

10	C	IN/OUT	-	-	Modify date/time and confirmation given

2. Knowing that:

06 (month) → 0110
2016 (year) → 011111100000

0110 011111100000 → 26592

Write to the register

153	R	valuex1	-	Year / Month (see date and time read/write section)

The value 26592

3. Knowing that:

54 (minutes)→ 110110
18 (hour) → 10010
15 (day) → 01111

110110 10010 01111 → 55887

Write to the register

154	R	valuex1	-	Day / Hour / Minutes (see date and time read/write section)

The value *55887*

4. Take the boolean to 0

10	C	IN/OUT	-	-	Modify date/time and confirmation given

In this way the 2 previously written whole variables are saved to the controller.

8.7 Software version and revision interpretation

The version and revision in the controller are recorded in registers 131 and 132:

131	R	OUT	valuex1	-	Software version	Always
132	R	OUT	valuex1	-	Software version (revision)	Always

The information is coded as follows:

Software release (R: 131)

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Therefore, if for example TA15r00 is in the controller, register 131 will be equal to 2001 (T=**20**, A=**01**), while register 132 will be equal to 1400 (Version **14**, revision **00**).
By combining the two pieces of information, it is possible to determine the on-board software, its version and revision.

8.8 Modbus Characteristics

Modicon Modbus protocol implemented as described in the document:
Modicon Modbus protocol reference guide
March 1992, PI Modbus-300 rev D.

As regards serial communication with the Modbus protocol, the communication data are:
Speed: may be selected by software (see user menu, usually from 1200 to 19200 baud).
- Data bits: 8 (not modifiable).
- Stop bits: 2 (not modifiable).
- Parity: None (not modifiable)
- Flow Control: (Establishes how the PC and the converter interact, no influence on the controller).
- Start address, this is 1 and not 0

Address:
This is the supervision variable address in the electronic control unit.

Type:
C: Boolean variable (Coil for the Modbus protocol).
R: Analogue and whole variables (Register for the Modbus protocol).

Flow:
OUT: Read-only variable for the BMS.
IN: BMS read/write variable.

Scale factor:
valuex1:
the value read or written by the BMS is the true value, no conversion factor is required.

valuex10:
the value read (OUT) or written (IN) by the BMS must be multiplied by 10 after being read, or before being written.

valuex100:
the value read (OUT) or written (IN) by the BMS must be multiplied by 100 after being read, or before being written.

value/10:
the value read (OUT) or written (IN) by the BMS must be divided by 10 after being read, or before being written.

value/100:
the value read (OUT) or written (IN) by the BMS must be divided by 100 after being read, or before being written.

Example:
WRITING AND READING THE CHILLER TEMPERATURE SETPOINT.

- **Writing**

002	R	IN	valuex10	Chiller temperature setpoint

If the “Chiller temperature setpoint” variable must be written (IN) at 7.3 °C
The BMS must multiply the value to send to the controller by 10 (7.3x10 = 73)

- **Read**

002	R	OUT	value/10	Chiller temperature setpoint

If the “Chiller temperature setpoint” variable must be read (OUT)
The BMS must divide the value received from the controller by 10 (86/10 = 8.6 °C)

If a probe is in an alarm condition a value equal to -999 is sent that is -99.9
If a probe or a parameter is not configured a value equal to -888 is sent that is -88.8

Unit of Measurement:
This is the data unit of measurement after conversion with the scale factor

Example:

013	R	OUT	value/10	bar	High pressure transducer 1

Reading a value of 221 from the controller
With the scale factor, the true value is 22.1 which involves reading 22.1 bar in the unit of measurement column.

Function codes
The read and write controls (function codes) for the coils and registers available are shown in the following table:

Type of datum	Type of control	Function Codes
Coils (Boolean)	Read	1
	Write one variable	5
	Write multiple variables	15
Registers (analogue and whole)	Read	4
	Write one variable	6
	Write multiple variables	16

Coil Modbus addresses: Boolean variables:

Registers	Type	
000	C	NOT MANAGED
001	C	Boolean 001
002	C	Boolean 002
003	C	Boolean 003
…	C	…
181	C	Boolean 181
182	C	Boolean 182
183	C	Boolean 183

Register Modbus addresses: Analogue and Whole variables:

Registers	Type	
000	R	NOT MANAGED
001	R	Analogue 001
002	R	Analogue 002
003	R	Analogue 003
…	…	…
125	R	Analogue 125
126	R	Analogue 126
127	R	Analogue 127
128	R	NOT MANAGED
129	R	Whole 001
130	R	Whole 002
131	R	Whole 003
…	…	…
254	R	Whole 126
255	R	Whole 127
256	R	Whole 128

Decoding by bit:
Some whole variables must be transformed into 16bit Boolean variables (one word) and decoded bit by bit. The value of each bit has a particular meaning.

Note:
If the value returned by the reading of the whole variable is negative, before converting the variable from whole to Boolean it is necessary to take the 1s complement (that is add 65536 to the negative whole value).

Example 1:
Compressor 2 status: address 16 -> Modbus address 144 [128+16]
Whole value read by supervision: 530

As the value is positive, the 1s complement is NOT taken.

Value converted into boolean (16 bit): 530 → 0000001000010010
Bit to bit decoding (using the database):

Bit 0:	0→	Configured
Bit 1:	1→	Enabled
Bit 2:	0→	OFF
Bit 3:	0→	Pump-down not active
Bit 4:	1→	Alarm active
Bit 5:	0→	---
Bit 6:	0→	---
Bit 7:	0→	---
Bit 8:	0→	---
Bit 9:	1→	chiller
Bit 10:	0→	---
Bit 11:	0→	---
Bit 12:	0→	---
Bit 13:	0→	---
Bit 14:	0→	---
Bit 15:	0→	not required

Example 2:
Compressor 2 status: address 16 -> Modbus address 144 [128+16]
Whole value read by supervision: -31994

As the value is negative, the 1s complement is taken: -31994 **+ 65536** = 33542

Value converted into boolean (16 bit): 33542 → 1000001100000110
Bit to bit decoding (using the database):

Bit 0:	0→	Configured
Bit 1:	1→	Enabled
Bit 2:	1→	ON
Bit 3:	0→	Pump-down not active
Bit 4:	0→	Alarm not active
Bit 5:	0→	---
Bit 6:	0→	---
Bit 7:	0→	---
Bit 8:	1→	ON whole
Bit 9:	1→	chiller
Bit 10:	0→	---
Bit 11:	0→	---
Bit 12:	0→	---
Bit 13:	0→	---
Bit 14:	0→	---
Bit 15:	1→	required

8.9 Switching of the units to autonomous operation in the case of a fault or disconnection of the Supervisor

This function can be used in the following cases:

- communication down between the Supervisor and unit: for example due to a broken communication cable or loss of power to the Supervisor;

The Supervisor must perform cyclical variations of the register 40243 within 2 minutes of the previous variation (e.g. writing of register 40243 = "0", wait for 30s, writing of register 40243 = "1", wait for 30s and so on). Communication between the Supervisor and the unit is lost when there is no variation of the register 40243 for more than 2 minutes.
In which case, the unit switches to autonomous mode if possible, to guarantee the supply of power until normal operation of the Supervisor is restored.
The thermoregulator on the unit regulates the unit in autonomous mode in relation to the last setpoint value received from the Supervisor.

The unit can enter autonomous mode if all the following conditions were in place before loss of communication with the Supervisor:

- serial configured as "Supervision with watchdog" in the User menu;
- consent for autonomous operation enabled with bit 15 (Modbus);
- operation of the unit is enabled at the local keyboard or from the digital input

The unit does not start up when there is no communication with the Supervisor and even one of the above conditions is not met.

In case of voltage interruption, once the same is reinstated, bit 15 (Modbus) is initialised internally at 0 and must be reset by the supervisor.

Reset of local settings in Stand-Alone: Disabled	In case of watch-dog supervision active, it allows to set if the stand-alone unit must return to the settings entered using the keyboard. This function is only valid for the chiller setpoint set using the BMS and for the power limitation set using the BMS.

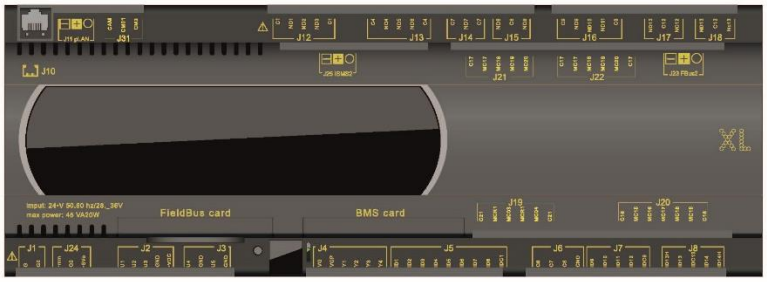
If the reset of the local settings is used together with watch-dog Supervision and independent operation consent, in case of loss of communication with the BMS the unit uses the chiller setpoint set using the keyboard and excludes any chiller power limitation that might have been set.

9 INTERFACING WITH BMS (MODBUS OVER IP)

9.1 Components required

MODBUS over IP interface board.
For the correct installation of the serial board, see the documentation supplied with the same.

Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



9.2 Installing the serial interface board

Follow the instructions in paragraph 2 “Installing the serial board” to insert the MODBUS over IP serial board into the controller. Always complete the connection to the ground using the connector on the left of the Ethernet interface.

9.3 Setting supervisor parameters

To communicate with the system, set the parameters as shown below.

You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Supervision	Communication towards a supervisor system must be enabled.
En. from superv.: On/Off: S Operating mode: S	Allows the on/off status and the operating mode change of the unit to be selected from a supervision system. Enabling from supervisor must be set as indicated alongside: ▪ Enable on/off: **Yes** ▪ Operating mode enable **Yes**
Serial line setting Standard Protocol Speed 19200 baud Unit ID 001	The supervisor connection parameters must be set as follows: ▪ Protocol: **Standard** ▪ Communication speed: **19200 baud (*)** ▪ unit identification number: **must match the Modbus slave address of the board**

(*) Communication speed between pCO and serial interface board.

9.4 Configuring the serial interface board

The first configuration of the MODBUS over IP serial interface board can be completed using the user interface of the electronic control board (with the exclusion of the touch screen display). Refer to the document “Modbus over IP interface cards configuration from system screen” for instructions.
Communication with the MODBUS system over IP is for internal networks. Due to the purpose and intended use of the product, encryption algorithms are not used to prevent interception of Modbus messages exchanged on the network.

9.5 Meaning of variables

Analogue variables are expressed with a decimal number (e.g.: 12.0bar -> 120; 33.8°C -> 338)
If a probe is in an alarm condition a value equal to -999 is sent that is -99.9
If a probe or a parameter is not configured a value equal to 888 is sent that is -88.8

9.6 Setting up the supervisor network

The supervision network is set up by the technicians who develop the Modbus over IP interface. For the connection to the Ethernet network use a category 5e or better S/FTP type cable.

9.7 MODBUS over IP Interface database (software versions TA17 and higher)

The reference database for systems using MODBUS over IP networks is shown below:

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
0	C		-	-	NOT MANAGED	
1	C	OUT	-	-	Unit status (0:Off - 1:On)	Always
3	C	OUT	-	-	Evaporator pump 1 status (0:Off - 1:On)	Note 1
4	C	OUT	-	-	Evaporator pump 2 status (0:Off - 1:On)	Note 1
5	C	OUT	-	-	Recuperator pump status (0:Off - 1:On)	Note 1
6	C	OUT	-	-	Condenser pump status (0:Off - 1:On)	Note 1
8	C	IN	-	-	On/off command from supervisor (0:Off - 1:On)	Note 2
		OUT	-	-		
9	C	IN	-	-	Modify date/time and confirmation (see date and time read/write section)	Always
		OUT	-	-		
10	C	IN	-	-	Enable time bands setting from supervisor	Always
		OUT	-	-		
11	C	OUT	-	-	Enable operating mode change from supervisor	Always
15	C	IN	-	-	Enable consent for autonomous operation in case of disconnection of the supervisor (only for serial line configured in "Supervision with watchdog" mode)	Note 2
		OUT	-	-		
31	C	IN	-	-	System adjustment on/off command (only for units with DHW)	Note 1
		OUT	-	-		
32	C	IN	-	-	DHW adjustment on/off command (only for units with DHW)	Note 1
		OUT	-	-		
33	C	IN	-	-	Temperature controller limitation command from supervisor for Demand Limit, Capacity Cap and Smart Current Limit (0:Off - 1:On)	Note 2
		OUT	-	-		
34	C	OUT	-	-	Energy meter electricity value reading enable	Note 1 and 2
35	C	OUT	-	-	Energy meter configuration for 3-phase electric line connection	Note 1 and 2
36	C	OUT	-	-	Energy meter configuration for connection of electric line with neutral	Note 1 and 2
37	C	OUT	-	-	Possibility of neutral current reading	Note 1 and 2
39	C	OUT	-	-	Changing the status of unit alarms	Always
40	C	OUT	-	-	ATS enable	Always
41	C	OUT	-	-	ATS 1 power supply detected	Always
42	C	OUT	-	-	ATS 1 power supply connected	Always
43	C	OUT	-	-	ATS 2 power supply detected	Always
44	C	OUT	-	-	ATS 2 power supply connected	Always
2	R	IN	valuex10	°C	Chiller temperature setpoint	Note 1
		OUT	value/10			
3	R	IN	valuex10	°C	Heat pump temperature setpoint	Note 1
		OUT	value/10			
4	R	IN	valuex10	°C	Recovery/DHW setpoint	Note 1
		OUT	value/10			

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
5	R	OUT	value/10	°C	Main active setpoint	Note 1
6	R	OUT	value/10	°C	Recovery setpoint active	Note 1
7	R	OUT	value/10	°C	Inlet temperature of evaporator	Note 1
8	R	OUT	value/10	°C	Evaporator outlet temperature (average)	Note 1
9	R	OUT	value/10	°C	Condenser inlet temperature	Note 1
10	R	OUT	value/10	°C	Condenser outlet temperature (average)	Note 1
11	R	OUT	value/10	°C	Recuperator inlet temperature / DHW storage tank temperature	Note 1
12	R	OUT	value/10	°C	Recuperator outlet temperature	Note 1
13	R	OUT	value/10	bar	High pressure transducer 1	Note 1
14	R	OUT	value/10	bar	High pressure transducer 2	Note 1
15	R	OUT	value/10	bar	High pressure transducer 3	Note 1
16	R	OUT	value/10	bar	High pressure transducer 4	Note 1
17	R	OUT	value/10	bar	Low pressure transducer 1	Note 1
18	R	OUT	value/10	bar	Low pressure transducer 2	Note 1
19	R	OUT	value/10	bar	Low pressure transducer 3	Note 1
20	R	OUT	value/10	bar	Low pressure transducer 4	Note 1
21	R	OUT	value/10	°C	External air temperature	Note 1
22	R	OUT	value/10	°C	Optional probe temperature	Note 1
23	R	OUT	value/10	°C	Freecooling inlet temperature	Note 1
24	R	OUT	value/10	kPa	Differential pressure transducer on hydraulic side of evaporator	Note 1
25	R	OUT	value/10	kPa	Differential pressure transducer on recuperator water side	Note 1
26	R	OUT	value/10	°C	Compressor 1 discharge temperature	Note 1
27	R	OUT	value/10	°C	Compressor 2 discharge temperature	Note 1
28	R	OUT	value/10	°C	Compressor 3 discharge temperature	Note 1
29	R	OUT	value/10	°C	Compressor 4 discharge temperature	Note 1
30	R	OUT	value/10	°C	Compressor 5 discharge temperature	Note 1
31	R	OUT	value/10	°C	Compressor 6 discharge temperature	Note 1
32	R	OUT	value/10	°C	Compressor 7 discharge temperature	Note 1
33	R	OUT	value/10	°C	Compressor 8 discharge temperature	Note 1
34	R	OUT	value/10	°C	Plant storage tank setpoint enabled	Note 1
35	R	OUT	value/10	°C	Plant storage tank temperature	Note 1
36	R	OUT	value/10	kPa	Differential pressure transducer on hydraulic side of condenser	Note 1
37	R	OUT	value/10	-	Compression ratio in absolute bar of Centrifuge comp. 8	Note 1
41	R	OUT	value/10	%	Power demand to centrifuge comp. 1	Note 1
			valuex1	rpm	Revs demand to inverter 1	Note 1
42	R	OUT	value/10	%	Power demand to centrifuge comp. 2	Note 1
			valuex1	rpm	Revs demand to inverter 2	Note 1
43	R	OUT	value/10	%	Power demand to centrifuge comp. 3	Note 1
			valuex1	rpm	Revs demand to inverter 3	Note 1
44	R	OUT	value/10	%	Power demand to centrifuge comp. 4	Note 1
			valuex1	rpm	Revs demand to inverter 4	Note 1
45	R	OUT	value/10	kW	Power demand to centrifuge comp. 1	Note 1
46	R	OUT	value/10	kW	Power demand to centrifuge comp. 2	Note 1
47	R	OUT	value/10	kW	Power demand to centrifuge comp. 3	Note 1
48	R	OUT	value/10	kW	Power demand to centrifuge comp. 4	Note 1
49	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 1	Note 1
50	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 2	Note 1
51	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 3	Note 1
52	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 4	Note 1
53	R	OUT	value/10	%	IGV position of centrifugal comp. 1	Note 1
54	R	OUT	value/10	%	IGV position of centrifugal comp. 2	Note 1
55	R	OUT	value/10	%	IGV position of centrifugal comp. 3	Note 1
56	R	OUT	value/10	%	IGV position of centrifugal comp. 4	Note 1
57	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 1	Note 1
58	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 2	Note 1
59	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 3	Note 1
60	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 4	Note 1
61	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 1	Note 1
62	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 2	Note 1
63	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 3	Note 1
64	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 4	Note 1
65	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 1	Note 1
66	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 2	Note 1
67	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 3	Note 1
68	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 4	Note 1
69	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 1	Note 1

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
70	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 2	Note 1
71	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 3	Note 1
72	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 4	Note 1
73	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 1	Note 1
74	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 2	Note 1
75	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 3	Note 1
76	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 4	Note 1
77	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 1	Note 1
78	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 2	Note 1
79	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 3	Note 1
80	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 4	Note 1
81	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 1	Note 1
82	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 2	Note 1
83	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 3	Note 1
84	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 4	Note 1
85					Confidential	
86	R	OUT	value/10	%	Power demand to centrifuge comp. 5	Note 1
87	R	OUT	value/10	%	Power demand to centrifuge comp. 6	Note 1
88	R	OUT	value/10	%	Power demand to centrifuge comp. 7	Note 1
89	R	OUT	value/10	%	Power demand to centrifuge comp. 8	Note 1
90	R	OUT	value/10	kW	Power demand to centrifuge comp. 5	Note 1
91	R	OUT	value/10	kW	Power demand to centrifuge comp. 6	Note 1
92	R	OUT	value/10	kW	Power demand to centrifuge comp. 7	Note 1
93	R	OUT	value/10	kW	Power demand to centrifuge comp. 8	Note 1
94	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 5	Note 1
95	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 6	Note 1
96	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 7	Note 1
97	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 8	Note 1
98	R	OUT	value/10	%	IGV position of centrifugal comp. 5	Note 1
99	R	OUT	value/10	%	IGV position of centrifugal comp. 6	Note 1
100	R	OUT	value/10	%	IGV position of centrifugal comp. 7	Note 1
101	R	OUT	value/10	%	IGV position of centrifugal comp. 8	Note 1
102	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 5	Note 1
103	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 6	Note 1
104	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 7	Note 1
105	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 8	Note 1
106	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 5	Note 1
107	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 6	Note 1
108	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 7	Note 1
109	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 8	Note 1
110	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 5	Note 1
111	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 6	Note 1
112	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 7	Note 1
113	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 8	Note 1
114	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 5	Note 1
115	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 6	Note 1
116	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 7	Note 1
117	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 8	Note 1
118	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 5	Note 1
119	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 6	Note 1
120	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 7	Note 1
121	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 8	Note 1
122	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 5	Note 1
123	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 6	Note 1
124	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 7	Note 1
125	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 8	Note 1
126	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 5	Note 1
127	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 6	Note 1
128	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 7	Note 1
5005	R	OUT	valuex1	-	Software version	Always
5006	R	OUT	valuex1	-	Software version (revision)	Always
5007	R	OUT	valuex1	-	Unit type configuration (00:Chiller - 01:Chiller+recovery - 02:Chiller+freecooling - 10:Heat pump - 11:Heat pump+recovery - 14 Heat pump+DHW - 15: +2P module - 21:Energy raiser - 25:Energy raiser and +2P module)	Always
5008	R	OUT	valuex1	-	N° circuits	Always
5009	R	OUT	valuex1	-	N° compressors	Always

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
5010	R	OUT	valuex1	-	N° separation stages per compressor	Always
5011	R	OUT	valuex1	-	Type of compressors (0:Centrifuge - 1:Hermetic - 2:Alternative - 3:Screw*) * To identify if and which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter	Always
5012	R	OUT	valuex1	-	Unit configuration status [1] (Bit0: 0:Heat pump disabled, 1:Heat pump enabled Bit1: 0:Quick Mind disabled, 1:Quick Mind enabled Bit2: 0:Inlet, 1:Outlet Bit3: 0:FreeCooling disabled, 1:FreeCooling enabled Bit4 - Bit10: Not significant Bit11: 0:Recovery disabled, 1:Recovery enabled Bit12 - Bit15: Not significant)	Always
5013	R	OUT	valuex1	-	Unit configuration status [2] (Bit0: 0:Time bands disabled, 1:Time bands enabled Bit1: 0:Pumpdown disabled, 1:Pumpdown enabled Bit2: 0:Setpoint modification disabled, 1:Setpoint modification enabled Bit3: 0:Air cooling, 1:Water cooling Bit4: 0:Sequencer disabled, 1:Sequencer enabled Bit5: 0:DHW disabled, 1:DHW enabled Bit6: 0:anti-legionellosis disabled, 1:anti-legionellosis enabled Bit7: 0: +2P module disabled, 1: +2P module enabled Bit8 - Bit15: Not significant)	Always
5014	R	OUT	valuex1	-	Unit status (0:ON from keyboard - 1:ON from digital input - 2:ON from time bands - 3:ON from supervisor - 4:OFF from alarm - 5:OFF from supervisor - 6:OFF from time bands - 7:OFF from digital input - 8:OFF from keyboard - 9:OFF with deselection of compressors - 10:OFF)	Always
5015	R	OUT	valuex1	-	Unit timing status (0:Unit off - 1:Unit timing - 3:Unit at full power - 4:Switching off - 5: Timing of compressors - 6:Pump timing - 8:Unit OFF from alarm)	Always
5016	R	IN / OUT	valuex1	-	Operating mode Chiller unit (3:chiller) Chiller + freecooling (7:chiller - 8:chiller+fc) Chiller + recovery (2:chiller+rec - 3:chiller) Heat pump (3:chiller 4:heatpump) Energy raisers (0:auto -1:recovery - 2:chiller+rec - 3:chiller) Heat pump with recovery (10:summer auto - 11:summer rec - 12:summer ch+rec - 13:summer ch - 14:winter hp - 15:winter rec - 16:winter auto)	Always
5017	R	OUT	valuex1	-	Compressor 1 status (Bit0: 0:Configured, 1:Not configured Bit1: 0:Disabled, 1:Enabled Bit2: 0:OFF, 1:ON Bit3: 0:Pump-down inactive, 1:Pump-down active Bit4: 0:Alarm not active, 1:Alarm active Bit5: 0:--- ,1:ON with 3 steps active; start for screw and centrifuge compressors Bit6: 0:--- ,1:ON with 2 steps active Bit7: 0:--- ,1:ON with 1 step active Bit8: 0:--- ,1:ON entire Bit9: 0:--- ,1:chiller Bit10: 0:--- ,1:heat pump Bit11: 0:--- ,1:recovery Bit12: 0:--- ,1:defrost Bit13: 0:--- ,1:freecooling Bit14: 0:--- ,1:dripping Bit15: 0:--- ,1:request)	Always
5018	R	OUT	valuex1	-	Compressor 2 status (see compressor 1 status)	Note 1
5019	R	OUT	valuex1	-	Compressor 3 status (see compressor 1 status)	Note 1
5020	R	OUT	valuex1	-	Compressor 4 status (see compressor 1 status)	Note 1
5021	R	OUT	valuex1	-	Compressor 5 status (see compressor 1 status)	Note 1
5022	R	OUT	valuex1	-	Compressor 6 status (see compressor 1 status)	Note 1
5023	R	OUT	valuex1	-	Compressor 7 status (see compressor 1 status)	Note 1
5024	R	OUT	valuex1	-	Compressor 8 status (see compressor 1 status)	Note 1
5025	R	OUT	valuex1	-	Average hours compressors (thousands)	Always

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
5026	R	OUT	valuex1	-	Average hours compressors (units)	Always
5027	R	IN	valuex1	-	Year / Month (see date and time read/write section)	Always
		OUT	valuex1	-		
5028	R	IN	valuex1	-	Day / Hour / Minutes (see date and time read/write section)	Always
		OUT	valuex1	-		
5029	R	OUT	valuex1	-	Pump code (Bit0: 0: --- , 1:Enable pump 1 Bit1: 0: --- , 1:Enable pump 2 Bit2: 0: --- , 1:Recovery pump enabled Bit3: 0: --- , 1:DHW pump enabled Bit4: 0: --- , 1:Condenser pump enabled Bit5: 0: --- , Bit6: 0: --- , 1:Pumps 1 and 2 stopped for machine or hydraulic circuit alarms Bit7: 0: --- , 1:Recovery pump stopped due to machine or hydraulic circuit alarms Bit8: 0: --- , 1:Pump 1 alarm Bit9: 0: --- , 1:Pump 2 alarm Bit10: 0: --- , 1:Recovery pump alarm Bit11: 0: --- , 1:DHW pump alarm Bit12: 0: --- , 1:Condenser pump alarm Bit13: 0: --- , 1:Condenser flow or antifreeze alarm Bit14: 0: --- , 1:Unit no longer available -stop_by_alarm- Bit15: 0: --- , 1:Unit in alarm status but with requested pumps -no_stop_pump-)	Always
5030	R	OUT	valuex1	-	Flash operating mode (Bit0: 0:--- , 1:Anti-legionellosis function active Bit1: 0:--- , 1:Sniffer function on pumps enabled Bit2: 0:--- , 1:Unit start delay after power failure Bit3: 0:--- , 1:Thermoregulator on hold/timing Bit4: 0:--- , 1:Fast Restart function enabled Bit5: 0:--- , 1:+2P module enabled Bit6: Not significant Bit7: 0:--- , 1:Unit with power limitation enabled Bit8: 0: --- , 1:Unit with antifreeze limitation enabled Bit9: 0: --- , 1:high temperature pressure switch control enabled Bit10: 0: --- , 1:Defrosting on Bit11: 0: --- , 1:Energy storage Bit12: 0: --- , 1:Drip phase active in at least one circuit Bit13: 0: --- , 1:Override at maximum in at least one circuit Bit14: 0: --- , 1:Override at minimum in at least one circuit Bit15: 0: --- , 1:The unit is producing DHW	Always
5032	R	OUT	valuex1	-	Unit status (0: ON from keyboard - 1: ON from digital input - 2: ON from time bands - 3: ON from KIPlink - 4: ON from supervisor - 5: ON from sequencer - 6: ON from Manager 3000 - 7: ON from ClimaPRO - 8: ON from LAN - 9: ON from manager + - 20: OFF from alarm - 21: OFF from ClimaPRO - 22: OFF from Manager 3000 - 23: OFF from sequencer - 24: OFF from supervisor - 25: OFF from KIPlink - 26: OFF from time bands - 27: OFF from digital input - 28: OFF from keyboard - 29: OFF with deselection of compressors - 30: OFF - 31: Standby - 32: OFF from LAN - 33: OFF from manager +)	Always
5034	R	OUT	valuex1	-	Active alarm code (with greater priority)	Always
5035	R	OUT	valuex1	-	Screw compressor model (0: Bitzer/Bitzer CSC - 1:Hitachi - 2:Fu-Sheng - 3:Bitzer inverter - 10:Hybrid*) * To identify which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter	Note 1
5036	R	OUT	valuex1	%	Chiller thermoregulator demand (not available for units with output adjustment)	Note 1
5037	R	OUT	valuex1	%	Active power of chiller thermoregulator	Note 1
5038	R	OUT	valuex1	%	Available power of chiller thermoregulator	Note 1
5039	R	OUT	valuex1	%	Heat pump thermoregulator demand (not available for units with output adjustment)	Note 1
5040	R	OUT	valuex1	%	Active power of heat pump thermoregulator	Note 1
5041	R	OUT	valuex1	%	Available power of heat pump thermoregulator	Note 1
5042	R	OUT	valuex1	%	Recovery thermoregulator demand (not available for units with output adjustment)	Note 1

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
5043	R	OUT	valuex1	%	Active power of recovery thermoregulator	Note 1
5044	R	OUT	valuex1	%	Available power of recovery thermoregulator	Note 1
5045	R	IN	valuex1	%	Temperature controller limitation in chiller (for Demand Limit and Capacity Cap)	Note 1
		OUT	valuex1			
5046	R	IN	valuex1	%	Temperature controller limitation in heat pump (for Demand Limit and Capacity Cap)	Note 1
		OUT	valuex1			
5047	R	IN	valuex1	%	Temperature controller limitation in recovery (for Demand Limit and Capacity Cap)	Note 1
		OUT	valuex1			
5048	R	OUT	valuex10	rpm	RPM centrifuge comp. 1	Note 1
			valuex1		RPM inverter comp.1	Note 1
5049	R	OUT	valuex10	rpm	RPM centrifuge comp. 2	Note 1
			valuex1		RPM inverter comp.2	Note 1
5050	R	OUT	valuex10	rpm	RPM centrifuge comp. 3	Note 1
			valuex1		RPM inverter comp.3	Note 1
5051	R	OUT	valuex10	rpm	RPM centrifuge comp. 4	Note 1
			valuex1		RPM inverter comp.4	Note 1
5052	R	OUT	valuex10	rpm	RPM centrifuge comp. 5	Note 1
5053	R	OUT	valuex10	rpm	RPM centrifuge comp. 6	Note 1
5054	R	OUT	valuex10	rpm	RPM centrifuge comp. 7	Note 1
5055	R	OUT	valuex10	rpm	RPM centrifuge comp. 8	Note 1
5056	R	OUT	valuex1	hx1000	Compressor 1 hours (thousands)	Always
5057	R	OUT	valuex1	h	Compressor 1 hours (units)	Always
5058	R	OUT	valuex1	hx1000	Compressor 2 hours (thousands)	Note 1
5059	R	OUT	valuex1	h	Compressor 2 hours (units)	Note 1
5060	R	OUT	valuex1	hx1000	Compressor 3 hours (thousands)	Note 1
5061	R	OUT	valuex1	h	Compressor 3 hours (units)	Note 1
5062	R	OUT	valuex1	hx1000	Compressor 4 hours (thousands)	Note 1
5063	R	OUT	valuex1	h	Compressor 4 hours (units)	Note 1
5064	R	OUT	valuex1	hx1000	Compressor 5 hours (thousands)	Note 1
5065	R	OUT	valuex1	h	Compressor 5 hours (units)	Note 1
5066	R	OUT	valuex1	hx1000	Compressor 6 hours (thousands)	Note 1
5067	R	OUT	valuex1	h	Compressor 6 hours (units)	Note 1
5068	R	OUT	valuex1	hx1000	Compressor 7 hours (thousands)	Note 1
5069	R	OUT	valuex1	h	Compressor 7 hours (units)	Note 1
5070	R	OUT	valuex1	hx1000	Compressor 8 hours (thousands)	Note 1
5071	R	OUT	valuex1	h	Compressor 8 hours (units)	Note 1
5072	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 1	Note 1
5073	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 2	Note 1
5074	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 3	Note 1
5075	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 4	Note 1
5076	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 1	Note 1
5077	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 2	Note 1
5078	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 3	Note 1
5079	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 4	Note 1
5080	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 1	Note 1
5081	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 2	Note 1
5082	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 3	Note 1
5083	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 4	Note 1
5084	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 1	Note 1
5085	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 2	Note 1
5086	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 3	Note 1
5087	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 4	Note 1
5088	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 5	Note 1
5089	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 6	Note 1
5090	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 7	Note 1
5091	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 8	Note 1
5092	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 5	Note 1
5093	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 6	Note 1
5094	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 7	Note 1
5095	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 8	Note 1
5096	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 5	Note 1
5097	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 6	Note 1
5098	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 7	Note 1
5099	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 8	Note 1
5100	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 5	Note 1
5101	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 6	Note 1
5102	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 7	Note 1
5113	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 8	Note 1
5115	R	OUT	valuex1	%	Opening of freecooling valve as a percentage	Note 1

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
5116	R	IN	Value x1	-	Watchdog	Note 2
		OUT	Value x1	-		
5123	R	OUT	value/10	%	Main pump speed % with VPF management	Note 1
5126	R	OUT	value/10	%	Recovery pump speed % with VPF management	Note 1
5128	R	OUT	valuex1	V	Network analyser: Line 1 - N voltage	Note 1 and 2
5129	R	OUT	valuex1	V	Network analyser: Line 2 - N voltage	Note 1 and 2
5130	R	OUT	valuex1	V	Network analyser: Line 3 - N voltage	Note 1 and 2
5131	R	OUT	valuex1	V	Network analyser: Line 1 - line 2 voltage	Note 1 and 2
5132	R	OUT	valuex1	V	Network analyser: Line 2 - line 3 voltage	Note 1 and 2
5133	R	OUT	valuex1	V	Network analyser: Line 3 - line 1 voltage	Note 1 and 2
5134	R	OUT	value/10	A	Network analyser: Line 1 current	Note 1 and 2
5135	R	OUT	value/10	A	Network analyser: Line 2 current	Note 1 and 2
5136	R	OUT	value/10	A	Network analyser: Line 3 current	Note 1 and 2
5137	R	OUT	value/10	A	Network analyser: Neutral current	Note 1 and 2
5138	R	OUT	value/1000	-	Network analyser: Power factor	Note 1 and 2
5139	R	OUT	value/10	kW	Network analyser: Line 1 power	Note 1 and 2
5140	R	OUT	value/10	kW	Network analyser: Line 2 power	Note 1 and 2
5141	R	OUT	value/10	kW	Network analyser: Line 3 power	Note 1 and 2
5142	R	OUT	value/10	kW	Network analyser: Total capacity	Note 1 and 2
5143	R	OUT	valuex1	kWh	Network analyser: Energy (millions)	Note 1 and 2
5144	R	OUT	valuex1	kWh	Network analyser: Energy (thousands)	Note 1 and 2
5145	R	OUT	valuex1	kWh	Network analyser: Energy (units)	Note 1 and 2
5146	R	OUT	valuex1	h	Network analyser: Time (millions)	Note 1 and 2
5147	R	OUT	valuex1	h	Network analyser: Time (thousands)	Note 1 and 2
5148	R	OUT	valuex1	h	Network analyser: Time (units)	Note 1 and 2
5157	R	IN	valuex1	A	Setpoint from BMS of the maximum permitted input current for the unit	Note 1 and 2
		OUT	valuex1			
5158	R	OUT	value/10	m^3/h	Thermal power analyser: evaporator flow rate	Note 1 and 2
5159	R	OUT	value/10	°C	Thermal power analyser: temperature T1 connected to the evaporator input	Note 1 and 2
5160	R	OUT	value/10	°C	Thermal power analyser: temperature T2 connected to the evaporator output	Note 1 and 2
5161	R	OUT	value/10	°C	Thermal power analyser: temperature difference calculated as T1 - T2	Note 1 and 2
5162	R	OUT	valuex1	kWh	Thermal power analyser: calculated thermal power	Note 1 and 2
5163	R	OUT	value/10	VA	Network analyser: Apparent power line 1	Note 1 and 2
5164	R	OUT	value/10	VA	Network analyser: Apparent power line 2	Note 1 and 2
5165	R	OUT	value/10	VA	Network analyser: Apparent power line 3	Note 1 and 2
5166	R	OUT	value/10	VA	Network analyser: Total apparent power	Note 1 and 2
5167	R	OUT	value/10	VAR	Network analyser: Reactive power line 1	Note 1 and 2
5168	R	OUT	value/10	VAR	Network analyser: Reactive power line 2	Note 1 and 2
5169	R	OUT	value/10	VAR	Network analyser: Reactive power line 3	Note 1 and 2
5170	R	OUT	value/10	VAR	Network analyser: Total reactive power	Note 1 and 2
5171	R	OUT	valuex1	%	Percentage ventilation of circuit 1 / opening of modulating valve disposal circuit 1	Note 1 and 2
5172	R	OUT	valuex1	%	Percentage ventilation of circuit 2 / opening of modulating valve disposal circuit 2	Note 1 and 2
5173	R	OUT	valuex1	%	Percentage ventilation of circuit 3 / opening of modulating valve disposal circuit 3	Note 1 and 2
5174	R	OUT	valuex1	%	Percentage ventilation of circuit 4 / opening of modulating valve disposal circuit 4	Note 1 and 2
5219	R	OUT	valuex1	-	[01] 10 simultaneously active alarms with priority from 1 to 10	Always
5220	R	OUT	valuex1	-	[02] 10 simultaneously active alarms with priority from 1 to 10	Always
5221	R	OUT	valuex1	-	[03] 10 simultaneously active alarms with priority from 1 to 10	Always
5222	R	OUT	valuex1	-	[04] 10 simultaneously active alarms with priority from 1 to 10	Always
5223	R	OUT	valuex1	-	[05] 10 simultaneously active alarms with priority from 1 to 10	Always
5224	R	OUT	valuex1	-	[06] 10 simultaneously active alarms with priority from 1 to 10	Always
5225	R	OUT	valuex1	-	[07] 10 simultaneously active alarms with priority from 1 to 10	Always
5226	R	OUT	valuex1	-	[08] 10 simultaneously active alarms with priority from 1 to 10	Always
5227	R	OUT	valuex1	-	[09] 10 simultaneously active alarms with priority from 1 to 10	Always

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
5228	R	OUT	valuex1	-	[10] 10 simultaneously active alarms with priority from 1 to 10	Always
5229	R	OUT	valuex1	A	Active permitted input current setpoint	Always
5230	R	OUT	valuex1	-	Information on bit-coded residential functions: Bit0: 0:--- , 1:HT zone configured Bit1: 0:--- , 1:HT zone active Bit2: 0:--- , 1:HT zone alarm Bit3: 0:--- , 1:LT zone configured Bit4: 0:--- , 1:LT zone active Bit5: 0:--- , 1:LT zone alarm Bit6: 0:--- , 1:DHW recirculation configured Bit7: 0:--- , 1:DHW recirculation active Bit8: 0: --- , 1:Dehumidifier configured Bit9: 0: --- , 1:Dehumidifier active Bit10: 0: --- , 1:Auxiliary source in system delivery active Bit11: 0: --- , 1:Auxiliary source in system storage active Bit12: 0: --- , 1:Auxiliary source in DHW storage active Bit13: 0: --- , 1:System auxiliary source block alarm Bit14: 0: --- , 1: not used Bit15: 0: --- , 1: not used	Note 1 and 2
5231	R	OUT	value/10	°C	Mixed water temperature	Note 1 and 2
5232	R	OUT	value/10	°C	LT active setpoint	Note 1 and 2
5233	R/W	IN OUT	value/10	°C	Mixed water temperature summer setpoint	Note 1 and 2
5234	R/W	IN OUT	value/10	°C	Mixed water temperature winter setpoint	Note 1 and 2
5235	R/W	IN OUT	valuex1	-	Operating mode automatic change for external air temperature: 0 = disabled 1 = enabled	Note 1 and 2
5236	R/W	IN OUT	valuex1	-	Start priority: 0 = system 1 = DHW	Note 1 and 2
5237	R	OUT	Value x1	-	Unit 1 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
5238	R	OUT	Value x1	-	Unit 2 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
5239	R	OUT	Value x1	-	Unit 3 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
5240	R	OUT	Value x1	-	Unit 4 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
5241	R	OUT	Value x1	%	Percentage of power delivered unit 1	Note 1, 2 and 3
5242	R	OUT	Value x1	%	Percentage of power delivered unit 2	Note 1, 2 and 3
5243	R	OUT	Value x1	%	Percentage of power delivered unit 3	Note 1, 2 and 3
5244	R	OUT	Value x1	%	Percentage of power delivered unit 4	Note 1, 2 and 3
5245	R	OUT	Value x1	%	Percentage of power delivered to the plant by the group	Note 1, 2 and 3
5246	R	OUT	Value x1	%	Percentage of power delivered to DHW by the group	Note 1, 2 and 3
5247	R	OUT	Value x1	-	Group status (0: ON from keyboard - 1: ON from a digital input - 2: ON from KIPLink - 3: ON from supervision, 10: OFF from keyboard - 11: OFF from digital input – 12: OFF from KIPLink – 13: OFF from supervision	Note 1, 2 and 3
5248	R	OUT	Value x1	-	Group operating mode (0: OFF - 1/2: Cooling+DHW - 3: Cooling - 4/5: Heating+DHW – 6: Heating – 7: DHW)	Note 1, 2 and 3
5249	R	OUT	valuex1	MW	Unit power produced	Note 1 and 2
5250	R	OUT	value/10	kW	Unit power produced	Note 1 and 2
5251	R	OUT	valuex1	MW	Unit power absorbed	Note 1 and 2
5252	R	OUT	value/10	kW	Unit power absorbed	Note 1 and 2
5253	R	OUT	value/100	-	Instantaneous efficiency (EER/COP/DHW COP)	Note 1 and 2
5254	R	OUT	valuex1	MWh	Current day: energy produced in chiller (MWh)	Note 1 and 2
5255	R	OUT	value/10	kWh	Current day: energy produced in chiller (kWh)	Note 1 and 2
5256	R	OUT	valuex1	MWh	Current day: energy absorbed in chiller (MWh)	Note 1 and 2

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
5257	R	OUT	value/10	kWh	Current day: energy absorbed in chiller (kWh)	Note 1 and 2
5258	R	OUT	valuex1	MWh	Current day: energy produced in heatpump (MWh)	Note 1 and 2
5259	R	OUT	value/10	kWh	Current day: energy produced in heatpump (kWh)	Note 1 and 2
5260	R	OUT	valuex1	MWh	Current day: energy absorbed in heatpump (MWh)	Note 1 and 2
5261	R	OUT	value/10	kWh	Current day: energy absorbed in heatpump (kWh)	Note 1 and 2
5262	R	OUT	valuex1	MWh	Current day: energy produced in DHW (MWh)	Note 1 and 2
5263	R	OUT	value/10	kWh	Current day: energy produced in DHW (kWh)	Note 1 and 2
5264	R	OUT	valuex1	MWh	Current day: energy absorbed in DHW (MWh)	Note 1 and 2
5265	R	OUT	value/10	kWh	Current day: energy absorbed in DHW (kWh)	Note 1 and 2
5266	R	OUT	valuex1	MWh	Current day: total energy produced (MWh)	Note 1 and 2
5267	R	OUT	value/10	kWh	Current day: total energy produced (kWh)	Note 1 and 2
5268	R	OUT	valuex1	MWh	Current day: total absorbed energy (MWh)	Note 1 and 2
5269	R	OUT	value/10	kWh	Current day: total absorbed energy (kWh)	Note 1 and 2
5270	R	OUT	value/100	-	Current day: Integrated efficiency in chiller	Note 1 and 2
5271	R	OUT	value/100	-	Current day: Integrated efficiency in heatpump	Note 1 and 2
5272	R	OUT	value/100	-	Current day: Integrated efficiency in DHW	Note 1 and 2
5273	R	OUT	value/100	-	Current day: Total integrated efficiency	Note 1 and 2
5274	R	OUT	valuex1	MWh	Previous day: energy produced in chiller (MWh)	Note 1 and 2
5275	R	OUT	value/10	kWh	Previous day: energy produced in chiller (kWh)	Note 1 and 2
5276	R	OUT	valuex1	MWh	Previous day: energy absorbed in chiller (MWh)	Note 1 and 2
5277	R	OUT	value/10	kWh	Previous day: energy absorbed in chiller (kWh)	Note 1 and 2
5278	R	OUT	valuex1	MWh	Previous day: energy produced in heatpump (MWh)	Note 1 and 2
5279	R	OUT	value/10	kWh	Previous day: energy produced in heatpump (kWh)	Note 1 and 2
5280	R	OUT	valuex1	MWh	Previous day: energy absorbed in heatpump (MWh)	Note 1 and 2
5281	R	OUT	value/10	kWh	Previous day: energy absorbed in heatpump (kWh)	Note 1 and 2
5282	R	OUT	valuex1	MWh	Previous day: energy produced in DHW (MWh)	Note 1 and 2
5283	R	OUT	value/10	kWh	Previous day: energy produced in DHW (kWh)	Note 1 and 2
5284	R	OUT	valuex1	MWh	Previous day: energy absorbed in DHW (MWh)	Note 1 and 2
5285	R	OUT	value/10	kWh	Previous day: energy absorbed in DHW (kWh)	Note 1 and 2
5286	R	OUT	valuex1	MWh	Previous day: total energy produced (MWh)	Note 1 and 2
5287	R	OUT	value/10	kWh	Previous day: total energy produced (kWh)	Note 1 and 2
5288	R	OUT	valuex1	MWh	Previous day: total absorbed energy (MWh)	Note 1 and 2
5289	R	OUT	value/10	kWh	Previous day: total absorbed energy (kWh)	Note 1 and 2
5290	R	OUT	value/100	-	Previous day: Integrated efficiency in chiller	Note 1 and 2
5291	R	OUT	value/100	-	Previous day: Integrated efficiency in heatpump	Note 1 and 2
5292	R	OUT	value/100	-	Previous day: Integrated efficiency in DHW	Note 1 and 2
5293	R	OUT	value/100	-	Previous day: Total integrated efficiency	Note 1 and 2
5294	R	OUT	valuex1	MWh	Current month: energy produced in chiller (MWh)	Note 1 and 2
5295	R	OUT	value/10	kWh	Current month: energy produced in chiller (kWh)	Note 1 and 2
5296	R	OUT	valuex1	MWh	Current month: energy absorbed in chiller (MWh)	Note 1 and 2
5297	R	OUT	value/10	kWh	Current month: energy absorbed in chiller (kWh)	Note 1 and 2
5298	R	OUT	valuex1	MWh	Current month: energy produced in heatpump (MWh)	Note 1 and 2
5299	R	OUT	value/10	kWh	Current month: energy produced in heatpump (kWh)	Note 1 and 2
5300	R	OUT	valuex1	MWh	Current month: energy absorbed in heatpump (MWh)	Note 1 and 2
5301	R	OUT	value/10	kWh	Current month: energy absorbed in heatpump (kWh)	Note 1 and 2
5302	R	OUT	valuex1	MWh	Current month: energy produced in DHW (MWh)	Note 1 and 2
5405	R	OUT	value/10	kWh	Current month: energy produced in DHW (kWh)	Note 1 and 2
5406	R	OUT	valuex1	MWh	Current month: energy absorbed in DHW (MWh)	Note 1 and 2
5407	R	OUT	value/10	kWh	Current month: energy absorbed in DHW (kWh)	Note 1 and 2
5408	R	OUT	valuex1	MWh	Current month: total energy produced (MWh)	Note 1 and 2
5409	R	OUT	value/10	kWh	Current month: total energy produced (kWh)	Note 1 and 2
5410	R	OUT	valuex1	MWh	Current month: total absorbed energy (MWh)	Note 1 and 2
5411	R	OUT	value/10	kWh	Current month: total absorbed energy (kWh)	Note 1 and 2
5412	R	OUT	value/100	-	Current month: Integrated efficiency in chiller	Note 1 and 2
5413	R	OUT	value/100	-	Current month: Integrated efficiency in heatpump	Note 1 and 2
5414	R	OUT	value/100	-	Current month: Integrated efficiency in DHW	Note 1 and 2
5415	R	OUT	value/100	-	Current month: Total integrated efficiency	Note 1 and 2
5416	R	OUT	valuex1	MWh	Previous month: energy produced in chiller (MWh)	Note 1 and 2
5417	R	OUT	value/10	kWh	Previous month: energy produced in chiller (kWh)	Note 1 and 2
5418	R	OUT	valuex1	MWh	Previous month: energy absorbed in chiller (MWh)	Note 1 and 2
5419	R	OUT	value/10	kWh	Previous month: energy absorbed in chiller (kWh)	Note 1 and 2
5420	R	OUT	valuex1	MWh	Previous month: energy produced in heatpump (MWh)	Note 1 and 2
5421	R	OUT	value/10	kWh	Previous month: energy produced in heatpump (kWh)	Note 1 and 2
5422	R	OUT	valuex1	MWh	Previous month: energy absorbed in heatpump (MWh)	Note 1 and 2
5423	R	OUT	value/10	kWh	Previous month: energy absorbed in heatpump (kWh)	Note 1 and 2
5424	R	OUT	valuex1	MWh	Previous month: energy produced in DHW (MWh)	Note 1 and 2
5425	R	OUT	value/10	kWh	Previous month: energy produced in DHW (kWh)	Note 1 and 2
5426	R	OUT	valuex1	MWh	Previous month: energy absorbed in DHW (MWh)	Note 1 and 2
5427	R	OUT	value/10	kWh	Previous month: energy absorbed in DHW (kWh)	Note 1 and 2

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
5428	R	OUT	valuex1	MWh	Previous month: total energy produced (MWh)	Note 1 and 2
5429	R	OUT	value/10	kWh	Previous month: total energy produced (kWh)	Note 1 and 2
5430	R	OUT	valuex1	MWh	Previous month: total absorbed energy (MWh)	Note 1 and 2
5431	R	OUT	value/10	kWh	Previous month: total absorbed energy (kWh)	Note 1 and 2
5432	R	OUT	value/100	-	Previous month: Integrated efficiency in chiller	Note 1 and 2
5433	R	OUT	value/100	-	Previous month: Integrated efficiency in heatpump	Note 1 and 2
5434	R	OUT	value/100	-	Previous month: Integrated efficiency in DHW	Note 1 and 2
5435	R	OUT	value/100	-	Previous month: Total integrated efficiency	Note 1 and 2
5436	R	OUT	valuex1	GWh	Current year: energy produced in chiller (GWh)	Note 1 and 2
5437	R	OUT	valuex1	MWh	Current year: energy produced in chiller (MWh)	Note 1 and 2
5438	R	OUT	value/10	kWh	Current year: energy produced in chiller (kWh)	Note 1 and 2
5439	R	OUT	valuex1	GWh	Current year: energy absorbed in chiller (GWh)	Note 1 and 2
5440	R	OUT	valuex1	MWh	Current year: energy absorbed in chiller (MWh)	Note 1 and 2
5441	R	OUT	value/10	kWh	Current year: energy absorbed in chiller (kWh)	Note 1 and 2
5442	R	OUT	valuex1	GWh	Current year: energy produced in heatpump (GWh)	Note 1 and 2
5443	R	OUT	valuex1	MWh	Current year: energy produced in heatpump (MWh)	Note 1 and 2
5444	R	OUT	value/10	kWh	Current year: energy produced in heatpump (kWh)	Note 1 and 2
5445	R	OUT	valuex1	GWh	Current year: energy absorbed in heatpump (GWh)	Note 1 and 2
5446	R	OUT	valuex1	MWh	Current year: energy absorbed in heatpump (MWh)	Note 1 and 2
5447	R	OUT	value/10	kWh	Current year: energy absorbed in heatpump (kWh)	Note 1 and 2
5448	R	OUT	valuex1	GWh	Current year: energy produced in DHW (GWh)	Note 1 and 2
5449	R	OUT	valuex1	MWh	Current year: energy produced in DHW (MWh)	Note 1 and 2
5450	R	OUT	value/10	kWh	Current year: energy produced in DHW (kWh)	Note 1 and 2
5451	R	OUT	valuex1	GWh	Current year: energy absorbed in DHW (GWh)	Note 1 and 2
5452	R	OUT	valuex1	MWh	Current year: energy absorbed in DHW (MWh)	Note 1 and 2
5453	R	OUT	value/10	kWh	Current year: energy absorbed in DHW (kWh)	Note 1 and 2
5454	R	OUT	valuex1	GWh	Current year: total energy produced (GWh)	Note 1 and 2
5455	R	OUT	valuex1	MWh	Current year: total energy produced (MWh)	Note 1 and 2
5456	R	OUT	value/10	kWh	Current year: total energy produced (kWh)	Note 1 and 2
5457	R	OUT	valuex1	GWh	Current year: total absorbed energy (GWh)	Note 1 and 2
5458	R	OUT	valuex1	MWh	Current year: total absorbed energy (MWh)	Note 1 and 2
5459	R	OUT	value/10	kWh	Current year: total absorbed energy (kWh)	Note 1 and 2
5460	R	OUT	value/100	-	Current year: Integrated efficiency in chiller	Note 1 and 2
5461	R	OUT	value/100	-	Current year: Integrated efficiency in heatpump	Note 1 and 2
5462	R	OUT	value/100	-	Current year: Integrated efficiency in DHW	Note 1 and 2
5463	R	OUT	value/100	-	Current year: Total integrated efficiency	Note 1 and 2
5464	R	OUT	valuex1	GWh	Previous year: energy produced in chiller (GWh)	Note 1 and 2
5465	R	OUT	valuex1	MWh	Previous year: energy produced in chiller (MWh)	Note 1 and 2
5466	R	OUT	value/10	kWh	Previous year: energy produced in chiller (kWh)	Note 1 and 2
5467	R	OUT	valuex1	GWh	Previous year: energy absorbed in chiller (GWh)	Note 1 and 2
5468	R	OUT	valuex1	MWh	Previous year: energy absorbed in chiller (MWh)	Note 1 and 2
5469	R	OUT	value/10	kWh	Previous year: energy absorbed in chiller (kWh)	Note 1 and 2
5470	R	OUT	valuex1	GWh	Previous year: energy produced in heatpump (GWh)	Note 1 and 2
5471	R	OUT	valuex1	MWh	Previous year: energy produced in heatpump (MWh)	Note 1 and 2
5472	R	OUT	value/10	kWh	Previous year: energy produced in heatpump (kWh)	Note 1 and 2
5473	R	OUT	valuex1	GWh	Previous year: energy absorbed in heatpump (GWh)	Note 1 and 2
5474	R	OUT	valuex1	MWh	Previous year: energy absorbed in heatpump (MWh)	Note 1 and 2
5475	R	OUT	value/10	kWh	Previous year: energy absorbed in heatpump (kWh)	Note 1 and 2
5476	R	OUT	valuex1	GWh	Previous year: energy produced in DHW (GWh)	Note 1 and 2
5477	R	OUT	valuex1	MWh	Previous year: energy produced in DHW (MWh)	Note 1 and 2
5478	R	OUT	value/10	kWh	Previous year: energy produced in DHW (kWh)	Note 1 and 2
5479	R	OUT	valuex1	GWh	Previous year: energy absorbed in DHW (GWh)	Note 1 and 2
5480	R	OUT	valuex1	MWh	Previous year: energy absorbed in DHW (MWh)	Note 1 and 2
5481	R	OUT	value/10	kWh	Previous year: energy absorbed in DHW (kWh)	Note 1 and 2
5482	R	OUT	valuex1	GWh	Previous year: total energy produced (GWh)	Note 1 and 2
5483	R	OUT	valuex1	MWh	Previous year: total energy produced (MWh)	Note 1 and 2
5484	R	OUT	value/10	kWh	Previous year: total energy produced (kWh)	Note 1 and 2
5485	R	OUT	valuex1	GWh	Previous year: total energy absorbed (GWh)	Note 1 and 2
5486	R	OUT	valuex1	MWh	Previous year: total absorbed energy (MWh)	Note 1 and 2
5487	R	OUT	value/10	kWh	Previous year: total absorbed energy (kWh)	Note 1 and 2
5488	R	OUT	value/100	-	Previous year: Integrated efficiency in chiller	Note 1 and 2
5489	R	OUT	value/100	-	Previous year: Integrated efficiency in heatpump	Note 1 and 2
5490	R	OUT	value/100	-	Previous year: Integrated efficiency in DHW	Note 1 and 2
5491	R	OUT	value/100	-	Previous year: Total integrated efficiency	Note 1 and 2
5492	R	OUT	valuex1	GWh	Year -2: energy produced in chiller (GWh)	Note 1 and 2
5493	R	OUT	valuex1	MWh	Year -2: energy produced in chiller (MWh)	Note 1 and 2
5494	R	OUT	value/10	kWh	Year -2: energy produced in chiller (kWh)	Note 1 and 2
5495	R	OUT	valuex1	GWh	Year -2: energy absorbed in chiller (GWh)	Note 1 and 2
5496	R	OUT	valuex1	MWh	Year -2: energy absorbed in chiller (MWh)	Note 1 and 2

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS
5497	R	OUT	value/10	kWh	Year -2: energy absorbed in chiller (kWh)	Note 1 and 2
5498	R	OUT	valuex1	GWh	Year -2: energy produced in heatpump (GWh)	Note 1 and 2
5502	R	OUT	valuex1	MWh	Year -2: energy produced in heatpump (MWh)	Note 1 and 2
5503	R	OUT	value/10	kWh	Year -2: energy produced in heatpump (kWh)	Note 1 and 2
5504	R	OUT	valuex1	GWh	Year -2: energy absorbed in heatpump (GWh)	Note 1 and 2
5505	R	OUT	valuex1	MWh	Year -2: energy absorbed in heatpump (MWh)	Note 1 and 2
5506	R	OUT	value/10	kWh	Year -2: energy absorbed in heatpump (kWh)	Note 1 and 2
5507	R	OUT	valuex1	GWh	Year -2: energy produced in DHW (GWh)	Note 1 and 2
5508	R	OUT	valuex1	MWh	Year -2: energy produced in DHW (MWh)	Note 1 and 2
5509	R	OUT	value/10	kWh	Year -2: energy produced in DHW (kWh)	Note 1 and 2
5510	R	OUT	valuex1	GWh	Year -2: energy absorbed in DHW (GWh)	Note 1 and 2
5511	R	OUT	valuex1	MWh	Year -2: energy absorbed in DHW (MWh)	Note 1 and 2
5512	R	OUT	value/10	kWh	Year -2: energy absorbed in DHW (kWh)	Note 1 and 2
5513	R	OUT	valuex1	GWh	Year -2: total energy produced (GWh)	Note 1 and 2
5514	R	OUT	valuex1	MWh	Year -2: total energy produced (MWh)	Note 1 and 2
5515	R	OUT	value/10	kWh	Year -2: total energy produced (kWh)	Note 1 and 2
5516	R	OUT	valuex1	GWh	Year -2: total absorbed energy (GWh)	Note 1 and 2
5517	R	OUT	valuex1	MWh	Year -2: total absorbed energy (MWh)	Note 1 and 2
5518	R	OUT	value/10	kWh	Year -2: total absorbed energy (kWh)	Note 1 and 2
5519	R	OUT	value/100	-	Year -2: Integrated efficiency in chiller	Note 1 and 2
5520	R	OUT	value/100	-	Year -2: Integrated efficiency in heatpump	Note 1 and 2
5521	R	OUT	value/100	-	Year -2: Integrated efficiency in DHW	Note 1 and 2
5522	R	OUT	value/100	-	Year -2: Total integrated efficiency	Note 1 and 2

***Type:** C =Coil, R=Register

Note 1: availability of the variable to the supervisor system depends on the type of unit and optional devices used.
Note 2: the possibility of using the variable depends on enabling of a parameter on the controller.
Note 3: only available for multi-unit Master-Client control.

9.8 Reading/writing the date and time

The date and time are read and written using bit coding. A settings acceptance command is also used for writing.

Example of reading the date and time:

Reading the **YEAR/MONTH** variable

153	R	valuex1	-	Year / Month (see date and time read/write section)

The value read is: 38877

Value converted into boolean (16 bit): 38877 → 1001011111011101
Note: if the read number is negative the complement to 1 must be performed, that is, sum **65536** before performing binary conversion

Bit to bit decoding (using the database):

MONTH	Bit 15: Bit 14: Bit 13: Bit 12:	1 0 0 1	1001 → 09 (September)
YEAR	Bit 11: Bit 10: Bit 9: Bit 8: Bit 7: Bit 6: Bit 5: Bit 4: Bit 3: Bit 2: Bit 1: Bit 0:	0 1 1 1 1 1 0 1 1 1 0 1	011111011101 → 2013

Reading the **DAY/HOUR/MINUTES** variable

154	R	valuex1	-	Day / Hour / Minutes (see date and time read/write section)

The value read is: 15675

Value converted into boolean (16 bit): 15675 → 11110100111011

Bit to bit decoding (using the database):

MINUTES	Bit 15: Bit 14: Bit 13: Bit 12: Bit 11: Bit 10:	0 0 1 1 1 1	001111 → 15
HOUR	Bit 9: Bit 8: Bit 7: Bit 6: Bit 5:	0 1 0 0 1	01001 → 9
DAY	Bit 4: Bit 3: Bit 2: Bit 1: Bit 0:	1 1 0 1 1	11011 → 27

The relative date and time is therefore *27/09/2013 time 09.15*

Example of writing the date and time:

The date and time are written in 3 phases.

- setting a boolean variable to allow the whole variables to be written.
- writing the required value in the 2 whole variables to protocol using the reverse procedure to reading.
- resetting a boolean variable to give final confirmation.

Example:
To write the date and time: ***15/06/2016 time 18.54***

5. Take the boolean to 1:

10	C	IN/OUT	-	-	Modify date/time and confirmation given

6. Knowing that:

06 (month) → 0110
2016 (year) → 011111100000

0110 011111100000 → 26592

Write to the register

153	R	valuex1	-	Year / Month (see date and time read/write section)

The value 26592

7. Knowing that:

54 (minutes)→ 110110
18 (hour) → 10010
15 (day) → 01111

110110 10010 01111 → 55887

Write to the register

154	R	valuex1	-	Day / Hour / Minutes (see date and time read/write section)

The value *55887*

8. Take the boolean to 0

10	C	IN/OUT	-	-	Modify date/time and confirmation given

In this way the 2 previously written whole variables are saved to the controller.

9.9 Software version and revision interpretation

The version and revision in the controller are recorded in registers 5005 and 5006:

5005	R	OUT	valuex1	-	Software version	Always
5006	R	OUT	valuex1	-	Software version (revision)	Always

The information is coded as follows:

Software release (R: 5005)

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Therefore, if for example TA15r00 is in the controller, register 5005 will be equal to 2001 (T=**20**, A=**01**), while register 5006 will be equal to 1400 (Version **14**, revision **00**).
By combining the two pieces of information, it is possible to determine the on-board software, its version and revision.

9.10 Modbus Characteristics

Modicon Modbus protocol implemented as described in the document:
Modicon Modbus protocol reference guide
March 1992, PI Modbus-300 rev D.

Address:
This is the supervision variable address in the electronic control unit.

Type:
C: Boolean variable (Coil for the Modbus protocol)
R: Analogue and whole variables (Register for the Modbus protocol)

Flow:
OUT: Read-only variable for the BMS
IN: BMS read/write variable

Scale factor:
valuex1:
the value read or written by the BMS is the true value, no conversion factor is required
valuex10:
the value read (OUT) or written (IN) by the BMS must be multiplied by 10 after being read, or before being written
valuex100:
the value read (OUT) or written (IN) by the BMS must be multiplied by 100 after being read, or before being written
value/10:
the value read (OUT) or written (IN) by the BMS must be divided by 10 after being read, or before being written
value/100:
the value read (OUT) or written (IN) by the BMS must be divided by 100 after being read, or before being written

Example:
WRITING AND READING THE CHILLER TEMPERATURE SETPOINT

- **Writing**

002	R	IN	valuex10	Chiller temperature setpoint

If the “Chiller temperature setpoint” variable must be written (IN) at 7.3 °C
The BMS must multiply the value to send to the controller by 10 (7.3x10 = 73)

- **Read**

002	R	OUT	value/10	Chiller temperature setpoint

If the “Chiller temperature setpoint” variable must be read (OUT)
The BMS must divide the value received from the controller by 10 (86/10 = 8.6 °C)

If a probe is in an alarm condition a value equal to -999 is sent that is -99.9
If a probe or a parameter is not configured a value equal to -888 is sent that is -88.8

Unit of Measurement:
This is the data unit of measurement after conversion with the scale factor.

Example:

012	R	OUT	value/10	bar	High pressure transducer 1

Reading a value of 221 from the controller
With the scale factor, the true value is 22.1 which involves reading 22.1 bar in the unit of measurement column.

Function codes

The read and write controls (function codes) for the coils and registers available are shown in the following table:

Type of datum	Type of control	Function Codes
Coils (Boolean)	Read	1
	Write one variable	5
	Write multiple variables	15
Registers (analogue and whole)	Read	4
	Write one variable	6
	Write multiple variables	16

Coil Modbus addresses: Boolean variables

Registers	Type	
000	C	NOT MANAGED
001	C	Boolean 001
002	C	Boolean 002
003	C	Boolean 003
…		…
181	C	Boolean 181
182	C	Boolean 182
183	C	Boolean 183

Register Modbus addresses: Analogue and Whole variables

Registers	Type	
000	R	NOT MANAGED
001	R	Analogue 001
002	R	Analogue 002
003	R	Analogue 003
…	…	…
125	R	Analogue 125
126	R	Analogue 126
127	R	Analogue 127
128	R	NOT MANAGED
129	R	Whole 001
130	R	Whole 002
131	R	Whole 003
…	…	…
254	R	Whole 126
255	R	Whole 127
256	R	Whole 128

Decoding by bit:
Some whole variables must be transformed into 16bit Boolean variables (one word) and decoded bit by bit. The value of each bit has a particular meaning.

Note:
If the value returned by the reading of the whole variable is negative, before converting the variable from whole to Boolean it is necessary to take the 1s complement (that is add 65536 to the negative whole value).

Example 1:
Compressor 2 status: address 16 -> Modbus address 144 [128+16]
Whole value read by supervision: 530

As the value is positive, the 1s complement is NOT taken.

Value converted into boolean (16 bit): 530 → 0000001000010010
Bit to bit decoding (using the database):

Bit 0:	0→	Configured
Bit 1:	1→	Enabled
Bit 2:	0→	OFF
Bit 3:	0→	Pump-down not active
Bit 4:	1→	Alarm active
Bit 5:	0→	---
Bit 6:	0→	---
Bit 7:	0→	---
Bit 8:	0→	---
Bit 9:	1→	chiller
Bit 10:	0→	---
Bit 11:	0→	---
Bit 12:	0→	---
Bit 13:	0→	---
Bit 14:	0→	---
Bit 15:	0→	not required

Example 2:
Compressor 2 status: address 16 -> Modbus address 144 [128+16]
Whole value read by supervision: -31994

As the value is negative, the 1s complement is taken: -31994 **+ 65536** = 33542

Value converted into boolean (16 bit): 33542 → 1000001100000110
Bit to bit decoding (using the database):

Bit 0:	0→	Configured
Bit 1:	1→	Enabled
Bit 2:	1→	ON
Bit 3:	0→	Pump-down not active
Bit 4:	0→	Alarm not active
Bit 5:	0→	---
Bit 6:	0→	---
Bit 7:	0→	---
Bit 8:	1→	ON whole
Bit 9:	1→	chiller
Bit 10:	0→	---
Bit 11:	0→	---
Bit 12:	0→	---
Bit 13:	0→	---
Bit 14:	0→	---
Bit 15:	1→	required

9.11 Switching of the units to autonomous operation in the case of a fault or disconnection of the Supervisor

This function can be used in the following cases:

- communication down between the Supervisor and unit: for example due to a broken communication cable or loss of power to the Supervisor;

The Supervisor must perform cyclical variations of the register 40243 within 2 minutes of the previous variation (e.g. writing of register 40243 = "0", wait for 30s, writing of register 40243 = "1", wait for 30s and so on). Communication between the Supervisor and the unit is lost when there is no variation of the register 40243 for more than 2 minutes.
In which case, the unit switches to autonomous mode if possible, to guarantee the supply of power until normal operation of the Supervisor is restored.
The thermoregulator on the unit regulates the unit in autonomous mode in relation to the last setpoint value received from the Supervisor.

The unit can enter autonomous mode if all the following conditions were in place before loss of communication with the Supervisor:

- serial configured as "Supervision with watchdog" in the User menu;
- consent for autonomous operation enabled with bit 15 (Modbus);
- operation of the unit is enabled at the local keyboard or from the digital input.

The unit does not start up when there is no communication with the Supervisor and even one of the above conditions is not met.

In case of voltage interruption, once the same is reinstated, bit 15 (Modbus) is initialised internally at 0 and must be reset by the supervisor.

Reset of local settings in Stand-Alone: Disabled	In case of watch-dog supervision active, it allows to set if the stand-alone unit must return to the settings entered using the keyboard. This function is only valid for the chiller setpoint set using the BMS and for the power limitation set using the BMS.

If the reset of the local settings is used together with watch-dog Supervision and independent operation consent, in case of loss of communication with the BMS the unit uses the chiller setpoint set using the keyboard and excludes any chiller power limitation that might have been set.

9.12 Instructions for the configuration of the MODBUS over IP board from the PC

Before a PC can communicate with the MODBUS over IP board, the settings of both devices must be correctly aligned. As the factory settings of the MODBUS over IP board can only be changed after establishing the connection with the PC, during the first access the Personal Computer must be set to adapt to the factory settings of the MODBUS over IP board.

9.12.1 PC settings

Disconnect the PC from any networks and connect it directly to the MODBUS over IP board using the cable (crossed).

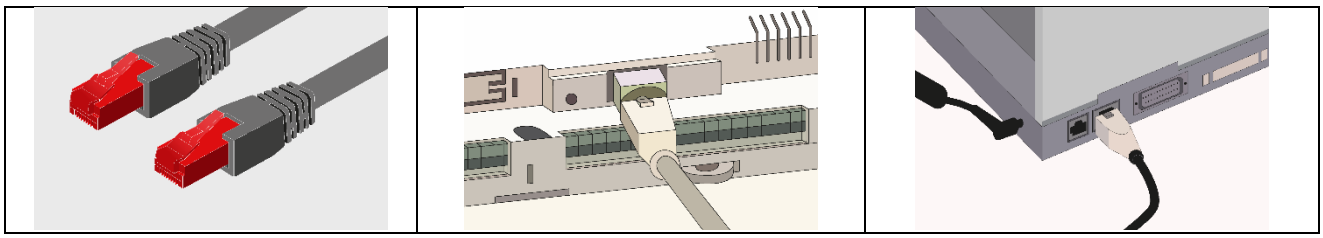


Figure 9-1: *demonstration of configuration of the MODBUS over IP board using a PC.*

Set the Personal Computer so that it does not use DHCP, but rather the IP address: 172.16.0.2.
The Subnet mask field also needs to be specified. The Gateway does not need to be specified.

The procedure is described below.
In the “Control Panel”:

1. Double click on “Network Connections”.
2. Double click on “Local Area Connection (LAN)”.
3. Click on “Properties”.
4. Double click on “Internet Protocol (TCP/IP)”.

Before changing the settings, take note of all the existing settings as these will be have to be restored afterwards in order to allow the PC to communicate with the data network it was previously connected to.

6. Click on “Use the following IP address” and set the following parameters:
   IP address = 172.16.0.2
   Subnet mask = 255.255.0.0
7. Click “OK” to close all the windows.

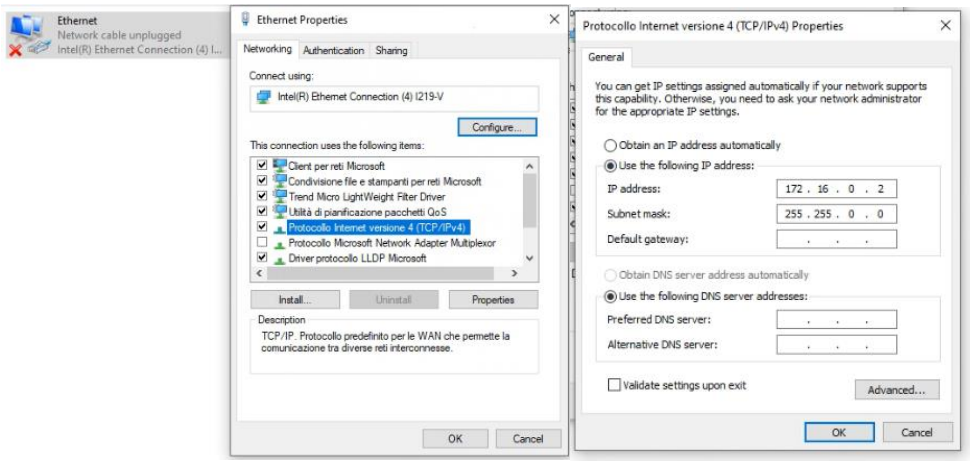


Figure 9-2: *parameter setting window.*

The PC is set so that it does not use the “proxy” network device as a communication channel. In fact, the PC is not networked and if the use of “proxy” were not disabled, communication would become impossible.

1. Open the Windows “Control Panel”.
2. Double click on “Internet Options”.
3. Click “Connections”. Another window will appear.
4. Click “LAN settings”.
5. Disable the proxy server.
6. Press “OK” to close the windows.

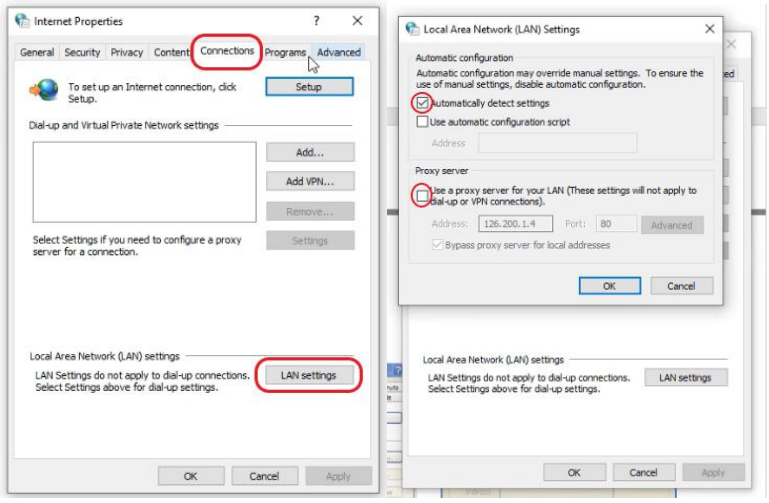


Figure 9-3: *disabling the proxy server.*

9.12.2 Starting the MODBUS over IP board with the factory settings

1. switch on the W3000+ controller;
2. make sure that both LEDs of the MODBUS over IP board connector light up within a few seconds.

Figure 9-4: *MODBUS over IP board detail.*

INFORMATION:
The choice as to whether to activate factory settings or user settings can only be made when starting the MODBUS over IP board. The MODBUS over IP board reinitialises whenever it is turned on.

3. As soon as the Status LED turns on **green** immediately after restart, hold down the button to activate the factory settings;
4. holding the button down for about 20 seconds will cause the status LED to flash **red** 3 times. Release the button while this is happening.
5. after red flashing stops, the Status LED turns **green**; then, if the procedure has been performed correctly the Status LED flashes **red** 3 times to confirm that the button has been pressed and released, and then back to **green** for about one minute (completion of the initialisation procedure); after completing the initialisation procedure, the Status LED starts flashing: the MODBUS over IP board initialisation procedure has now been completed and the board is on.

In this way, the MODBUS over IP board will not use the “User” set communication configuration parameter values, but rather the following factory values:
IP address: 172.16.0.1
Subnet mask: 255.255.0.0

Note:
These values will remain active until the MODBUS over IP **board is restarted**.
After restart, the MODBUS over IP board will return to the “User” configuration values
It is recommended that the network communication parameters are configured immediately.

9.12.3 Access the MODBUS over IP board via the PC

The MODBUS over IP board can recognise interrogations sent by a supervisor using the MODBUS over IP protocol.
To allow the board to communicate with the data network it will be installed to, certain network communication parameters must be set.

INFORMATION:
The network administrator must establish whether the MODBUS over IP board can be connected and must provide essential system data.

1. on the PC open a web browser;
2. write the following number, including dots, in the address field: 172.16.0.1

3. press **Send**.

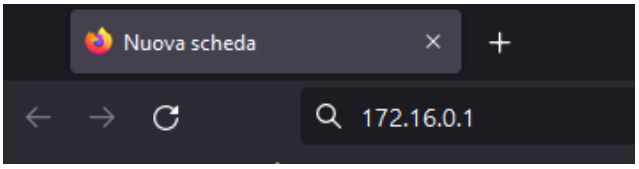


Figure 9-5: *entering the IP address.*

The **first access** page may offer one of the following two alternatives:

- **Restrict access**: you will be asked to customise all passwords and, upon confirmation, all services (except the following) will be disabled: HTTPS, SFTP SSH SCP).
- **Do not restrict access**: no password confirmation will be required. To log in, simply enter your password and default user ID.

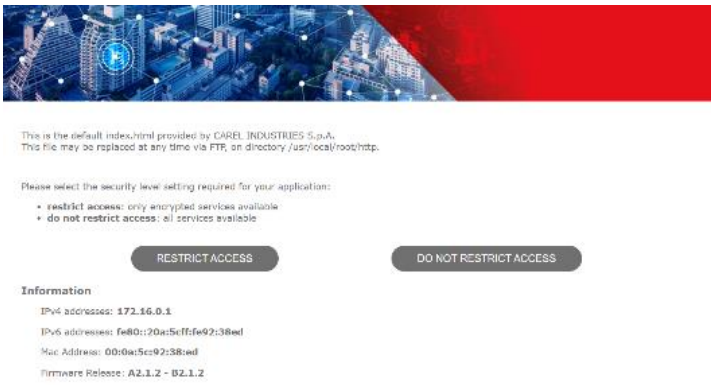


Figure 9-6: *possibility to log in for the first time.*

When logging in for the **second time** (with HTTPS and entering the customised password and user ID), the page displayed will only show the **"administrator area"** button.

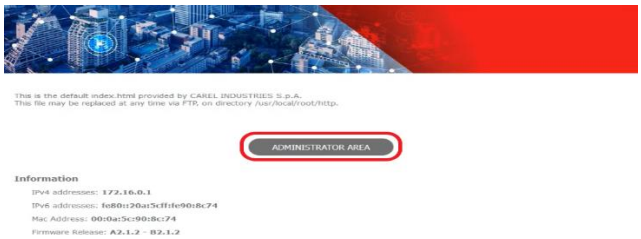


Figure 9-7: *"administrator area" button display.*

At the login and password request enter the factory values:

Username: **admin**
Password: **fadmin**

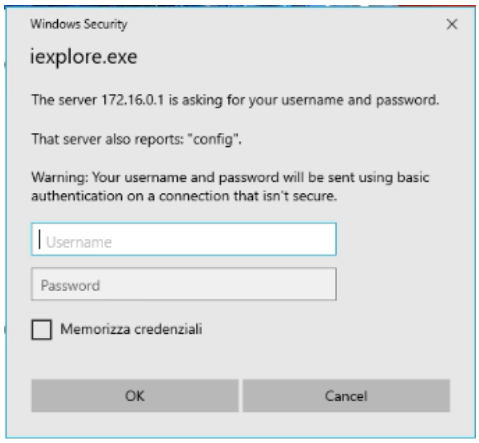


Figure 9-8

If the details entered during the previous access are correct, the following page appears:

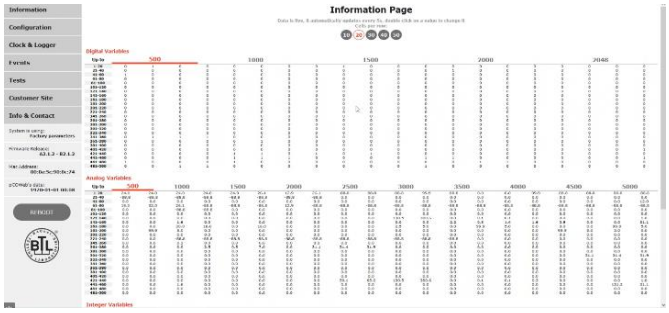


Figure 9-9: *"Information page" display.*

The MODBUS over IP board is set at the factory with Carel protocol.
Switch the protocol to Modbus Extended.
Ensure that the address matches the one entered in the controller.

All the settings will be applied the next time that the MODBUS over IP board is restarted

To set the user network parameters, click on "Configuration", then on the "Network" board and set the following basic network parameters:
• IP address.
• NetMask.

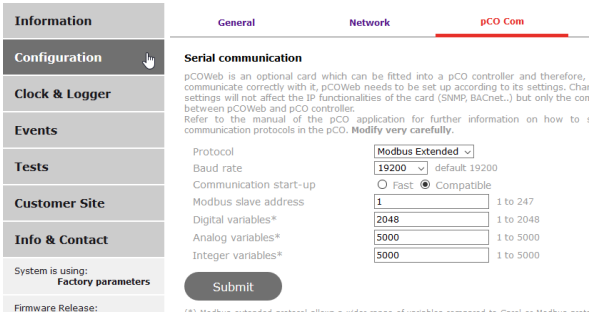


Figure 9-10: *modification of the Modbus Extended protocol.*

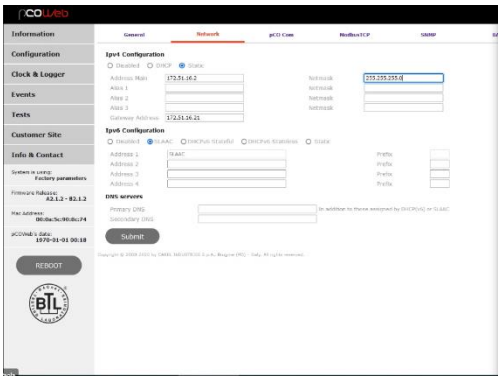


Figure 9-11: *"Network" screen.*

INFORMATION:
The professional system integrator who sets the various parameters, checks the network communication, and starts the supervision system, must be familiar with MODBUS over IP systems.

9.13 Instructions for the configuration of the MODBUS over IP board on the PC

The function permits configuration of the MODBUS over IP board communication parameters directly at the PGD keyboard.

The function is available for:

- version 5.16 (and above) of the bios on the controller in which the MODBUS over IP board is slotted
- version A1.5.0 (and above) of the firmware of the MODBUS over IP board

The purpose is to permit configuration of the network (Ethernet for the MODBUS over IP board) when a board of this type is installed for the first time. The other parameters (alarms, events, etc.) must be configured with the usual instruments: BACset or web interface (only for MODBUS over IP board)

The following screen shows the procedure for the configuration of the MODBUS over IP board (indicated as pCOWeb in the screen).

1	Press **[ALARM]** and **[ENTER]** together. Hold down until the mask shown to the side appears.	> SYSTEM INFORMATION LOG DATA OTHER INFORMATION FLASH NAND FILES
2	Press **[UP]** and **[DOWN]** to move the cursor to the “OTHER INFORMATION” row and press **[ENTER]** to select.	SYSTEM INFORMATION LOG DATA > OTHER INFORMATION FLASH NAND FILES
3	Press **[UP]** and **[DOWN]** to move the cursor to the “PCOWEB/NET CONFIG” row and press **[ENTER]** to select.	ID/PRODUCT CODE > PCOWEB/NET CONFIG MEMORIES STATUS CHIP IO VERSION
4	To configure a MODBUS over IP or MODBUS OVER IP board, select “PCOWEB settings”	> PCOWEB settings PCONET settings

Configuration of the MODBUS over IP board

1	Select PCOWEB settings and the mask shown to the side appears. The fields are soon populated with the current data. If the fields are not populated with the current parameters, check the version of the firmware of the MODBUS over IP board and the protocol set on the serial line. The parameters can now be edited. To do so, use the **[ENTER]** key to select a field and the **[UP]/[DOWN]** keys to set the required value. The IP address and Netmask field cannot be edited if the DHCP option is set at ON.	DHCP:--- IP Address: ---.---.---.---
2	Continue pressing **[ENTER]** to view all the available parameters, shown in the masks below:	Netmask: ---.---.---.--- Gateway: ---.---.---.---
3		DNS1: ---.---.---.--- DNS2: ---.---.---.---
4		BACnet ID: ------ BACnet Type: -------
5	After selecting the parameters, it is possible to update them with the new data by selecting “YES” in the window shown to the side and then pressing **[ENTER]**.	PCOWEB CONFIG ENABLE Update pCOWEB? NO
6	The message to the side appears while the parameters are updating:	PCOWEB CONFIG ENABLE Please wait for end of update
7	The mask shown to the side appears at the end of the process:	PCOWEB CONFIG ENABLE Update complete Reboot pCOWEB to apply new setting
8	Next turn OFF and then ON again the power to the controller in which the MODBUS over IP board is installed. This also causes the MODBUS over IP board to restart with the new settings.	

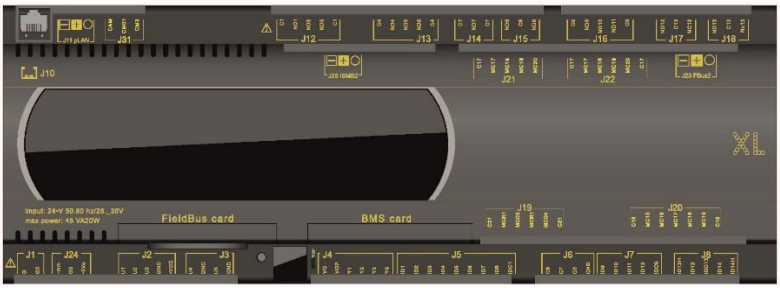
10 INTERFACING WITH THE LONWORKS SYSTEM

10.1 Components required

The components required to interface MEHITS S.p.A. units with an electronic controller to the LONWORKS system are described below.

LONWORKS interface board.
For the correct installation of the serial board, see the documentation supplied with the same

Electronic control board.
Already fitted on the machine.
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



10.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the LONWORKS serial board into the controller.

10.3 Setting supervisor parameters

To communicate with the LONWORKS system, set the parameters as shown below.

You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Supervision	Communication towards a supervisor system must be enabled.
En. from superv.: On/Off: S Operating mode: S	Allows the on/off status and the operating mode change of the unit to be selected from a supervision system. Enabling from supervisor must be set as indicated alongside: ▪ Enable on/off: **Yes** ▪ Operating mode enable **Yes**
Serial line setting LonWorks Protocol Speed 4800 baud Unit ID 001	The supervisor connection parameters must be set as follows: ▪ Protocol: **Lonworks** ▪ Communication speed: **4800 baud (*)** ▪ Unit ID: from **001** to **200 (default 11, …)**

(*) Communication speed between pCO and interface board.
The speed of communication towards the external BMS is always 78 kbps.

10.4 Setting up the supervisor network

The supervisor network is set up by LONWORKS staff.

Note:
MEHITS S.p.A. will supply the serial files and some files necessary for LONWORKS technicians to configure the network.
A .NXE file and a .XIF file will be provided.
The board is programmed by the technician in charge of the integration.

10.5 Programming the LONWORKS system serial interface board

The reference database for systems using the LONWORKS networks is shown below:

Address	Type	Type NV	Flow	Conversion factor	Unit of measure	Description	Available to BMS
001	A	105	IN	valuex10	°C	Chiller temperature setpoint	Note 1
			OUT	value/10			
002	A	105	IN	valuex10	°C	Heat pump temperature setpoint	Note 1
			OUT	value/10			
003	A	105	IN	valuex10	°C	Recovery setpoint	Note 1
			OUT	value/10			
006	A	105	OUT	value/10	°C	Inlet temperature of evaporator	Note 1
007	A	105	OUT	value/10	°C	Evaporator outlet temperature (average)	Note 1
008	A	105	OUT	value/10	°C	Condenser inlet temperature	Note 1
009	A	105	OUT	value/10	°C	Condenser outlet temperature (average)	Note 1
010	A	105	OUT	value/10	°C	Recuperator inlet temperature / DHW storage tank temperature	Note 1
011	A	105	OUT	value/10	°C	Recuperator outlet temperature	Note 1
001	B	95	OUT	-	-	Unit status (0:Off - 1:On)	Always
003	B	95	OUT	-	-	Evaporator pump 1 status (0:Off - 1:On)	Note 1
004	B	95	OUT	-	-	Evaporator pump 2 status (0:Off - 1:On)	Note 1
005	B	95	OUT	-	-	Recuperator pump status (0:Off - 1:On)	Note 1
006	B	95	OUT	-	-	Condenser pump status (0:Off - 1:On)	Note 1
007	B	95	OUT	-	-	Status of secondary pump for water/water unit with water side reversal (0:Off - 1:On) (no longer used)	-
008	B	95	IN	-	-	On/off command from supervisor (0:Off - 1:On)	Note 2
			OUT	-			
005	I	8	OUT	valuex1	-	Unit type configuration (00:Chiller - 01:Chiller+recovery - 02:Chiller+freecooling - 10:Heat pump - 11:Heat pump+recovery - 14 Heat pump+DHW - 15: +2P module - 21:Energy raiser - 25:Energy raiser and +2P module)	Always
006	I	8	OUT	valuex1	-	N° circuits	Always
007	I	8	OUT	valuex1	-	N° compressors	Always
008	I	8	OUT	valuex1	-	N° separation stages per compressor	Always
009	I	8	OUT	valuex1	-	Type of compressors (0:Centrifuge - 1:Hermetic - 2:Alternative - 3:Screw*) * To identify if and which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter	Always
012	I	8	OUT	valuex1	-	Unit status (0:ON from keyboard - 1:ON from digital input - 2:ON from time bands - 3:ON from supervisor - 4:OFF from alarm - 5:OFF from supervisor - 6:OFF from time bands - 7:OFF from digital input - 8:OFF from keyboard - 9:OFF with deselection of compressors - 10:OFF)	Always
013	I	8	OUT	valuex1	-	Unit timing status (0:Unit off - 1:Unit timing - 3:Unit at full power - 4:Switching off - 5: Timing of compressors - 6:Pump timing - 8:Unit OFF from alarm)	Always
014	I	8	IN	valuex1	-	Operating mode Chiller (3:chiller) Chiller + freecooling (7:chiller - 8:chiller+fc) Chiller + recovery (2:chiller+rec - 3:chiller) Heat pump (3:chiller 4:heatpump) Energy raisers (0:auto -1:recovery - 2:chiller+rec - 3:chiller) Heat pump with recovery (10:summer auto - 11:summer rec - 12:summer ch+rec - 13:summer ch - 14:winter hp - 15:winter rec - 16:winter auto)	Always
			OUT	valuex1	-		

Address	Type	Type NV	Flow	Conversion factor	Unit of measure	Description	Available to BMS
015	I	83	OUT	valuex1	-	Compressor 1 status (Bit0: 0:Configured , 1:Not configured Bit1: 0:Not enabled , 1:Enabled Bit2: 0:OFF , 1:ON Bit3: 0:Pump-down inactive, 1:Pump-down active Bit4: 0:Alarm not active , 1:Alarm active Bit5: 0:--- ,1:ON with 3 steps active Bit6: 0:--- ,1:ON with 2 steps active Bit7: 0:--- ,1:ON with 1 step active Bit8: 0:--- ,1:ON whole Bit9: 0:--- ,1:chiller Bit10: 0:--- ,1:heat pump Bit11: 0:--- ,1:recovery Bit12: 0:--- ,1:defrost Bit13: 0:--- ,1:freecooling Bit14: 0:--- ,1:dripping Bit15: 0:--- ,1:request)	Always
016	I	83	OUT	valuex1	-	Compressor 2 status (see compressor 1 status)	Note 1
017	I	83	OUT	valuex1	-	Compressor 3 status (see compressor 1 status)	Note 1
018	I	83	OUT	valuex1	-	Compressor 4 status (see compressor 1 status)	Note 1
019	I	83	OUT	valuex1	-	Compressor 5 status (see compressor 1 status)	Note 1
020	I	83	OUT	valuex1	-	Compressor 6 status (see compressor 1 status)	Note 1
021	I	83	OUT	valuex1	-	Compressor 7 status (see compressor 1 status)	Note 1
022	I	83	OUT	valuex1	-	Compressor 8 status (see compressor 1 status)	Note 1
032	I	8	OUT	valuex1	-	Active alarm code (with greater priority)	Always
034	I	81	OUT	valuex1	%	Chiller thermoregulator demand (not available for units with output adjustment)	Note 1
035	I	81	OUT	valuex1	%	Active power of chiller thermoregulator	Note 1
037	I	81	OUT	valuex1	%	Heat pump thermoregulator demand (not available for units with output adjustment)	Note 1
038	I	81	OUT	valuex1	%	Active power of heat pump thermoregulator	Note 1
040	I	81	OUT	valuex1	%	Recovery thermoregulator demand (not available for units with output adjustment)	Note 1
041	I	81	OUT	valuex1	%	Active power of recovery thermoregulator	Note 1
043	I	81	IN	valuex1	%	Thermoregulator limitation in chiller mode	Note 1
			OUT	valuex1			
044	I	81	IN	valuex1	%	Thermoregulator limitation in heat pump mode	Note 1
			OUT	valuex1			
045	I	81	IN	valuex1	%	Thermoregulator limitation in recovery mode	Note 1
			OUT	valuex1			
046	I	102	OUT	valuex10	rpm	RPM centrifuge comp. 1	Note 1
				valuex1		RPM inverter comp.1	Note 1
047	I	102	OUT	valuex10	rpm	RPM centrifuge comp. 2	Note 1
				valuex1		RPM inverter comp.2	Note 1
048	I	102	OUT	valuex10	rpm	RPM centrifuge comp. 3	Note 1
				valuex1		RPM inverter comp.3	Note 1
049	I	102	OUT	valuex10	rpm	RPM centrifuge comp. 4	Note 1
				valuex1		RPM inverter comp.4	Note 1

Note 1: availability of the variable to the supervisor system depends on the type of unit and optional devices used.
Note 2: the possibility of using the variable depends on enabling of a parameter on the controller.

Analogue variables are expressed with a decimal number (e.g.: 12.0bar -> 120; 33.8°C -> 338).
If a probe is in an alarm condition a value equal to -999 is sent that is -99.9
If a probe or a parameter is not configured a value equal to 888 is sent that is -88.8

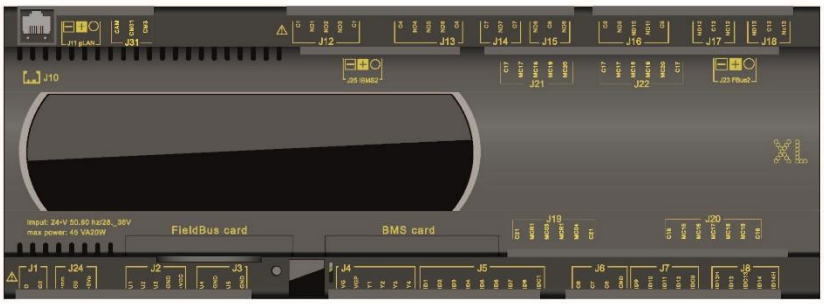
11 INTERFACING WITH THE BACNET SYSTEM

11.1 Components required

The components required to interface MEHITS S.p.A. units with an electronic controller to the BACNET system are described below.

BACNET serial interface board.
As well as the BACNET MS/TP board (for RS485 network) the BACNET TCP/IP serial board is also available.
For the correct installation of the serial board, see the documentation supplied with the same.

Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



11.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the BACNET serial board into the controller. Always complete the connection of the BACNET TCP/IP board to the ground using the connector on the left of the Ethernet interface.

11.3 Setting supervisor parameters

To communicate with the BACNET system, set the parameters as shown below.

You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Supervision	Communication towards a supervisor system must be enabled.
En. from superv.: On/Off: S Operating mode: S	Allows the on/off status and the operating mode change of the unit to be selected from a supervision system. Enabling from supervisor must be set as indicated alongside: ▪ Enable on/off: **Yes** ▪ Operating mode enable **Yes**
Serial line setting Bacnet Protocol Speed 19200 baud Unit ID 001	The supervisor connection parameters must be set as follows: ▪ Protocol: **Bacnet** ▪ Communication speed: **19200 baud (*)** ▪ Unit ID: from **001** to **200 (default 11, …)** **When using the BACNET MS/TP board only, make sure that the identification number of the unit is 001.**

(*) Communication speed between pCO and serial interface board.
The speed of communication to the external BMS may be 9600-19200-36400-76800.

11.4 Configuring the serial interface board

Initial configuration of the BACNET MS/TP or BACNET TCP/IP serial interface board can be done directly using the user interface of the electronic control board (excluding the touch screen display). Refer to the document “Bacnet interface cards configuration from system screen” for instructions.
Communication with the BACNET system over IP is for internal networks. Due to the purpose and intended use of the product, encryption algorithms are not used to prevent interception of Bacnet messages exchanged on the network.

11.5 Meaning of variables

Analogue variables are expressed with a decimal number (e.g.: 12.0bar -> 120; 33.8°C -> 338)
If a probe is in an alarm condition a value equal to -999 is sent that is -99.9
If a probe or a parameter is not configured a value equal to 888 is sent that is -88.8

IMPORTANT:
the scale factor of just the analogue variables (type A) must be **multiplied by 10** before being applied to the read or written value of the variable.

11.6 Setting up the supervisor network

The supervision network is set up by the technicians developing the BACNET interface. For the connection of the BACNET TCP/IP board to the Ethernet network use a category 5e or better S/FTP type cable.

11.7 BACNET interface database (software versions TA17 and higher)

The reference database for systems using the BACNET networks is shown below:

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
100001	B	OUT	-	-	Unit status (0:Off - 1:On)	Always
100003	B	OUT	-	-	Evaporator pump 1 status (0:Off - 1:On)	Note 1
100004	B	OUT	-	-	Evaporator pump 2 status (0:Off - 1:On)	Note 1
100005	B	OUT	-	-	Recuperator pump status (0:Off - 1:On)	Note 1
100006	B	OUT	-	-	Condenser pump status (0:Off - 1:On)	Note 1
100008	B	IN	-	-	On/off command from supervisor (0:Off - 1:On)	Note 2
		OUT	-	-		
100009	B	IN	-	-	Modify date/time and confirmation (see date and time read/write section)	Always
		OUT	-	-		
100010	B	IN	-	-	Enable time bands setting from supervisor	Always
		OUT	-	-		
100011	B	OUT	-	-	Enable operating mode change from supervisor	Always
100015	B	IN	-	-	Enable consent for autonomous operation in case of disconnection of the supervisor (only for serial line configured in "Supervision with watchdog" mode)	Note 2
		OUT				
100031	B	IN	-	-	System adjustment on/off command (only for units with DHW)	Note 1
		OUT	-	-		
100032	B	IN	-	-	DHW adjustment on/off command (only for units with DHW)	Note 1
		OUT	-	-		
100033	B	IN	-	-	Temperature controller limitation command from supervisor for Demand Limit, Capacity Cap and Smart Current Limit (0:Off - 1:On)	Note 2
		OUT	-	-		
100034	B	OUT	-	-	Energy meter electricity value reading enable	Note 1 and 2
100035	B	OUT	-	-	Energy meter configuration for 3-phase electric line connection	Note 1 and 2
100036	B	OUT	-	-	Energy meter configuration for connection of electric line with neutral	Note 1 and 2
100037	B	OUT	-	-	Possibility of neutral current reading	Note 1 and 2
100039	B	OUT	-	-	Changing the status of unit alarms	Always
100040	B	OUT	-	-	ATS enable	Always
100041	B	OUT	-	-	ATS 1 power supply detected	Always
100042	B	OUT	-	-	ATS 1 power supply connected	Always
100043	B	OUT	-	-	ATS 2 power supply detected	Always
100044	B	OUT	-	-	ATS 2 power supply connected	Always
100001	A	IN	valuex10	°C	Chiller temperature setpoint	Note 1
		OUT	value/10			
100002	A	IN	valuex10	°C	Heat pump temperature setpoint	Note 1
		OUT	value/10			
100003	A	IN	valuex10	°C	Recovery/DHW setpoint	Note 1
		OUT	value/10			

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
100004	A	OUT	value/10	°C	Main active setpoint	Note 1
100005	A	OUT	value/10	°C	Recovery setpoint active	Note 1
100006	A	OUT	value/10	°C	Inlet temperature of evaporator	Note 1
100007	A	OUT	value/10	°C	Evaporator outlet temperature (average)	Note 1
100008	A	OUT	value/10	°C	Condenser inlet temperature	Note 1
100009	A	OUT	value/10	°C	Condenser outlet temperature (average)	Note 1
100010	A	OUT	value/10	°C	Recuperator inlet temperature / DHW storage tank temperature	Note 1
100011	A	OUT	value/10	°C	Recuperator outlet temperature	Note 1
100012	A	OUT	value/10	bar	High pressure transducer 1	Note 1
100013	A	OUT	value/10	bar	High pressure transducer 2	Note 1
100014	A	OUT	value/10	bar	High pressure transducer 3	Note 1
100015	A	OUT	value/10	bar	High pressure transducer 4	Note 1
100016	A	OUT	value/10	bar	Low pressure transducer 1	Note 1
100017	A	OUT	value/10	bar	Low pressure transducer 2	Note 1
100018	A	OUT	value/10	bar	Low pressure transducer 3	Note 1
100019	A	OUT	value/10	bar	Low pressure transducer 4	Note 1
100020	A	OUT	value/10	°C	External air temperature	Note 1
100021	A	OUT	value/10	°C	Optional probe temperature	Note 1
100022	A	OUT	value/10	°C	Freecooling inlet temperature	Note 1
100023	A	OUT	value/10	kPa	Differential pressure transducer on hydraulic side of evaporator	Note 1
100024	A	OUT	value/10	kPa	Differential pressure transducer on recuperator water side	Note 1
100025	A	OUT	value/10	°C	Compressor 1 discharge temperature	Note 1
100026	A	OUT	value/10	°C	Compressor 2 discharge temperature	Note 1
100027	A	OUT	value/10	°C	Compressor 3 discharge temperature	Note 1
100028	A	OUT	value/10	°C	Compressor 4 discharge temperature	Note 1
100029	A	OUT	value/10	°C	Compressor 5 discharge temperature	Note 1
100030	A	OUT	value/10	°C	Compressor 6 discharge temperature	Note 1
100031	A	OUT	value/10	°C	Compressor 7 discharge temperature	Note 1
100032	A	OUT	value/10	°C	Compressor 8 discharge temperature	Note 1
100033	A	OUT	value/10	°C	Plant storage tank setpoint enabled	Note 1
100034	A	OUT	value/10	°C	Plant storage tank temperature	Note 1
100035	A	OUT	value/10	kPa	Differential pressure transducer on hydraulic side of condenser	Note 1
100036	A	OUT	value/10	-	Compression ratio in absolute bar of Centrifuge comp. 8	Note 1
100040	A	OUT	value/10	%	Power demand to centrifuge comp. 1	Note 1
			valuex1	rpm	Revs demand to inverter 1	Note 1
100041	A	OUT	value/10	%	Power demand to centrifuge comp. 2	Note 1
			valuex1	rpm	Revs demand to inverter 2	Note 1
100042	A	OUT	value/10	%	Power demand to centrifuge comp. 3	Note 1
			valuex1	rpm	Revs demand to inverter 3	Note 1
100043	A	OUT	value/10	%	Power demand to centrifuge comp. 4	Note 1
			valuex1	rpm	Revs demand to inverter 4	Note 1
100044	A	OUT	value/10	kW	Power demand to centrifuge comp. 1	Note 1
100045	A	OUT	value/10	kW	Power demand to centrifuge comp. 2	Note 1
100046	A	OUT	value/10	kW	Power demand to centrifuge comp. 3	Note 1
100047	A	OUT	value/10	kW	Power demand to centrifuge comp. 4	Note 1
100048	A	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 1	Note 1
100049	A	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 2	Note 1
100050	A	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 3	Note 1
100051	A	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 4	Note 1
100052	A	OUT	value/10	%	IGV position of centrifugal comp. 1	Note 1
100053	A	OUT	value/10	%	IGV position of centrifugal comp. 2	Note 1
100054	A	OUT	value/10	%	IGV position of centrifugal comp. 3	Note 1
100055	A	OUT	value/10	%	IGV position of centrifugal comp. 4	Note 1
100056	A	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 1	Note 1
100057	A	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 2	Note 1
100058	A	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 3	Note 1
100059	A	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 4	Note 1
100060	A	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 1	Note 1
100061	A	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 2	Note 1
100062	A	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 3	Note 1
100063	A	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 4	Note 1
100064	A	OUT	value/10	°C	SCR temperature of centrifuge comp. 1	Note 1
100065	A	OUT	value/10	°C	SCR temperature of centrifuge comp. 2	Note 1
100066	A	OUT	value/10	°C	SCR temperature of centrifuge comp. 3	Note 1
100067	A	OUT	value/10	°C	SCR temperature of centrifuge comp. 4	Note 1
100068	A	OUT	value/10	°C	Outlet temperature of centrifuge comp. 1	Note 1
100069	A	OUT	value/10	°C	Outlet temperature of centrifuge comp. 2	Note 1
100070	A	OUT	value/10	°C	Outlet temperature of centrifuge comp. 3	Note 1
100071	A	OUT	value/10	°C	Outlet temperature of centrifuge comp. 4	Note 1

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
100072	A	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 1	Note 1
100073	A	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 2	Note 1
100074	A	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 3	Note 1
100075	A	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 4	Note 1
100076	A	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 1	Note 1
100077	A	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 2	Note 1
100078	A	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 3	Note 1
100079	A	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 4	Note 1
100080	A	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 1	Note 1
100081	A	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 2	Note 1
100082	A	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 3	Note 1
100083	A	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 4	Note 1
100085	A	OUT	value/10	%	Power demand to centrifuge comp. 5	Note 1
100086	A	OUT	value/10	%	Power demand to centrifuge comp. 6	Note 1
100087	A	OUT	value/10	%	Power demand to centrifuge comp. 7	Note 1
100088	A	OUT	value/10	%	Power demand to centrifuge comp. 8	Note 1
100089	A	OUT	value/10	kW	Power demand to centrifuge comp. 5	Note 1
100090	A	OUT	value/10	kW	Power demand to centrifuge comp. 6	Note 1
100091	A	OUT	value/10	kW	Power demand to centrifuge comp. 7	Note 1
100092	A	OUT	value/10	kW	Power demand to centrifuge comp. 8	Note 1
100093	A	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 5	Note 1
100094	A	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 6	Note 1
100095	A	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 7	Note 1
100096	A	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 8	Note 1
100097	A	OUT	value/10	%	IGV position of centrifugal comp. 5	Note 1
100098	A	OUT	value/10	%	IGV position of centrifugal comp. 6	Note 1
100099	A	OUT	value/10	%	IGV position of centrifugal comp. 7	Note 1
100100	A	OUT	value/10	%	IGV position of centrifugal comp. 8	Note 1
100101	A	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 5	Note 1
100102	A	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 6	Note 1
100103	A	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 7	Note 1
100104	A	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 8	Note 1
100105	A	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 5	Note 1
100106	A	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 6	Note 1
100107	A	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 7	Note 1
100108	A	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 8	Note 1
100109	A	OUT	value/10	°C	SCR temperature of centrifuge comp. 5	Note 1
100110	A	OUT	value/10	°C	SCR temperature of centrifuge comp. 6	Note 1
100111	A	OUT	value/10	°C	SCR temperature of centrifuge comp. 7	Note 1
100112	A	OUT	value/10	°C	SCR temperature of centrifuge comp. 8	Note 1
100113	A	OUT	value/10	°C	Outlet temperature of centrifuge comp. 5	Note 1
100114	A	OUT	value/10	°C	Outlet temperature of centrifuge comp. 6	Note 1
100115	A	OUT	value/10	°C	Outlet temperature of centrifuge comp. 7	Note 1
100116	A	OUT	value/10	°C	Outlet temperature of centrifuge comp. 8	Note 1
100117	A	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 5	Note 1
100118	A	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 6	Note 1
100119	A	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 7	Note 1
100120	A	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 8	Note 1
100121	A	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 5	Note 1
100122	A	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 6	Note 1
100123	A	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 7	Note 1
100124	A	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 8	Note 1
100125	A	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 5	Note 1
100126	A	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 6	Note 1
100127	A	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 7	Note 1
200003	I	OUT	valuex1	-	Software version	Always
200004	I	OUT	valuex1	-	Software version (revision)	Always
200005	I	OUT	valuex1	-	Unit type configuration (00:Chiller - 01:Chiller+recovery - 02:Chiller+freecooling - 10:Heat pump - 11:Heat pump+recovery - 14 Heat pump+DHW - 15: +2P module - 21:Energy raiser - 25:Energy raiser and +2P module)	Always
200006	I	OUT	valuex1	-	N° circuits	Always
200007	I	OUT	valuex1	-	N° compressors	Always
200008	I	OUT	valuex1	-	N° separation stages per compressor	Always
200009	I	OUT	valuex1	-	Type of compressors (0:Centrifuge - 1:Hermetic - 2:Alternative - 3:Screw*) * To identify if and which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter	Always

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200010	I	OUT	valuex1	-	Unit configuration status [1] (Bit0: 0:Heat pump disabled, 1:Heat pump enabled Bit1: 0:Quick Mind disabled, 1:Quick Mind enabled Bit2: 0:Inlet, 1:Outlet Bit3: 0:FreeCooling disabled, 1:FreeCooling enabled Bit4 - Bit10: Not significant Bit11: 0:Recovery disabled, 1:Recovery enabled Bit12 - Bit15: Not significant)	Always
200011	I	OUT	valuex1	-	Unit configuration status [2] (Bit0: 0:Time bands disabled, 1:Time bands enabled Bit1: 0:Pumpdown disabled, 1:Pumpdown enabled Bit2: 0:Setpoint modification disabled, 1:Setpoint modification enabled Bit3: 0:Air cooling, 1:Water cooling Bit4: 0:Sequencer disabled, 1:Sequencer enabled Bit5: 0:DHW disabled, 1:DHW enabled Bit6: 0:anti-legionellosis disabled, 1:anti-legionellosis enabled Bit7: 0: +2P module disabled, 1: +2P module enabled Bit8 - Bit15: Not significant)	Always
200012	I	OUT	valuex1	-	Unit status (0:ON from keyboard - 1:ON from digital input - 2:ON from time bands - 3:ON from supervisor - 4:OFF from alarm - 5:OFF from supervisor - 6:OFF from time bands - 7:OFF from digital input - 8:OFF from keyboard - 9:OFF with deselection of compressors - 10:OFF)	Always
200013	I	OUT	valuex1	-	Unit timing status (0:Unit off - 1:Unit timing - 3:Unit at full power - 4:Switching off - 5: Timing of compressors - 6:Pump timing - 8:Unit OFF from alarm)	Always
200014	I	IN / OUT	valuex1	-	Operating mode Chiller (3:chiller) Chiller + freecooling (7:chiller - 8:chiller+fc) Chiller + recovery (2:chiller+rec - 3:chiller) Heat pump (3:chiller - 4:heatpump) Energy raisers (0:auto - 1:recovery - 2:chiller+rec - 3:chiller) Heat pump with recovery (10:summer auto - 11:summer rec - 12:summer ch+rec - 13:summer ch - 14:winter hp - 15:winter rec - 16:winter auto)	Always
200015	I	OUT	valuex1	-	Compressor 1 status (Bit0: 0:Configured , 1:Not configured Bit1: 0:Not enabled , 1:Enabled Bit2: 0:OFF , 1:ON Bit3: 0:Pump-down inactive, 1:Pump-down active Bit4: 0:Alarm not active , 1:Alarm active Bit5: 0:--- ,1:ON with 3 steps active; start for screw and centrifuge compressors Bit6: 0:--- ,1:ON with 2 steps active Bit7: 0:--- ,1:ON with 1 step active Bit8: 0:--- ,1:ON whole Bit9: 0:--- ,1:chiller Bit10: 0:--- ,1:heat pump Bit11: 0:--- ,1:recovery Bit12: 0:--- ,1:defrost Bit13: 0:--- ,1:freecooling Bit14: 0:--- ,1:dripping Bit15: 0:--- ,1:request)	Always
200016	I	OUT	valuex1	-	Compressor 2 status (see compressor 1 status)	Note 1
200017	I	OUT	valuex1	-	Compressor 3 status (see compressor 1 status)	Note 1
200018	I	OUT	valuex1	-	Compressor 4 status (see compressor 1 status)	Note 1
200019	I	OUT	valuex1	-	Compressor 5 status (see compressor 1 status)	Note 1
200020	I	OUT	valuex1	-	Compressor 6 status (see compressor 1 status)	Note 1
200021	I	OUT	valuex1	-	Compressor 7 status (see compressor 1 status)	Note 1
200022	I	OUT	valuex1	-	Compressor 8 status (see compressor 1 status)	Note 1
200023	I	OUT	valuex1	-	Average hours compressors (thousands)	Always
200024	I	OUT	valuex1	-	Average hours compressors (units)	Always
200025	I	IN	valuex1	-	Year / Month (see date and time read/write section)	Always
		OUT	valuex1	-		
200026	I	IN	valuex1	-	Day / Hour / Minutes (see date and time read/write section)	Always
		OUT	valuex1	-		
200027	I	OUT	valuex1	-	Pump coding (Bit0: 0: --- , 1:Enable pump 1 Bit1: 0: --- , 1:Enable pump 2 Bit2: 0: --- , 1:Recovery pump enabled Bit3: 0: --- , 1:Enable DHW pump Bit4: 0: --- , 1:Enable condenser pump Bit5: 0: --- , Bit6: 0: --- , 1:Pumps 1 and 2 stopped due to machine or hydraulic circuit alarms Bit7: 0: --- , 1:Recovery pump stopped due to machine or hydraulic circuit alarms Bit8: 0: --- , 1:Pump 1 alarm	Always

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
					Bit9: 0: --- , 1:Pump 2 alarm Bit10: 0: --- , 1:Recovery pump alarm Bit11: 0: --- , 1:DHW pump alarm Bit12: 0: --- , 1:Condenser pump alarm Bit13: 0: --- , 1:Condenser flow or antifreeze alarm Bit14: 0: --- , 1:Unit no longer available - stop_by_alarm- Bit15: 0: --- , 1:Unit in alarm status but with requested pumps - no_stop_pump-)	
200028	I	OUT	valuex1	-	Flash operating mode (Bit0: 0:--- , 1:Anti-legionellosis function active Bit1: 0:--- , 1:Sniffer function on pumps active Bit2: 0:--- , 1:Unit start delay after power failure Bit3: 0:--- , 1:Thermoregulator on hold/timing Bit4: 0:--- , 1:Fast Restart function enabled Bit5: 0:--- , 1:+2P module enabled Bit6: Insignificant Bit7: 0:--- , 1:Unit with power limitation on Bit8: 0: --- , 1:Unit with anti-freeze limitation on Bit9: 0: --- , 1:pressure switch high temperature control on Bit10: 0: --- , 1:defrosting on Bit11: 0: --- , 1:Energy storage Bit12: 0: --- , 1:Drip phase active in at least one circuit Bit13: 0: --- , 1:Override at maximum in at least one circuit Bit14: 0: --- , 1:Override at minimum in at least one circuit Bit15: 0: --- , 1:The unit is producing DHW	Always
200030	I	OUT	valuex1	-	Unit status (0: ON from keyboard - 1: ON from digital input - 2: ON from time bands - 3: ON from KIPlink - 4: ON from supervisor - 5: ON from sequencer - 6: ON from Manager 3000 - 7: ON from ClimaPRO - 8: ON from LAN - 9: ON from manager + - 20: OFF from alarm - 21: OFF from ClimaPRO - 22: OFF from Manager 3000 - 23: OFF from sequencer - 24: OFF from supervisor - 25: OFF from KIPlink - 26: OFF from time bands - 27: OFF from digital input - 28: OFF from keyboard - 29: OFF with deselection of compressors - 30: OFF - 31: Standby - 32: OFF from LAN - 33: OFF from manager +)	Always
200032	I	OUT	valuex1	-	Active alarm code (with greater priority)	Always
200033	I	OUT	valuex1	-	Screw compressor model (0: Bitzer/Bitzer CSC - 1:Hitachi - 2:Fu-Sheng - 3:Bitzer inverter - 10:Hybrid*) * To identify which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter	Note 1
200034	I	OUT	valuex1	%	Chiller thermoregulator demand (not available for units with output adjustment)	Note 1
200035	I	OUT	valuex1	%	Active power of chiller thermoregulator	Note 1
200036	I	OUT	valuex1	%	Available power of chiller thermoregulator	Note 1
200037	I	OUT	valuex1	%	Heat pump thermoregulator demand (not available for units with output adjustment)	Note 1
200038	I	OUT	valuex1	%	Active power of heat pump thermoregulator	Note 1
200039	I	OUT	valuex1	%	Available power of heat pump thermoregulator	Note 1
200040	I	OUT	valuex1	%	Recovery thermoregulator demand (not available for units with output adjustment)	Note 1
200041	I	OUT	valuex1	%	Active power of recovery thermoregulator	Note 1
200042	I	OUT	valuex1	%	Available power of recovery thermoregulator	Note 1
200043	I	IN	valuex1	%	Temperature controller limitation in chiller (for Demand Limit and Capacity Cap)	Note 1
		OUT	valuex1			
200044	I	IN	valuex1	%	Temperature controller limitation in heat pump (for Demand Limit and Capacity Cap)	Note 1
		OUT	valuex1			
200045	I	IN	valuex1	%	Temperature controller limitation in recovery (for Demand Limit and Capacity Cap)	Note 1
		OUT	valuex1			
200046	I	OUT	valuex10	rpm	RPM centrifuge comp. 1	Note 1
			valuex1		RPM inverter comp.1	Note 1
200047	I	OUT	valuex10	rpm	RPM centrifuge comp. 2	Note 1
			valuex1		RPM inverter comp.2	Note 1
200048	I	OUT	valuex10	rpm	RPM centrifuge comp. 3	Note 1
			valuex1		RPM inverter comp.3	Note 1
200049	I	OUT	valuex10	rpm	RPM centrifuge comp. 4	Note 1
			valuex1		RPM inverter comp.4	Note 1
200050	I	OUT	valuex10	rpm	RPM centrifuge comp. 5	Note 1
200051	I	OUT	valuex10	rpm	RPM centrifuge comp. 6	Note 1
200052	I	OUT	valuex10	rpm	RPM centrifuge comp. 7	Note 1
200053	I	OUT	valuex10	rpm	RPM centrifuge comp. 8	Note 1
200054	I	OUT	valuex1	hx1000	Compressor 1 hours (thousands)	Always

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200055	I	OUT	valuex1	h	Compressor 1 hours (units)	Always
200056	I	OUT	valuex1	hx1000	Compressor 2 hours (thousands)	Note 1
200057	I	OUT	valuex1	h	Compressor 2 hours (units)	Note 1
200058	I	OUT	valuex1	hx1000	Compressor 3 hours (thousands)	Note 1
200059	I	OUT	valuex1	h	Compressor 3 hours (units)	Note 1
200060	I	OUT	valuex1	hx1000	Compressor 4 hours (thousands)	Note 1
200061	I	OUT	valuex1	h	Compressor 4 hours (units)	Note 1
200062	I	OUT	valuex1	hx1000	Compressor 5 hours (thousands)	Note 1
200063	I	OUT	valuex1	h	Compressor 5 hours (units)	Note 1
200064	I	OUT	valuex1	hx1000	Compressor 6 hours (thousands)	Note 1
200065	I	OUT	valuex1	h	Compressor 6 hours (units)	Note 1
200066	I	OUT	valuex1	hx1000	Compressor 7 hours (thousands)	Note 1
200067	I	OUT	valuex1	h	Compressor 7 hours (units)	Note 1
200068	I	OUT	valuex1	hx1000	Compressor 8 hours (thousands)	Note 1
200069	I	OUT	valuex1	h	Compressor 8 hours (units)	Note 1
200070	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 1	Note 1
200071	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 2	Note 1
200072	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 3	Note 1
200073	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 4	Note 1
200074	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 1	Note 1
200075	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 2	Note 1
200076	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 3	Note 1
200077	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 4	Note 1
200078	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 1	Note 1
200079	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 2	Note 1
200080	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 3	Note 1
200081	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 4	Note 1
200082	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 1	Note 1
200083	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 2	Note 1
200084	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 3	Note 1
200085	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 4	Note 1
200086	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 5	Note 1
200087	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 6	Note 1
200088	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 7	Note 1
200089	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 8	Note 1
200090	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 5	Note 1
200091	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 6	Note 1
200092	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 7	Note 1
200093	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 8	Note 1
200094	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 5	Note 1
200095	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 6	Note 1
200096	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 7	Note 1
200097	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 8	Note 1
200098	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 5	Note 1
200099	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 6	Note 1
200100	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 7	Note 1
200111	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 8	Note 1
200113	I	OUT	valuex1	%	Opening of freecooling valve as a percentage	Note 1
200114	I	IN	Value x1	-	Watchdog	Note 2
	I	OUT	Value x1	-		
200121	I	OUT	value/10	%	Main pump speed % with VPF management	Note 1
200124	I	OUT	value/10	%	Recovery pump speed % with VPF management	Note 1
200126	I	OUT	valuex1	V	Network analyser: Line 1 - N voltage	Note 1 and 2
200127	I	OUT	valuex1	V	Network analyser: Line 2 - N voltage	Note 1 and 2
200128	I	OUT	valuex1	V	Network analyser: Line 3 - N voltage	Note 1 and 2
200129	I	OUT	valuex1	V	Network analyser: Line 1 - line 2 voltage	Note 1 and 2
200130	I	OUT	valuex1	V	Network analyser: Line 2 - line 3 voltage	Note 1 and 2
200131	I	OUT	valuex1	V	Network analyser: Line 3 - line 1 voltage	Note 1 and 2
200132	I	OUT	value/10	A	Network analyser: Line 1 current	Note 1 and 2
200133	I	OUT	value/10	A	Network analyser: Line 2 current	Note 1 and 2

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200134	I	OUT	value/10	A	Network analyser: Line 3 current	Note 1 and 2
200135	I	OUT	value/10	A	Network analyser: Neutral current	Note 1 and 2
200136	I	OUT	value/1000	-	Network analyser: Power factor	Note 1 and 2
200137	I	OUT	value/10	kW	Network analyser: Line 1 power	Note 1 and 2
200138	I	OUT	value/10	kW	Network analyser: Line 2 power	Note 1 and 2
200139	I	OUT	value/10	kW	Network analyser: Line 3 power	Note 1 and 2
200140	I	OUT	value/10	kW	Network analyser: Total capacity	Note 1 and 2
200141	I	OUT	valuex1	kWh	Network analyser: Energy (millions)	Note 1 and 2
200142	I	OUT	valuex1	kWh	Network analyser: Energy (thousands)	Note 1 and 2
200143	I	OUT	valuex1	kWh	Network analyser: Energy (units)	Note 1 and 2
200144	I	OUT	valuex1	h	Network analyser: Time (millions)	Note 1 and 2
200145	I	OUT	valuex1	h	Network analyser: Time (thousands)	Note 1 and 2
200146	I	OUT	valuex1	h	Network analyser: Time (units)	Note 1 and 2
200155	I	IN OUT	valuex1 valuex1	A	Setpoint from BMS of the maximum permitted input current for the unit	Note 1 and 2
200156	I	OUT	value/10	m^3/h	Thermal power analyser: evaporator flow rate	Note 1 and 2
200157	I	OUT	value/10	°C	Thermal power analyser: temperature T1 connected to the evaporator input	Note 1 and 2
200158	I	OUT	value/10	°C	Thermal power analyser: temperature T2 connected to the evaporator output	Note 1 and 2
200159	I	OUT	value/10	°C	Thermal power analyser: temperature difference calculated as T1 - T2	Note 1 and 2
200160	I	OUT	valuex1	kWh	Thermal power analyser: calculated thermal power	Note 1 and 2
200161	I	OUT	value/10	VA	Network analyser: Apparent power line 1	Note 1 and 2
200162	I	OUT	value/10	VA	Network analyser: Apparent power line 2	Note 1 and 2
200163	I	OUT	value/10	VA	Network analyser: Apparent power line 3	Note 1 and 2
200164	I	OUT	value/10	VA	Network analyser: Total apparent power	Note 1 and 2
200165	I	OUT	value/10	VAR	Network analyser: Reactive power line 1	Note 1 and 2
200166	I	OUT	value/10	VAR	Network analyser: Reactive power line 2	Note 1 and 2
200167	I	OUT	value/10	VAR	Network analyser: Reactive power line 3	Note 1 and 2
200168	I	OUT	value/10	VAR	Network analyser: Total reactive power	Note 1 and 2
200169	I	OUT	valuex1	%	Percentage ventilation of circuit 1 / opening of modulating valve disposal circuit 1	Note 1 and 2
200170	I	OUT	valuex1	%	Percentage ventilation of circuit 2 / opening of modulating valve disposal circuit 2	Note 1 and 2
200171	I	OUT	valuex1	%	Percentage ventilation of circuit 3 / opening of modulating valve disposal circuit 3	Note 1 and 2
200172	I	OUT	valuex1	%	Percentage ventilation of circuit 4 / opening of modulating valve disposal circuit 4	Note 1 and 2
200217	I	OUT	valuex1	-	[01] 10 simultaneously active alarms with priority from 1 to 10	Always
200218	I	OUT	valuex1	-	[02] 10 simultaneously active alarms with priority from 1 to 10	Always
200219	I	OUT	valuex1	-	[03] 10 simultaneously active alarms with priority from 1 to 10	Always
200220	I	OUT	valuex1	-	[04] 10 simultaneously active alarms with priority from 1 to 10	Always
200221	I	OUT	valuex1	-	[05] 10 simultaneously active alarms with priority from 1 to 10	Always
200222	I	OUT	valuex1	-	[06] 10 simultaneously active alarms with priority from 1 to 10	Always
200223	I	OUT	valuex1	-	[07] 10 simultaneously active alarms with priority from 1 to 10	Always
200224	I	OUT	valuex1	-	[08] 10 simultaneously active alarms with priority from 1 to 10	Always

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200225	I	OUT	valuex1	-	[09] 10 simultaneously active alarms with priority from 1 to 10	Always
200226	I	OUT	valuex1	-	[10] 10 simultaneously active alarms with priority from 1 to 10	Always
200227	I	OUT	valuex1	A	Active permitted input current setpoint	Always
200228	I	OUT	valuex1	-	Information on bit-coded residential functions: Bit0: 0:--- , 1:HT zone configured Bit1: 0:--- , 1:HT zone active Bit2: 0:--- , 1:HT zone alarm Bit3: 0:--- , 1:LT zone configured Bit4: 0:--- , 1:LT zone active Bit5: 0:--- , 1:LT zone alarm Bit6: 0:--- , 1:DHW recirculation configured Bit7: 0:--- , 1:DHW recirculation active Bit8: 0: --- , 1:Dehumidifier configured Bit9: 0: --- , 1:Dehumidifier active Bit10: 0: --- , 1:Auxiliary source in system delivery active Bit11: 0: --- , 1:Auxiliary source in system storage active Bit12: 0: --- , 1:Auxiliary source in DHW storage active Bit13: 0: --- , 1:System auxiliary source block alarm Bit14: 0: --- , 1: not used Bit15: 0: --- , 1: not used	Note 1 and 2
200229	I	OUT	value/10	°C	Mixed water temperature	Note 1 and 2
200230	I	OUT	value/10	°C	LT active setpoint	Note 1 and 2
200231	I	IN OUT	value/10	°C	Mixed water temperature summer setpoint	Note 1 and 2
200232	I	IN OUT	value/10	°C	Mixed water temperature winter setpoint	Note 1 and 2
200233	I	IN OUT	valuex1	-	Operating mode automatic change for external air temperature: 0 = disabled 1 = enabled	Note 1 and 2
200234	I	IN	valuex1	-	Start priority: 0 = system 1 = DHW	Note 1 and 2
200235	I	OUT	Value x1	-	Unit 1 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
200236	I	OUT	Value x1	-	Unit 2 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
200237	I	OUT	Value x1	-	Unit 3 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
200238	I	OUT	Value x1	-	Unit 4 status (0: OFF - 1: ON cooling plant – 2: ON heating plant – 3: ON heating DHW – 4: Alarm – 5: Offline)	Note 1, 2 and 3
200239	I	OUT	Value x1	%	Percentage of power delivered unit 1	Note 1, 2 and 3
200240	I	OUT	Value x1	%	Percentage of power delivered unit 2	Note 1, 2 and 3
200241	I	OUT	Value x1	%	Percentage of power delivered unit 3	Note 1, 2 and 3
200242	I	OUT	Value x1	%	Percentage of power delivered unit 4	Note 1, 2 and 3
200243	I	OUT	Value x1	%	Percentage of power delivered to the plant by the group	Note 1, 2 and 3
200244	I	OUT	Value x1	%	Percentage of power delivered to DHW by the group	Note 1, 2 and 3
200245	I	OUT	Value x1	-	Group status (0: ON from keyboard - 1: ON from a digital input - 2: ON from KIPLink - 3: ON from supervision, 10: OFF from keyboard - 11: OFF from digital input – 12: OFF from KIPLink – 13: OFF from supervision	Note 1, 2 and 3
200246	I	OUT	Value x1	-	Group operating mode (0: OFF - 1/2: Cooling+DHW - 3: Cooling - 4/5: Heating+DHW – 6: Heating – 7: DHW)	Note 1, 2 and 3
200247	R	OUT	valuex1	MW	Unit power produced	Note 1 and 2

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200248	R	OUT	value/10	kW	Unit power produced	Note 1 and 2
200249	R	OUT	valuex1	MW	Unit power absorbed	Note 1 and 2
200250	R	OUT	value/10	kW	Unit power absorbed	Note 1 and 2
200251	R	OUT	value/100	-	Instantaneous efficiency (EER/COP/DHW COP)	Note 1 and 2
200252	R	OUT	valuex1	MWh	Current day: energy produced in chiller (MWh)	Note 1 and 2
200253	R	OUT	value/10	kWh	Current day: energy produced in chiller (kWh)	Note 1 and 2
200254	R	OUT	valuex1	MWh	Current day: energy absorbed in chiller (MWh)	Note 1 and 2
200255	R	OUT	value/10	kWh	Current day: energy absorbed in chiller (kWh)	Note 1 and 2
200256	R	OUT	valuex1	MWh	Current day: energy produced in heatpump (MWh)	Note 1 and 2
200257	R	OUT	value/10	kWh	Current day: energy produced in heatpump (kWh)	Note 1 and 2
200258	R	OUT	valuex1	MWh	Current day: energy absorbed in heatpump (MWh)	Note 1 and 2
200259	R	OUT	value/10	kWh	Current day: energy absorbed in heatpump (kWh)	Note 1 and 2
200260	R	OUT	valuex1	MWh	Current day: energy produced in DHW (MWh)	Note 1 and 2
200261	R	OUT	value/10	kWh	Current day: energy produced in DHW (kWh)	Note 1 and 2
200262	R	OUT	valuex1	MWh	Current day: energy absorbed in DHW (MWh)	Note 1 and 2
200263	R	OUT	value/10	kWh	Current day: energy absorbed in DHW (kWh)	Note 1 and 2
200264	R	OUT	valuex1	MWh	Current day: total energy produced (MWh)	Note 1 and 2
200265	R	OUT	value/10	kWh	Current day: total energy produced (kWh)	Note 1 and 2
200266	R	OUT	valuex1	MWh	Current day: total absorbed energy (MWh)	Note 1 and 2
200267	R	OUT	value/10	kWh	Current day: total absorbed energy (kWh)	Note 1 and 2
200268	R	OUT	value/100	-	Current day: Integrated efficiency in chiller	Note 1 and 2
200269	R	OUT	value/100	-	Current day: Integrated efficiency in heatpump	Note 1 and 2
200270	R	OUT	value/100	-	Current day: Integrated efficiency in DHW	Note 1 and 2

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200271	R	OUT	value/100	-	Current day: Total integrated efficiency	Note 1 and 2
200272	R	OUT	valuex1	MWh	Previous day: energy produced in chiller (MWh)	Note 1 and 2
200273	R	OUT	value/10	kWh	Previous day: energy produced in chiller (kWh)	Note 1 and 2
200274	R	OUT	valuex1	MWh	Previous day: energy absorbed in chiller (MWh)	Note 1 and 2
200275	R	OUT	value/10	kWh	Previous day: energy absorbed in chiller (kWh)	Note 1 and 2
200276	R	OUT	valuex1	MWh	Previous day: energy produced in heatpump (MWh)	Note 1 and 2
200277	R	OUT	value/10	kWh	Previous day: energy produced in heatpump (kWh)	Note 1 and 2
200278	R	OUT	valuex1	MWh	Previous day: energy absorbed in heatpump (MWh)	Note 1 and 2
200279	R	OUT	value/10	kWh	Previous day: energy absorbed in heatpump (kWh)	Note 1 and 2
200280	R	OUT	valuex1	MWh	Previous day: energy produced in DHW (MWh)	Note 1 and 2
200281	R	OUT	value/10	kWh	Previous day: energy produced in DHW (kWh)	Note 1 and 2
200282	R	OUT	valuex1	MWh	Previous day: energy absorbed in DHW (MWh)	Note 1 and 2
200283	R	OUT	value/10	kWh	Previous day: energy absorbed in DHW (kWh)	Note 1 and 2
200284	R	OUT	valuex1	MWh	Previous day: total energy produced (MWh)	Note 1 and 2
200285	R	OUT	value/10	kWh	Previous day: total energy produced (kWh)	Note 1 and 2
200286	R	OUT	valuex1	MWh	Previous day: total absorbed energy (MWh)	Note 1 and 2
200287	R	OUT	value/10	kWh	Previous day: total absorbed energy (kWh)	Note 1 and 2
200288	R	OUT	value/100	-	Previous day: Integrated efficiency in chiller	Note 1 and 2
200289	R	OUT	value/100	-	Previous day: Integrated efficiency in heatpump	Note 1 and 2
200290	R	OUT	value/100	-	Previous day: Integrated efficiency in DHW	Note 1 and 2
200291	R	OUT	value/100	-	Previous day: Total integrated efficiency	Note 1 and 2
200292	R	OUT	valuex1	MWh	Current month: energy produced in chiller (MWh)	Note 1 and 2
200293	R	OUT	value/10	kWh	Current month: energy produced in chiller (kWh)	Note 1 and 2

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200294	R	OUT	valuex1	MWh	Current month: energy absorbed in chiller (MWh)	Note 1 and 2
200295	R	OUT	value/10	kWh	Current month: energy absorbed in chiller (kWh)	Note 1 and 2
200296	R	OUT	valuex1	MWh	Current month: energy produced in heatpump (MWh)	Note 1 and 2
200297	R	OUT	value/10	kWh	Current month: energy produced in heatpump (kWh)	Note 1 and 2
200298	R	OUT	valuex1	MWh	Current month: energy absorbed in heatpump (MWh)	Note 1 and 2
200299	R	OUT	value/10	kWh	Current month: energy absorbed in heatpump (kWh)	Note 1 and 2
200300	R	OUT	valuex1	MWh	Current month: energy produced in DHW (MWh)	Note 1 and 2
200403	R	OUT	value/10	kWh	Current month: energy produced in DHW (kWh)	Note 1 and 2
200404	R	OUT	valuex1	MWh	Current month: energy absorbed in DHW (MWh)	Note 1 and 2
200405	R	OUT	value/10	kWh	Current month: energy absorbed in DHW (kWh)	Note 1 and 2
200406	R	OUT	valuex1	MWh	Current month: total energy produced (MWh)	Note 1 and 2
200407	R	OUT	value/10	kWh	Current month: total energy produced (kWh)	Note 1 and 2
200408	R	OUT	valuex1	MWh	Current month: total absorbed energy (MWh)	Note 1 and 2
200409	R	OUT	value/10	kWh	Current month: total absorbed energy (kWh)	Note 1 and 2
200410	R	OUT	value/100	-	Current month: Integrated efficiency in chiller	Note 1 and 2
200411	R	OUT	value/100	-	Current month: Integrated efficiency in heatpump	Note 1 and 2
200412	R	OUT	value/100	-	Current month: Integrated efficiency in DHW	Note 1 and 2
200413	R	OUT	value/100	-	Current month: Total integrated efficiency	Note 1 and 2
200414	R	OUT	valuex1	MWh	Previous month: energy produced in chiller (MWh)	Note 1 and 2
200415	R	OUT	value/10	kWh	Previous month: energy produced in chiller (kWh)	Note 1 and 2
200416	R	OUT	valuex1	MWh	Previous month: energy absorbed in chiller (MWh)	Note 1 and 2
200417	R	OUT	value/10	kWh	Previous month: energy absorbed in chiller (kWh)	Note 1 and 2
200418	R	OUT	valuex1	MWh	Previous month: energy produced in heatpump (MWh)	Note 1 and 2

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200419	R	OUT	value/10	kWh	Previous month: energy produced in heatpump (kWh)	Note 1 and 2
200420	R	OUT	valuex1	MWh	Previous month: energy absorbed in heatpump (MWh)	Note 1 and 2
200421	R	OUT	value/10	kWh	Previous month: energy absorbed in heatpump (kWh)	Note 1 and 2
200422	R	OUT	valuex1	MWh	Previous month: energy produced in DHW (MWh)	Note 1 and 2
200423	R	OUT	value/10	kWh	Previous month: energy produced in DHW (kWh)	Note 1 and 2
200424	R	OUT	valuex1	MWh	Previous month: energy absorbed in DHW (MWh)	Note 1 and 2
200425	R	OUT	value/10	kWh	Previous month: energy absorbed in DHW (kWh)	Note 1 and 2
200426	R	OUT	valuex1	MWh	Previous month: total energy produced (MWh)	Note 1 and 2
200427	R	OUT	value/10	kWh	Previous month: total energy produced (kWh)	Note 1 and 2
200428	R	OUT	valuex1	MWh	Previous month: total absorbed energy (MWh)	Note 1 and 2
200429	R	OUT	value/10	kWh	Previous month: total absorbed energy (kWh)	Note 1 and 2
200430	R	OUT	value/100	-	Previous month: Integrated efficiency in chiller	Note 1 and 2
200431	R	OUT	value/100	-	Previous month: Integrated efficiency in heatpump	Note 1 and 2
200432	R	OUT	value/100	-	Previous month: Integrated efficiency in DHW	Note 1 and 2
200433	R	OUT	value/100	-	Previous month: Total integrated efficiency	Note 1 and 2
200434	R	OUT	valuex1	GWh	Current year: energy produced in chiller (GWh)	Note 1 and 2
200435	R	OUT	valuex1	MWh	Current year: energy produced in chiller (MWh)	Note 1 and 2
200436	R	OUT	value/10	kWh	Current year: energy produced in chiller (kWh)	Note 1 and 2
200437	R	OUT	valuex1	GWh	Current year: energy absorbed in chiller (GWh)	Note 1 and 2
200438	R	OUT	valuex1	MWh	Current year: energy absorbed in chiller (MWh)	Note 1 and 2
200439	R	OUT	value/10	kWh	Current year: energy absorbed in chiller (kWh)	Note 1 and 2
200440	R	OUT	valuex1	GWh	Current year: energy produced in heatpump (GWh)	Note 1 and 2
200441	R	OUT	valuex1	MWh	Current year: energy produced in heatpump (MWh)	Note 1 and 2

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200442	R	OUT	value/10	kWh	Current year: energy produced in heatpump (kWh)	Note 1 and 2
200443	R	OUT	valuex1	GWh	Current year: energy absorbed in heatpump (GWh)	Note 1 and 2
200444	R	OUT	valuex1	MWh	Current year: energy absorbed in heatpump (MWh)	Note 1 and 2
200445	R	OUT	value/10	kWh	Current year: energy absorbed in heatpump (kWh)	Note 1 and 2
200446	R	OUT	valuex1	GWh	Current year: energy produced in DHW (GWh)	Note 1 and 2
200447	R	OUT	valuex1	MWh	Current year: energy produced in DHW (MWh)	Note 1 and 2
200448	R	OUT	value/10	kWh	Current year: energy produced in DHW (kWh)	Note 1 and 2
200449	R	OUT	valuex1	GWh	Current year: energy absorbed in DHW (GWh)	Note 1 and 2
200450	R	OUT	valuex1	MWh	Current year: energy absorbed in DHW (MWh)	Note 1 and 2
200451	R	OUT	value/10	kWh	Current year: energy absorbed in DHW (kWh)	Note 1 and 2
200452	R	OUT	valuex1	GWh	Current year: total energy produced (GWh)	Note 1 and 2
200453	R	OUT	valuex1	MWh	Current year: total energy produced (MWh)	Note 1 and 2
200454	R	OUT	value/10	kWh	Current year: total energy produced (kWh)	Note 1 and 2
200455	R	OUT	valuex1	GWh	Current year: total absorbed energy (GWh)	Note 1 and 2
200456	R	OUT	valuex1	MWh	Current year: total absorbed energy (MWh)	Note 1 and 2
200457	R	OUT	value/10	kWh	Current year: total absorbed energy (kWh)	Note 1 and 2
200458	R	OUT	value/100	-	Current year: Integrated efficiency in chiller	Note 1 and 2
200459	R	OUT	value/100	-	Current year: Integrated efficiency in heatpump	Note 1 and 2
200460	R	OUT	value/100	-	Current year: Integrated efficiency in DHW	Note 1 and 2
200461	R	OUT	value/100	-	Current year: Total integrated efficiency	Note 1 and 2
200462	R	OUT	valuex1	GWh	Previous year: energy produced in chiller (GWh)	Note 1 and 2
200463	R	OUT	valuex1	MWh	Previous year: energy produced in chiller (MWh)	Note 1 and 2
200464	R	OUT	value/10	kWh	Previous year: energy produced in chiller (kWh)	Note 1 and 2

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200465	R	OUT	valuex1	GWh	Previous year: energy absorbed in chiller (GWh)	Note 1 and 2
200466	R	OUT	valuex1	MWh	Previous year: energy absorbed in chiller (MWh)	Note 1 and 2
200467	R	OUT	value/10	kWh	Previous year: energy absorbed in chiller (kWh)	Note 1 and 2
200468	R	OUT	valuex1	GWh	Previous year: energy produced in heatpump (GWh)	Note 1 and 2
200469	R	OUT	valuex1	MWh	Previous year: energy produced in heatpump (MWh)	Note 1 and 2
200470	R	OUT	value/10	kWh	Previous year: energy produced in heatpump (kWh)	Note 1 and 2
200471	R	OUT	valuex1	GWh	Previous year: energy absorbed in heatpump (GWh)	Note 1 and 2
200472	R	OUT	valuex1	MWh	Previous year: energy absorbed in heatpump (MWh)	Note 1 and 2
200473	R	OUT	value/10	kWh	Previous year: energy absorbed in heatpump (kWh)	Note 1 and 2
200474	R	OUT	valuex1	GWh	Previous year: energy produced in DHW (GWh)	Note 1 and 2
200475	R	OUT	valuex1	MWh	Previous year: energy produced in DHW (MWh)	Note 1 and 2
200476	R	OUT	value/10	kWh	Previous year: energy produced in DHW (kWh)	Note 1 and 2
200477	R	OUT	valuex1	GWh	Previous year: energy absorbed in DHW (GWh)	Note 1 and 2
200478	R	OUT	valuex1	MWh	Previous year: energy absorbed in DHW (MWh)	Note 1 and 2
200479	R	OUT	value/10	kWh	Previous year: energy absorbed in DHW (kWh)	Note 1 and 2
200480	R	OUT	valuex1	GWh	Previous year: total energy produced (GWh)	Note 1 and 2
200481	R	OUT	valuex1	MWh	Previous year: total energy produced (MWh)	Note 1 and 2
200482	R	OUT	value/10	kWh	Previous year: total energy produced (kWh)	Note 1 and 2
200483	R	OUT	valuex1	GWh	Previous year: total energy absorbed (GWh)	Note 1 and 2
200484	R	OUT	valuex1	MWh	Previous year: total absorbed energy (MWh)	Note 1 and 2
200485	R	OUT	value/10	kWh	Previous year: total absorbed energy (kWh)	Note 1 and 2
200486	R	OUT	value/100	-	Previous year: Integrated efficiency in chiller	Note 1 and 2
200487	R	OUT	value/100	-	Previous year: Integrated efficiency in heatpump	Note 1 and 2

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200488	R	OUT	value/100	-	Previous year: Integrated efficiency in DHW	Note 1 and 2
200489	R	OUT	value/100	-	Previous year: Total integrated efficiency	Note 1 and 2
200490	R	OUT	valuex1	GWh	Year -2: energy produced in chiller (GWh)	Note 1 and 2
200491	R	OUT	valuex1	MWh	Year -2: energy produced in chiller (MWh)	Note 1 and 2
200492	R	OUT	value/10	kWh	Year -2: energy produced in chiller (kWh)	Note 1 and 2
200493	R	OUT	valuex1	GWh	Year -2: energy absorbed in chiller (GWh)	Note 1 and 2
200494	R	OUT	valuex1	MWh	Year -2: energy absorbed in chiller (MWh)	Note 1 and 2
200495	R	OUT	value/10	kWh	Year -2: energy absorbed in chiller (kWh)	Note 1 and 2
200496	R	OUT	valuex1	GWh	Year -2: energy produced in heatpump (GWh)	Note 1 and 2
200500	R	OUT	valuex1	MWh	Year -2: energy produced in heatpump (MWh)	Note 1 and 2
200501	R	OUT	value/10	kWh	Year -2: energy produced in heatpump (kWh)	Note 1 and 2
200502	R	OUT	valuex1	GWh	Year -2: energy absorbed in heatpump (GWh)	Note 1 and 2
200503	R	OUT	valuex1	MWh	Year -2: energy absorbed in heatpump (MWh)	Note 1 and 2
200504	R	OUT	value/10	kWh	Year -2: energy absorbed in heatpump (kWh)	Note 1 and 2
200505	R	OUT	valuex1	GWh	Year -2: energy produced in DHW (GWh)	Note 1 and 2
200506	R	OUT	valuex1	MWh	Year -2: energy produced in DHW (MWh)	Note 1 and 2
200507	R	OUT	value/10	kWh	Year -2: energy produced in DHW (kWh)	Note 1 and 2
200508	R	OUT	valuex1	GWh	Year -2: energy absorbed in DHW (GWh)	Note 1 and 2
200509	R	OUT	valuex1	MWh	Year -2: energy absorbed in DHW (MWh)	Note 1 and 2
200510	R	OUT	value/10	kWh	Year -2: energy absorbed in DHW (kWh)	Note 1 and 2
200511	R	OUT	valuex1	GWh	Year -2: total energy produced (GWh)	Note 1 and 2
200512	R	OUT	valuex1	MWh	Year -2: total energy produced (MWh)	Note 1 and 2
200513	R	OUT	value/10	kWh	Year -2: total energy produced (kWh)	Note 1 and 2

Address	Type	Flow	Conversion factor	Unit of Measurement	Description	Available to BMS
200514	R	OUT	valuex1	GWh	Year -2: total absorbed energy (GWh)	Note 1 and 2
200515	R	OUT	valuex1	MWh	Year -2: total absorbed energy (MWh)	Note 1 and 2
200516	R	OUT	value/10	kWh	Year -2: total absorbed energy (kWh)	Note 1 and 2
200517	R	OUT	value/100	-	Year -2: Integrated efficiency in chiller	Note 1 and 2
200518	R	OUT	value/100	-	Year -2: Integrated efficiency in heatpump	Note 1 and 2
200519	R	OUT	value/100	-	Year -2: Integrated efficiency in DHW	Note 1 and 2
200520	R	OUT	value/100	-	Year -2: Total integrated efficiency	Note 1 and 2

***Type:** B =Binary, A=Analog, I=Integer

Note 1: availability of the variable to the supervisor system depends on the type of unit and optional devices used.
Note 2: the possibility of using the variable depends on enabling of a parameter on the controller.
Note 3: Only available for multi-unit Master-Client control.

11.8 Software version and revision interpretation

The version and revision in the controller are given in the entire 200003 and 200004:

200003	I	OUT	valuex1	-	Software version	Always
200004	I	OUT	valuex1	-	Software version (revision)	Always

The information is coded as follows:

Software release (I: 200003)

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Therefore, if for example TA15r00 is in the controller, the entire 200003 will be equal to 2001 (T=**20**, A=**01)**, while the entire 200004 will be equal to 1400 (Version **14**, revision **00**).
By combining the two pieces of information, it is possible to determine the on-board software, its version and revision.

11.9 Switching of the units to autonomous operation in the case of a fault or disconnection of the Supervisor

This function can be used in the following cases:

- communication down between the Supervisor and unit: for example due to a broken communication cable or loss of power to the Supervisor.

The Supervisor must perform cyclical variations of the register I114 within 2 minutes of the previous variation (e.g. writing of register I114 = "0", wait for 30s, writing of register I114 = "1", wait for 30s and so on). Communication between the Supervisor and the unit is lost when there is no variation of the register I114 for more than 2 minutes.
In which case, the unit switches to autonomous mode if possible, to guarantee the supply of power until normal operation of the Supervisor is restored.
The thermoregulator on the unit regulates the unit in autonomous mode in relation to the last setpoint value received from the Supervisor.

The unit can enter autonomous mode if all the following conditions were in place before loss of communication with the Supervisor:

- serial configured as "Supervision with watchdog" in the User menu;
- consent for autonomous operation enabled with bit 15;
- operation of the unit is enabled at the local keyboard or from the digital input.

The unit does not start up when there is no communication with the Supervisor and even one of the above conditions is not met.

In case of voltage interruption, once the same is reinstated, bit 15 (Modbus) is initialised internally at 0 and must be reset by the supervisor.

11.10 Instructions on configuration of the BACNET TCP/IP board on the PC

Before a PC can communicate with the BACNET TCP/IP board, the settings of both devices must be correctly aligned.
As the factory settings of the BACNET TCP/IP board can only be changed after establishing the connection with the PC, when making access for the first time, the Personal Computer will have to be adapted to the factory settings of the BACNET TCP/IP board.

11.10.1 PC settings

Disconnect the Personal Computer from any networks and connect it directly to the BACNET TCP/IP board using the cable (crossed).

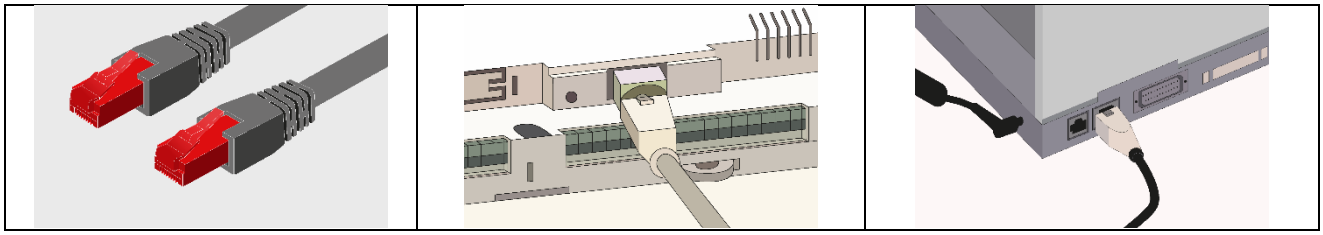


Figure 11-1: *demonstration of configuration of the BACNET TCP/IP board using a PC.*

Set the Personal Computer so that it does not use DHCP, but rather the IP address: 172.16.0.2.
The Subnet mask field also needs to be specified. The Gateway does not need to be specified.

The procedure is described below.
In the “Control Panel”:

1. Double click on “Network Connections”.
2. Double click on “Local Area Connection (LAN)”.
3. Click on “Properties”.
4. Double click on “Internet Protocol (TCP/IP)”.

Before changing the settings, take note of all the existing settings as these will be have to be restored afterwards in order to allow the PC to communicate with the data network it was previously connected to.

6. Click on “Use the following IP address” and set the following parameters:
   IP address = 172.16.0.2
   Subnet mask = 255.255.0.0
7. Click “OK” to close all the windows.

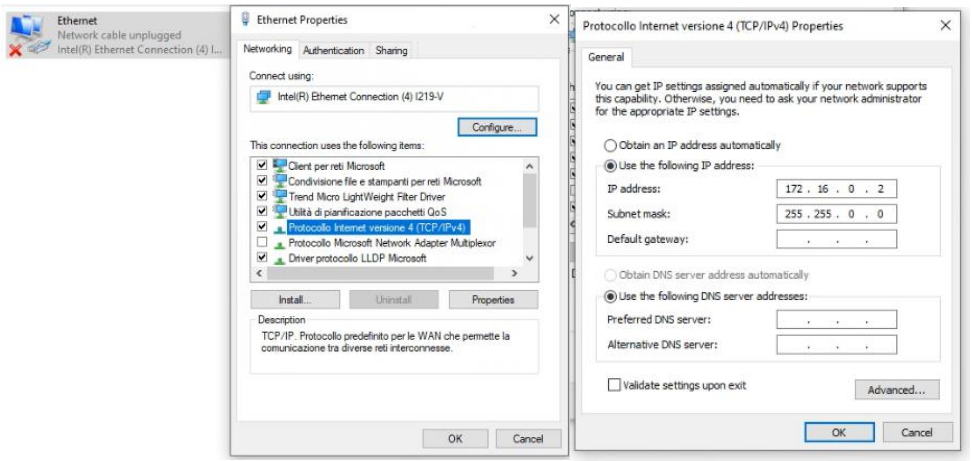


Figure 11-2: *parameter setting window.*

The PC is set so that it does not use the “proxy” network device as a communication channel. In fact, the PC is not networked and if the use of “proxy” were not disabled, communication would become impossible.

1. Open the Windows “Control Panel”.
2. Double click on “Internet Options”.
3. Click “Connections”. Another window will appear.
4. Click “LAN settings”.
5. Disable the proxy server.
6. Press “OK” to close the windows.

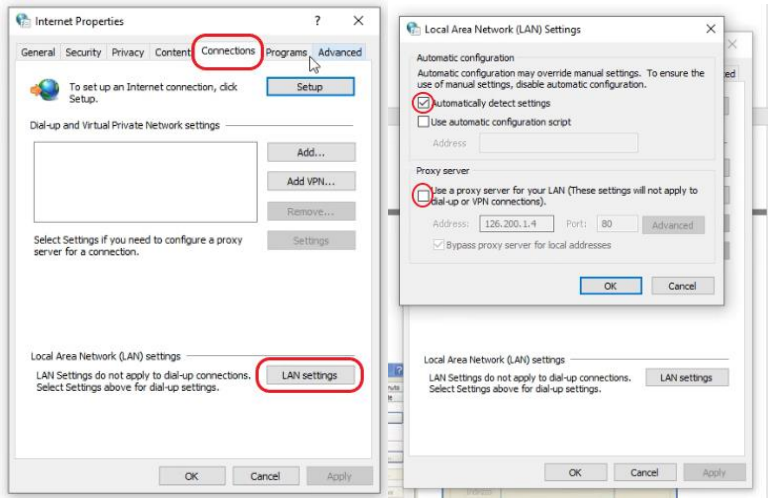


Figure 11-3: *disabling the proxy server.*

11.10.2 Starting the BACNET TCP/IP board with the factory settings

1. switch on the W3000+ controller;
2. Make sure that both the LEDs of the BACNET TCP/IP board connector light up within a few seconds.

Figure 11-4: *BACNET TCP/IP board detail.*

INFORMATION:
The choice as to whether to activate factory settings or user settings can only be made when starting the BACNET TCP/IP board. The BACNET TCP/IP board restarts whenever it is turned on.

3. As soon as the Status LED turns on **green** immediately after restart, hold down the button to activate the factory settings;
4. holding the button down for about 20 seconds will cause the status LED to flash **red** 3 times. Release the button while this is happening.

5. after the red flashes, the Status LED turns **green** and, if the procedure has been performed correctly, the Status LED confirms the button has been pressed and released by rapidly flashing **red** 3 times and then shining **green** for about one minute (completion of the start phase); after completing the start phase, the Status LED starts flashing: the BACNET TCP/IP board has now completely started;

In this way, the BACNET TCP/IP board will not use the “User” set communication configuration parameter values, but rather the following factory values:
IP address: 172.16.0.1
Subnet mask: 255.255.0.0

Note:
These values will remain active until the BACNET TCP/IP BOARD IS RESTARTED.
After restart, the BACNET TCP/IP board will return to the “User” configuration values
It is recommended that the network communication parameters are configured immediately.

11.10.3 Access the BACNET TCP/IP board via the PC

To allow the board to communicate with the data network it will be installed to, certain network communication parameters must be set.
The BACNET TCP/IP board can recognise queries sent by a supervisor using either of the following two versions of the BACnet (Building Automation Control Networks) protocol:
• BACnet/IP (Addenda A/Annex J)
• BACnet Ethernet ISO8802-2 over 8802-3

INFORMATION:
The network administrator must establish whether the BACNET TCP/IP board can be connected and must communicate essential system data.

1. on the PC open a web browser;
2. write the following number, including dots, in the address field: 172.16.0.1

3. press **Send**.

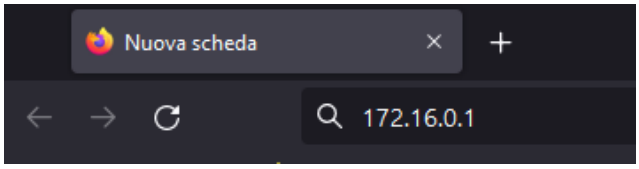


Figure 11-5: *entering the IP address.*

The **first access** page may offer one of the following two alternatives:

- **Restrict access**: you will be asked to customise all passwords and, upon confirmation, all services (except the following) will be disabled: HTTPS, SFTP SSH SCP).
- **Do not restrict access**: no password confirmation will be required. To log in, simply enter your password and default user ID.

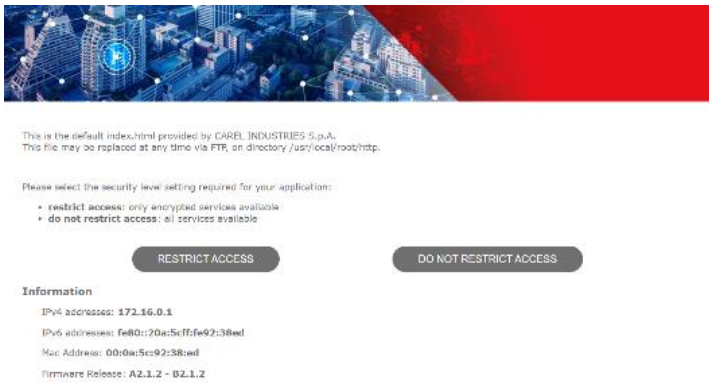


Figure 11-6: *possibility to log in for the first time.*

When logging in for the **second time** (with HTTPS and entering the customised password and user ID), the page displayed will only show the **"administrator area"** button.

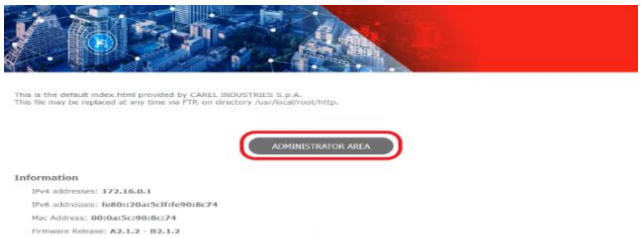


Figure 11-7: *"administrator area" button display.*

At the login and password request enter the factory values:

Username: **admin**
Password: **fadmin**

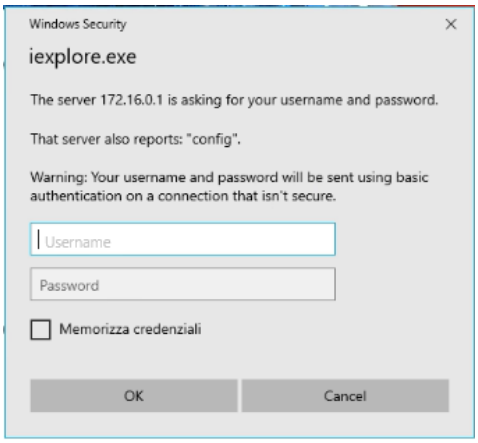


Figure 11-8: *entering the username and password.*

The BACNET TCP/IP board is set at the factory with Carel protocol.
Switch the protocol to Modbus Extended.
Ensure that the address matches the one entered in the controller.

All the settings will be enabled the next time the BACNET TCP/IP board is started.

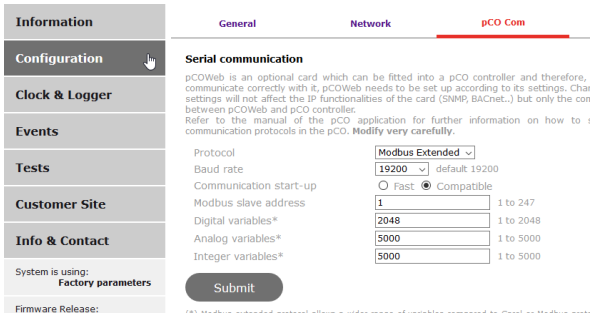


Figure 11-9: *modification of the Modbus Extended protocol.*

The BACNET TCP/IP board is set at the factory for the reading of maximum 207 digital, analogue and whole variables.
In the BACnet menu change the values in the pCO Mapping Parameters fields from 207 to 2048

All the settings will be enabled the next time the BACNET TCP/IP board is started.

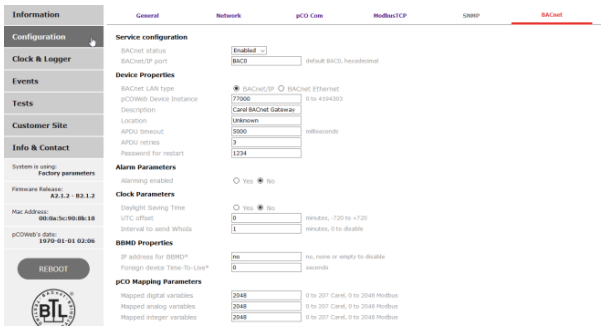


Figure 11-10: *modification of the values of the pCO Mapping Parameters fields.*

If the details entered during the previous access stage are correct, the following page appears:

Update the variable data by clicking the "Information" button.

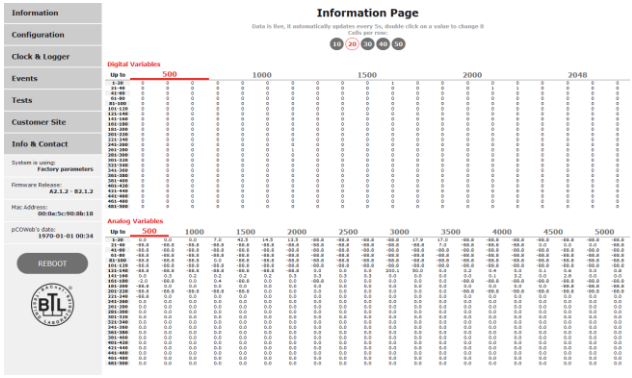


Figure 11-11: *"Information page" display.*

As the BACNET TCP/IP board in its factory configuration is set with DHCP addressing (automatic addressing), it will already be operational and no further action will be required.

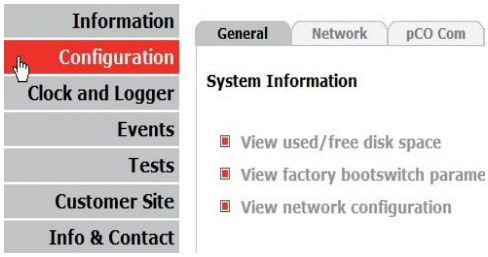


Figure 11-12: *"system information" page.*

To set the user network parameters, click on "Configuration", then on the "Network" board and set the following basic network parameters:
• IP address
• NetMask

The set values will only be used from the next time the BACNET TCP/IP board is restarted.

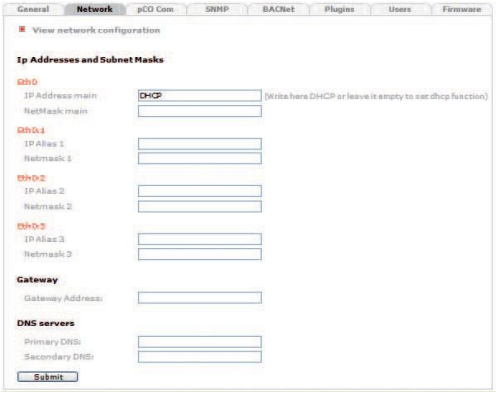


Figure 11-13: *setting of user type network parameters.*

INFORMATION:
The professional system integrator who sets the various parameters, checks the network communication, and starts the supervision system, must be familiar with BACNET.

11.11 Instruction for configuration from PC BACNET MS/TP board

Before a PC can communicate with the BACNET MS/TP board, the settings of both devices must be correctly aligned. Since the factory settings of the BACNET MS/TP board can only be changed once the connection to the PC has been established via the BACset software, the PC must be set to the factory settings of the BACNET MS/TP card the first time it is accessed.

11.11.1 PC settings

Connect the PC directly to the BACNET MS/TP board via a USB-RS485 converter, EIA-485.

Figure 11-14: *USB-RS485, EIA-485 converter.*

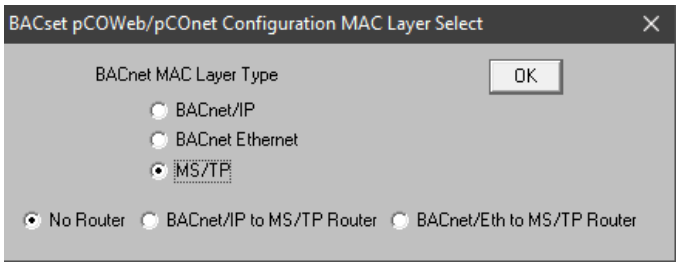
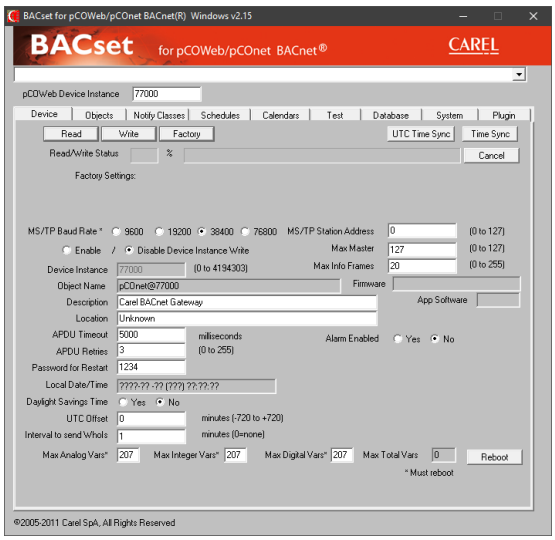
1. To activate the factory settings, switch on the W3000+ controller by pressing and holding the button for about 10 seconds until the status LED slowly flashes red-off 3 times.
2. Release the button while the LED is flashing: after flashing red 3 times, the LED turns green. The LED then confirms that the button has been released by flashing quickly red-off 3 times, and then turns green again.
3. For the complete start-up of the BACNET MS/TP board it will take another 35 seconds until the Network LED is flashing. Only from this moment on will it be possible to access the board remotely.

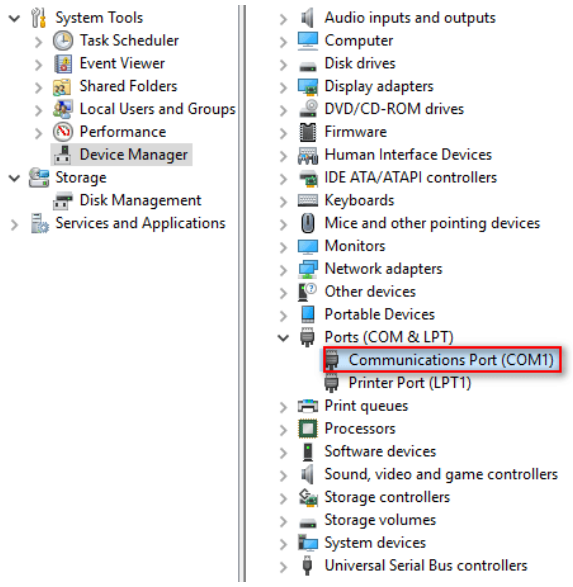
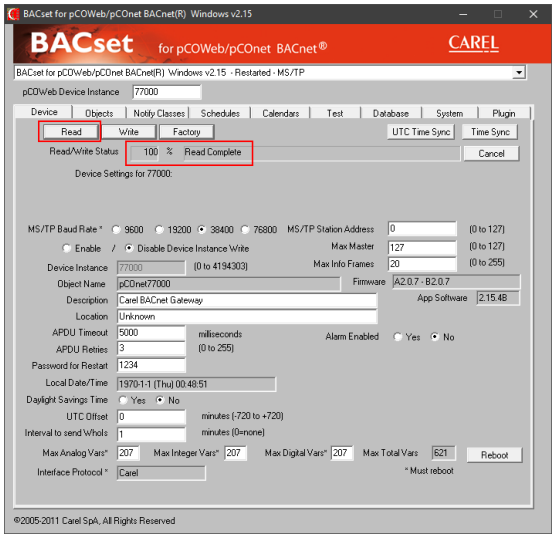
In this way, the BACNET MS/TP board will use the following factory default values:
Device instance: 77000
Station Address: 0
MaxMaster: 127
Max Info Frames: 20
BaudRate: 38400

11.11.2 Accessing the BACNET MS/TP board from a PC

In order for the board to communicate with the controller, certain communication parameters must be set correctly.

INFORMATION:
When using the BACNET MS/TP board only, make sure that the identification number of the unit is 001. See paragraph **11.3 "Setting supervisor parameters".**

Start the BACset application on the PC. The pop-up shown in the image will open. Select MS/TP and then No Router.	
If there are no errors, the main page of BACset will be presented. Continue to the second-to-last point. If errors occur, the communication parameters of PC must be changed. Continue with the next steps.	

Check the content of the following system file: C:\Windows\BACLIB.INI Specifically check the last 5 rows of the file, shown here as an example: MSTPts=1 MSTPmaxmaster=127 MSTPmaxinfoframes=20 MSTPcom=3 MSTPbaud=38400 If on the BACNET MS/TP board there are default values, the following values must be in BACLIB.INI: MSTPmaxmaster=127 MSTPmaxinfoframes=20 MSTPbaud=38400 As far as the MSTPts field, its value must be different from the one of the board, which by default is 0. MSTPcom is the port used by the PC for connection through converter USB-RS485; therefore, check on the control panel which port is used Once you have saved the file and reopened BACset, you can proceed to the second-to-last step.	
If the procedure has been carried out correctly, no error messages will be displayed. Press the "Read" button to verify correct communication between the PC and the BACNET MS/TP board. When finished, Read Complete will be displayed at 100%.	

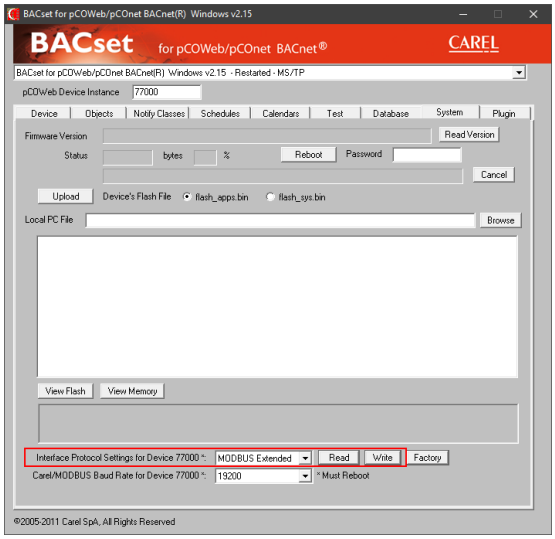
Select the “System” tab.

After pressing the "Read" button, the following will be displayed by default at the bottom:
Interface Protocol: Carel
BaudRate: 19200

Replace Carel with MODBUS Extended and press Write.
This will align the communication parameters of the BACNET MS/TP board with the controller parameters.

Now reboot the board.

After restarting, the status LED will flash green-off if communication with the controller is established.



11.12 Instructions on configuration of the BACNET TCP/IP and BACNET MS/TP board on the user interface

The function permits configuration of the BACNET TCP/IP, BACNET MS/TP and MODBUS OVER IP board communication parameters directly at the PGD keyboard.

The function is available for:

- version 5.16 (and above) of the bios on the controller in which the BACNET TCP/IP - BACNET MS/TP board is slotted;
- version A1.5.0 (and above) of the firmware of the BACNET TCP/IP board;
- version A485_A1.2.1 (and above) of the firmware of the BACNET MS/TP board;

The purpose is to permit configuration of the network (Ethernet for the BACNET TCP/IP board, RS485 for the BACNET MS/TP board) when a board of this type is installed for the first time. The other parameters (alarms, events, etc.) must be configured with the usual instruments: BACset or web interface (only for BACNET TCP/IP board).

INFORMATION:
When using the BACNET MS/TP board only, make sure that the identification number of the unit is 001. See paragraph **11.3 "Setting supervisor parameters".**

The masks below illustrate the procedure for configuring the BACNET TCP/IP board (indicated in the masks as pCOWeb) and the BACNET MS/TP board (indicated in the masks as pCONet).

1	Press **[ALARM]** and **[ENTER]** together. Hold down until the mask shown to the side appears.	`> SYSTEM INFORMATION`
		`LOG DATA`
		`OTHER INFORMATION`
		`FLASH NAND FILES`

2	Press **[UP]** and **[DOWN]** to move the cursor to the "OTHER INFORMATION" row and press **[ENTER]** to select.	`SYSTEM INFORMATION`
		`LOG DATA`
		`> OTHER INFORMATION`
		`FLASH NAND FILES`

3	Press **[UP]** and **[DOWN]** to move the cursor to the "PCOWEB/NET CONFIG" row and press **[ENTER]** to select.	`ID/PRODUCT CODE`
		`> PCOWEB/NET CONFIG`
		`MEMORIES STATUS`
		`CHIP IO VERSION`

4	Select "PCOWEB settings" to configure a BACNET TCP/IP board. Select "PCONET settings" to configure a BACNET MS/TP board.	`> PCOWEB settings` `PCONET settings`

Configuring the BACNET TCP/IP board

1	Select PCOWEB settings and the mask shown to the side appears. The fields are soon populated with the current data. If they are not, check the version of the firmware of the BACNET TCP/IP board and the protocol set for the serial line. The parameters can now be edited. To do so, use the **[ENTER]** key to select a field and the **[UP]/[DOWN]** keys to set the required value. The IP address and Netmask field cannot be edited if the DHCP option is set at ON.	DHCP:--- IP Address: ---.---.---.---
2	Continue pressing **[ENTER]** to view all the available parameters, shown in the masks below:	Netmask: ---.---.---.--- Gateway: ---.---.---.---
3		DNS1: ---.---.---.--- DNS2: ---.---.---.---
4		BACnet ID: ------ BACnet Type: -------
5	After selecting the parameters, it is possible to update them with the new data by selecting “YES” in the window shown to the side and then pressing **[ENTER]**.	PCOWEB CONFIG ENABLE Update pCOWEB? NO
6	The message to the side appears while the parameters are updating:	PCOWEB CONFIG ENABLE Please wait for end of update
7	The mask shown to the side appears at the end of the process:	PCOWEB CONFIG ENABLE Update complete Reboot pCOWEB to apply new setting
8	Next, turn the power off and then on again to the controller in which the BACNET TCP/IP board is slotted. This also causes the BACNET TCP/IP board to restart with the new settings.	

Configuring the BACNET MS/TP board

1	Select PCONET settings and the mask shown to the side appears. The fields are soon populated with the current data. If they are not, check the version of the firmware of the BACNET MS/TP board and the protocol set for the serial line. The parameters can now be edited. To do so, use the **[ENTER]** key to select a field and the **[UP]** / **[DOWN]** keys to set the required value.	BACnet ID: ------- BACnet baud: --------
2	Continue pressing ENTER to view all the available parameters, shown in the mask to the side:	BACnet MAC: Max Masters: --- Max frames: -----
3	After selecting the parameters, it is possible to update them with the new data by selecting “YES” in the window shown to the side and then pressing **[ENTER]**.	PCONET CONFIG ENABLE Update pCOnet? NO
4	The message to the side appears while the parameters are updating.	PCONET CONFIG ENABLE Please wait for end of update
5	The mask shown to the side appears at the end of the process.	PCONET CONFIG ENABLE Update complete Reboot pCOnet to apply new setting
6	Next, turn the power off and then on again to the controller in which the BACNET MS/TP board is slotted. This also causes the BACNET MS/TP board to restart with the new settings.	

12 INTERFACING TO MITSUBISHI ELECTRIC REMOTE CONTROLLERS

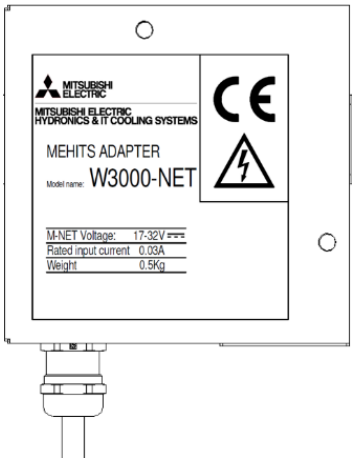
Below is the table showing the compatibility of Mitsubishi Electronic system remote controllers with W3000:

MITSUBISHI ELECTRIC SYSTEMS R/C	AE-200E (Ver.7.68 or later)	
	AE-50E (Ver.7.68 or later) *AE-200E is required on same system	
	EW-50E (Ver.7.68 or later) *AE-200E is required on same system	
MEHITS	2-pipe systems consisting of chiller unit and heat pump Note: Water cooled heat pump units with water-side reversal are excluded	W3000+ (version TA10 or later)
	ADAPTER MEHITS (version 1.00)	

* The use of the ADAPTER requires a central controller.

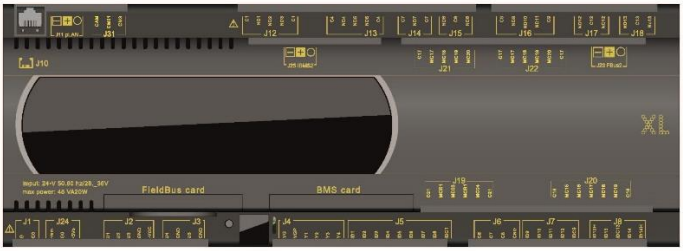
12.1 Components required

MEHITS Adapter



Serial interface card.
For the correct installation of the serial board, see the documentation supplied with the same.

Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



12.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the serial board into the controller.

12.3 W3000 + serial line parameter setting

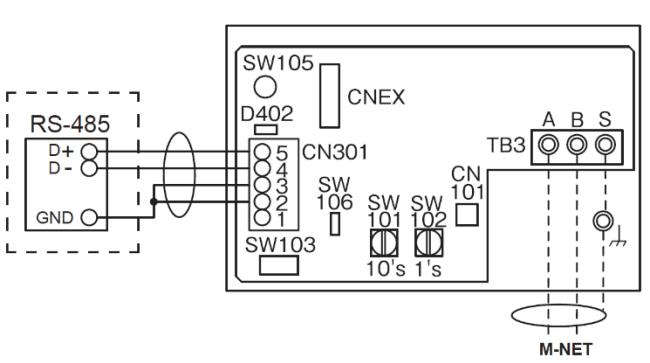
In order to communicate with MITSUBISHI ELECTRIC system remote controllers, it will be necessary to set the parameters below.
You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Supervision	Communication towards a supervisor system must be enabled.
En. from superv.: On/Off: S Operating mode: S	Allows the on/off status and the operating mode change of the unit to be selected from a supervision system. Enabling from supervisor must be set as indicated alongside: ▪ Enable on/off: **Yes** ▪ Operating mode enable **Yes**
Serial line setting ModBus Protocol Speed 19200 baud Unit ID 011	The supervisor connection parameters must be set as follows: ▪ Protocol: **Modbus** ▪ Communication speed: **19200 baud** ▪ unit ID no.: from **011**

12.4 Setting up the supervisor network

M-NET Transmission Cable and Modbus cable wiring*

W3000-NET



ITEM	CONTENTS
TB3	M-NET LINE TERMINAL BLOCK
CN301	RS-485 CONNECTOR
CNEX	SOFTWARE UPDATE CONNECTOR
CN101	POWER SUPPLY FOR SW UPDATE
D402	LED(POWER/ERROR)
SW101	M-NET ADDRESS (10th DIGIT)
SW102	M-NET ADDRESS (1st DIGIT)
SW103	SWITCH(FOR FUNCTION SETTINGS)
SW105	SWITCH(RESET)
SW106	SWITCH(TERMINAL RESISTOR RS-485)

Serial Interface board Included

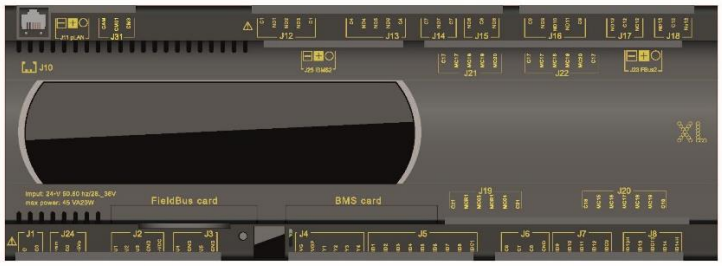
* Refer to MEHITS Adapter manual for details about connection.
The serial cable must be kept separate from the power cables.
The shield of the connection cable must be earthed in just one point.

13 IDRORELAX INTERFACING

13.1 Components required

Serial interface card.
For the correct installation of the serial board, see the documentation supplied with the same.

Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



13.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the serial board into the controller.

13.3 W3000 + serial line parameter setting

To communicate with IDRORELAX, set the parameters as shown below.
You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Supervision	Communication towards a supervisor system must be enabled.
En. from superv.: On/Off: S Operating mode: S	Allows the on/off status and the operating mode change of the unit to be selected from a supervision system. Enabling from supervisor must be set as indicated alongside: ▪ Enable on/off: **Yes** ▪ Operating mode enable **Yes**
Serial line setting ModBus Protocol Speed 19200 baud Unit ID 011	The supervisor connection parameters must be set as follows: ▪ Protocol: **Modbus** ▪ Communication speed: **from 1200 baud 19200 baud*** ▪ Unit ID: from **001** to **200 (default 11, ...)***

* Communication speed and ID number are left to personal choice in W3000, as long as they are also similarly configured in Idrorelax.

13.4 IDRORELAX touchscreen serial connection

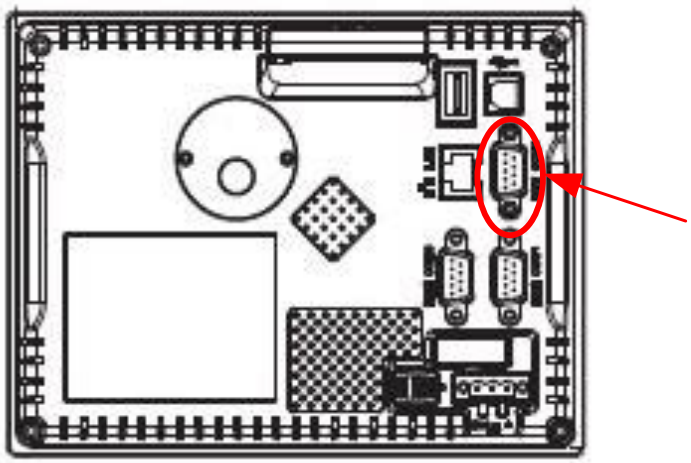


Figure 12-1: *RS485-COM3 serial board.*

The RS485-COM3 serial board is dedicated to the connection of the serial converter for connection to W3000 +.

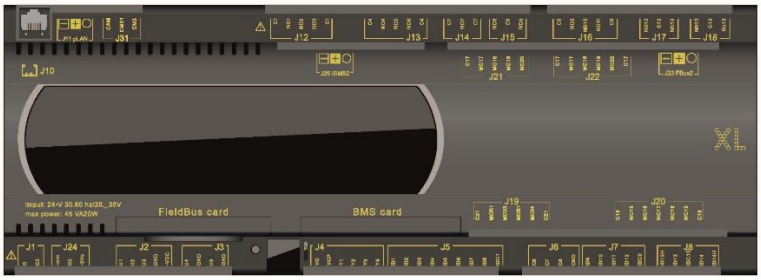
Note:
To make the connection possible, make sure that dip-switch 6 (SW3) is set to ON.

14 INTERFACING WITH THE BMS (SNMP)

14.1 Components required

pCOWeb interface card.
For the correct installation of the serial board, see the documentation supplied with the same.

Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



14.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the pCOWeb serial board into the controller. Always complete the connection to the ground using the connector on the left of the Ethernet interface.

14.3 Setting supervisor parameters

To communicate with the system, set the parameters as shown below.

You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Supervision	Communication towards a supervisor system must be enabled.
En. from superv.: On/Off: S Operating mode: S	Allows the on/off status and the operating mode change of the unit to be selected from a supervision system. Enabling from supervisor must be set as indicated alongside: ▪ Enable on/off: **Yes** ▪ Operating mode enable **Yes**
Serial line setting Standard Protocol Speed 19200 baud Unit ID 001	The supervisor connection parameters must be set as follows: ▪ Protocol: **Standard** ▪ Communication speed: **19200 baud (*)** ▪ unit ID number: **not influential**

(*) Communication speed between pCO and serial interface board.

14.4 Configuring the serial interface board

The first configuration of the pCOWeb serial interface board can be completed using the user interface of the electronic control board (with the exclusion of the touch screen display).
Communication with the SNMP system is for internal networks. Due to the purpose and intended use of the product, encryption algorithms are not used to prevent interception of SNMP messages exchanged on the network.

14.5 Meaning of variables

Analogue variables are expressed with a decimal number (e.g.: 12.0bar -> 120; 33.8°C -> 338)
If a probe is in an alarm condition a value equal to -999 is sent that is -99.9
If a probe or a parameter is not configured a value equal to 888 is sent that is -88.8

14.6 Setting up the supervisor network

The supervisor network is set up by the technicians developing the SNMP interface. For the connection to the Ethernet network use a category 5e or better S/FTP type cable.

14.7 SNMP interface database (software versions TA17 and higher)

For the content of the database refer to the list of variables exposed through the Modbus protocol.

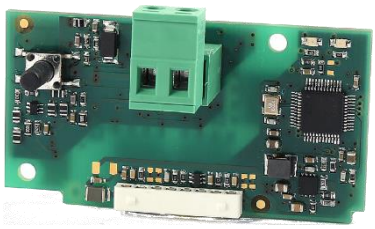
15 INTERFACING WITH THE BMS (KONNEX)

15.1 Konnex communication

System mode with a data rate of 9.6 kbits/s is supported for communication between the Carel board and KNX and TP1.
The operation of a KNX network requires a specific bus power supply that supplies the bus 29 volts DC.
The network is configured on a personal computer (with Windows OS) with ETS5 installed and an interface between the USB/Ethernet port and the KNX bus.

15.2 Components required

Konnex serial interface board.
For the correct installation of the serial board, see the documentation supplied with the same.



Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.

15.3 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial card” to insert the Konnex serial card into the controller.

15.4 Setting serial line configuration parameters

The parameters for communication with the BMS must be set as shown below.

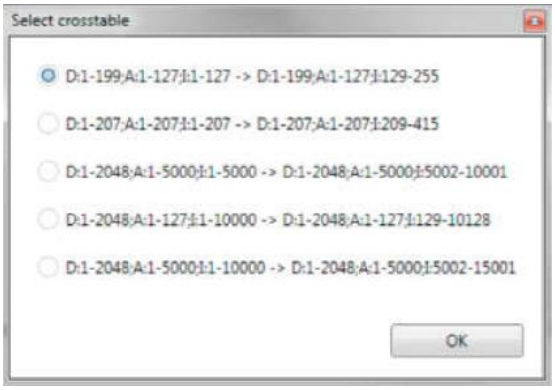
You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Supervision	Communication towards a supervisor system must be enabled.
En. from superv.: On/Off: S Operating mode: S	Allows the on/off status and the operating mode change of the unit to be selected from a supervision system. Enabling from supervisor must be set as indicated alongside: ▪ Enable on/off: **Yes** ▪ Operating mode enable **Yes**
Serial line setting ModBus Protocol Speed 19200 baud Unit ID 011	The supervisor connection parameters must be set as follows: ▪ Protocol: **Modbus** ▪ Communication speed: **from 1200 baud 19200 baud** ▪ Unit ID: from **001** to **200 (default 11, …)**

15.5 Use of ETS5 and DCA Carel

For the use of the ETS5 tool and the Carel DCA, please refer to chapters 4 and 5 of the Konnex communication board manual supplied by MEHITS

Note:
When choosing the parameter database, tick the fourth choice.



15.6 Setting up the supervisor network

The supervisor network is set up by Konnex staff.

Note:
MEHITS will supply the serial files and some files necessary for Konnex technicians to configure the network.
The following is provided:

- 2cf file containing the variables database
- Konnex card manual

15.7 KONNEX interface database (software versions TA17 and above)

For the content of the database refer to the list of variables exposed through the Modbus protocol.

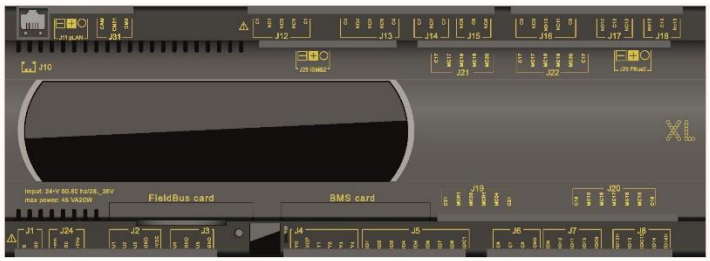
16 CONFIGURATION AND ACTIVATION OF THE E-MAIL NOTIFICATION SERVICE

The PCOweb board also offers the possibility of a mail notification service. The configuration of the service requires the use of a FTP protocol access program.
The activation of the mail notification service is through the web interface of the PCOweb board.

16.1 Components required

PCOweb interface card.
For the correct installation of the serial board, see the documentation supplied with the same.

Electronic control board.
(Already fitted on the machine).
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



16.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the PCOweb serial board into the controller. Always complete the connection to the ground using the connector on the left of the Ethernet interface.

16.3 Setting supervisor parameters

To communicate with the system, set the parameters as shown below.

You must enter the user menu and, after having given the password, scroll to the masks described below.

Configuration of the serial line: Supervision	Communication towards a supervisor system must be enabled.
En. from superv.: On/Off: S Operating mode: S	Allows the on/off status and the operating mode change of the unit to be selected from a supervision system. Enabling from supervisor must be set as indicated alongside: ▪ Enable on/off: **Yes** ▪ Operating mode enable **Yes**
Serial line setting Bacnet Protocol Speed 19200 baud Unit ID 001	The supervisor connection parameters must be set as follows: ▪ Protocol: **Bacnet** ▪ Communication speed: **19200 baud (*)** ▪ unit identification number: **must match the Modbus slave address of the board**

(*) Communication speed between pCO and serial interface board.

16.4 Configuring the serial interface board

The first configuration of the pCOweb serial interface board can be completed using the user interface of the electronic control board (with the exclusion of the touch screen display).
Communication with the pCOweb system is for internal networks. Due to the purpose and intended use of the product, encryption algorithms are not used to prevent interception of BACnet messages exchanged on the network.

16.5 Setting up the supervisor network

The supervision network is set up by the technicians developing the BACnet interface. For the connection to the Ethernet network use a category 5e or better S/FTP type cable.

16.6 Instructions for the configuration of the pCOweb board using a PC

Before a PC can communicate with the pCOweb board, the settings of both devices must be correctly aligned.
As the factory settings of the pCOweb board can only be changed after establishing the connection with the PC, when making access for the first time, the Personal Computer will have to be adapted to the factory settings of the pCOweb board.

16.6.1 PC settings

Disconnect the Personal Computer from any networks and connect it directly to the pCOweb board using the cable (crossed).

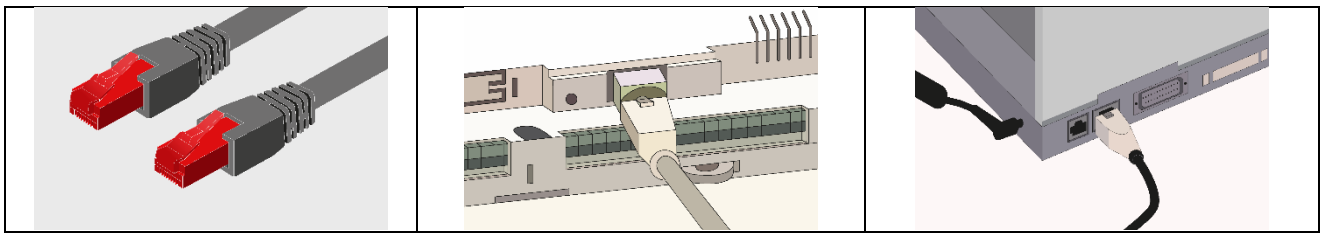


Figure 16-1: *demonstration of configuration of the pCOweb board using a PC.*

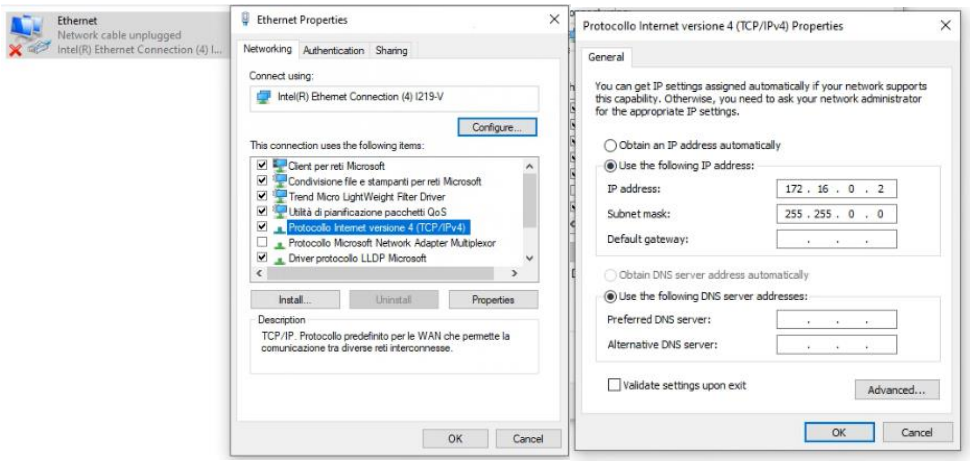
Set the Personal Computer so that it does not use DHCP, but rather the IP address: 172.16.0.2.
The Subnet mask field also needs to be specified. The Gateway does not need to be specified.

The procedure is described below.
In the “Control Panel”:

1. Double click on “Network Connections”.
2. Double click on “Local Area Connection (LAN)”.
3. Click on “Properties”.
4. Double click on “Internet Protocol (TCP/IP)”.

Before changing the settings, take note of all the existing settings as these will be have to be restored afterwards in order to allow the PC to communicate with the data network it was previously connected to.

6. Click on “Use the following IP address”. Set the following parameters:
   IP address = 172.16.0.2
   Subnet mask = 255.255.0.0
7. Click on OK to close all the windows.



The Personal Computer is set so that communications do not have to pass through the “proxy” network device: in fact, as the PC is not networked, communication would be impossible if the “proxy” were not disabled.

1. Open the Windows “Control Panel”.
2. Double click on “Internet Options”.
3. Click “Connections”. Another window appears
4. Click “LAN settings”.
5. Disable the proxy server.
6. Press “OK” to close the windows.

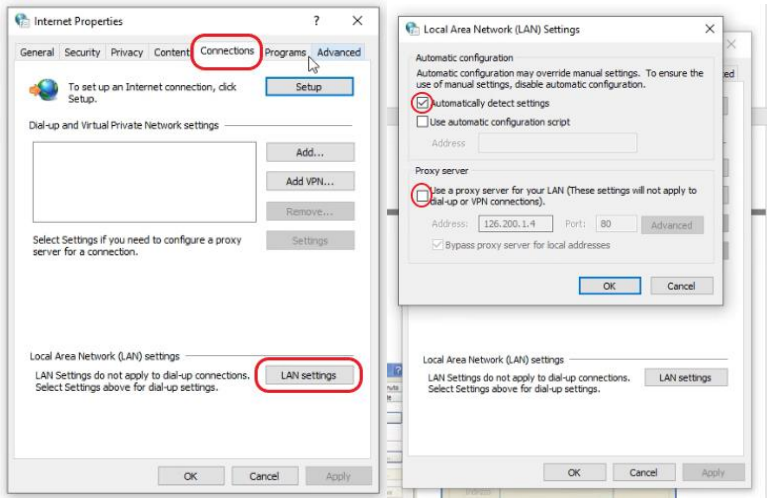


Figure 16-2: *disabling the proxy server.*

16.6.2 Starting the PCOweb board with factory settings

3. switch on the W3000+ controller;
4. Make sure that both the indicator lamps on the PCOweb board connector light up within a few seconds.

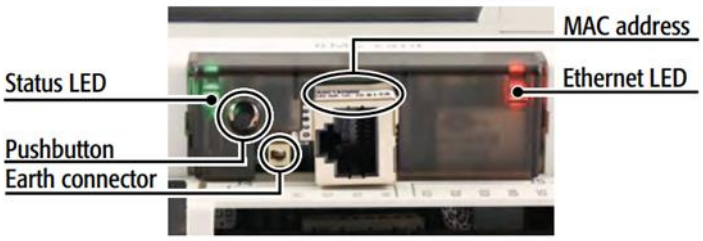


Figure 16-3: *pCOweb board detail.*

INFORMATION:
The choice as to whether to activate factory settings or user settings can only be made when starting the pCOweb board. The pCOweb board restarts whenever it is turned on.

3. As soon as the Status LED turns on green immediately after restart, hold down the button to activate the factory settings.
4. holding the button down for about 20 seconds will cause the status LED to flash **red** 3 times. Release the button while this is happening.
5. after the 3 red flashes, the Status LED turns GREEN and, if the procedure has been performed correctly, the Status LED confirms the button has been pressed and released by rapidly flashing RED 3 times and then shining **green** for about 1 minute (completion of the start phase); after completing the start phase, the Status LED starts flashing: the PCOweb board has now completely started.

In this way, the PCOweb board will not use the “User” set communication configuration parameter values, but rather the following factory values:
IP address: 172.16.0.1
Subnet mask: 255.255.0.0

NOTE:
These values will remain active until the PCOweb BOARD IS RESTARTED.
After restart, the pCOweb board will return to the “User” configuration values.
It is recommended that the network communication parameters are configured immediately.

16.6.3 Access the PCOweb via the PC

The pCOweb board can recognise interrogations sent by a supervisor using the MODBUS over IP protocol.
To allow the board to communicate with the data network it will be installed to, certain network communication parameters must be set.

INFORMATION:
The network administrator must establish whether the PCOweb board can be connected and must communicate essential system data.

1. on the PC open a web browser;
2. write the following number, including dots, in the address field: 172.16.0.1

3. press **Send**.

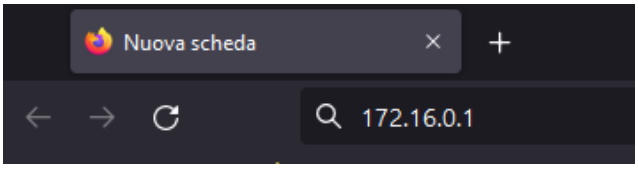


Figure 16-4: *entering the IP address.*

The **first access** page may offer one of the following two alternatives:

- **Restrict access**: you will be asked to customise all passwords and, upon confirmation, all services (except the following) will be disabled: HTTPS, SFTP SSH SCP).
- **Do not restrict access**: no password confirmation will be required. To log in, simply enter your password and default user ID.

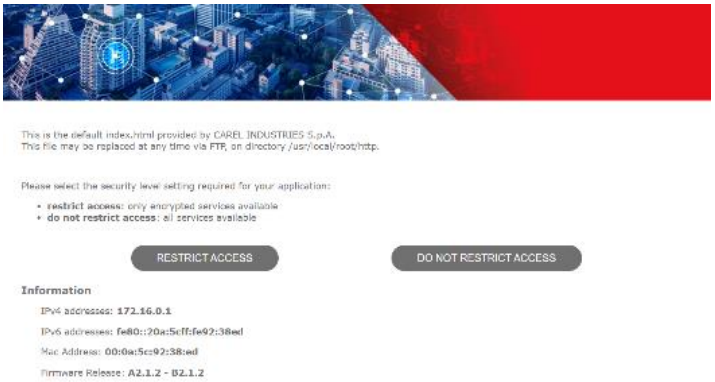


Figure 16-5: *possibility to log in for the first time.*

When logging in for the **second time** (with HTTPS and entering the customised password and user ID), the page displayed will only show the **"administrator area"** button.

Figure 16-6: *"administrator area" button display.*

At the login and password request enter the factory values:

Username: **admin**
Password: **fadmin**

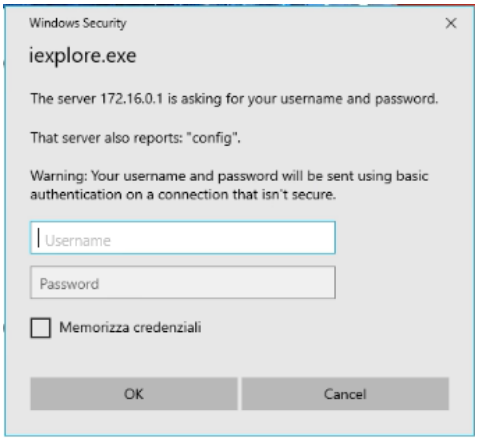


Figure 16-7: *"administrator area" button display.*

If the details entered during the previous access are correct, the following page appears:

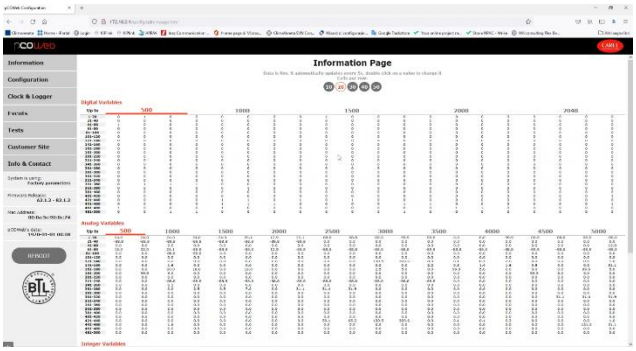


Figure 16-8: *"Information page" display.*

As the PCOweb board in its factory configuration is set with DHCP addressing (automatic addressing), it will already be operational and no further action will be required.

To set the user network parameters, click on "Configuration", then on the "Network" board and set the following basic network parameters:

- IP address.
- NetMask.

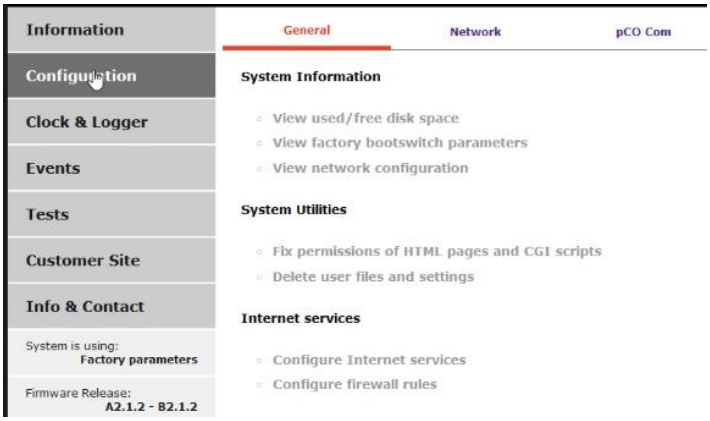


Figure 16-9*: click "configuration".*

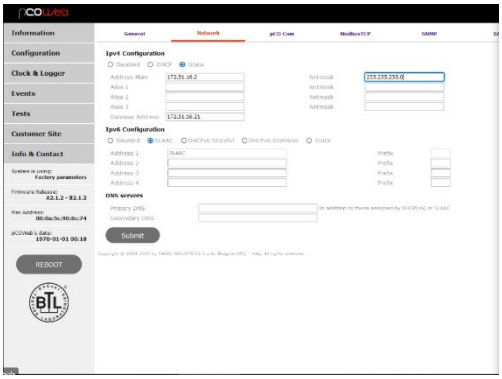


Figure 16-10: *network screen.*

INFORMATION:
The professional system integrator who sets the various parameters, checks the network communication, and starts the supervision system, must be familiar with Bacnet.

16.7 Instructions for the configuration of the pCOweb board using the user interface

The function permits configuration of the communication parameters of the PCOweb board directly at the PGD keypad.

The function is available for:

- version 5.16 (and above) of the bios on the controller in which the PCOweb board is slotted.
- version A1.5.0 (and above) of the firmware of the PCOweb board.

The purpose is to permit configuration of the network (Ethernet for the PCOweb board) when a board of this type is installed for the first time. The other parameters (alarms, events, etc.) must be configured with the usual instruments: BACset or web interface (only for PCOweb board).

The following masks show the procedure for the configuration of the pCOweb board

1	Press **[ALARM] and [ENTER]** together. Hold down until the mask shown to the side appears.	> SYSTEM INFORMATION LOG DATA OTHER INFORMATION FLASH NAND FILES
2	Press **[UP] and [DOWN]** to move the cursor to the “OTHER INFORMATION” row and press **[ENTER]** to select.	SYSTEM INFORMATION LOG DATA > OTHER INFORMATION FLASH NAND FILES
3	Press **[UP] and [DOWN]** to move the cursor to the “PCOWEB/NET CONFIG” row and press **[ENTER]** to select.	ID/PRODUCT CODE > PCOWEB/NET CONFIG MEMORIES STATUS CHIP IO VERSION
4	To configure a MODBUS over IP or MODBUS OVER IP board, select “PCOWEB settings”	> PCOWEB settings PCONET settings

Configuration of the PCOweb board

1	Select PCOWEB settings and the mask shown to the side appears. The fields are soon populated with the current data. If they are not, check the version of the firmware of the PCOweb board and the protocol set for the serial line. The parameters can now be edited. To do so, use the ENTER key to select a field and the UP/DOWN keys to set the required value. The IP address and Netmask field cannot be edited if the DHCP option is set at ON.	DHCP:--- IP Address: ---.---.---.---
2	Continue pressing ENTER to view all the available parameters, shown in the masks below:	Netmask: ---.---.---.--- Gateway: ---.---.---.---
3		DNS1: ---.---.---.--- DNS2: ---.---.---.---
4		BACnet ID: ------ BACnet Type: -------
5	After selecting the parameters, it is possible to update them with the new data by selecting YES in the window shown to the side and then pressing ENTER:	PCOWEB CONFIG ENABLE Update pCOWEB? NO
6	The message to the side appears while the parameters are updating:	PCOWEB CONFIG ENABLE Please wait for end of update
7	The mask shown to the side appears at the end of the process:	PCOWEB CONFIG ENABLE Update complete Reboot pCOWEB to apply new setting
8	Next, turn the power off and then on again to the controller in which the PCOweb board is slotted. This also causes the PCOweb board to restart with the new settings.	

16.8 Configuring the mail notification service (FTP)

To start the configuration of the mail notification service, enter the access protocol and the address of the PCOweb board.
The credentials are as follows:
User name: root
Password: froot

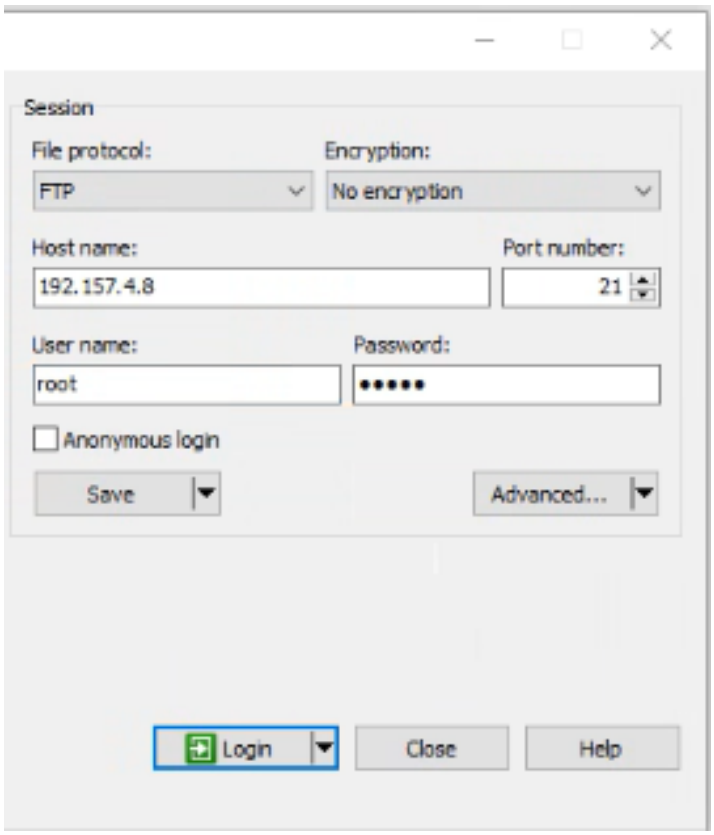


Figure 16-11: *mail notification configuration page.*

After logging in, follow this path:

```
/usr/local/www/flash/http/
```

2 important files will be required in this path,
1. W3000plus_page.html
2. Alarm_table

Together with the index.html file, these files make up the body of the mail:

Figure 16-12: *Index file in the folder.*

Replace the notifycfg file with the one provided by MEHITS:

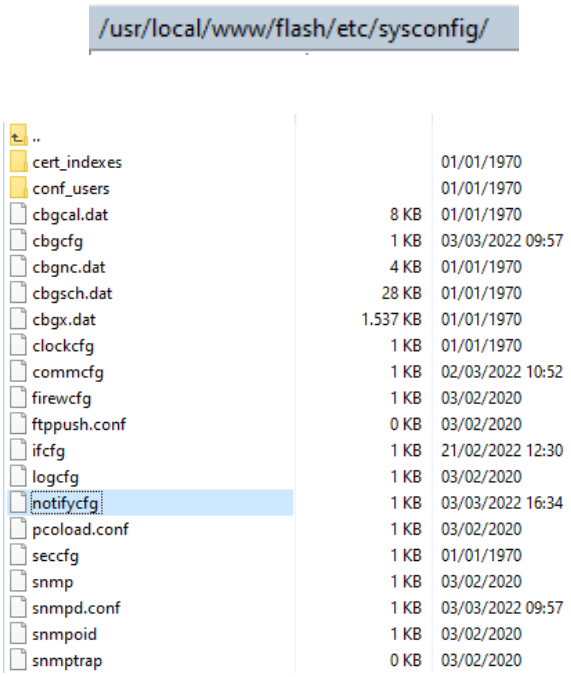


***Figure 16-3**: notifycfg file.*

The notifycfg file is used to set the events for sending the mail via the pCOweb board. Its presence allows the self-configuration of the information found in the “Digitals” section of the “Events” page:

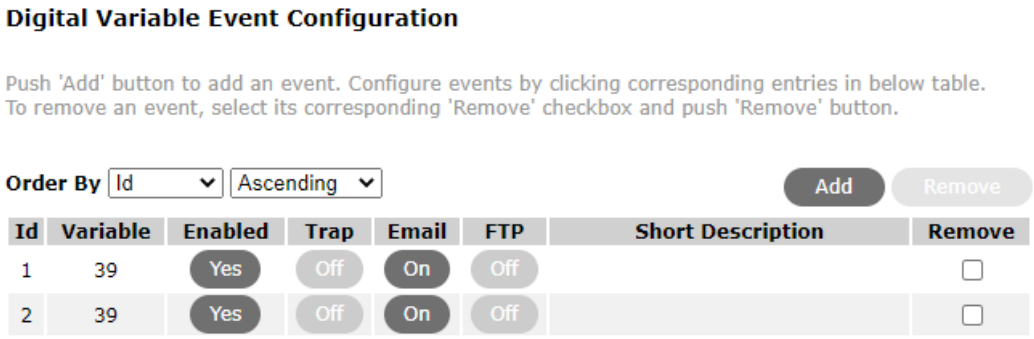


***Figure 16-14:** “Events” page display.*

Once the notifycfg file has been uploaded through ftp server, it will be necessary to access the “Digitals” menu and click on the “Email” entry for each event:

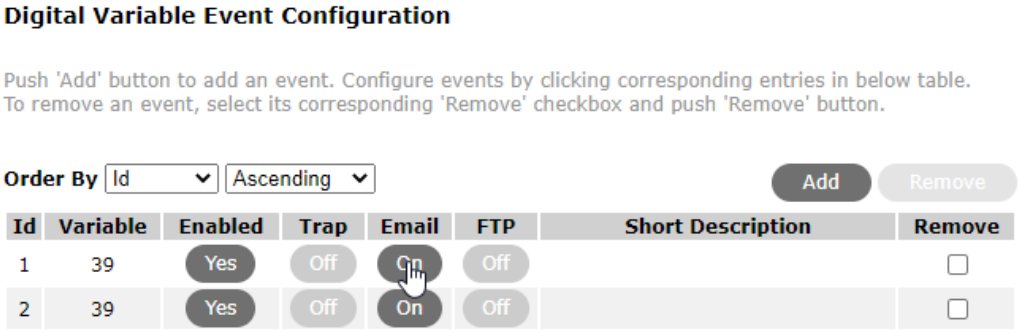


Figure 16-15: *page for email activation for each event.*

A pop-up will open, with the setting for the forwarding of mail notifications. Using the “Pick” button, it will necessary to select the html file previously uploaded through the ftp server (“W3000plus_page.html”). It will also be necessary to set “Attachment” to “Enabled”.
It is also advisable to fill in the “Subject” field (which is the subject of the mail) with the serial number of the unit to which the pCOweb card is connected, followed by a short description. In this way, in the event of an alarm it will be easier for the user to identify the unit that has raised the alarm.

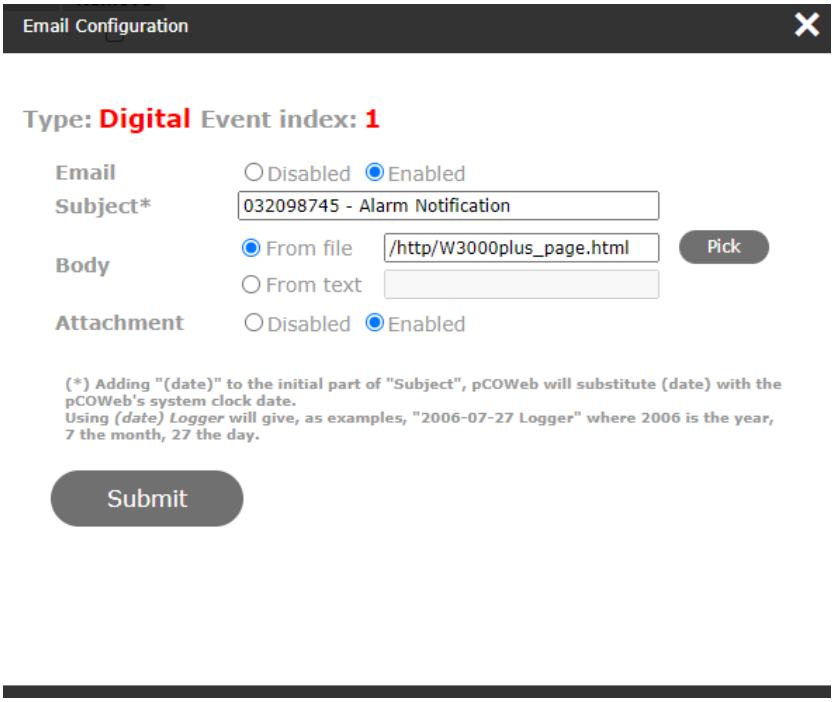


Figure 16-16: *“email configuration” pop-up.*

Press the “Submit” button to save the settings.

16.9 Activation of the email notification service (user interface)

To start the activation of the email notification service, access the pCOweb web service, go to the Events page and select the E-mail item (the configuration can be changed according to your company criteria).

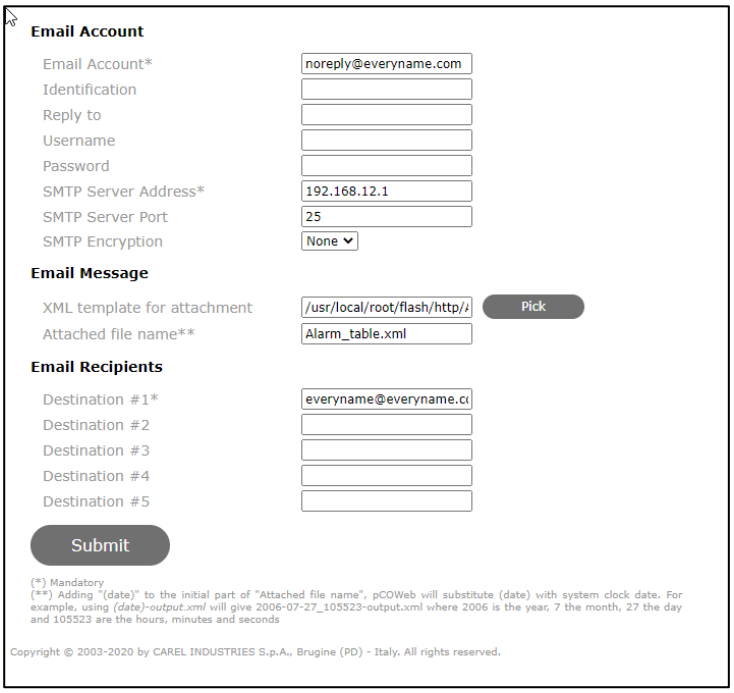


Figure 16-17: *e-mail notification activation page.*

Enter the information of the e-mail account to be activated. (If not available, ask your IT department or network provider for the SMTP server address).

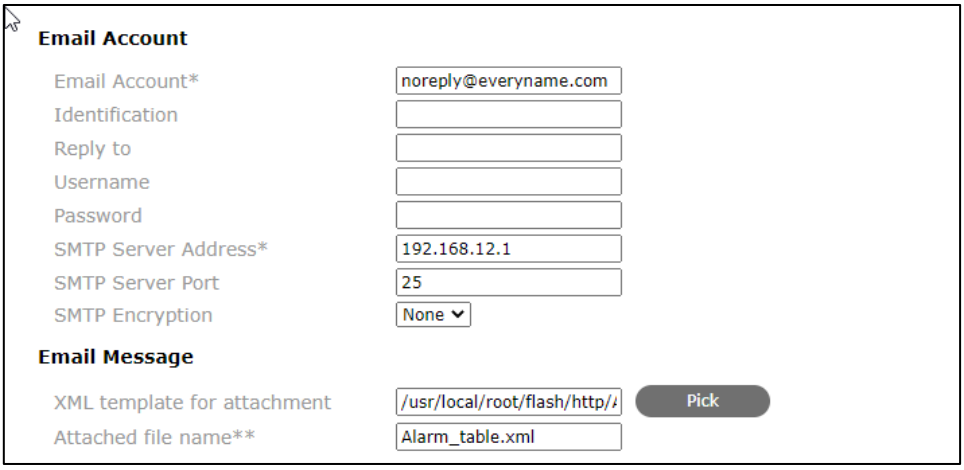


Figure 16-18: *entering the e-mail account information.*

Using the Pick button, insert the “alarm.table” file set during the configuration of the service (see section 1.3.1) and click “Submit”:

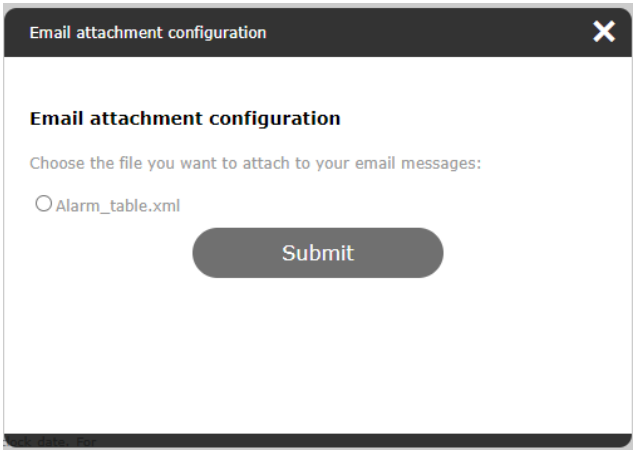


Figure 16-19: *“Alarm_table.xml” end selection.*

Enter the recipient account information and click the “Submit” button to refresh the page:

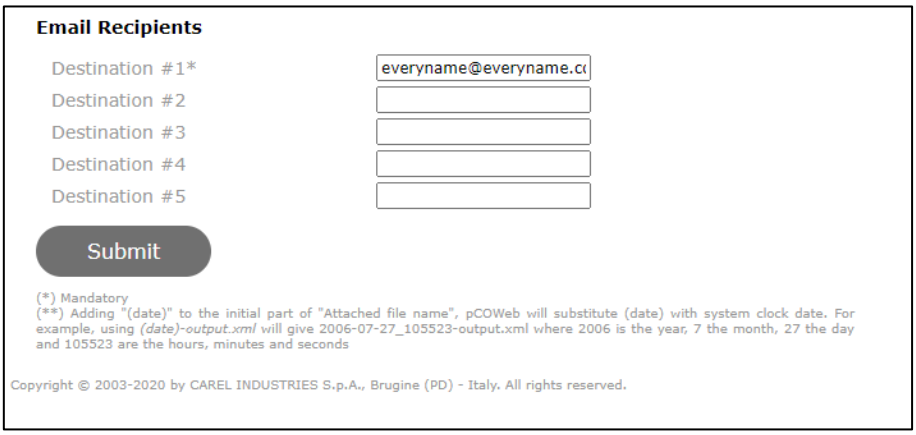


Figure 16-20: *recipient entry page.*

Once the procedures have been completed, the e-mail will be activated.

INFORMATION:
Following a power failure and subsequent power reconnection, the user will by default receive an e-mail notification with the status of any active alarms prior to the time of the power failure.

16.10 pCOweb notes for the American market

For pCOweb cards intended for the American market, with the exception of the HTTPS service, all pCOweb services are disabled by default.

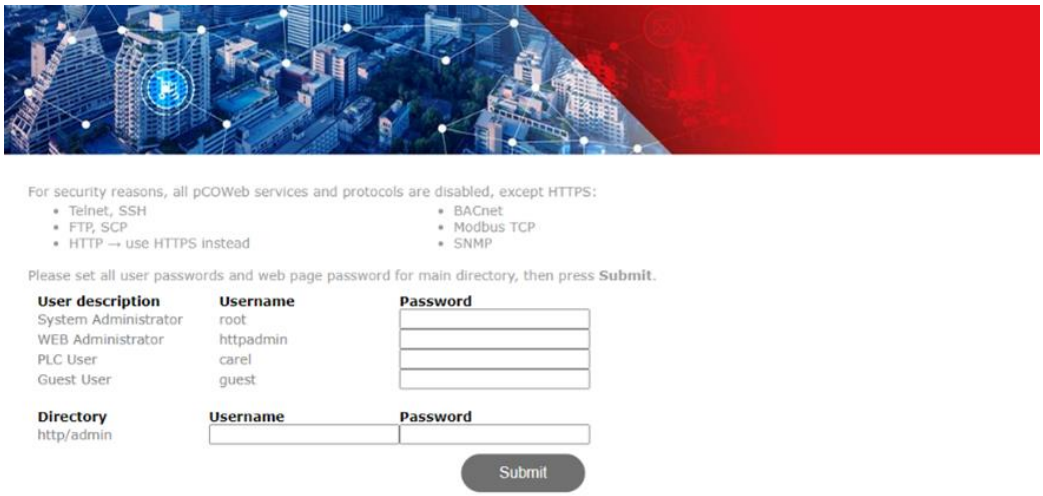


Figure 16-21: *data entry page.*

To reactivate the desired services:

1. select and enter a password for each required user
2. enter the credentials for the admin user.

After entering the credentials, click “Submit” to access the web interface.
Go to the configuration page and under General select “Configure Internet services”.

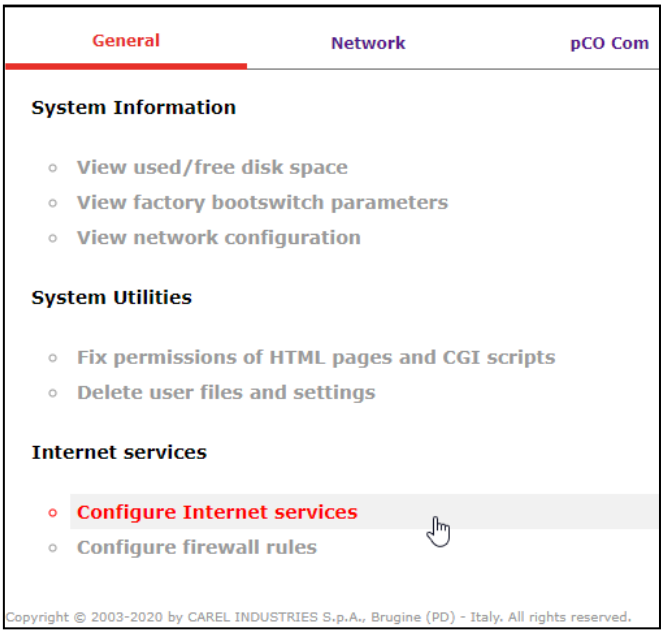


Figure 16-22: *“configure internet services” option selection.*

Using the ”status“ item, enable the desired services:

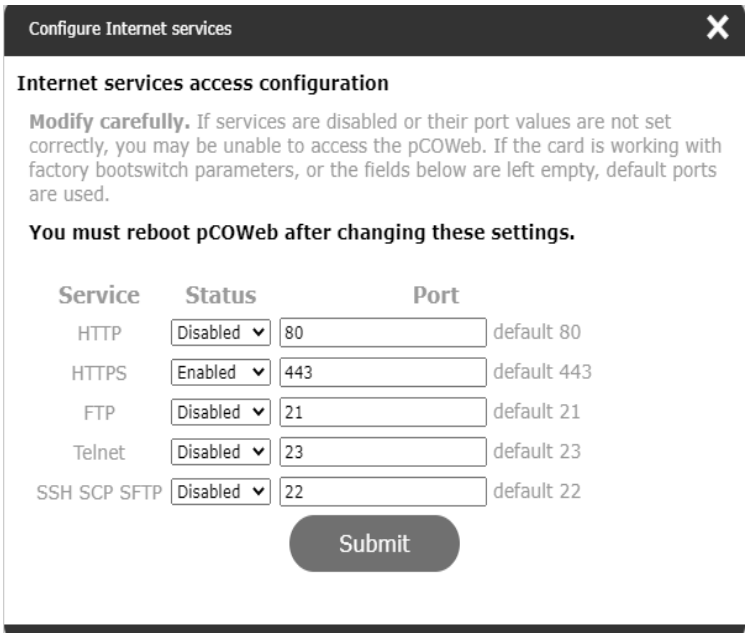


Figure 16-23: *desired services enable page.*

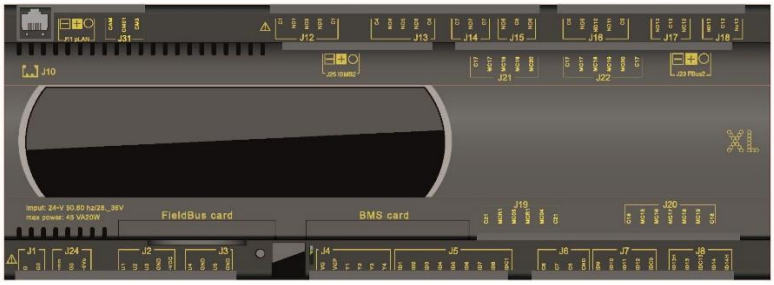
Click ”Submit“ to apply the changes

17 LAN Multi Manager interfacing

17.1 Components required

MODBUS serial interface board.
For the correct installation of the serial board, see the documentation supplied with the same.

Electronic control board.
(Already fitted on the machine)
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



17.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the MODBUS serial board into the controller.

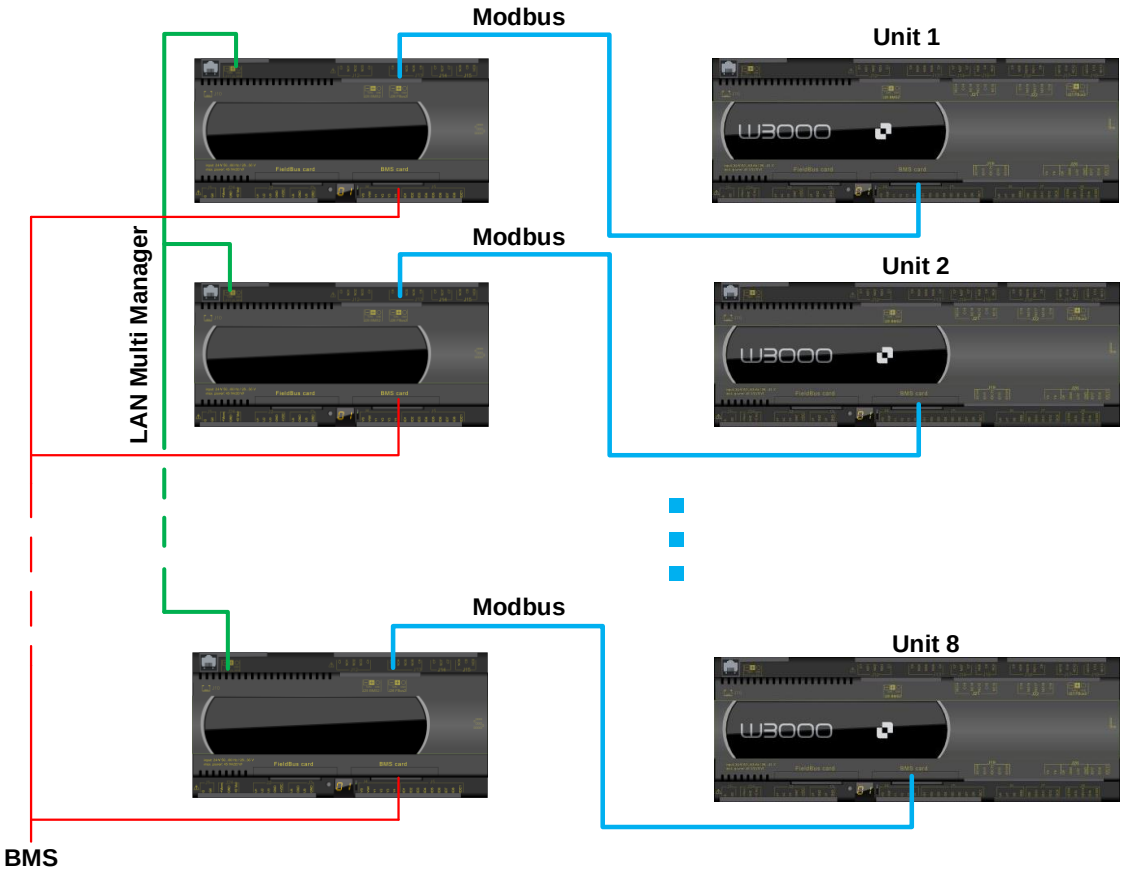
17.3 Setting serial line configuration parameters

The parameters for communication with the BMS must be set as shown below.

You must enter the user menu and, after having given the password, scroll to the masks described below.

`Configuration of the serial line:` `LAN Multi Manager`	It is necessary to enable LAN Multi Manager in the serial line

`Serial line setting`
`ModBus Protocol`
`Speed 19200 baud`
`Unit ID 011`
	With the serial line set to LAN Multi Manager, the parameters are overridden as follows:
	▪ Protocol: **Modbus**
	▪ Communication speed: **19200 baud**
	▪ Unit ID: **11**



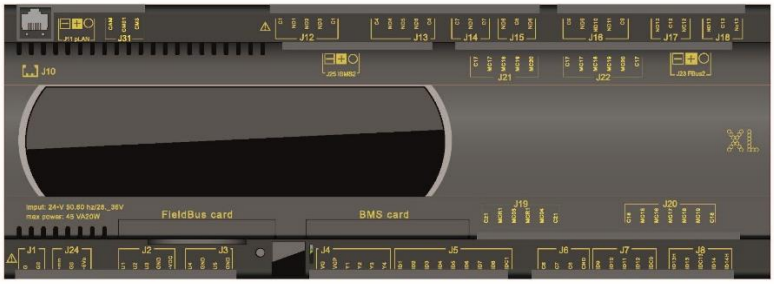
For the management of the system made up of the units simply connect the BMS to a LAN Multi Manager device of one unit.
In case of need of supervision of all the data of the units, connect the BMS to all the LAN Multi Manager devices.

17.4 Interfacing with BMS MODBUS RTU or Over IP

17.4.1 Components required

Interface board MODBUS RTU (for RS485 serial line transmission) or MODBUS Over IP (for Ethernet cable transmission).
For the correct installation of the serial board, see the documentation supplied with the same.

LAN Multi Manager dedicated electronic control board.
(Already fitted on the machine)
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



17.4.2 Installing the serial interface board

Follow the instructions in paragraph 2 “Installing the serial board” to insert the MODBUS RTU or MODBUS over IP serial board into the controller. Always complete the connection to the ground using the connector on the left of the Ethernet interface.

17.4.3 Setting serial line configuration parameters (MODBUS RTU)

The parameters for communication with the BMS must be set as shown below.

Go to the support menu, and after entering the password access the group submenu and scroll down to the masks described below.

Supervision Protocol: Modbus Speed: 19200 baud ID number: 011	The supervisor connection parameters must be set as follows: ▪ Protocol: **Modbus** ▪ Communication speed: **from 1200 baud 19200 baud** Unit ID: from **001** to **200 (default 11, …)**

17.4.4 Setting serial line configuration parameters (MODBUS Over/IP)

The parameters for communication with the BMS must be set as shown below.

Go to the support menu, and after entering the password access the group submenu and scroll down to the masks described below.

Supervision Protocol: Modbus Speed: 19200 baud ID number: 001	The supervisor connection parameters must be set as follows: ▪ Protocol: **Standard** ▪ Communication speed: **19200 baud (*)** unit ID: **from 001 to 200 (default 11, …)**

(*) Communication speed between pCO and serial interface board.

17.4.5 Configuring the serial interface board

The first configuration of the MODBUS over IP serial interface board can be completed using the user interface of the electronic control board (with the exclusion of the touch screen display). Refer to the document “Modbus over IP interface cards configuration from system screen” for instructions.
Communication with the MODBUS system over IP is for internal networks. Due to the purpose and intended use of the product, encryption algorithms are not used to prevent interception of Modbus messages exchanged on the network.

17.4.6 Setting up the supervisor network

The supervision network is set up by the technicians who develop the Modbus over IP interface. For the connection to the Ethernet network use a category 5e or better S/FTP type cable.

17.4.7 Setting up the supervisor network

The supervisor network must be set up as shown below.

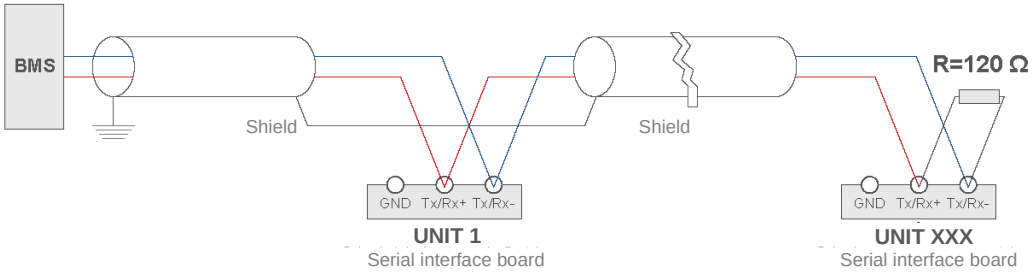


***Figure 17-1**: summary diagram showing a possible BMS supervision network layout.*

Take great care when connecting the serial line to the units. This is an RS485 serial line, based on a balanced differential communication line with a characteristic impedance of 120 ohm.
The maximum length of the connection depends on the Baud-rate, background electrical noise, and the type and quality of the cable. Operation is generally guaranteed up to 1000 m.
Use a shielded and twisted 3 x AWG 20/22 cable for the network.
If the reference signal must be equalised use the third wire.
The serial connection is made with a single cable running from the BMS to the first unit (the closest), then continuing to connect with the next ones (in order of distance).
The serial cable must be kept separate from the power cables.

The shield of each connection cable must be connected to the shield of the previous derivation. The ground connection must be made in just one point.
A maximum of 200 units can be connected to the network; the polling time of the entire system is proportional to the number of units monitored by the BMS.

17.4.8 Interface database MODBUS RTU (software versions TG04 and higher)

Address	Type *	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
0	C		-	-	NOT MANAGED		
1	C	OUT	-	-	Unit status (0:Off - 1:On)	Always	U
3	C	OUT	-	-	Evaporator pump 1 status (0:Off - 1:On)	Note 1	U
4	C	OUT	-	-	Evaporator pump 2 status (0:Off - 1:On)	Note 1	U
5	C	OUT	-	-	Recuperator pump status (0:Off - 1:On)	Note 1	U
6	C	OUT	-	-	Condenser pump status (0:Off - 1:On)	Note 1	U
11	C	OUT	-	-	Enable operating mode change from supervisor	Always	U
34	C	OUT	-	-	Energy meter electricity value reading enable	Note 1 and 2	U
35	C	OUT	-	-	Energy meter configuration for 3-phase electric line connection	Note 1 and 2	U
36	C	OUT	-	-	Energy meter configuration for connection of electric line with neutral	Note 1 and 2	U
37	C	OUT	-	-	Possibility of neutral current reading	Note 1 and 2	U
39	C	OUT	-	-	Changing the status of unit alarms	Always	U
251	C	OUT	-	-	Offline unit 1 (0: unit online – 1: unit offline)	Always	G
252	C	OUT	-	-	Offline unit 2 (0: unit online – 1: unit offline)	Always	G
253	C	OUT	-	-	Offline unit 3 (0: unit online – 1: unit offline)	Always	G
254	C	OUT	-	-	Offline unit 4 (0: unit online – 1: unit offline)	Always	G
255	C	OUT	-	-	Offline unit 5 (0: unit online – 1: unit offline)	Always	G
256	C	OUT	-	-	Offline unit 6 (0: unit online – 1: unit offline)	Always	G
257	C	OUT	-	-	Offline unit 7 (0: unit online – 1: unit offline)	Always	G
258	C	OUT	-	-	Offline unit 8 (0: unit online – 1: unit offline)	Always	G
267	C	IN OUT	-	-	Enable unit 1 (0: unit disabled – 1: unit enabled)	Always	G
268	C	IN OUT	-	-	Enable unit 2 (0: unit disabled – 1: unit enabled)	Always	G
269	C	IN OUT	-	-	Enable unit 3 (0: unit disabled – 1: unit enabled)	Always	G
270	C	IN OUT	-	-	Enable unit 4 (0: unit disabled – 1: unit enabled)	Always	G
271	C	IN OUT	-	-	Enable unit 5 (0: unit disabled – 1: unit enabled)	Always	G
272	C	IN OUT	-	-	Enable unit 6 (0: unit disabled – 1: unit enabled)	Always	G
273	C	IN OUT	-	-	Enable unit 7 (0: unit disabled – 1: unit enabled)	Always	G
274	C	IN OUT	-	-	Enable unit 8 (0: unit disabled – 1: unit enabled)	Always	G
283	C	IN OUT	-	-	System on/off command (0: system off – 1: system on)	Always	G
284	C	IN OUT	-	-	Thermoregulator limitation command from supervisor (0:Off - 1:On)	Note 2	G
285	C	OUT	-	-	System single pump status (0:Off - 1:On)	Note 1 and 2	G
287	C	IN OUT	-	-	Unit manual rotation command (0: command not active – 1: command active)	Note 2	G
0	R		-	-	NOT MANAGED		
4	R	OUT	value/10	°C	Main active setpoint	Note 1	U
5	R	OUT	value/10	°C	Recovery setpoint active	Note 1	U
6	R	OUT	value/10	°C	Inlet temperature of evaporator	Note 1	U
7	R	OUT	value/10	°C	Evaporator outlet temperature (average)	Note 1	U
8	R	OUT	value/10	°C	Condenser inlet temperature	Note 1	U
9	R	OUT	value/10	°C	Condenser outlet temperature (average)	Note 1	U
10	R	OUT	value/10	°C	Recuperator inlet temperature / DHW storage tank temperature	Note 1	U
11	R	OUT	value/10	°C	Recuperator outlet temperature	Note 1	U
12	R	OUT	value/10	bar	High pressure transducer 1	Note 1	U
13	R	OUT	value/10	bar	High pressure transducer 2	Note 1	U
14	R	OUT	value/10	bar	High pressure transducer 3	Note 1	U
15	R	OUT	value/10	bar	High pressure transducer 4	Note 1	U
16	R	OUT	value/10	bar	Low pressure transducer 1	Note 1	U
17	R	OUT	value/10	bar	Low pressure transducer 2	Note 1	U
18	R	OUT	value/10	bar	Low pressure transducer 3	Note 1	U
19	R	OUT	value/10	bar	Low pressure transducer 4	Note 1	U
20	R	OUT	value/10	°C	External air temperature	Note 1	U
21	R	OUT	value/10	°C	Optional probe temperature	Note 1	U

Address	Type *	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
22	R	OUT	value/10	°C	Freecooling inlet temperature	Note 1	U
23	R	OUT	value/10	kPa	Differential pressure transducer on hydraulic side of evaporator	Note 1	U
24	R	OUT	value/10	kPa	Differential pressure transducer on recuperator water side	Note 1	U
25	R	OUT	value/10	°C	Compressor 1 discharge temperature	Note 1	U
26	R	OUT	value/10	°C	Compressor 2 discharge temperature	Note 1	U
27	R	OUT	value/10	°C	Compressor 3 discharge temperature	Note 1	U
28	R	OUT	value/10	°C	Compressor 4 discharge temperature	Note 1	U
29	R	OUT	value/10	°C	Compressor 5 discharge temperature	Note 1	U
30	R	OUT	value/10	°C	Compressor 6 discharge temperature	Note 1	U
31	R	OUT	value/10	°C	Compressor 7 discharge temperature	Note 1	U
32	R	OUT	value/10	°C	Compressor 8 discharge temperature	Note 1	U
33	R	OUT	value/10	°C	Plant storage tank setpoint enabled	Note 1	U
34	R	OUT	value/10	°C	Plant storage tank temperature	Note 1	U
35	R	OUT	value/10	kPa	Differential pressure transducer on hydraulic side of condenser	Note 1	U
36	R	OUT	value/10	-	Compression ratio in absolute bar of Centrifuge comp. 8	Note 1	U
40	R	OUT	value/10	%	Power demand to centrifuge comp. 1	Note 1	U
			valuex1	rpm	Revs demand to inverter 1	Note 1	U
41	R	OUT	value/10	%	Power demand to centrifuge comp. 2	Note 1	U
			valuex1	rpm	Revs demand to inverter 2	Note 1	U
42	R	OUT	value/10	%	Power demand to centrifuge comp. 3	Note 1	U
			valuex1	rpm	Revs demand to inverter 3	Note 1	U
43	R	OUT	value/10	%	Power demand to centrifuge comp. 4	Note 1	U
			valuex1	rpm	Revs demand to inverter 4	Note 1	U
44	R	OUT	value/10	kW	Power demand to centrifuge comp. 1	Note 1	U
45	R	OUT	value/10	kW	Power demand to centrifuge comp. 2	Note 1	U
46	R	OUT	value/10	kW	Power demand to centrifuge comp. 3	Note 1	U
47	R	OUT	value/10	kW	Power demand to centrifuge comp. 4	Note 1	U
48	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 1	Note 1	U
49	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 2	Note 1	U
50	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 3	Note 1	U
51	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 4	Note 1	U
52	R	OUT	value/10	%	IGV position of centrifugal comp. 1	Note 1	U
53	R	OUT	value/10	%	IGV position of centrifugal comp. 2	Note 1	U
54	R	OUT	value/10	%	IGV position of centrifugal comp. 3	Note 1	U
55	R	OUT	value/10	%	IGV position of centrifugal comp. 4	Note 1	U
56	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 1	Note 1	U
57	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 2	Note 1	U
58	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 3	Note 1	U
59	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 4	Note 1	U
60	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 1	Note 1	U
61	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 2	Note 1	U
62	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 3	Note 1	U
63	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 4	Note 1	U
64	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 1	Note 1	U
65	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 2	Note 1	U
66	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 3	Note 1	U
67	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 4	Note 1	U
68	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 1	Note 1	U
69	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 2	Note 1	U
70	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 3	Note 1	U
71	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 4	Note 1	U
72	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 1	Note 1	U
73	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 2	Note 1	U
74	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 3	Note 1	U
75	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 4	Note 1	U
76	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 1	Note 1	U
77	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 2	Note 1	U
78	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 3	Note 1	U
79	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 4	Note 1	U
80	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 1	Note 1	U
81	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 2	Note 1	U
82	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 3	Note 1	U

Address	Type *	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
83	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 4	Note 1	U
84					Confidential		
85	R	OUT	value/10	%	Power demand to centrifuge comp. 5	Note 1	U
86	R	OUT	value/10	%	Power demand to centrifuge comp. 6	Note 1	U
87	R	OUT	value/10	%	Power demand to centrifuge comp. 7	Note 1	U
88	R	OUT	value/10	%	Power demand to centrifuge comp. 8	Note 1	U
89	R	OUT	value/10	kW	Power demand to centrifuge comp. 5	Note 1	U
90	R	OUT	value/10	kW	Power demand to centrifuge comp. 6	Note 1	U
91	R	OUT	value/10	kW	Power demand to centrifuge comp. 7	Note 1	U
92	R	OUT	value/10	kW	Power demand to centrifuge comp. 8	Note 1	U
93	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 5	Note 1	U
94	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 6	Note 1	U
95	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 7	Note 1	U
96	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 8	Note 1	U
97	R	OUT	value/10	%	IGV position of centrifugal comp. 5	Note 1	U
98	R	OUT	value/10	%	IGV position of centrifugal comp. 6	Note 1	U
99	R	OUT	value/10	%	IGV position of centrifugal comp. 7	Note 1	U
100	R	OUT	value/10	%	IGV position of centrifugal comp. 8	Note 1	U
101	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 5	Note 1	U
102	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 6	Note 1	U
103	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 7	Note 1	U
104	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 8	Note 1	U
105	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 5	Note 1	U
106	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 6	Note 1	U
107	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 7	Note 1	U
108	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 8	Note 1	U
109	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 5	Note 1	U
110	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 6	Note 1	U
111	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 7	Note 1	U
112	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 8	Note 1	U
113	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 5	Note 1	U
114	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 6	Note 1	U
115	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 7	Note 1	U
116	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 8	Note 1	U
117	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 5	Note 1	U
118	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 6	Note 1	U
119	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 7	Note 1	U
120	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 8	Note 1	U
121	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 5	Note 1	U
122	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 6	Note 1	U
123	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 7	Note 1	U
124	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 8	Note 1	U
125	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 5	Note 1	U
126	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 6	Note 1	U
127	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 7	Note 1	U
128	R				NOT MANAGED		U
131	R	OUT	valuex1	-	Software version	Always	U
132	R	OUT	valuex1	-	Software version (revision)	Always	U
133	R	OUT	valuex1	-	Unit type configuration (00:Chiller - 01:Chiller+recovery - 02:Chiller+freecooling - 10:Heat pump - 11:Heat pump+recovery - 14 Heat pump+DHW - 15: +2P module - 21:Energy raiser - 25:Energy raiser and +2P module)	Always	U
134	R	OUT	valuex1	-	N° circuits	Always	U
135	R	OUT	valuex1	-	N° compressors	Always	U
136	R	OUT	valuex1	-	N° separation stages per compressor	Always	U
137	R	OUT	valuex1	-	Type of compressors (0:Centrifuge - 1:Hermetic - 2:Alternative - 3:Screw*) * To identify if and which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter	Always	U
138	R	OUT	valuex1	-	Unit configuration status [1]	Always	U

Address	Type *	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
					(Bit0: 0:Heat pump disabled, 1:Heat pump enabled		
					Bit1: 0:Quick Mind disabled, 1:Quick Mind enabled		
					Bit2: 0:Inlet, 1:Outlet		
					Bit3: 0:FreeCooling disabled, 1:FreeCooling enabled		
					Bit4 - Bit10: Not significant		
					Bit11: 0:Recovery disabled, 1:Recovery enabled		
					Bit12 - Bit15: Not significant)		
139	R	OUT	valuex1	-	Unit configuration status [2]	Always	U
					(Bit0: 0:Time bands disabled, 1:Time bands enabled		
					Bit1: 0:Pumpdown disabled, 1:Pumpdown enabled		
					Bit2: 0:Setpoint modification disabled, 1:Setpoint modification enabled		
					Bit3: 0:Air cooling, 1:Water cooling		
					Bit4: 0:Sequencer disabled, 1:Sequencer enabled		
					Bit5: 0:DHW disabled, 1:DHW enabled		
					Bit6: 0:anti-legionellosis disabled, 1:anti-legionellosis enabled		
					Bit7: 0: +2P module disabled, 1: +2P module enabled		
					Bit8 - Bit15: Not significant)		
140	R	OUT	valuex1	-	Unit status (0:ON from keyboard - 1:ON from digital input - 2:ON from time bands - 3:ON from supervisor - 4:OFF from alarm - 5:OFF from supervisor - 6:OFF from time bands - 7:OFF from digital input - 8:OFF from keyboard - 9:OFF with deselection of compressors - 10:OFF)	Always	U
141	R	OUT	valuex1	-	Unit timing status (0:Unit off - 1:Unit timing - 3:Unit at full power - 4:Switching off - 5: Timing of compressors - 6:Pump timing - 8:Unit OFF from alarm)	Always	U
142	R	IN / OUT	valuex1	-	Operating mode	Always	U
					Chiller unit (3:chiller)		
					Chiller + freecooling (7:chiller - 8:chiller+fc)		
					Chiller + recovery (2:chiller+rec - 3:chiller)		
					Heat pump (3:chiller 4:heatpump)		
					Energy raisers (0:auto -1:recovery - 2:chiller+rec - 3:chiller)		
					Heat pump with recovery (10:summer auto - 11:summer rec - 12:summer ch+rec - 13:summer ch - 14:winter hp - 15:winter rec - 16:winter auto)		
143	R	OUT	valuex1	-	Compressor 1 status	Always	U
					(Bit0: 0:Configured, 1:Not configured		
					Bit1: 0:Disabled, 1:Enabled		
					Bit2: 0:OFF, 1:ON		
					Bit3: 0:Pump-down inactive, 1:Pump-down active		
					Bit4: 0:Alarm not active, 1:Alarm active		
					Bit5: 0:--- ,1:ON with 3 steps active; start for screw and centrifuge compressors		
					Bit6: 0:--- ,1:ON with 2 steps active		
					Bit7: 0:--- ,1:ON with 1 step active		
					Bit8: 0:--- ,1:ON entire		
					Bit9: 0:--- ,1:chiller		
					Bit10: 0:--- ,1:heat pump		
					Bit11: 0:--- ,1:recovery		
					Bit12: 0:--- ,1:defrost		
					Bit13: 0:--- ,1:freecooling		
					Bit14: 0:--- ,1:dripping		
					Bit15: 0:--- ,1:request)		
144	R	OUT	valuex1	-	Compressor 2 status (see compressor 1 status)	Note 1	U
145	R	OUT	valuex1	-	Compressor 3 status (see compressor 1 status)	Note 1	U
146	R	OUT	valuex1	-	Compressor 4 status (see compressor 1 status)	Note 1	U
147	R	OUT	valuex1	-	Compressor 5 status (see compressor 1 status)	Note 1	U
148	R	OUT	valuex1	-	Compressor 6 status (see compressor 1 status)	Note 1	U
149	R	OUT	valuex1	-	Compressor 7 status (see compressor 1 status)	Note 1	U
150	R	OUT	valuex1	-	Compressor 8 status (see compressor 1 status)	Note 1	U
151	R	OUT	valuex1	-	Average hours compressors (thousands)	Always	U
152	R	OUT	valuex1	-	Average hours compressors (units)	Always	U
155	R	OUT	valuex1	-	Pump code	Always	U
					(Bit0: 0: --- , 1:Enable pump 1		
					Bit1: 0: --- , 1:Enable pump 2		

Address	Type *	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
					Bit2: 0: --- , 1:Recovery pump enabled		
					Bit3: 0: --- , 1:DHW pump enabled		
					Bit4: 0: --- , 1:Condenser pump enabled		
					Bit5: 0: --- ,		
					Bit6: 0: --- , 1:Pumps 1 and 2 stopped for machine or hydraulic circuit alarms		
					Bit7: 0: --- , 1:Recovery pump stopped due to machine or hydraulic circuit alarms		
					Bit8: 0: --- , 1:Pump 1 alarm		
					Bit9: 0: --- , 1:Pump 2 alarm		
					Bit10: 0: --- , 1:Recovery pump alarm		
					Bit11: 0: --- , 1:DHW pump alarm		
					Bit12: 0: --- , 1:Condenser pump alarm		
					Bit13: 0: --- , 1:Condenser flow or antifreeze alarm		
					Bit14: 0: --- , 1:Unit no longer available - stop_by_alarm-		
					Bit15: 0: --- , 1:Unit in alarm status but with requested pumps -no_stop_pump-)		
156	R	OUT	valuex1	-	Flash operating mode	Always	U
					(Bit0: 0:--- , 1:Anti-legionellosis function active		
					Bit1: 0:--- , 1:Sniffer function on pumps enabled		
					Bit2: 0:--- , 1:Unit start delay after power failure		
					Bit3: 0:--- , 1:Thermoregulator on hold/timing		
					Bit4: 0:--- , 1:Fast Restart function enabled		
					Bit5: 0:--- , 1:+2P module enabled		
					Bit6: Not significant		
					Bit7: 0:--- , 1:Unit with power limitation enabled		
					Bit8: 0: --- , 1:Unit with antifreeze limitation enabled		
					Bit9: 0: --- , 1:high temperature pressure switch control enabled		
					Bit10: 0: --- , 1:Defrosting on		
					Bit11: 0: --- , 1:Energy storage		
					Bit12: 0: --- , 1:Drip phase active in at least one circuit		
					Bit13: 0: --- , 1:Override at maximum in at least one circuit		
					Bit14: 0: --- , 1:Override at minimum in at least one circuit		
					Bit15: 0: --- , 1:The unit is producing DHW		
158	R	OUT	valuex1	-	Unit status (0: ON from keyboard - 1: ON from digital input - 2: ON from time bands - 3: ON from KIPlink - 4: ON from supervisor - 5: ON from sequencer - 6: ON from Manager 3000 - 7: ON from ClimaPRO - 8: ON from LAN - 9: ON from manager + - 20: OFF from alarm - 21: OFF from ClimaPRO - 22: OFF from Manager 3000 - 23: OFF from sequencer - 24: OFF from supervisor - 25: OFF from KIPlink - 26: OFF from time bands - 27: OFF from digital input - 28: OFF from keyboard - 29: OFF with deselection of compressors - 30: OFF - 31: Standby - 32: OFF from LAN - 33: OFF from manager +)	Always	U
160	R	OUT	valuex1	-	Active alarm code (with greater priority)	Always	U
161	R	OUT	valuex1	-	Screw compressor model (0: Bitzer/Bitzer CSC - 1:Hitachi - 2:Fu-Sheng - 3:Bitzer inverter - 10:Hybrid*)	Note 1	U
					* To identify which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter		
174	R	OUT	valuex10	rpm	RPM centrifuge comp. 1	Note 1	U
			valuex1		RPM inverter comp.1	Note 1	U
175	R	OUT	valuex10	rpm	RPM centrifuge comp. 2	Note 1	U
			valuex1		RPM inverter comp.2	Note 1	U
176	R	OUT	valuex10	rpm	RPM centrifuge comp. 3	Note 1	U
			valuex1		RPM inverter comp.3	Note 1	U
177	R	OUT	valuex10	rpm	RPM centrifuge comp. 4	Note 1	U
			valuex1		RPM inverter comp.4	Note 1	U
178	R	OUT	valuex10	rpm	RPM centrifuge comp. 5	Note 1	U
179	R	OUT	valuex10	rpm	RPM centrifuge comp. 6	Note 1	U
180	R	OUT	valuex10	rpm	RPM centrifuge comp. 7	Note 1	U
181	R	OUT	valuex10	rpm	RPM centrifuge comp. 8	Note 1	U

Address	Type *	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
182	R	OUT	valuex1	hx1000	Compressor 1 hours (thousands)	Always	U
183	R	OUT	valuex1	h	Compressor 1 hours (units)	Always	U
184	R	OUT	valuex1	hx1000	Compressor 2 hours (thousands)	Note 1	U
185	R	OUT	valuex1	h	Compressor 2 hours (units)	Note 1	U
186	R	OUT	valuex1	hx1000	Compressor 3 hours (thousands)	Note 1	U
187	R	OUT	valuex1	h	Compressor 3 hours (units)	Note 1	U
188	R	OUT	valuex1	hx1000	Compressor 4 hours (thousands)	Note 1	U
189	R	OUT	valuex1	h	Compressor 4 hours (units)	Note 1	U
190	R	OUT	valuex1	hx1000	Compressor 5 hours (thousands)	Note 1	U
191	R	OUT	valuex1	h	Compressor 5 hours (units)	Note 1	U
192	R	OUT	valuex1	hx1000	Compressor 6 hours (thousands)	Note 1	U
193	R	OUT	valuex1	h	Compressor 6 hours (units)	Note 1	U
194	R	OUT	valuex1	hx1000	Compressor 7 hours (thousands)	Note 1	U
195	R	OUT	valuex1	h	Compressor 7 hours (units)	Note 1	U
196	R	OUT	valuex1	hx1000	Compressor 8 hours (thousands)	Note 1	U
197	R	OUT	valuex1	h	Compressor 8 hours (units)	Note 1	U
198	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 1	Note 1	U
199	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 2	Note 1	U
200	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 3	Note 1	U
201	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 4	Note 1	U
202	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 1	Note 1	U
203	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 2	Note 1	U
204	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 3	Note 1	U
205	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 4	Note 1	U
206	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 1	Note 1	U
207	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 2	Note 1	U
208	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 3	Note 1	U
209	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 4	Note 1	U
210	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 1	Note 1	U
211	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 2	Note 1	U
212	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 3	Note 1	U
213	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 4	Note 1	U
214	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 5	Note 1	U
215	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 6	Note 1	U
216	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 7	Note 1	U
217	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 8	Note 1	U
218	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 5	Note 1	U
219	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 6	Note 1	U
220	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 7	Note 1	U
221	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 8	Note 1	U
222	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 5	Note 1	U
223	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 6	Note 1	U
224	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 7	Note 1	U
225	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 8	Note 1	U
226	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 5	Note 1	U
227	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 6	Note 1	U
228	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 7	Note 1	U
239	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 8	Note 1	U
241	R	OUT	valuex1	%	Opening of freecooling valve as a percentage	Note 1	U
249	R	OUT	value/10	%	Main pump speed % with VPF management	Note 1	U
252	R	OUT	value/10	%	Recovery pump speed % with VPF management	Note 1	U
254	R	OUT	valuex1	V	Network analyser: Line 1 - N voltage	Note 1 and 2	U
255	R	OUT	valuex1	V	Network analyser: Line 2 - N voltage	Note 1 and 2	U
256	R	OUT	valuex1	V	Network analyser: Line 3 - N voltage	Note 1 and 2	U
257	R	OUT	valuex1	V	Network analyser: Line 1 - line 2 voltage	Note 1 and 2	U
258	R	OUT	valuex1	V	Network analyser: Line 2 - line 3 voltage	Note 1 and 2	U
259	R	OUT	valuex1	V	Network analyser: Line 3 - line 1 voltage	Note 1 and 2	U
260	R	OUT	value/10	A	Network analyser: Line 1 current	Note 1 and 2	U
261	R	OUT	value/10	A	Network analyser: Line 2 current	Note 1 and 2	U
262	R	OUT	value/10	A	Network analyser: Line 3 current	Note 1 and 2	U

Address	Type *	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
263	R	OUT	value/10	A	Network analyser: Neutral current	Note 1 and 2	U
264	R	OUT	value/1000	-	Network analyser: Power factor	Note 1 and 2	U
265	R	OUT	value/10	kW	Network analyser: Line 1 power	Note 1 and 2	U
266	R	OUT	value/10	kW	Network analyser: Line 2 power	Note 1 and 2	U
267	R	OUT	value/10	kW	Network analyser: Line 3 power	Note 1 and 2	U
268	R	OUT	value/10	kW	Network analyser: Total capacity	Note 1 and 2	U
269	R	OUT	valuex1	kWh	Network analyser: Energy (millions)	Note 1 and 2	U
270	R	OUT	valuex1	kWh	Network analyser: Energy (thousands)	Note 1 and 2	U
271	R	OUT	valuex1	kWh	Network analyser: Energy (units)	Note 1 and 2	U
272	R	OUT	valuex1	h	Network analyser: Time (millions)	Note 1 and 2	U
273	R	OUT	valuex1	h	Network analyser: Time (thousands)	Note 1 and 2	U
274	R	OUT	valuex1	h	Network analyser: Time (units)	Note 1 and 2	U
283	R	OUT	valuex1	A	Setpoint from BMS of the maximum permitted input current for the unit	Note 1 and 2	
		OUT	value/10				U
284	R	OUT	value/10	m^3/h	Thermal power analyser: evaporator flow rate	Note 1 and 2	U
285	R	OUT	value/10	°C	Thermal power analyser: temperature T1 connected to the evaporator input	Note 1 and 2	U
286	R	OUT	value/10	°C	Thermal power analyser: temperature T2 connected to the evaporator output	Note 1 and 2	U
287	R	OUT	valuex1	°C	Thermal power analyser: temperature difference calculated as T1 - T2	Note 1 and 2	U
288	R	OUT	value/10	kW	Thermal power analyser: calculated thermal power	Note 1 and 2	U
289	R	OUT	value/10	VA	Network analyser: Apparent power line 1	Note 1 and 2	U
290	R	OUT	value/10	VA	Network analyser: Apparent power line 2	Note 1 and 2	U
291	R	OUT	value/10	VA	Network analyser: Apparent power line 3	Note 1 and 2	U
292	R	OUT	value/10	VA	Network analyser: Total apparent power	Note 1 and 2	U
293	R	OUT	value/10	VAR	Network analyser: Reactive power line 1	Note 1 and 2	U
294	R	OUT	value/10	VAR	Network analyser: Reactive power line 2	Note 1 and 2	U
295	R	OUT	value/10	VAR	Network analyser: Reactive power line 3	Note 1 and 2	U
296	R	OUT	valuex1	VAR	Network analyser: Total reactive power	Note 1 and 2	U
297	R	OUT	valuex1	%	Percentage ventilation of circuit 1 / opening of modulating valve disposal circuit 1	Note 1 and 2	U
298	R	OUT	valuex1	%	Percentage ventilation of circuit 2 / opening of modulating valve disposal circuit 2	Note 1 and 2	U
299	R	OUT	valuex1	%	Percentage ventilation of circuit 3 / opening of modulating valve disposal circuit 3	Note 1 and 2	U
300	R	OUT	valuex1	%	Percentage ventilation of circuit 4 / opening of modulating valve disposal circuit 4	Note 1 and 2	U
345	R	OUT	valuex1	-	[01] 10 simultaneously active alarms with priority from 1 to 10	Always	U
346	R	OUT	valuex1	-	[02] 10 simultaneously active alarms with priority from 1 to 10	Always	U
347	R	OUT	valuex1	-	[03] 10 simultaneously active alarms with priority from 1 to 10	Always	U
348	R	OUT	valuex1	-	[04] 10 simultaneously active alarms with priority from 1 to 10	Always	U
349	R	OUT	valuex1	-	[05] 10 simultaneously active alarms with priority from 1 to 10	Always	U
350	R	OUT	valuex1	-	[06] 10 simultaneously active alarms with priority from 1 to 10	Always	U
351	R	OUT	valuex1	-	[07] 10 simultaneously active alarms with priority from 1 to 10	Always	U
352	R	OUT	valuex1	-	[08] 10 simultaneously active alarms with priority from 1 to 10	Always	U
353	R	OUT	valuex1	-	[09] 10 simultaneously active alarms with priority from 1 to 10	Always	U
354	R	OUT	valuex1	-	[10] 10 simultaneously active alarms with priority from 1 to 10	Always	U
355	R	OUT	valuex1	A	Active permitted input current setpoint	Always	U
1129	R	OUT	value/10	°C	Unit 1 evaporator inlet temperature	Always	G
1130	R	OUT	value/10	°C	Unit 2 evaporator inlet temperature	Always	G
1131	R	OUT	value/10	°C	Unit 3 evaporator inlet temperature	Always	G
1132	R	OUT	value/10	°C	Unit 4 evaporator inlet temperature	Always	G
1133	R	OUT	value/10	°C	Unit 5 evaporator inlet temperature	Always	G
1134	R	OUT	value/10	°C	Unit 6 evaporator inlet temperature	Always	G
1135	R	OUT	value/10	°C	Unit 7 evaporator inlet temperature	Always	G
1136	R	OUT	value/10	°C	Unit 8 evaporator inlet temperature	Always	G
1145	R	OUT	value/10	°C	Unit 1 evaporator outlet temperature	Always	G
1146	R	OUT	value/10	°C	Unit 2 evaporator outlet temperature	Always	G

Address	Type *	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
1147	R	OUT	value/10	°C	Unit 3 evaporator outlet temperature	Always	G
1148	R	OUT	value/10	°C	Unit 4 evaporator outlet temperature	Always	G
1149	R	OUT	value/10	°C	Unit 5 evaporator outlet temperature	Always	G
1150	R	OUT	value/10	°C	Unit 6 evaporator outlet temperature	Always	G
1151	R	OUT	value/10	°C	Unit 7 evaporator outlet temperature	Always	G
1152	R	OUT	value/10	°C	Unit 8 evaporator outlet temperature	Always	G
1193	R	OUT	value/10	°C	Unit 1 condenser inlet temperature	Always	G
1194	R	OUT	value/10	°C	Unit 2 condenser inlet temperature	Always	G
1195	R	OUT	value/10	°C	Unit 3 condenser inlet temperature	Always	G
1196	R	OUT	Value/10	°C	Unit 4 condenser inlet temperature	Always	G
1209	R	OUT	value/10	°C	Unit 1 condenser outlet temperature	Always	G
1210	R	OUT	value/10	°C	Unit 2 condenser outlet temperature	Always	G
1211	R	OUT	value/10	°C	Unit 3 condenser outlet temperature	Always	G
1212	R	OUT	value/10	°C	Unit 4 condenser outlet temperature	Always	G
1225	R	OUT	value/10	°C	Cold/hot circuit inlet temperature	Always	G
1226	R	IN	value/10	°C	Cold/hot circuit outlet temperature	Always	G
1229	R	OUT	value/10	°C	Cold temperature setpoint	Always	G
		IN	value/10	°C			
1230	R	OUT	value/10	°C	Cold temperature adjustment band	Always	G
		IN	value/10	°C			
1231	R	OUT	value/10	°C	Hot temperature setpoint	Always	G
		IN	value/10	°C			
1232	R	OUT	value/10	°C	Hot temperature adjustment band	Always	G
		IN	value/10	°C			
1235	R	OUT	value/10	°C	Cold/hot active temperature setpoint	Always	G
1237	R	OUT	valuex1	°C	External air temperature	Always	G
1238	R	OUT	valuex1	%	Unit 1 cold/hot demand percentage	Always	G
1239	R	OUT	valuex1	%	Unit 2 cold/hot demand percentage	Always	G
1240	R	OUT	valuex1	%	Unit 3 cold/hot demand percentage	Always	G
1241	R	OUT	valuex1	%	Unit 4 cold/hot demand percentage	Always	G
1242	R	OUT	valuex1	%	Unit 5 cold/hot demand percentage	Always	G
1243	R	OUT	valuex1	%	Unit 6 cold/hot demand percentage	Always	G
1244	R	OUT	valuex1	%	Unit 7 cold/hot demand percentage	Always	G
1245	R	OUT	valuex1	%	Unit 8 cold/hot demand percentage	Always	G
1254	R	OUT	valuex1	%	Unit 1 cold/hot active percentage	Always	G
1255	R	OUT	valuex1	%	Unit 2 cold/hot active percentage	Always	G
1256	R	OUT	valuex1	%	Unit 3 cold/hot active percentage	Always	G
1257	R	OUT	valuex1	%	Unit 4 cold/hot active percentage	Always	G
1258	R	OUT	valuex1	%	Unit 5 cold/hot active percentage	Always	G
1259	R	OUT	valuex1	%	Unit 6 cold/hot active percentage	Always	G
1260	R	OUT	valuex1	%	Unit 7 cold/hot active percentage	Always	G
1261	R	OUT	valuex1	%	Unit 8 cold/hot active percentage	Always	G
1270	R	OUT	valuex1	-	Unit status (0:ON from keyboard - 1:ON from digital input - 2:ON from time bands - 3:ON from supervisor - 4:OFF from alarm - 5:OFF from supervisor - 6:OFF from time bands - 7:OFF from digital input - 8:OFF from keyboard - 9:OFF with deselection of compressors - 10:OFF)	Always	G
1271	R	OUT	valuex1	-	Unit 2 status (see unit 1 status)	Always	G
1272	R	OUT	valuex1	-	Unit 3 status (see unit 1 status)	Always	G
1273	R	OUT	valuex1	-	Unit 4 status (see unit 1 status)	Always	G
1274	R	OUT	valuex1	-	Unit 5 status (see unit 1 status)	Always	G
1275	R	OUT	valuex1	-	Unit 6 status (see unit 1 status)	Always	G
1276	R	OUT	valuex1	-	Unit 7 status (see unit 1 status)	Always	G
1277	R	OUT	valuex1	-	Unit 8 status (see unit 1 status)	Always	G
1286	R	OUT	valuex1	-	Unit 1 alarm code active	Always	G
1287	R	OUT	valuex1	-	Unit 2 alarm code active	Always	G
1288	R	OUT	valuex1	-	Unit 3 alarm code active	Always	G
1289	R	OUT	valuex1	-	Unit 4 alarm code active	Always	G
1290	R	OUT	valuex1	-	Unit 5 alarm code active	Always	G
1291	R	OUT	valuex1	-	Unit 6 alarm code active	Always	G
1292	R	OUT	valuex1	-	Unit 7 alarm code active	Always	G
1293	R	OUT	valuex1	-	Unit 8 alarm code active	Always	G
1334	R	OUT	valuex1	-	System status (0:ON from keyboard - 1:ON from digital input - 20:OFF from alarm - 27:OFF digital input - 28:OFF from keyboard)	Always	G
1335	R	OUT	valuex1	-	System alarm code active	Always	G
1336	R	OUT	valuex1	%	Cold/hot circuit demand percentage	Always	G

Address	Type *	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
1337	R	IN	valuex1	%	Cold/hot circuit active percentage	Always	G
1340	R	OUT	valuex1	-	System operating mode (1: cold - 2: hot)	Always	G
		IN	valuex1	-			
1341	R	OUT	valuex1	%	Cold capacity limit percentage	Always	G
		IN	valuex1	%			
1342	R	OUT	valuex1	%	Hot capacity limit percentage	Always	G
		IN	valuex1	%			
1344	R	OUT	valuex1	%	Pump speed percentage with unit 1 cold/hot circuit inverter	Note 1 and 2	G
1345	R	OUT	valuex1	%	Pump speed percentage with unit 2 cold/hot circuit inverter	Note 1 and 2	G
1346	R	OUT	valuex1	%	Pump speed percentage with unit 3 cold/hot circuit inverter	Note 1 and 2	G
1347	R	OUT	valuex1	%	Pump speed percentage with unit 4 cold/hot circuit inverter	Note 1 and 2	G
1348	R	OUT	valuex1	%	Pump speed percentage with unit 5 cold/hot circuit inverter	Note 1 and 2	G
1349	R	OUT	valuex1	%	Pump speed percentage with unit 6 cold/hot circuit inverter	Note 1 and 2	G
1350	R	OUT	valuex1	%	Pump speed percentage with unit 7 cold/hot circuit inverter	Note 1 and 2	G
1351	R	OUT	valuex1	%	Pump speed percentage with unit 8 cold/hot circuit inverter	Note 1 and 2	G
1360	R	OUT	valuex1	%	Unit 1 cold/hot available percentage	Always	G
1361	R	OUT	valuex1	%	Unit 2 cold/hot available percentage	Always	G
1362	R	OUT	valuex1	%	Unit 3 cold/hot available percentage	Always	G
1363	R	OUT	valuex1	%	Unit 4 cold/hot available percentage	Always	G
1364	R	OUT	valuex1	%	Unit 5 cold/hot available percentage	Always	G
1365	R	OUT	valuex1	%	Unit 6 cold/hot available percentage	Always	G
1366	R	OUT	valuex1	%	Unit 7 cold/hot available percentage	Always	G
1367	R	OUT	valuex1	%	Unit 8 cold/hot available percentage	Always	G
1408	R	OUT	valuex1	-	Group master unit address	Always	G
1409	R	OUT	valuex1	-	Address of the unit with KIPlink master of the group in the KIPLAN network	Note 2	G
1410	R	OUT	value/10	°C	Main setpoint variation introduced by dynamic setpoint management	Note 2	G
1411	R	OUT	valuex1	-	01 internal units group status (0:Not -significant - 1:Group ON - 2:Group OFF - 3:OFF due to alarm - 4:Offline from KIPlink - 5:Offline from controller)	Always	G
1412	R	OUT	valuex1	-	02 internal units group status (see 01 internal units group status)	Always	G
1413	R	OUT	valuex1	-	03 internal units group status (see 01 internal units group status)	Always	G
1414	R	OUT	valuex1	-	04 internal units group status (see 01 internal units group status)	Always	G
1415	R	OUT	valuex1	-	05 internal units group status (see 01 internal units group status)	Always	G
1416	R	OUT	valuex1	-	06 internal units group status (see 01 internal units group status)	Always	G
1417	R	OUT	valuex1	-	07 internal units group status (see 01 internal units group status)	Always	G
1418	R	OUT	valuex1	-	08 internal units group status (see 01 internal units group status)	Always	G
1419	R	OUT	valuex1	-	09 internal units group status (see 01 internal units group status)	Always	G
1420	R	OUT	valuex1	-	10 internal units group status (see 01 internal units group status)	Always	G
1421	R	OUT	valuex1	-	11 internal units group status (see 01 internal units group status)	Always	G
1422	R	OUT	valuex1	-	12 internal units group status (see 01 internal units group status)	Always	G
1423	R	OUT	valuex1	-	13 internal units group status (see 01 internal units group status)	Always	G
1424	R	OUT	valuex1	-	14 internal units group status (see 01 internal units group status)	Always	G
1425	R	OUT	valuex1	-	15 internal units group status (see 01 internal units group status)	Always	G
1426	R	OUT	valuex1	-	16 internal units group status (see 01 internal units group status)	Always	G

Address	Type *	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
1427	R	OUT	valuex1	-	17 internal units group status (see 01 internal units group status)	Always	G
1428	R	OUT	valuex1	-	18 internal units group status (see 01 internal units group status)	Always	G
1429	R	OUT	valuex1	-	19 internal units group status (see 01 internal units group status)	Always	G
1430	R	OUT	valuex1	-	20 internal units group status (see 01 internal units group status)	Always	G
1431	R	OUT	value/10	%	System individual pump % speed	Always	G

***Type:** C =Coil, R=Register
***Ref.**: Registers referred to the U = Unit or G = Group

Note 1: availability of the variable to the supervisor system depends on the type of unit and optional devices used
Note 2: the possibility of using the variable depends on enabling of a parameter on the controller.

17.4.9 MODBUS OVER IP Interface database (software versions TG04 and higher)

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
0	C		-	-	NOT MANAGED		
1	C	OUT	-	-	Unit status (0:Off - 1:On)	Always	U
3	C	OUT	-	-	Evaporator pump 1 status (0:Off - 1:On)	Note 1	U
4	C	OUT	-	-	Evaporator pump 2 status (0:Off - 1:On)	Note 1	U
5	C	OUT	-	-	Recuperator pump status (0:Off - 1:On)	Note 1	U
6	C	OUT	-	-	Condenser pump status (0:Off - 1:On)	Note 1	U
11	C	OUT	-	-	Enable operating mode change from supervisor	Always	U
34	C	OUT	-	-	Energy meter electricity value reading enable	Note 1 and 2	U
35	C	OUT	-	-	Energy meter configuration for 3-phase electric line connection	Note 1 and 2	U
36	C	OUT	-	-	Energy meter configuration for connection of electric line with neutral	Note 1 and 2	U
37	C	OUT	-	-	Possibility of neutral current reading	Note 1 and 2	U
39	C	OUT	-	-	Changing the status of unit alarms	Always	U
251	C	OUT	-	-	Offline unit 1 (0: unit online – 1: unit offline)	Always	G
252	C	OUT	-	-	Offline unit 2 (0: unit online – 1: unit offline)	Always	G
253	C	OUT	-	-	Offline unit 3 (0: unit online – 1: unit offline)	Always	G
254	C	OUT	-	-	Offline unit 4 (0: unit online – 1: unit offline)	Always	G
255	C	OUT	-	-	Offline unit 5 (0: unit online – 1: unit offline)	Always	G
256	C	OUT	-	-	Offline unit 6 (0: unit online – 1: unit offline)	Always	G
257	C	OUT	-	-	Offline unit 7 (0: unit online – 1: unit offline)	Always	G
258	C	OUT	-	-	Offline unit 8 (0: unit online – 1: unit offline)	Always	G
267	C	IN OUT	-	-	Enable unit 1 (0: unit disabled – 1: unit enabled)	Always	G
268	C	IN OUT	-	-	Enable unit 2 (0: unit disabled – 1: unit enabled)	Always	G
269	C	IN OUT	-	-	Enable unit 3 (0: unit disabled – 1: unit enabled)	Always	G
270	C	IN OUT	-	-	Enable unit 4 (0: unit disabled – 1: unit enabled)	Always	G
271	C	IN OUT	-	-	Enable unit 5 (0: unit disabled – 1: unit enabled)	Always	G
272	C	IN OUT	-	-	Enable unit 6 (0: unit disabled – 1: unit enabled)	Always	G
273	C	IN OUT	-	-	Enable unit 7 (0: unit disabled – 1: unit enabled)	Always	G
274	C	IN OUT	-	-	Enable unit 8 (0: unit disabled – 1: unit enabled)	Always	G
283	C	IN OUT	- -	- -	System on/off command (0: system off – 1: system on)	Always	G
284	C	IN OUT	-	-	Demand Limit command from supervision (0: command not active – 1: command active)	Note 2	G
285	C	OUT	-	-	System single pump status (0:Off - 1:On)	Note 1 and 2	G
287	C	IN OUT	-	-	Unit manual rotation command (0: command not active – 1: command active)	Note 2	G
5	R	OUT	value/10	°C	Main active setpoint	Note 1	U
6	R	OUT	value/10	°C	Recovery setpoint active	Note 1	U
7	R	OUT	value/10	°C	Inlet temperature of evaporator	Note 1	U
8	R	OUT	value/10	°C	Evaporator outlet temperature (average)	Note 1	U
9	R	OUT	value/10	°C	Condenser inlet temperature	Note 1	U
10	R	OUT	value/10	°C	Condenser outlet temperature (average)	Note 1	U
11	R	OUT	value/10	°C	Recuperator inlet temperature / DHW storage tank temperature	Note 1	U
12	R	OUT	value/10	°C	Recuperator outlet temperature	Note 1	U
13	R	OUT	value/10	bar	High pressure transducer 1	Note 1	U
14	R	OUT	value/10	bar	High pressure transducer 2	Note 1	U
15	R	OUT	value/10	bar	High pressure transducer 3	Note 1	U
16	R	OUT	value/10	bar	High pressure transducer 4	Note 1	U
17	R	OUT	value/10	bar	Low pressure transducer 1	Note 1	U
18	R	OUT	value/10	bar	Low pressure transducer 2	Note 1	U
19	R	OUT	value/10	bar	Low pressure transducer 3	Note 1	U
20	R	OUT	value/10	bar	Low pressure transducer 4	Note 1	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
21	R	OUT	value/10	°C	External air temperature	Note 1	U
22	R	OUT	value/10	°C	Optional probe temperature	Note 1	U
23	R	OUT	value/10	°C	Freecooling inlet temperature	Note 1	U
24	R	OUT	value/10	kPa	Differential pressure transducer on hydraulic side of evaporator	Note 1	U
25	R	OUT	value/10	kPa	Differential pressure transducer on recuperator water side	Note 1	U
26	R	OUT	value/10	°C	Compressor 1 discharge temperature	Note 1	U
27	R	OUT	value/10	°C	Compressor 2 discharge temperature	Note 1	U
28	R	OUT	value/10	°C	Compressor 3 discharge temperature	Note 1	U
29	R	OUT	value/10	°C	Compressor 4 discharge temperature	Note 1	U
30	R	OUT	value/10	°C	Compressor 5 discharge temperature	Note 1	U
31	R	OUT	value/10	°C	Compressor 6 discharge temperature	Note 1	U
32	R	OUT	value/10	°C	Compressor 7 discharge temperature	Note 1	U
33	R	OUT	value/10	°C	Compressor 8 discharge temperature	Note 1	U
34	R	OUT	value/10	°C	Plant storage tank setpoint enabled	Note 1	U
35	R	OUT	value/10	°C	Plant storage tank temperature	Note 1	U
36	R	OUT	value/10	kPa	Differential pressure transducer on hydraulic side of condenser	Note 1	U
37	R	OUT	value/10	-	Compression ratio in absolute bar of Centrifuge comp. 8	Note 1	U
41	R	OUT	value/10	%	Power demand to centrifuge comp. 1	Note 1	U
			valuex1	rpm	Revs demand to inverter 1	Note 1	U
42	R	OUT	value/10	%	Power demand to centrifuge comp. 2	Note 1	U
			valuex1	rpm	Revs demand to inverter 2	Note 1	U
43	R	OUT	value/10	%	Power demand to centrifuge comp. 3	Note 1	U
			valuex1	rpm	Revs demand to inverter 3	Note 1	U
44	R	OUT	value/10	%	Power demand to centrifuge comp. 4	Note 1	U
			valuex1	rpm	Revs demand to inverter 4	Note 1	U
45	R	OUT	value/10	kW	Power demand to centrifuge comp. 1	Note 1	U
46	R	OUT	value/10	kW	Power demand to centrifuge comp. 2	Note 1	U
47	R	OUT	value/10	kW	Power demand to centrifuge comp. 3	Note 1	U
48	R	OUT	value/10	kW	Power demand to centrifuge comp. 4	Note 1	U
49	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 1	Note 1	U
50	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 2	Note 1	U
51	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 3	Note 1	U
52	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 4	Note 1	U
53	R	OUT	value/10	%	IGV position of centrifugal comp. 1	Note 1	U
54	R	OUT	value/10	%	IGV position of centrifugal comp. 2	Note 1	U
55	R	OUT	value/10	%	IGV position of centrifugal comp. 3	Note 1	U
56	R	OUT	value/10	%	IGV position of centrifugal comp. 4	Note 1	U
57	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 1	Note 1	U
58	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 2	Note 1	U
59	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 3	Note 1	U
60	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 4	Note 1	U
61	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 1	Note 1	U
62	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 2	Note 1	U
63	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 3	Note 1	U
64	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 4	Note 1	U
65	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 1	Note 1	U
66	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 2	Note 1	U
67	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 3	Note 1	U
68	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 4	Note 1	U
69	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 1	Note 1	U
70	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 2	Note 1	U
71	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 3	Note 1	U
72	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 4	Note 1	U
73	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 1	Note 1	U
74	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 2	Note 1	U
75	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 3	Note 1	U
76	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 4	Note 1	U
77	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 1	Note 1	U
78	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 2	Note 1	U
79	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 3	Note 1	U
80	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 4	Note 1	U
81	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 1	Note 1	U
82	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 2	Note 1	U
83	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 3	Note 1	U
84	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 4	Note 1	U
85					Confidential		

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
86	R	OUT	value/10	%	Power demand to centrifuge comp. 5	Note 1	U
87	R	OUT	value/10	%	Power demand to centrifuge comp. 6	Note 1	U
88	R	OUT	value/10	%	Power demand to centrifuge comp. 7	Note 1	U
89	R	OUT	value/10	%	Power demand to centrifuge comp. 8	Note 1	U
90	R	OUT	value/10	kW	Power demand to centrifuge comp. 5	Note 1	U
91	R	OUT	value/10	kW	Power demand to centrifuge comp. 6	Note 1	U
92	R	OUT	value/10	kW	Power demand to centrifuge comp. 7	Note 1	U
93	R	OUT	value/10	kW	Power demand to centrifuge comp. 8	Note 1	U
94	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 5	Note 1	U
95	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 6	Note 1	U
96	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 7	Note 1	U
97	R	OUT	value/10	kW	Power absorbed by centrifuge comp./inverter 8	Note 1	U
98	R	OUT	value/10	%	IGV position of centrifugal comp. 5	Note 1	U
99	R	OUT	value/10	%	IGV position of centrifugal comp. 6	Note 1	U
100	R	OUT	value/10	%	IGV position of centrifugal comp. 7	Note 1	U
101	R	OUT	value/10	%	IGV position of centrifugal comp. 8	Note 1	U
102	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 5	Note 1	U
103	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 6	Note 1	U
104	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 7	Note 1	U
105	R	OUT	value/10	barg	Internal inlet pressure to centrifuge comp./inverter 8	Note 1	U
106	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 5	Note 1	U
107	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 6	Note 1	U
108	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 7	Note 1	U
109	R	OUT	value/10	°C	Inlet temperature of centrifuge comp./inverter 8	Note 1	U
110	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 5	Note 1	U
111	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 6	Note 1	U
112	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 7	Note 1	U
113	R	OUT	value/10	°C	SCR temperature of centrifuge comp. 8	Note 1	U
114	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 5	Note 1	U
115	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 6	Note 1	U
116	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 7	Note 1	U
117	R	OUT	value/10	°C	Outlet temperature of centrifuge comp. 8	Note 1	U
118	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 5	Note 1	U
119	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 6	Note 1	U
120	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 7	Note 1	U
121	R	OUT	value/10	°C	Cavity temperature of centrifuge comp./inverter 8	Note 1	U
122	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 5	Note 1	U
123	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 6	Note 1	U
124	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 7	Note 1	U
125	R	OUT	value/10	°C	Temperature of inverter of centrifuge comp./inverter 8	Note 1	U
126	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 5	Note 1	U
127	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 6	Note 1	U
128	R	OUT	value/10	-	Compression ratio in absolute bar of centrifuge comp. 7	Note 1	U
5005	R	OUT	valuex1	-	Software version	Always	U
5006	R	OUT	valuex1	-	Software version (revision)	Always	U
5007	R	OUT	valuex1	-	Unit type configuration (00:Chiller - 01:Chiller+recovery - 02:Chiller+freecooling - 10:Heat pump - 11:Heat pump+recovery - 14 Heat pump+DHW - 15: +2P module - 21:Energy raiser - 25:Energy raiser and +2P module)	Always	U
5008	R	OUT	valuex1	-	N° circuits	Always	U
5009	R	OUT	valuex1	-	N° compressors	Always	U
5010	R	OUT	valuex1	-	N° separation stages per compressor	Always	U
5011	R	OUT	valuex1	-	Type of compressors (0:Centrifuge - 1:Hermetic - 2:Alternative - 3:Screw*) * To identify if and which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter	Always	U
5012	R	OUT	valuex1	-	Unit configuration status [1] (Bit0: 0:Heat pump disabled, 1:Heat pump enabled Bit1: 0:Quick Mind disabled, 1:Quick Mind enabled Bit2: 0:Inlet, 1:Outlet Bit3: 0:FreeCooling disabled, 1:FreeCooling enabled Bit4 - Bit10: Not significant Bit11: 0:Recovery disabled, 1:Recovery enabled Bit12 - Bit15: Not significant)	Always	U
5013	R	OUT	valuex1	-	Unit configuration status [2]	Always	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
					(Bit0: 0:Time bands disabled, 1:Time bands enabled		
					Bit1: 0:Pumpdown disabled, 1:Pumpdown enabled		
					Bit2: 0:Setpoint modification disabled, 1:Setpoint modification enabled		
					Bit3: 0:Air cooling, 1:Water cooling		
					Bit4: 0:Sequencer disabled, 1:Sequencer enabled		
					Bit5: 0:DHW disabled, 1:DHW enabled		
					Bit6: 0:anti-legionellosis disabled, 1:anti-legionellosis enabled		
					Bit7: 0: +2P module disabled, 1: +2P module enabled		
					Bit8 - Bit15: Not significant)		
5014	R	OUT	valuex1	-	Unit status (0:ON from keyboard - 1:ON from digital input - 2:ON from time bands - 3:ON from supervisor - 4:OFF from alarm - 5:OFF from supervisor - 6:OFF from time bands - 7:OFF from digital input - 8:OFF from keyboard - 9:OFF with deselection of compressors - 10:OFF)	Always	U
5015	R	OUT	valuex1	-	Unit timing status (0:Unit off - 1:Unit timing - 3:Unit at full power - 4:Switching off - 5: Timing of compressors - 6:Pump timing - 8:Unit OFF from alarm)	Always	U
5016	R	IN / OUT	valuex1	-	Operating mode	Always	U
					Chiller unit (3:chiller)		
					Chiller + freecooling (7:chiller - 8:chiller+fc)		
					Chiller + recovery (2:chiller+rec - 3:chiller)		
					Heat pump (3:chiller 4:heatpump)		
					Energy raisers (0:auto -1:recovery - 2:chiller+rec - 3:chiller)		
					Heat pump with recovery (10:summer auto - 11:summer rec - 12:summer ch+rec - 13:summer ch - 14:winter hp - 15:winter rec - 16:winter auto)		
5017	R	OUT	valuex1	-	Compressor 1 status	Always	U
					(Bit0: 0:Configured, 1:Not configured		
					Bit1: 0:Disabled, 1:Enabled		
					Bit2: 0:OFF, 1:ON		
					Bit3: 0:Pump-down inactive, 1:Pump-down active		
					Bit4: 0:Alarm not active, 1:Alarm active		
					Bit5: 0:--- ,1:ON with 3 steps active; start for screw and centrifuge compressors		
					Bit6: 0:--- ,1:ON with 2 steps active		
					Bit7: 0:--- ,1:ON with 1 step active		
					Bit8: 0:--- ,1:ON entire		
					Bit9: 0:--- ,1:chiller		
					Bit10: 0:--- ,1:heat pump		
					Bit11: 0:--- ,1:recovery		
					Bit12: 0:--- ,1:defrost		
					Bit13: 0:--- ,1:freecooling		
					Bit14: 0:--- ,1:dripping		
					Bit15: 0:--- ,1:request)		
5018	R	OUT	valuex1	-	Compressor 2 status (see compressor 1 status)	Note 1	U
5019	R	OUT	valuex1	-	Compressor 3 status (see compressor 1 status)	Note 1	U
5020	R	OUT	valuex1	-	Compressor 4 status (see compressor 1 status)	Note 1	U
5021	R	OUT	valuex1	-	Compressor 5 status (see compressor 1 status)	Note 1	U
5022	R	OUT	valuex1	-	Compressor 6 status (see compressor 1 status)	Note 1	U
5023	R	OUT	valuex1	-	Compressor 7 status (see compressor 1 status)	Note 1	U
5024	R	OUT	valuex1	-	Compressor 8 status (see compressor 1 status)	Note 1	U
5025	R	OUT	valuex1	-	Average hours compressors (thousands)	Always	U
5026	R	OUT	valuex1	-	Average hours compressors (units)	Always	U
5029	R	OUT	valuex1	-	Pump code	Always	U
					(Bit0: 0: --- , 1:Enable pump 1		
					Bit1: 0: --- , 1:Enable pump 2		
					Bit2: 0: --- , 1:Recovery pump enabled		
					Bit3: 0: --- , 1:DHW pump enabled		
					Bit4: 0: --- , 1:Condenser pump enabled		
					Bit5: 0: --- ,		
					Bit6: 0: --- , 1:Pumps 1 and 2 stopped for machine or hydraulic circuit alarms		
					Bit7: 0: --- , 1:Recovery pump stopped due to machine or hydraulic circuit alarms		
					Bit8: 0: --- , 1:Pump 1 alarm		
					Bit9: 0: --- , 1:Pump 2 alarm		

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
					Bit10: 0: --- , 1:Recovery pump alarm		
					Bit11: 0: --- , 1:DHW pump alarm		
					Bit12: 0: --- , 1:Condenser pump alarm		
					Bit13: 0: --- , 1:Condenser flow or antifreeze alarm		
					Bit14: 0: --- , 1:Unit no longer available -stop_by_alarm-		
					Bit15: 0: --- , 1:Unit in alarm status but with requested pumps -no_stop_pump-)		
5030	R	OUT	valuex1	-	Flash operating mode (Bit0: 0:--- , 1:Anti-legionellosis function active Bit1: 0:--- , 1:Sniffer function on pumps enabled Bit2: 0:--- , 1:Unit start delay after power failure Bit3: 0:--- , 1:Thermoregulator on hold/timing Bit4: 0:--- , 1:Fast Restart function enabled Bit5: 0:--- , 1:+2P module enabled Bit6: Not significant Bit7: 0:--- , 1:Unit with power limitation enabled Bit8: 0: --- , 1:Unit with antifreeze limitation enabled Bit9: 0: --- , 1:high temperature pressure switch control enabled Bit10: 0: --- , 1:Defrosting on Bit11: 0: --- , 1:Energy storage Bit12: 0: --- , 1:Drip phase active in at least one circuit Bit13: 0: --- , 1:Override at maximum in at least one circuit Bit14: 0: --- , 1:Override at minimum in at least one circuit Bit15: 0: --- , 1:The unit is producing DHW	Always	U
5032	R	OUT	valuex1	-	Unit status (0: ON from keyboard - 1: ON from digital input - 2: ON from time bands - 3: ON from KIPlink - 4: ON from supervisor - 5: ON from sequencer - 6: ON from Manager 3000 - 7: ON from ClimaPRO - 8: ON from LAN - 9: ON from manager + - 20: OFF from alarm - 21: OFF from ClimaPRO - 22: OFF from Manager 3000 - 23: OFF from sequencer - 24: OFF from supervisor - 25: OFF from KIPlink - 26: OFF from time bands - 27: OFF from digital input - 28: OFF from keyboard - 29: OFF with deselection of compressors - 30: OFF - 31: Standby - 32: OFF from LAN - 33: OFF from manager +)	Always	U
5034	R	OUT	valuex1	-	Active alarm code (with greater priority)	Always	U
5035	R	OUT	valuex1	-	Screw compressor model (0: Bitzer/Bitzer CSC - 1:Hitachi - 2:Fu-Sheng - 3:Bitzer inverter - 10:Hybrid*) * To identify which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter	Note 1	U
5048	R	OUT	valuex10	rpm	RPM centrifuge comp. 1	Note 1	U
			valuex1		RPM inverter comp.1	Note 1	U
5049	R	OUT	valuex10	rpm	RPM centrifuge comp. 2	Note 1	U
			valuex1		RPM inverter comp.2	Note 1	U
5050	R	OUT	valuex10	rpm	RPM centrifuge comp. 3	Note 1	U
			valuex1		RPM inverter comp.3	Note 1	U
5051	R	OUT	valuex10	rpm	RPM centrifuge comp. 4	Note 1	U
			valuex1		RPM inverter comp.4	Note 1	U
5052	R	OUT	valuex10	rpm	RPM centrifuge comp. 5	Note 1	U
5053	R	OUT	valuex10	rpm	RPM centrifuge comp. 6	Note 1	U
5054	R	OUT	valuex10	rpm	RPM centrifuge comp. 7	Note 1	U
5055	R	OUT	valuex10	rpm	RPM centrifuge comp. 8	Note 1	U
5056	R	OUT	valuex1	hx1000	Compressor 1 hours (thousands)	Always	U
5057	R	OUT	valuex1	h	Compressor 1 hours (units)	Always	U
5058	R	OUT	valuex1	hx1000	Compressor 2 hours (thousands)	Note 1	U
5059	R	OUT	valuex1	h	Compressor 2 hours (units)	Note 1	U
5060	R	OUT	valuex1	hx1000	Compressor 3 hours (thousands)	Note 1	U
5061	R	OUT	valuex1	h	Compressor 3 hours (units)	Note 1	U
5062	R	OUT	valuex1	hx1000	Compressor 4 hours (thousands)	Note 1	U
5063	R	OUT	valuex1	h	Compressor 4 hours (units)	Note 1	U
5064	R	OUT	valuex1	hx1000	Compressor 5 hours (thousands)	Note 1	U
5065	R	OUT	valuex1	h	Compressor 5 hours (units)	Note 1	U
5066	R	OUT	valuex1	hx1000	Compressor 6 hours (thousands)	Note 1	U
5067	R	OUT	valuex1	h	Compressor 6 hours (units)	Note 1	U
5068	R	OUT	valuex1	hx1000	Compressor 7 hours (thousands)	Note 1	U
5069	R	OUT	valuex1	h	Compressor 7 hours (units)	Note 1	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
5070	R	OUT	valuex1	hx1000	Compressor 8 hours (thousands)	Note 1	U
5071	R	OUT	valuex1	h	Compressor 8 hours (units)	Note 1	U
5072	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 1	Note 1	U
5073	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 2	Note 1	U
5074	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 3	Note 1	U
5075	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 4	Note 1	U
5076	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 1	Note 1	U
5077	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 2	Note 1	U
5078	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 3	Note 1	U
5079	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 4	Note 1	U
5080	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 1	Note 1	U
5081	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 2	Note 1	U
5082	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 3	Note 1	U
5083	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 4	Note 1	U
5084	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 1	Note 1	U
5085	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 2	Note 1	U
5086	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 3	Note 1	U
5087	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 4	Note 1	U
5088	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 5	Note 1	U
5089	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 6	Note 1	U
5090	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 7	Note 1	U
5091	R	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 8	Note 1	U
5092	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 5	Note 1	U
5093	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 6	Note 1	U
5094	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 7	Note 1	U
5095	R	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 8	Note 1	U
5096	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 5	Note 1	U
5097	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 6	Note 1	U
5098	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 7	Note 1	U
5099	R	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 8	Note 1	U
5100	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 5	Note 1	U
5101	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 6	Note 1	U
5102	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 7	Note 1	U
5113	R	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 8	Note 1	U
5115	R	OUT	valuex1	%	Opening of freecooling valve as a percentage	Note 1	U
5123	R	OUT	value/10	%	Main pump speed % with VPF management	Note 1	U
5126	R	OUT	value/10	%	Recovery pump speed % with VPF management	Note 1	U
5128	R	OUT	valuex1	V	Network analyser: Line 1 - N voltage	Note 1 and 2	U
5129	R	OUT	valuex1	V	Network analyser: Line 2 - N voltage	Note 1 and 2	U
5130	R	OUT	valuex1	V	Network analyser: Line 3 - N voltage	Note 1 and 2	U
5131	R	OUT	valuex1	V	Network analyser: Line 1 - line 2 voltage	Note 1 and 2	U
5132	R	OUT	valuex1	V	Network analyser: Line 2 - line 3 voltage	Note 1 and 2	U
5133	R	OUT	valuex1	V	Network analyser: Line 3 - line 1 voltage	Note 1 and 2	U
5134	R	OUT	value/10	A	Network analyser: Line 1 current	Note 1 and 2	U
5135	R	OUT	value/10	A	Network analyser: Line 2 current	Note 1 and 2	U
5136	R	OUT	value/10	A	Network analyser: Line 3 current	Note 1 and 2	U
5137	R	OUT	value/10	A	Network analyser: Neutral current	Note 1 and 2	U
5138	R	OUT	value/1000	-	Network analyser: Power factor	Note 1 and 2	U
5139	R	OUT	value/10	kW	Network analyser: Line 1 power	Note 1 and 2	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
5140	R	OUT	value/10	kW	Network analyser: Line 2 power	Note 1 and 2	U
5141	R	OUT	value/10	kW	Network analyser: Line 3 power	Note 1 and 2	U
5142	R	OUT	value/10	kW	Network analyser: Total capacity	Note 1 and 2	U
5143	R	OUT	valuex1	kWh	Network analyser: Energy (millions)	Note 1 and 2	U
5144	R	OUT	valuex1	kWh	Network analyser: Energy (thousands)	Note 1 and 2	U
5145	R	OUT	valuex1	kWh	Network analyser: Energy (units)	Note 1 and 2	U
5146	R	OUT	valuex1	h	Network analyser: Time (millions)	Note 1 and 2	U
5147	R	OUT	valuex1	h	Network analyser: Time (thousands)	Note 1 and 2	U
5148	R	OUT	valuex1	h	Network analyser: Time (units)	Note 1 and 2	U
5157	R	OUT	valuex1	A	Setpoint from BMS of the maximum permitted input current for the unit	Note 1 and 2	U
5158	R	OUT	value/10	m^3/h	Thermal power analyser: evaporator flow rate	Note 1 and 2	U
5159	R	OUT	value/10	°C	Thermal power analyser: temperature T1 connected to the evaporator input	Note 1 and 2	U
5160	R	OUT	value/10	°C	Thermal power analyser: temperature T2 connected to the evaporator output	Note 1 and 2	U
5161	R	OUT	value/10	°C	Thermal power analyser: temperature difference calculated as T1 - T2	Note 1 and 2	U
5162	R	OUT	valuex1	kW	Thermal power analyser: calculated thermal power	Note 1 and 2	U
5163	R	OUT	value/10	VA	Network analyser: Apparent power line 1	Note 1 and 2	U
5164	R	OUT	value/10	VA	Network analyser: Apparent power line 2	Note 1 and 2	U
5165	R	OUT	value/10	VA	Network analyser: Apparent power line 3	Note 1 and 2	U
5166	R	OUT	value/10	VA	Network analyser: Total apparent power	Note 1 and 2	U
5167	R	OUT	value/10	VAR	Network analyser: Reactive power line 1	Note 1 and 2	U
5168	R	OUT	value/10	VAR	Network analyser: Reactive power line 2	Note 1 and 2	U
5169	R	OUT	value/10	VAR	Network analyser: Reactive power line 3	Note 1 and 2	U
5170	R	OUT	value/10	VAR	Network analyser: Total reactive power	Note 1 and 2	U
5171	R	OUT	valuex1	%	Percentage ventilation of circuit 1 / opening of modulating valve disposal circuit 1	Note 1 and 2	U
5172	R	OUT	valuex1	%	Percentage ventilation of circuit 2 / opening of modulating valve disposal circuit 2	Note 1 and 2	U
5173	R	OUT	valuex1	%	Percentage ventilation of circuit 3 / opening of modulating valve disposal circuit 3	Note 1 and 2	U
5174	R	OUT	valuex1	%	Percentage ventilation of circuit 4 / opening of modulating valve disposal circuit 4	Note 1 and 2	U
5219	R	OUT	valuex1	-	[01] 10 simultaneously active alarms with priority from 1 to 10	Always	U
5220	R	OUT	valuex1	-	[02] 10 simultaneously active alarms with priority from 1 to 10	Always	U
5221	R	OUT	valuex1	-	[03] 10 simultaneously active alarms with priority from 1 to 10	Always	U
5222	R	OUT	valuex1	-	[04] 10 simultaneously active alarms with priority from 1 to 10	Always	U
5223	R	OUT	valuex1	-	[05] 10 simultaneously active alarms with priority from 1 to 10	Always	U
5224	R	OUT	valuex1	-	[06] 10 simultaneously active alarms with priority from 1 to 10	Always	U
5225	R	OUT	valuex1	-	[07] 10 simultaneously active alarms with priority from 1 to 10	Always	U
5226	R	OUT	valuex1	-	[08] 10 simultaneously active alarms with priority from 1 to 10	Always	U
5227	R	OUT	valuex1	-	[09] 10 simultaneously active alarms with priority from 1 to 10	Always	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
5228	R	OUT	valuex1	-	[10] 10 simultaneously active alarms with priority from 1 to 10	Always	U
5229	R	OUT	valuex1	A	Active permitted input current setpoint	Always	U
6003	R	OUT	value/10	°C	Unit 1 evaporator inlet temperature	Always	G
6004	R	OUT	value/10	°C	Unit 2 evaporator inlet temperature	Always	G
6005	R	OUT	value/10	°C	Unit 3 evaporator inlet temperature	Always	G
6006	R	OUT	value/10	°C	Unit 4 evaporator inlet temperature	Always	G
6007	R	OUT	value/10	°C	Unit 5 evaporator inlet temperature	Always	G
6008	R	OUT	value/10	°C	Unit 6 evaporator inlet temperature	Always	G
6009	R	OUT	value/10	°C	Unit 7 evaporator inlet temperature	Always	G
6010	R	OUT	value/10	°C	Unit 8 evaporator inlet temperature	Always	G
6019	R	OUT	value/10	°C	Unit 1 evaporator outlet temperature	Always	G
6020	R	OUT	value/10	°C	Unit 2 evaporator outlet temperature	Always	G
6021	R	OUT	value/10	°C	Unit 3 evaporator outlet temperature	Always	G
6022	R	OUT	value/10	°C	Unit 4 evaporator outlet temperature	Always	G
6023	R	OUT	value/10	°C	Unit 5 evaporator outlet temperature	Always	G
6024	R	OUT	value/10	°C	Unit 6 evaporator outlet temperature	Always	G
6025	R	OUT	value/10	°C	Unit 7 evaporator outlet temperature	Always	G
6026	R	OUT	value/10	°C	Unit 8 evaporator outlet temperature	Always	G
6067	R	OUT	value/10	°C	Unit 1 condenser inlet temperature	Always	G
6068	R	OUT	value/10	°C	Unit 2 condenser inlet temperature	Always	G
6069	R	OUT	value/10	°C	Unit 3 condenser inlet temperature	Always	G
6070	R	OUT	Value/10	°C	Unit 4 condenser inlet temperature	Always	G
6083	R	OUT	value/10	°C	Unit 1 condenser outlet temperature	Always	G
6084	R	OUT	value/10	°C	Unit 2 condenser outlet temperature	Always	G
6085	R	OUT	value/10	°C	Unit 3 condenser outlet temperature	Always	G
6086	R	OUT	value/10	°C	Unit 4 condenser outlet temperature	Always	G
6099	R	OUT	value/10	°C	Cold/hot circuit inlet temperature	Always	G
6100	R	OUT	value/10	°C	Cold/hot circuit outlet temperature	Always	G
6103	R	IN	value/10	°C	Cold temperature setpoint	Always	G
		OUT	value/10	°C			
6104	R	IN	value/10	°C	Cold temperature adjustment band	Always	G
		OUT	value/10	°C			
6105	R	IN	value/10	°C	Hot temperature setpoint	Always	G
		OUT	value/10	°C			
6106	R	IN	value/10	°C	Hot temperature adjustment band	Always	G
		OUT	value/10	°C			
6109	R	OUT	value/10	°C	Cold/hot active temperature setpoint	Always	G
6111	R	OUT	value/10	°C	External air temperature	Always	G
6112	R	OUT	valuex1	%	Unit 1 cold/hot demand percentage	Always	G
6113	R	OUT	valuex1	%	Unit 2 cold/hot demand percentage	Always	G
6114	R	OUT	valuex1	%	Unit 3 cold/hot demand percentage	Always	G
6115	R	OUT	valuex1	%	Unit 4 cold/hot demand percentage	Always	G
6116	R	OUT	valuex1	%	Unit 5 cold/hot demand percentage	Always	G
6117	R	OUT	valuex1	%	Unit 6 cold/hot demand percentage	Always	G
6118	R	OUT	valuex1	%	Unit 7 cold/hot demand percentage	Always	G
6119	R	OUT	valuex1	%	Unit 8 cold/hot demand percentage	Always	G
6128	R	OUT	valuex1	%	Unit 1 cold/hot active percentage	Always	G
6129	R	OUT	valuex1	%	Unit 2 cold/hot active percentage	Always	G
6130	R	OUT	valuex1	%	Unit 3 cold/hot active percentage	Always	G
6131	R	OUT	valuex1	%	Unit 4 cold/hot active percentage	Always	G
6132	R	OUT	valuex1	%	Unit 5 cold/hot active percentage	Always	G
6133	R	OUT	valuex1	%	Unit 6 cold/hot active percentage	Always	G
6134	R	OUT	valuex1	%	Unit 7 cold/hot active percentage	Always	G
6135	R	OUT	valuex1	%	Unit 8 cold/hot active percentage	Always	G
6144	R	OUT	valuex1	-	Unit status (0:ON from keyboard - 1:ON from digital input - 2:ON from time bands - 3:ON from supervisor - 4:OFF from alarm - 5:OFF from supervisor - 6:OFF from time bands - 7:OFF from digital input - 8:OFF from keyboard - 9:OFF with deselection of compressors - 10:OFF)	Always	G
6145	R	OUT	valuex1	-	Unit 2 status (see unit 1 status)	Always	G
6146	R	OUT	valuex1	-	Unit 3 status (see unit 1 status)	Always	G
6147	R	OUT	valuex1	-	Unit 4 status (see unit 1 status)	Always	G
6148	R	OUT	valuex1	-	Unit 5 status (see unit 1 status)	Always	G
6149	R	OUT	valuex1	-	Unit 6 status (see unit 1 status)	Always	G
6150	R	OUT	valuex1	-	Unit 7 status (see unit 1 status)	Always	G
6151	R	OUT	valuex1	-	Unit 8 status (see unit 1 status)	Always	G
6160	R	OUT	valuex1	-	Unit 1 alarm code active	Always	G

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
6161	R	OUT	valuex1	-	Unit 2 alarm code active	Always	G
6162	R	OUT	valuex1	-	Unit 3 alarm code active	Always	G
6163	R	OUT	valuex1	-	Unit 4 alarm code active	Always	G
6164	R	OUT	valuex1	-	Unit 5 alarm code active	Always	G
6165	R	OUT	valuex1	-	Unit 6 alarm code active	Always	G
6166	R	OUT	valuex1	-	Unit 7 alarm code active	Always	G
6167	R	OUT	valuex1	-	Unit 8 alarm code active	Always	G
6208	R	OUT	valuex1	-	System status (0:ON from keyboard - 1:ON from digital input - 20:OFF from alarm - 27:OFF digital input - 28:OFF from keyboard)	Always	G
6209	R	OUT	valuex1	-	System alarm code active	Always	G
6210	R	OUT	valuex1	%	Cold/hot circuit demand percentage	Always	G
6211	R	OUT	valuex1	%	Cold/hot circuit active percentage	Always	G
6214	R	IN OUT	valuex1	-	System operating mode (1: cold - 2: hot)	Always	G
6215	R	IN OUT	valuex1	%	Cold capacity limit percentage	Always	G
6216	R	IN OUT	valuex1	%	Hot capacity limit percentage	Always	G
6218	R	OUT	valuex1	%	Pump speed percentage with unit 1 cold/hot circuit inverter	Note 1 and 2	G
6219	R	OUT	valuex1	%	Pump speed percentage with unit 2 cold/hot circuit inverter	Note 1 and 2	G
6220	R	OUT	valuex1	%	Pump speed percentage with unit 3 cold/hot circuit inverter	Note 1 and 2	G
6221	R	OUT	valuex1	%	Pump speed percentage with unit 4 cold/hot circuit inverter	Note 1 and 2	G
6222	R	OUT	valuex1	%	Pump speed percentage with unit 5 cold/hot circuit inverter	Note 1 and 2	G
6223	R	OUT	valuex1	%	Pump speed percentage with unit 6 cold/hot circuit inverter	Note 1 and 2	G
6224	R	OUT	valuex1	%	Pump speed percentage with unit 7 cold/hot circuit inverter	Note 1 and 2	G
6225	R	OUT	valuex1	%	Pump speed percentage with unit 8 cold/hot circuit inverter	Note 1 and 2	G
6234	R	OUT	valuex1	%	Unit 1 cold/hot available percentage	Always	G
6235	R	OUT	valuex1	%	Unit 2 cold/hot available percentage	Always	G
6236	R	OUT	valuex1	%	Unit 3 cold/hot available percentage	Always	G
6237	R	OUT	valuex1	%	Unit 4 cold/hot available percentage	Always	G
6238	R	OUT	valuex1	%	Unit 5 cold/hot available percentage	Always	G
6239	R	OUT	valuex1	%	Unit 6 cold/hot available percentage	Always	G
6240	R	OUT	valuex1	%	Unit 7 cold/hot available percentage	Always	G
6241	R	OUT	valuex1	%	Unit 8 cold/hot available percentage	Always	G
6282	R	OUT	valuex1	-	Group master unit address	Always	G
6283	R	OUT	valuex1	-	Address of the unit with KIPlink master of the group in the KIPLAN network	Note 2	G
6284	R	OUT	Value/10	°C	Main setpoint variation introduced by dynamic setpoint management	Note 2	G
6285	R	OUT	valuex1	-	01 internal units group status (0:Not -significant - 1:Group ON - 2:Group OFF - 3:OFF due to alarm - 4:Offline from KIPlink - 5:Offline from controller)	Always	G
6286	R	OUT	valuex1	-	02 internal units group status (see 01 internal units group status)	Always	G
6287	R	OUT	valuex1	-	03 internal units group status (see 01 internal units group status)	Always	G
6288	R	OUT	valuex1	-	04 internal units group status (see 01 internal units group status)	Always	G
6289	R	OUT	valuex1	-	05 internal units group status (see 01 internal units group status)	Always	G
6290	R	OUT	valuex1	-	06 internal units group status (see 01 internal units group status)	Always	G
6291	R	OUT	valuex1	-	07 internal units group status (see 01 internal units group status)	Always	G
6292	R	OUT	valuex1	-	08 internal units group status (see 01 internal units group status)	Always	G
6293	R	OUT	valuex1	-	09 internal units group status (see 01 internal units group status)	Always	G
6294	R	OUT	valuex1	-	10 internal units group status (see 01 internal units group status)	Always	G

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
6295	R	OUT	valuex1	-	11 internal units group status (see 01 internal units group status)	Always	G
6296	R	OUT	valuex1	-	12 internal units group status (see 01 internal units group status)	Always	G
6297	R	OUT	valuex1	-	13 internal units group status (see 01 internal units group status)	Always	G
6298	R	OUT	valuex1	-	14 internal units group status (see 01 internal units group status)	Always	G
6299	R	OUT	valuex1	-	15 internal units group status (see 01 internal units group status)	Always	G
6300	R	OUT	valuex1	-	16 internal units group status (see 01 internal units group status)	Always	G
6301	R	OUT	valuex1	-	17 internal units group status (see 01 internal units group status)	Always	G
6302	R	OUT	valuex1	-	18 internal units group status (see 01 internal units group status)	Always	G
6303	R	OUT	valuex1	-	19 internal units group status (see 01 internal units group status)	Always	G
6304	R	OUT	valuex1	-	20 internal units group status (see 01 internal units group status)	Always	G
6305	R	OUT	value/10	%	System individual pump % speed	Always	G

***Type:** C =Coil, R=Register
***Ref.**: Registers referred to the U = Unit or G = Group

Note 1: availability of the variable to the supervisor system depends on the type of unit and optional devices used.
Note 2: the possibility of using the variable depends on enabling of a parameter on the controller.

17.4.10 Software version and revision interpretation

The version and revision in the controller are given in registers 131 and 132 for MODBUS RTU, and 5005 and 5006 for MODBUS OVER IP:

131 / 5005	R	OUT	valuex1	-	Software version	Always
132 / 5006	R	OUT	valuex1	-	Software version (revision)	Always

The information is coded as follows:

Software release (R: 131 / 5005)

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Therefore, if for example TA15r00 is in the controller, register 131 or 5005 will be equal to 2001 (T=**20**, A=**01**), while register 132 or 5006 will be equal to 1400 (Version **14**, revision **00**).
By combining the two pieces of information, it is possible to determine the on-board software, its version and revision.

17.4.11 Modbus Characteristics

Modicon Modbus protocol implemented as described in the document:
Modicon Modbus protocol reference guide
March 1992, PI Modbus-300 rev D.

As regards serial communication with the Modbus protocol, the communication data are:
- Speed: may be selected from software (see group submenu support menu, normally 1200 to 19200 baud)
- Data bits: 8 (not modifiable)
- Stop bits: 2 (not modifiable)
- Parity: None (not modifiable)
- Flow Control: (establishes how the PC and the converter interact, no influence on the controller)
- Start address, this is 1 and not 0

Address:
This is the supervision variable address in the electronic control unit.

Type:
C: Boolean variable (Coil for the Modbus protocol)
R: Analogue and whole variables (Register for the Modbus protocol)

Flow:
OUT: Read-only variable for the BMS
IN: BMS read/write variable

Scale factor:
valuex1:
the value read or written by the BMS is the true value, no conversion factor is required
valuex10:
the value read (OUT) or written (IN) by the BMS must be multiplied by 10 after being read, or before being written
valuex100:
the value read (OUT) or written (IN) by the BMS must be multiplied by 100 after being read, or before being written
value/10:
the value read (OUT) or written (IN) by the BMS must be divided by 10 after being read, or before being written
value/100:
the value read (OUT) or written (IN) by the BMS must be divided by 100 after being read, or before being written

Example: WRITING AND READING THE CHILLER TEMPERATURE SETPOINT

- **Writing**

002	R	IN	valuex10	Chiller temperature setpoint

If the “Chiller temperature setpoint” variable must be written (IN) at 7.3 °C
The BMS must multiply the value to send to the controller by 10 (7.3x10 = 73)

- **Read**

002	R	OUT	value/10	Chiller temperature setpoint

If the “Chiller temperature setpoint” variable must be read (OUT)
The BMS must divide the value received from the controller by 10 (86/10 = 8.6 °C)

If a probe is in an alarm condition a value equal to -999 is sent that is -99.9
If a probe or a parameter is not configured a value equal to -888 is sent that is -88.8

Unit of Measurement:
This is the data unit of measurement after conversion with the scale factor
Example:

013	R	OUT	value/10	bar	High pressure transducer 1

Reading a value of 221 from the controller
With the scale factor, the true value is 22.1 which involves reading 22.1 bar in the unit of measurement column.

Function codes

The read and write controls (function codes) for the coils and registers available are shown in the following table.

Type of datum	Type of control	Function Codes
Coils (Boolean)	Read	1
	Write one variable	5
	Write multiple variables	15
Registers (analogue and whole)	Read	4
	Write one variable	6
	Write multiple variables	16

Coil Modbus addresses: Boolean variables

Registers	Type	
000	C	NOT MANAGED
001	C	Boolean 001
002	C	Boolean 002
003	C	Boolean 003
…	C	…
181	C	Boolean 181
182	C	Boolean 182
183	C	Boolean 183

Register Modbus addresses: Analogue and Whole variables

Registers	Type	
000	R	NOT MANAGED
001	R	Analogue 001
002	R	Analogue 002
003	R	Analogue 003
…	…	…
125	R	Analogue 126
126	R	Analogue 127
127	R	Analogue 128
128	R	NOT MANAGED
129	R	Whole 001
130	R	Whole 002
131	R	Whole 003
…	…	…
254	R	Whole 126
255	R	Whole 127
256	R	Whole 128

Decoding by bit:
Some whole variables must be transformed into 16bit Boolean variables (one word) and decoded bit by bit. The value of each bit has a particular meaning.

Note:
If the value returned by the reading of the whole variable is negative, before converting the variable from whole to Boolean it is necessary to take the 1s complement (that is add 65536 to the negative whole value).

Example 1:
Compressor 2 status: address 16 -> Modbus address 144 [128+16]
Whole value read by supervision: 530

As the value is positive, the 1s complement is NOT taken.

Value converted into boolean (16 bit): 530 → 0000001000010010
Bit to bit decoding (using the database):

Bit 0:	0→	Configured
Bit 1:	1→	Enabled
Bit 2:	0→	OFF
Bit 3:	0→	Pump-down not active
Bit 4:	1→	Alarm active
Bit 5:	0→	---
Bit 6:	0→	---
Bit 7:	0→	---
Bit 8:	0→	---
Bit 9:	1→	chiller
Bit 10:	0→	---
Bit 11:	0→	---
Bit 12:	0→	---
Bit 13:	0→	---
Bit 14:	0→	---
Bit 15:	0→	not required

Example 2:
Compressor 2 status: address 16 -> Modbus address 144 [128+16]
Whole value read by supervision: -31994

As the value is negative, the 1s complement is taken: -31994 **+ 65536** = 33542

Value converted into boolean (16 bit): 33542 → 1000001100000110
Bit to bit decoding (using the database):

Bit 0:	0→	Configured
Bit 1:	1→	Enabled
Bit 2:	1→	ON
Bit 3:	0→	Pump-down not active
Bit 4:	0→	Alarm not active
Bit 5:	0→	---
Bit 6:	0→	---
Bit 7:	0→	---
Bit 8:	1→	ON whole
Bit 9:	1→	chiller
Bit 10:	0→	---
Bit 11:	0→	---
Bit 12:	0→	---
Bit 13:	0→	---
Bit 14:	0→	---
Bit 15:	1→	required

17.4.12 Instructions for the configuration of the MODBUS over IP board from the PC

Before a PC can communicate with the MODBUS over IP board, the settings of both devices must be correctly aligned. As the factory settings of the MODBUS over IP board can only be changed after establishing the connection with the PC, during the first access the Personal Computer must be set to adapt to the factory settings of the MODBUS over IP board.

17.4.12.1 PC settings

Disconnect the PC from any networks and connect it directly to the MODBUS over IP board using the cable (crossed).

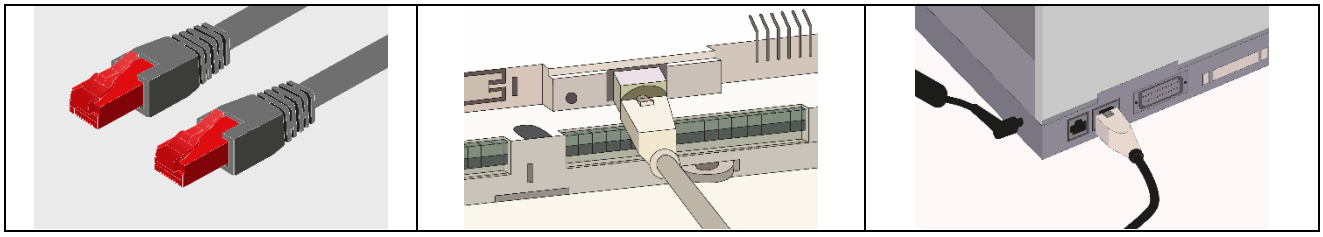


Figure 17-2: *demonstration of configuration of the MODBUS over IP board using a PC.*

Set the Personal Computer so that it does not use DHCP, but rather the IP address: 172.16.0.2.
The Subnet mask field also needs to be specified. The Gateway does not need to be specified.

The procedure is described below.
In the “Control Panel”:

1. Double click on “Network Connections”.
2. Double click on “Local Area Connection (LAN)”.
3. Click on “Properties”.
4. Double click on “Internet Protocol (TCP/IP)”.

Before changing the settings, take note of all the existing settings as these will be have to be restored afterwards in order to allow the PC to communicate with the data network it was previously connected to.

6. Click on “Use the following IP address” and set the following parameters:
   IP address = 172.16.0.2
   Subnet mask = 255.255.0.0
7. Click “OK” to close all the windows.

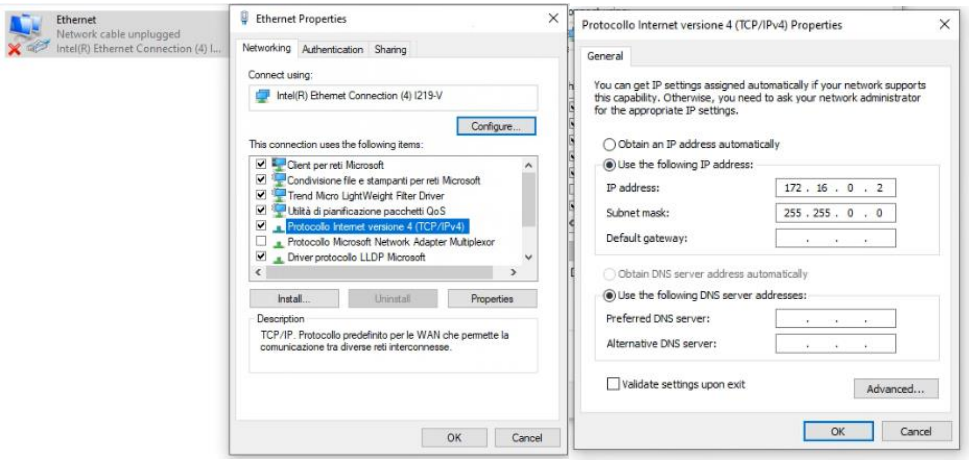


Figure 17-3: *parameter setting window.*

The PC is set so that it does not use the “proxy” network device as a communication channel. In fact, the PC is not networked and if the use of “proxy” were not disabled, communication would become impossible.

1. Open the Windows “Control Panel”.
2. Double click on “Internet Options”.
3. Click “Connections”. Another window will appear.
4. Click “LAN settings”.
5. Disable the proxy server.
6. Press “OK” to close the windows.

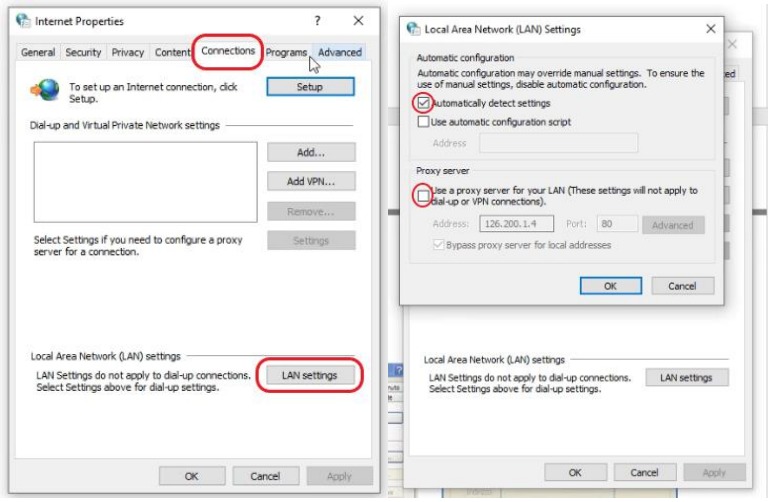


Figure 17-4: *disabling the proxy server.*

17.4.12.2 Starting the MODBUS over IP board with the factory settings

1. switch on the W3000+ controller;
2. Make sure that both LEDs of the MODBUS over IP board connector light up within a few seconds.

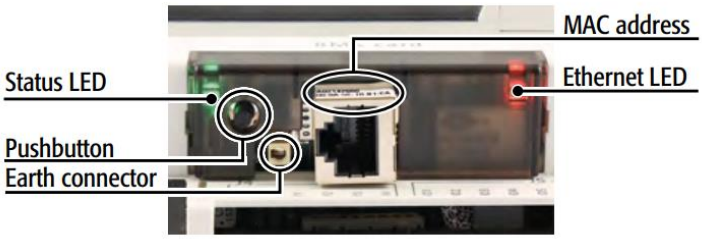


Figure 17-5: *MODBUS over IP board detail.*

INFORMATION:
The choice as to whether to activate factory settings or user settings can only be made when starting the MODBUS over IP board. The MODBUS over IP board reinitialises whenever it is turned on.

3. As soon as the Status LED turns on GREEN immediately after restart, hold down the button to activate the factory settings;
4. holding the button down for about 20 seconds will cause the status LED to flash RED 3 times. Release the button while this is happening;
5. after red flashing stops, the Status LED turns GREEN; then, if the procedure has been performed correctly the Status LED flashes RED 3 times to confirm that the button has been pressed and released, and then back to GREEN for about one minute (completion of the initialisation procedure); after completing the initialisation procedure, the Status LED starts flashing: the MODBUS over IP board initialisation procedure has now been completed and the board is on;

In this way, the MODBUS over IP board will not use the “User” set communication configuration parameter values, but rather the following factory values:
IP address: 172.16.0.1
Subnet mask: 255.255.0.0

NOTE: These values will remain active until the MODBUS over IP BOARD IS RESTARTED.
After restart, the MODBUS over IP board will return to the “User” configuration values
It is recommended that the network communication parameters are configured immediately.

17.4.12.3 Access the MODBUS over IP board via the PC

To allow the board to communicate with the data network it will be installed to, certain network communication parameters must be set.

INFORMATION:
The network administrator must establish whether the BACNET TCP/IP board can be connected and must communicate essential system data.

1. on the PC open a web browser;
2. write the following number, including dots, in the address field: 172.16.0.1

3. press **Send**.

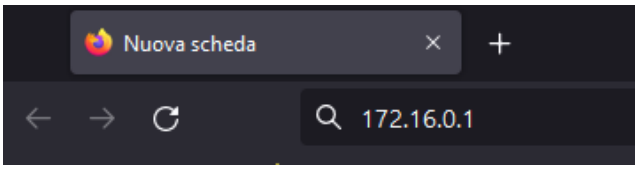


Figure 17-6: *entering the IP address.*

The **first access** page may offer one of the following two alternatives:

- **Restrict access**: you will be asked to customise all passwords and, upon confirmation, all services (except the following) will be disabled: HTTPS, SFTP SSH SCP).
- **Do not restrict access**: no password confirmation will be required. To log in, simply enter your password and default user ID.

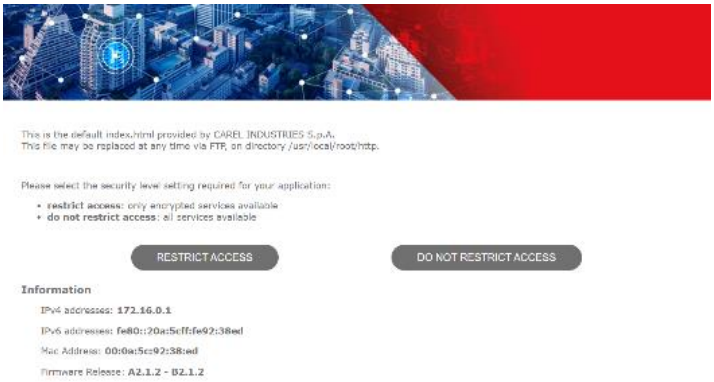


Figure 17-7: *possibility to log in for the first time.*

When logging in for the **second time** (with HTTPS and entering the customised password and user ID), the page displayed will only show the **"administrator area"** button.

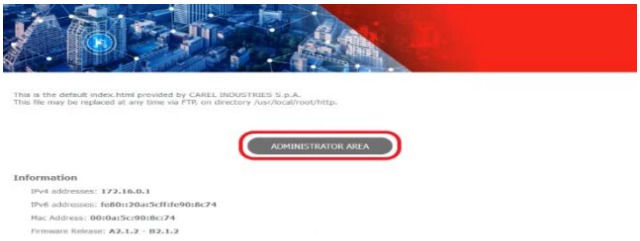


Figure 17-8: *"administrator area" button display.*

At the login and password request enter the factory values:

Username: **admin**
Password: **fadmin**

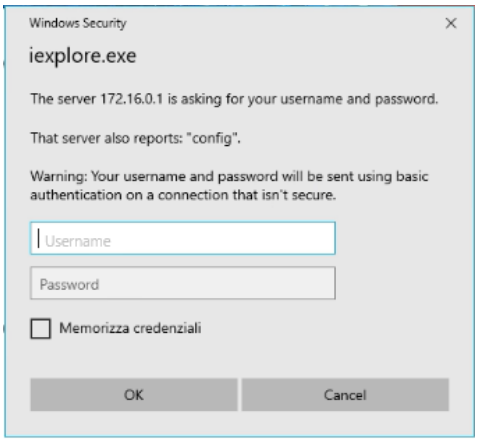


Figure 17-9: *entering the username and password.*

The MODBUS over IP board is set at the factory with Carel protocol.
Switch the protocol to Modbus Extended
Ensure that the address matches the one entered in the controller

All the settings will be applied the next time that the MODBUS over IP board is restarted

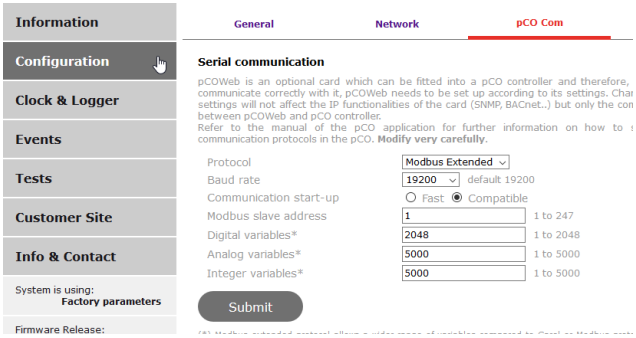


Figure 17-10: *modification of the Modbus Extended protocol.*

If the details entered during the previous access stage are correct, the following page appears:

Update the variable data by clicking the Information button

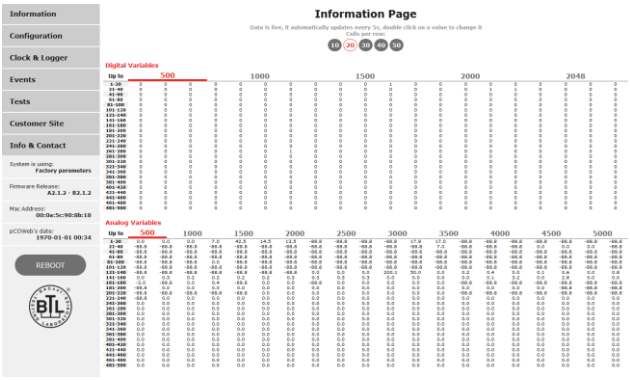
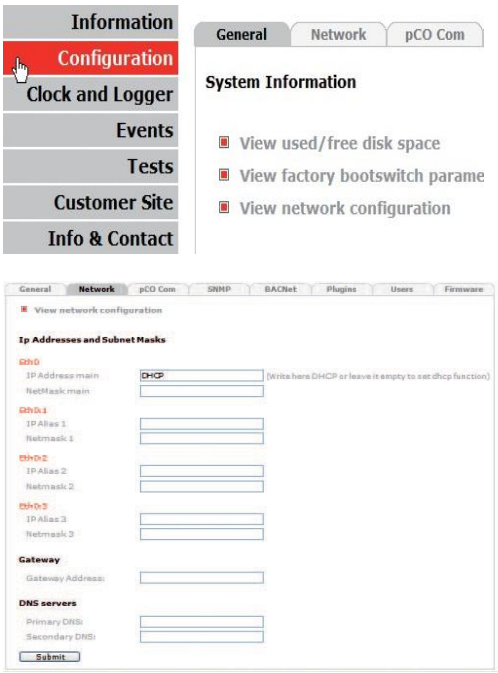


Figure 17-11: *"Information page" display.*

As the MODBUS over IP board in its factory configuration is set with DHCP addressing (automatic addressing), it will already be operational and no further action will be required.

To set the user network parameters, click on "Configuration", then on the "Network" board and set the following basic network parameters:
- IP address
- NetMask

The values set will only be applied the next time the MODBUS over IP board is restarted



INFORMATION:
The professional system integrator who sets the various parameters, checks the network communication, and starts the supervision system, must be familiar with BACNET.

17.4.13 Instructions for the configuration of the MODBUS over IP board on the PC

The function permits configuration of the MODBUS over IP and BACNET MS/TP board communication parameters directly at the PGD keyboard.

The function is available for:

- version 5.16 (and above) of the bios on the controller in which the MODBUS over IP - BACNET MS/TP board is slotted
- version A1.5.0 (and above) of the firmware of the MODBUS over IP board

The purpose is to permit configuration of the network (Ethernet for the MODBUS over IP board, RS485 for the BACNET MS/TP board) when a board of this type is installed for the first time. The other parameters (alarms, events, etc.) must be configured with the usual instruments: BACset or web interface (only for MODBUS over IP board)

The following screen shows the procedure for the configuration of the MODBUS over IP and MODBUS OVER IP (indicated as pCOWeb in the screen) board

1	Press **[ALARM]** and **[ENTER]** together. Hold down until the mask shown to the side appears.	> SYSTEM INFORMATION LOG DATA OTHER INFORMATION FLASH NAND FILES
2	Press **[UP] and [DOWN]** to move the cursor to the “OTHER INFORMATION” row and press **[ENTER]** to select.	SYSTEM INFORMATION LOG DATA > OTHER INFORMATION FLASH NAND FILES
3	Press **[UP] and [DOWN]** to move the cursor to the “PCOWEB/NET CONFIG” row and press **[ENTER]** to select.	ID/PRODUCT CODE > PCOWEB/NET CONFIG MEMORIES STATUS CHIP IO VERSION
4	To configure a MODBUS over IP or MODBUS OVER IP board, select “PCOWEB settings”	> PCOWEB settings PCONET settings

Configuration of the MODBUS over IP board

1	Select PCOWEB settings and the mask shown to the side appears. The fields are soon populated with the current data. If the fields are not populated with the current parameters, check the version of the firmware of the MODBUS over IP board and the protocol set on the serial line. The parameters can now be edited. To do so, use the **[ENTER]** key to select a field and the **[UP] / [DOWN]** keys to set the required value. The IP address and Netmask field cannot be edited if the DHCP option is set at ON.	DHCP:--- IP Address: ---.---.---.---
2	Continue pressing **[ENTER]** to view all the available parameters, shown in the masks below:	Netmask: ---.---.---.--- Gateway: ---.---.---.---
3		DNS1: ---.---.---.--- DNS2: ---.---.---.---
4		BACnet ID: ------ BACnet Type: -------
5	After selecting the parameters, it is possible to update them with the new data by selecting YES in the window shown to the side and then pressing ENTER:	PCOWEB CONFIG ENABLE Update pCOWEB? NO
6	The message to the side appears while the parameters are updating:	PCOWEB CONFIG ENABLE Please wait for end of update
7	The mask shown to the side appears at the end of the process:	PCOWEB CONFIG ENABLE Update complete Reboot pCOWEB to apply new setting
8	Next turn OFF and then ON again the power to the controller in which the MODBUS over IP board is installed. This also causes the MODBUS over IP board to restart with the new settings.	

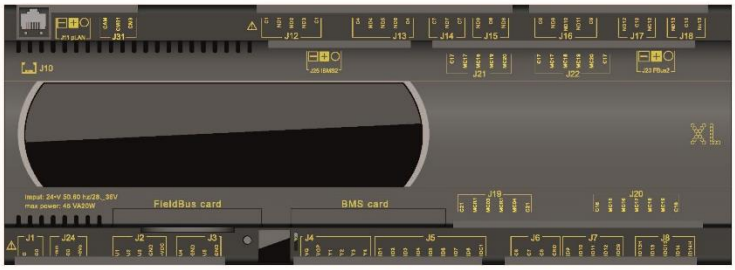
17.5 Interfacing with the BACNET system

17.5.1 Components required

The components required to interface MEHITS S.p.A. units with an electronic controller to the BACNET system are described below.

Serial interface board
BACNET.
As well as the BACNET MS/TP board (for RS485 network) the BACNET TCP/IP serial board is also available.
For the correct installation of the serial board, see the documentation supplied with the same.

LAN Multi Manager dedicated electronic control board.
Already fitted on the machine.
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



17.5.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the BACNET serial board into the controller. Always complete the connection of the BACNET TCP/IP board to the ground using the connector on the left of the Ethernet interface.

17.5.3 Setting supervisor parameters

To communicate with the BACNET system, set the parameters as shown below.

Go to the support menu, and after entering the password access the group submenu and scroll down to the masks described below.

Supervision Protocol: Standard Speed: 19200 baud ID number: 001	The supervisor connection parameters must be set as follows: ▪ Protocol: **Standard** ▪ Communication speed: **19200 baud (*)** ▪ Unit ID: from **001** to **200 (default 11, …)** **When using the BACNET MS/TP board only, make sure that the identification number of the unit is 001.**

(*) Communication speed between pCO and serial interface board.
The speed of communication to the external BMS may be 9600-19200-36400-76800.

17.5.4 Configuring the serial interface board

Initial configuration of the BACNET MS/TP or BACNET TCP/IP serial interface board can be done directly using the user interface of the electronic control board (excluding the touch screen display). Refer to the document “Bacnet interface cards configuration from system screen” for instructions.
Communication with the BACNET system over IP is for internal networks. Due to the purpose and intended use of the product, encryption algorithms are not used to prevent interception of Bacnet messages exchanged on the network.

17.5.5 Setting up the supervisor network

The supervision network is set up by the technicians developing the BACNET interface. For the connection of the BACNET TCP/IP board to the Ethernet network use a category 5e or better S/FTP type cable.

17.5.6 BACNET interface database (software versions TG04 and higher)

The reference database for systems using the BACNET networks is shown below:

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
100001	B	OUT	-	-	Unit status (0:Off - 1:On)	Always	U
100003	B	OUT	-	-	Evaporator pump 1 status (0:Off - 1:On)	Note 1	U
100004	B	OUT	-	-	Evaporator pump 2 status (0:Off - 1:On)	Note 1	U
100005	B	OUT	-	-	Recuperator pump status (0:Off - 1:On)	Note 1	U
100006	B	OUT	-	-	Condenser pump status (0:Off - 1:On)	Note 1	U
100011	B	OUT	-	-	Enable operating mode change from supervisor	Always	U
100034	B	OUT	-	-	Energy meter electricity value reading enable	Note 1 and 2	U
100035	B	OUT	-	-	Energy meter configuration for 3-phase electric line connection	Note 1 and 2	U
100036	B	OUT	-	-	Energy meter configuration for connection of electric line with neutral	Note 1 and 2	U
100037	B	OUT	-	-	Possibility of neutral current reading	Note 1 and 2	U
100039	B	OUT	-	-	Changing the status of unit alarms	Always	U
100251	B	OUT	-	-	Offline unit 1 (0: unit online – 1: unit offline)	Always	G
100252	B	OUT	-	-	Offline unit 2 (0: unit online – 1: unit offline)	Always	G
100253	B	OUT	-	-	Offline unit 3 (0: unit online – 1: unit offline)	Always	G
100254	B	OUT	-	-	Offline unit 4 (0: unit online – 1: unit offline)	Always	G
100255	B	OUT	-	-	Offline unit 5 (0: unit online – 1: unit offline)	Always	G
100256	B	OUT	-	-	Offline unit 6 (0: unit online – 1: unit offline)	Always	G
100257	B	OUT	-	-	Offline unit 7 (0: unit online – 1: unit offline)	Always	G
100258	B	OUT	-	-	Offline unit 8 (0: unit online – 1: unit offline)	Always	G
100267	B	IN	-	-	Enable unit 1 (0: unit disabled – 1: unit enabled)	Always	G
		OUT					
100268	B	IN	-	-	Enable unit 2 (0: unit disabled – 1: unit enabled)	Always	G
		OUT					
100269	B	IN	-	-	Enable unit 3 (0: unit disabled – 1: unit enabled)	Always	G
		OUT					
100270	B	IN	-	-	Enable unit 4 (0: unit disabled – 1: unit enabled)	Always	G
		OUT					
100271	B	IN	-	-	Enable unit 5 (0: unit disabled – 1: unit enabled)	Always	G
		OUT					
100272	B	IN	-	-	Enable unit 6 (0: unit disabled – 1: unit enabled)	Always	G
		OUT					
100273	B	IN	-	-	Enable unit 7 (0: unit disabled – 1: unit enabled)	Always	G
		OUT					
100274	B	IN	-	-	Enable unit 8 (0: unit disabled – 1: unit enabled)	Always	G
		OUT					
100283	B	IN	-	-	System on/off command (0: system off – 1: system on)	Always	G
		OUT	-	-			
100284	B	IN	-	-	Thermoregulator limitation command from supervisor (0:Off - 1:On)	Note 2	G
		OUT					
100285	B	OUT	-	-	System single pump status (0:Off - 1:On)	Note 1 and 2	G
100287	B	IN	-	-	Unit manual rotation command (0: command not active – 1: command active)	Note 2	G
100004	A	OUT	valuex1	°C	Main active setpoint	Note 1	U
100005	A	OUT	valuex1	°C	Recovery setpoint active	Note 1	U
100006	A	OUT	valuex1	°C	Inlet temperature of evaporator	Note 1	U
100007	A	OUT	valuex1	°C	Evaporator outlet temperature (average)	Note 1	U
100008	A	OUT	valuex1	°C	Condenser inlet temperature	Note 1	U
100009	A	OUT	valuex1	°C	Condenser outlet temperature (average)	Note 1	U
100010	A	OUT	valuex1	°C	Recuperator inlet temperature / DHW storage tank temperature	Note 1	U
100011	A	OUT	valuex1	°C	Recuperator outlet temperature	Note 1	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
100012	A	OUT	valuex1	bar	High pressure transducer 1	Note 1	U
100013	A	OUT	valuex1	bar	High pressure transducer 2	Note 1	U
100014	A	OUT	valuex1	bar	High pressure transducer 3	Note 1	U
100015	A	OUT	valuex1	bar	High pressure transducer 4	Note 1	U
100016	A	OUT	valuex1	bar	Low pressure transducer 1	Note 1	U
100017	A	OUT	valuex1	bar	Low pressure transducer 2	Note 1	U
100018	A	OUT	valuex1	bar	Low pressure transducer 3	Note 1	U
100019	A	OUT	valuex1	bar	Low pressure transducer 4	Note 1	U
100020	A	OUT	valuex1	°C	External air temperature	Note 1	U
100021	A	OUT	valuex1	°C	Optional probe temperature	Note 1	U
100022	A	OUT	valuex1	°C	Freecooling inlet temperature	Note 1	U
100023	A	OUT	valuex1	kPa	Differential pressure transducer on hydraulic side of evaporator	Note 1	U
100024	A	OUT	valuex1	kPa	Differential pressure transducer on recuperator water side	Note 1	U
100025	A	OUT	valuex1	°C	Compressor 1 discharge temperature	Note 1	U
100026	A	OUT	valuex1	°C	Compressor 2 discharge temperature	Note 1	U
100027	A	OUT	valuex1	°C	Compressor 3 discharge temperature	Note 1	U
100028	A	OUT	valuex1	°C	Compressor 4 discharge temperature	Note 1	U
100029	A	OUT	valuex1	°C	Compressor 5 discharge temperature	Note 1	U
100030	A	OUT	valuex1	°C	Compressor 6 discharge temperature	Note 1	U
100031	A	OUT	valuex1	°C	Compressor 7 discharge temperature	Note 1	U
100032	A	OUT	valuex1	°C	Compressor 8 discharge temperature	Note 1	U
100033	A	OUT	valuex1	°C	Plant storage tank setpoint enabled	Note 1	U
100034	A	OUT	valuex1	°C	Plant storage tank temperature	Note 1	U
100035	A	OUT	valuex1	kPa	Differential pressure transducer on hydraulic side of condenser	Note 1	U
100036	A	OUT	valuex1	-	Compression ratio in absolute bar of Centrifuge comp. 8	Note 1	U
100040	A	OUT	valuex1	%	Power demand to centrifuge comp. 1	Note 1	U
			valuex10	rpm	Revs demand to inverter 1	Note 1	U
100041	A	OUT	valuex1	%	Power demand to centrifuge comp. 2	Note 1	U
			valuex10	rpm	Revs demand to inverter 2	Note 1	U
100042	A	OUT	valuex1	%	Power demand to centrifuge comp. 3	Note 1	U
			valuex10	rpm	Revs demand to inverter 3	Note 1	U
100043	A	OUT	valuex1	%	Power demand to centrifuge comp. 4	Note 1	U
			valuex10	rpm	Revs demand to inverter 4	Note 1	U
100044	A	OUT	valuex1	kW	Power demand to centrifuge comp. 1	Note 1	U
100045	A	OUT	valuex1	kW	Power demand to centrifuge comp. 2	Note 1	U
100046	A	OUT	valuex1	kW	Power demand to centrifuge comp. 3	Note 1	U
100047	A	OUT	valuex1	kW	Power demand to centrifuge comp. 4	Note 1	U
100048	A	OUT	valuex1	kW	Power absorbed by centrifuge comp./inverter 1	Note 1	U
100049	A	OUT	valuex1	kW	Power absorbed by centrifuge comp./inverter 2	Note 1	U
100050	A	OUT	valuex1	kW	Power absorbed by centrifuge comp./inverter 3	Note 1	U
100051	A	OUT	valuex1	kW	Power absorbed by centrifuge comp./inverter 4	Note 1	U
100052	A	OUT	valuex1	%	IGV position of centrifugal comp. 1	Note 1	U
100053	A	OUT	valuex1	%	IGV position of centrifugal comp. 2	Note 1	U
100054	A	OUT	valuex1	%	IGV position of centrifugal comp. 3	Note 1	U
100055	A	OUT	valuex1	%	IGV position of centrifugal comp. 4	Note 1	U
100056	A	OUT	valuex1	barg	Internal inlet pressure to centrifuge comp./inverter 1	Note 1	U
100057	A	OUT	valuex1	barg	Internal inlet pressure to centrifuge comp./inverter 2	Note 1	U
100058	A	OUT	valuex1	barg	Internal inlet pressure to centrifuge comp./inverter 3	Note 1	U
100059	A	OUT	valuex1	barg	Internal inlet pressure to centrifuge comp./inverter 4	Note 1	U
100060	A	OUT	valuex1	°C	Inlet temperature of centrifuge comp./inverter 1	Note 1	U
100061	A	OUT	valuex1	°C	Inlet temperature of centrifuge comp./inverter 2	Note 1	U
100062	A	OUT	valuex1	°C	Inlet temperature of centrifuge comp./inverter 3	Note 1	U
100063	A	OUT	valuex1	°C	Inlet temperature of centrifuge comp./inverter 4	Note 1	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
100064	A	OUT	valuex1	°C	SCR temperature of centrifuge comp. 1	Note 1	U
100065	A	OUT	valuex1	°C	SCR temperature of centrifuge comp. 2	Note 1	U
100066	A	OUT	valuex1	°C	SCR temperature of centrifuge comp. 3	Note 1	U
100067	A	OUT	valuex1	°C	SCR temperature of centrifuge comp. 4	Note 1	U
100068	A	OUT	valuex1	°C	Outlet temperature of centrifuge comp. 1	Note 1	U
100069	A	OUT	valuex1	°C	Outlet temperature of centrifuge comp. 2	Note 1	U
100070	A	OUT	valuex1	°C	Outlet temperature of centrifuge comp. 3	Note 1	U
100071	A	OUT	valuex1	°C	Outlet temperature of centrifuge comp. 4	Note 1	U
100072	A	OUT	valuex1	°C	Cavity temperature of centrifuge comp./inverter 1	Note 1	U
100073	A	OUT	valuex1	°C	Cavity temperature of centrifuge comp./inverter 2	Note 1	U
100074	A	OUT	valuex1	°C	Cavity temperature of centrifuge comp./inverter 3	Note 1	U
100075	A	OUT	valuex1	°C	Cavity temperature of centrifuge comp./inverter 4	Note 1	U
100076	A	OUT	valuex1	°C	Temperature of inverter of centrifuge comp./inverter 1	Note 1	U
100077	A	OUT	valuex1	°C	Temperature of inverter of centrifuge comp./inverter 2	Note 1	U
100078	A	OUT	valuex1	°C	Temperature of inverter of centrifuge comp./inverter 3	Note 1	U
100079	A	OUT	valuex1	°C	Temperature of inverter of centrifuge comp./inverter 4	Note 1	U
100080	A	OUT	valuex1	-	Compression ratio in absolute bar of centrifuge comp. 1	Note 1	U
100081	A	OUT	valuex1	-	Compression ratio in absolute bar of centrifuge comp. 2	Note 1	U
100082	A	OUT	valuex1	-	Compression ratio in absolute bar of centrifuge comp. 3	Note 1	U
100083	A	OUT	valuex1	-	Compression ratio in absolute bar of centrifuge comp. 4	Note 1	U
100084	A				Confidential		
100085	A	OUT	valuex1	%	Power demand to centrifuge comp. 5	Note 1	U
100086	A	OUT	valuex1	%	Power demand to centrifuge comp. 6	Note 1	U
100087	A	OUT	valuex1	%	Power demand to centrifuge comp. 7	Note 1	U
100088	A	OUT	valuex1	%	Power demand to centrifuge comp. 8	Note 1	U
100089	A	OUT	valuex1	kW	Power demand to centrifuge comp. 5	Note 1	U
100090	A	OUT	valuex1	kW	Power demand to centrifuge comp. 6	Note 1	U
100091	A	OUT	valuex1	kW	Power demand to centrifuge comp. 7	Note 1	U
100092	A	OUT	valuex1	kW	Power demand to centrifuge comp. 8	Note 1	U
100093	A	OUT	valuex1	kW	Power absorbed by centrifuge comp./inverter 5	Note 1	U
100094	A	OUT	valuex1	kW	Power absorbed by centrifuge comp./inverter 6	Note 1	U
100095	A	OUT	valuex1	kW	Power absorbed by centrifuge comp./inverter 7	Note 1	U
100096	A	OUT	valuex1	kW	Power absorbed by centrifuge comp./inverter 8	Note 1	U
100097	A	OUT	valuex1	%	IGV position of centrifugal comp. 5	Note 1	U
100098	A	OUT	valuex1	%	IGV position of centrifugal comp. 6	Note 1	U
100099	A	OUT	valuex1	%	IGV position of centrifugal comp. 7	Note 1	U
100100	A	OUT	valuex1	%	IGV position of centrifugal comp. 8	Note 1	U
100101	A	OUT	valuex1	barg	Internal inlet pressure to centrifuge comp./inverter 5	Note 1	U
100102	A	OUT	valuex1	barg	Internal inlet pressure to centrifuge comp./inverter 6	Note 1	U
100103	A	OUT	valuex1	barg	Internal inlet pressure to centrifuge comp./inverter 7	Note 1	U
100104	A	OUT	valuex1	barg	Internal inlet pressure to centrifuge comp./inverter 8	Note 1	U
100105	A	OUT	valuex1	°C	Inlet temperature of centrifuge comp./inverter 5	Note 1	U
100106	A	OUT	valuex1	°C	Inlet temperature of centrifuge comp./inverter 6	Note 1	U
100107	A	OUT	valuex1	°C	Inlet temperature of centrifuge comp./inverter 7	Note 1	U
100108	A	OUT	valuex1	°C	Inlet temperature of centrifuge comp./inverter 8	Note 1	U
100109	A	OUT	valuex1	°C	SCR temperature of centrifuge comp. 5	Note 1	U
100110	A	OUT	valuex1	°C	SCR temperature of centrifuge comp. 6	Note 1	U
100111	A	OUT	valuex1	°C	SCR temperature of centrifuge comp. 7	Note 1	U
100112	A	OUT	valuex1	°C	SCR temperature of centrifuge comp. 8	Note 1	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
100113	A	OUT	valuex1	°C	Outlet temperature of centrifuge comp. 5	Note 1	U
100114	A	OUT	valuex1	°C	Outlet temperature of centrifuge comp. 6	Note 1	U
100115	A	OUT	valuex1	°C	Outlet temperature of centrifuge comp. 7	Note 1	U
100116	A	OUT	valuex1	°C	Outlet temperature of centrifuge comp. 8	Note 1	U
100117	A	OUT	valuex1	°C	Cavity temperature of centrifuge comp./inverter 5	Note 1	U
100118	A	OUT	valuex1	°C	Cavity temperature of centrifuge comp./inverter 6	Note 1	U
100119	A	OUT	valuex1	°C	Cavity temperature of centrifuge comp./inverter 7	Note 1	U
100120	A	OUT	valuex1	°C	Cavity temperature of centrifuge comp./inverter 8	Note 1	U
100121	A	OUT	valuex1	°C	Temperature of inverter of centrifuge comp./inverter 5	Note 1	U
100122	A	OUT	valuex1	°C	Temperature of inverter of centrifuge comp./inverter 6	Note 1	U
100123	A	OUT	valuex1	°C	Temperature of inverter of centrifuge comp./inverter 7	Note 1	U
100124	A	OUT	valuex1	°C	Temperature of inverter of centrifuge comp./inverter 8	Note 1	U
100125	A	OUT	valuex1	-	Compression ratio in absolute bar of centrifuge comp. 5	Note 1	U
100126	A	OUT	valuex1	-	Compression ratio in absolute bar of centrifuge comp. 6	Note 1	U
100127	A	OUT	valuex1	-	Compression ratio in absolute bar of centrifuge comp. 7	Note 1	U
200003	I	OUT	valuex1	-	Software version	Always	U
200004	I	OUT	valuex1	-	Software version (revision)	Always	U
200005	I	OUT	valuex1	-	Unit type configuration (00:Chiller - 01:Chiller+recovery - 02:Chiller+freecooling - 10:Heat pump - 11:Heat pump+recovery - 14 Heat pump+DHW - 15: +2P module - 21:Energy raiser - 25:Energy raiser and +2P module)	Always	U
200006	I	OUT	valuex1	-	N° circuits	Always	U
200007	I	OUT	valuex1	-	N° compressors	Always	U
200008	I	OUT	valuex1	-	N° separation stages per compressor	Always	U
200009	I	OUT	valuex1	-	Type of compressors (0:Centrifuge - 1:Hermetic - 2:Alternative - 3:Screw*) * To identify if and which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter	Always	U
200010	I	OUT	valuex1	-	Unit configuration status [1] (Bit0: 0:Heat pump disabled, 1:Heat pump enabled Bit1: 0:Quick Mind disabled, 1:Quick Mind enabled Bit2: 0:Inlet, 1:Outlet Bit3: 0:FreeCooling disabled, 1:FreeCooling enabled Bit4 - Bit10: Not significant Bit11: 0:Recovery disabled, 1:Recovery enabled Bit12 - Bit15: Not significant)	Always	U
200011	I	OUT	valuex1	-	Unit configuration status [2] (Bit0: 0:Time bands disabled, 1:Time bands enabled Bit1: 0:Pumpdown disabled, 1:Pumpdown enabled Bit2: 0:Setpoint modification disabled, 1:Setpoint modification enabled Bit3: 0:Air cooling, 1:Water cooling Bit4: 0:Sequencer disabled, 1:Sequencer enabled Bit5: 0:DHW disabled, 1:DHW enabled	Always	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
					Bit6: 0:anti-legionellosis disabled, 1:anti-legionellosis enabled		
					Bit7: 0: +2P module disabled, 1: +2P module enabled		
					Bit8 - Bit15: Not significant)		
200012	I	OUT	valuex1	-	Unit status (0:ON from keyboard - 1:ON from digital input - 2:ON from time bands - 3:ON from supervisor - 4:OFF from alarm - 5:OFF from supervisor - 6:OFF from time bands - 7:OFF from digital input - 8:OFF from keyboard - 9:OFF with deselection of compressors - 10:OFF)	Always	U
200013	I	OUT	valuex1	-	Unit timing status (0:Unit off - 1:Unit timing - 3:Unit at full power - 4:Switching off - 5: Timing of compressors - 6:Pump timing - 8:Unit OFF from alarm)	Always	U
200014	I	IN / OUT	valuex1	-	Operating mode	Always	U
					Chiller unit (3:chiller)		
					Chiller + freecooling (7:chiller - 8:chiller+fc)		
					Chiller + recovery (2:chiller+rec - 3:chiller)		
					Heat pump (3:chiller 4:heatpump)		
					Energy raisers (0:auto -1:recovery - 2:chiller+rec - 3:chiller)		
					Heat pump with recovery (10:summer auto - 11:summer rec - 12:summer ch+rec - 13:summer ch - 14:winter hp - 15:winter rec - 16:winter auto)		
200015	I	OUT	valuex1	-	Compressor 1 status	Always	U
					(Bit0: 0:Configured, 1:Not configured		
					Bit1: 0:Disabled, 1:Enabled		
					Bit2: 0:OFF, 1:ON		
					Bit3: 0:Pump-down inactive, 1:Pump-down active		
					Bit4: 0:Alarm not active, 1:Alarm active		
					Bit5: 0:--- ,1:ON with 3 steps active; start for screw and centrifuge compressors		
					Bit6: 0:--- ,1:ON with 2 steps active		
					Bit7: 0:--- ,1:ON with 1 step active		
					Bit8: 0:--- ,1:ON entire		
					Bit9: 0:--- ,1:chiller		
					Bit10: 0:--- ,1:heat pump		
					Bit11: 0:--- ,1:recovery		
					Bit12: 0:--- ,1:defrost		
					Bit13: 0:--- ,1:freecooling		
					Bit14: 0:--- ,1:dripping		
					Bit15: 0:--- ,1:request)		
200016	I	OUT	valuex1	-	Compressor 2 status (see compressor 1 status)	Note 1	U
200017	I	OUT	valuex1	-	Compressor 3 status (see compressor 1 status)	Note 1	U
200018	I	OUT	valuex1	-	Compressor 4 status (see compressor 1 status)	Note 1	U
200019	I	OUT	valuex1	-	Compressor 5 status (see compressor 1 status)	Note 1	U
200020	I	OUT	valuex1	-	Compressor 6 status (see compressor 1 status)	Note 1	U
200021	I	OUT	valuex1	-	Compressor 7 status (see compressor 1 status)	Note 1	U
200022	I	OUT	valuex1	-	Compressor 8 status (see compressor 1 status)	Note 1	U
200023	I	OUT	valuex1	-	Average hours compressors (thousands)	Always	U
200024	I	OUT	valuex1	-	Average hours compressors (units)	Always	U
200027	I	OUT	valuex1	-	Pump code	Always	U
					(Bit0: 0: --- , 1:Enable pump 1		
					Bit1: 0: --- , 1:Enable pump 2		
					Bit2: 0: --- , 1:Recovery pump enabled		
					Bit3: 0: --- , 1:DHW pump enabled		
					Bit4: 0: --- , 1:Condenser pump enabled		
					Bit5: 0: --- ,		
					Bit6: 0: --- , 1:Pumps 1 and 2 stopped for machine or hydraulic circuit alarms		

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
					Bit7: 0: --- , 1:Recovery pump stopped due to machine or hydraulic circuit alarms		
					Bit8: 0: --- , 1:Pump 1 alarm		
					Bit9: 0: --- , 1:Pump 2 alarm		
					Bit10: 0: --- , 1:Recovery pump alarm		
					Bit11: 0: --- , 1:DHW pump alarm		
					Bit12: 0: --- , 1:Condenser pump alarm		
					Bit13: 0: --- , 1:Condenser flow or antifreeze alarm		
					Bit14: 0: --- , 1:Unit no longer available -stop_by_alarm-		
					Bit15: 0: --- , 1:Unit in alarm status but with requested pumps -no_stop_pump-)		
200028	I	OUT	valuex1	-	Flash operating mode	Always	U
					(Bit0: 0:--- , 1:Anti-legionellosis function active		
					Bit1: 0:--- , 1:Sniffer function on pumps enabled		
					Bit2: 0:--- , 1:Unit start delay after power failure		
					Bit3: 0:--- , 1:Thermoregulator on hold/timing		
					Bit4: 0:--- , 1:Fast Restart function enabled		
					Bit5: 0:--- , 1:+2P module enabled		
					Bit6: Not significant		
					Bit7: 0:--- , 1:Unit with power limitation enabled		
					Bit8: 0: --- , 1:Unit with antifreeze limitation enabled		
					Bit9: 0: --- , 1:high temperature pressure switch control enabled		
					Bit10: 0: --- , 1:Defrosting on		
					Bit11: 0: --- , 1:Energy storage		
					Bit12: 0: --- , 1:Drip phase active in at least one circuit		
					Bit13: 0: --- , 1:Override at maximum in at least one circuit		
					Bit14: 0: --- , 1:Override at minimum in at least one circuit		
					Bit15: 0: --- , 1:The unit is producing DHW		
200030	I	OUT	valuex1	-	Unit status (0: ON from keyboard - 1: ON from digital input - 2: ON from time bands - 3: ON from KIPlink - 4: ON from supervisor - 5: ON from sequencer - 6: ON from Manager 3000 - 7: ON from ClimaPRO - 8: ON from LAN - 9: ON from manager + - 20: OFF from alarm - 21: OFF from ClimaPRO - 22: OFF from Manager 3000 - 23: OFF from sequencer - 24: OFF from supervisor - 25: OFF from KIPlink - 26: OFF from time bands - 27: OFF from digital input - 28: OFF from keyboard - 29: OFF with deselection of compressors - 30: OFF - 31: Standby - 32: OFF from LAN - 33: OFF from manager +)	Always	U
200032	I	OUT	valuex1	-	Active alarm code (with greater priority)	Always	U
200033	I	OUT	valuex1	-	Screw compressor model (0: Bitzer/Bitzer CSC - 1:Hitachi - 2:Fu-Sheng - 3:Bitzer inverter - 10:Hybrid*)	Note 1	U
					* To identify which compressor is with inverter, query the rpm of the compressor/s, if it is different from -888 the compressor/s is/are with inverter		
200046	I	OUT	valuex10	rpm	RPM centrifuge comp. 1	Note 1	U
			valuex1		RPM inverter comp.1	Note 1	U
200047	I	OUT	valuex10	rpm	RPM centrifuge comp. 2	Note 1	U
			valuex1		RPM inverter comp.2	Note 1	U
200048	I	OUT	valuex10	rpm	RPM centrifuge comp. 3	Note 1	U
			valuex1		RPM inverter comp.3	Note 1	U
200049	I	OUT	valuex10	rpm	RPM centrifuge comp. 4	Note 1	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
			valuex1		RPM inverter comp.4	Note 1	U
200050	I	OUT	valuex1	rpm	RPM centrifuge comp. 5	Note 1	U
200051	I	OUT	valuex1	rpm	RPM centrifuge comp. 6	Note 1	U
200052	I	OUT	valuex1	rpm	RPM centrifuge comp. 7	Note 1	U
200053	I	OUT	valuex1	rpm	RPM centrifuge comp. 8	Note 1	U
200054	I	OUT	valuex1	hx1000	Compressor 1 hours (thousands)	Always	U
200055	I	OUT	valuex1	h	Compressor 1 hours (units)	Always	U
200056	I	OUT	valuex1	hx1000	Compressor 2 hours (thousands)	Note 1	U
200057	I	OUT	valuex1	h	Compressor 2 hours (units)	Note 1	U
200058	I	OUT	valuex1	hx1000	Compressor 3 hours (thousands)	Note 1	U
200059	I	OUT	valuex1	h	Compressor 3 hours (units)	Note 1	U
200060	I	OUT	valuex1	hx1000	Compressor 4 hours (thousands)	Note 1	U
200061	I	OUT	valuex1	h	Compressor 4 hours (units)	Note 1	U
200062	I	OUT	valuex1	hx1000	Compressor 5 hours (thousands)	Note 1	U
200063	I	OUT	valuex1	h	Compressor 5 hours (units)	Note 1	U
200064	I	OUT	valuex1	hx1000	Compressor 6 hours (thousands)	Note 1	U
200065	I	OUT	valuex1	h	Compressor 6 hours (units)	Note 1	U
200066	I	OUT	valuex1	hx1000	Compressor 7 hours (thousands)	Note 1	U
200067	I	OUT	valuex1	h	Compressor 7 hours (units)	Note 1	U
200068	I	OUT	valuex1	hx1000	Compressor 8 hours (thousands)	Note 1	U
200069	I	OUT	valuex1	h	Compressor 8 hours (units)	Note 1	U
200070	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 1	Note 1	U
200071	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 2	Note 1	U
200072	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 3	Note 1	U
200073	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 4	Note 1	U
200074	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 1	Note 1	U
200075	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 2	Note 1	U
200076	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 3	Note 1	U
200077	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 4	Note 1	U
200078	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 1	Note 1	U
200079	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 2	Note 1	U
200080	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 3	Note 1	U
200081	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 4	Note 1	U
200082	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 1	Note 1	U
200083	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 2	Note 1	U
200084	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 3	Note 1	U
200085	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 4	Note 1	U
200086	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 5	Note 1	U
200087	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 6	Note 1	U
200088	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 7	Note 1	U
200089	I	OUT	valuex1	V	Three-phase input voltage of centrifuge compressor/inverter 8	Note 1	U
200090	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 5	Note 1	U
200091	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 6	Note 1	U
200092	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 7	Note 1	U
200093	I	OUT	valuex1	A	Power absorbed by centrifuge comp./inverter 8	Note 1	U
200094	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 5	Note 1	U
200095	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 6	Note 1	U
200096	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 7	Note 1	U
200097	I	OUT	valuex10	rpm	Surge threshold RPM of centrifuge comp. 8	Note 1	U
200098	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 5	Note 1	U
200099	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 6	Note 1	U
200100	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 7	Note 1	U
200111	I	OUT	valuex10	rpm	Choke threshold RPM of centrifuge comp. 8	Note 1	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
200113	I	OUT	valuex10	%	Opening of freecooling valve as a percentage	Note 1	U
200121	I	OUT	value/10	%	Main pump speed % with VPF management	Note 1	U
200124	I	OUT	value/10	%	Recovery pump speed % with VPF management	Note 1	U
200126	I	OUT	valuex1	V	Network analyser: Line 1 - N voltage	Note 1 and 2	U
200127	I	OUT	valuex1	V	Network analyser: Line 2 - N voltage	Note 1 and 2	U
200128	I	OUT	valuex1	V	Network analyser: Line 3 - N voltage	Note 1 and 2	U
200129	I	OUT	valuex1	V	Network analyser: Line 1 - line 2 voltage	Note 1 and 2	U
200130	I	OUT	valuex1	V	Network analyser: Line 2 - line 3 voltage	Note 1 and 2	U
200131	I	OUT	valuex1	V	Network analyser: Line 3 - line 1 voltage	Note 1 and 2	U
200132	I	OUT	value/10	A	Network analyser: Line 1 current	Note 1 and 2	U
200133	I	OUT	value/10	A	Network analyser: Line 2 current	Note 1 and 2	U
200134	I	OUT	value/10	A	Network analyser: Line 3 current	Note 1 and 2	U
200135	I	OUT	value/10	A	Network analyser: Neutral current	Note 1 and 2	U
200136	I	OUT	value/1000	-	Network analyser: Power factor	Note 1 and 2	U
200137	I	OUT	value/10	kW	Network analyser: Line 1 power	Note 1 and 2	U
200138	I	OUT	value/10	kW	Network analyser: Line 2 power	Note 1 and 2	U
200139	I	OUT	value/10	kW	Network analyser: Line 3 power	Note 1 and 2	U
200140	I	OUT	value/10	kW	Network analyser: Total capacity	Note 1 and 2	U
200141	I	OUT	valuex1	kWh	Network analyser: Energy (millions)	Note 1 and 2	U
200142	I	OUT	valuex1	kWh	Network analyser: Energy (thousands)	Note 1 and 2	U
200143	I	OUT	valuex1	kWh	Network analyser: Energy (units)	Note 1 and 2	U
200144	I	OUT	valuex1	h	Network analyser: Time (millions)	Note 1 and 2	U
200145	I	OUT	valuex1	h	Network analyser: Time (thousands)	Note 1 and 2	U
200146	I	OUT	valuex1	h	Network analyser: Time (units)	Note 1 and 2	U
200155	I	OUT	valuex1	A	Setpoint from BMS of the maximum permitted input current for the unit	Note 1 and 2	U
200156	I	OUT	value/10	m^3/h	Thermal power analyser: evaporator flow rate	Note 1 and 2	U
200157	I	OUT	value/10	°C	Thermal power analyser: temperature T1 connected to the evaporator input	Note 1 and 2	U
200158	I	OUT	value/10	°C	Thermal power analyser: temperature T2 connected to the evaporator output	Note 1 and 2	U
200159	I	OUT	value/10	°C	Thermal power analyser: temperature difference calculated as T1 - T2	Note 1 and 2	U
200160	I	OUT	valuex1	kW	Thermal power analyser: calculated thermal power	Note 1 and 2	U
200161	I	OUT	value/10	VA	Network analyser: Apparent power line 1	Note 1 and 2	U
200162	I	OUT	value/10	VA	Network analyser: Apparent power line 2	Note 1 and 2	U

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
200163	I	OUT	value/10	VA	Network analyser: Apparent power line 3	Note 1 and 2	U
200164	I	OUT	value/10	VA	Network analyser: Total apparent power	Note 1 and 2	U
200165	I	OUT	value/10	VAR	Network analyser: Reactive power line 1	Note 1 and 2	U
200166	I	OUT	value/10	VAR	Network analyser: Reactive power line 2	Note 1 and 2	U
200167	I	OUT	value/10	VAR	Network analyser: Reactive power line 3	Note 1 and 2	U
200168	I	OUT	value/10	VAR	Network analyser: Total reactive power	Note 1 and 2	U
200169	I	OUT	valuex1	%	Percentage ventilation of circuit 1 / opening of modulating valve disposal circuit 1	Note 1 and 2	U
200170	I	OUT	valuex1	%	Percentage ventilation of circuit 2 / opening of modulating valve disposal circuit 2	Note 1 and 2	U
200171	I	OUT	valuex1	%	Percentage ventilation of circuit 3 / opening of modulating valve disposal circuit 3	Note 1 and 2	U
200172	I	OUT	valuex1	%	Percentage ventilation of circuit 4 / opening of modulating valve disposal circuit 4	Note 1 and 2	U
200217	I	OUT	valuex1	-	[01] 10 simultaneously active alarms with priority from 1 to 10	Always	U
200218	I	OUT	valuex1	-	[02] 10 simultaneously active alarms with priority from 1 to 10	Always	U
200219	I	OUT	valuex1	-	[03] 10 simultaneously active alarms with priority from 1 to 10	Always	U
200220	I	OUT	valuex1	-	[04] 10 simultaneously active alarms with priority from 1 to 10	Always	U
200221	I	OUT	valuex1	-	[05] 10 simultaneously active alarms with priority from 1 to 10	Always	U
200222	I	OUT	valuex1	-	[06] 10 simultaneously active alarms with priority from 1 to 10	Always	U
200223	I	OUT	valuex1	-	[07] 10 simultaneously active alarms with priority from 1 to 10	Always	U
200224	I	OUT	valuex1	-	[08] 10 simultaneously active alarms with priority from 1 to 10	Always	U
200225	I	OUT	valuex1	-	[09] 10 simultaneously active alarms with priority from 1 to 10	Always	U
200226	I	OUT	valuex1	-	[10] 10 simultaneously active alarms with priority from 1 to 10	Always	U
200227	I	OUT	valuex1	A	Active permitted input current setpoint	Always	U
201001	I	OUT	value/10	°C	Unit 1 evaporator inlet temperature	Always	G
201002	I	OUT	value/10	°C	Unit 2 evaporator inlet temperature	Always	G
201003	I	OUT	value/10	°C	Unit 3 evaporator inlet temperature	Always	G
201004	I	OUT	value/10	°C	Unit 4 evaporator inlet temperature	Always	G
201005	I	OUT	value/10	°C	Unit 5 evaporator inlet temperature	Always	G
201006	I	OUT	value/10	°C	Unit 6 evaporator inlet temperature	Always	G
201007	I	OUT	value/10	°C	Unit 7 evaporator inlet temperature	Always	G
201008	I	OUT	value/10	°C	Unit 8 evaporator inlet temperature	Always	G
201017	I	OUT	value/10	°C	Unit 1 evaporator outlet temperature	Always	G
201018	I	OUT	value/10	°C	Unit 2 evaporator outlet temperature	Always	G
201019	I	OUT	value/10	°C	Unit 3 evaporator outlet temperature	Always	G
201020	I	OUT	value/10	°C	Unit 4 evaporator outlet temperature	Always	G
201021	I	OUT	value/10	°C	Unit 5 evaporator outlet temperature	Always	G
201022	I	OUT	value/10	°C	Unit 6 evaporator outlet temperature	Always	G
201023	I	OUT	value/10	°C	Unit 7 evaporator outlet temperature	Always	G
201024	I	OUT	value/10	°C	Unit 8 evaporator outlet temperature	Always	G
201065	I	OUT	value/10	°C	Unit 1 condenser inlet temperature	Always	G
201066	I	OUT	value/10	°C	Unit 2 condenser inlet temperature	Always	G
201067	I	OUT	value/10	°C	Unit 3 condenser inlet temperature	Always	G
201068	I	OUT	Value/10	°C	Unit 4 condenser inlet temperature	Always	G

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
201081	I	OUT	value/10	°C	Unit 1 condenser outlet temperature	Always	G
201082	I	OUT	value/10	°C	Unit 2 condenser outlet temperature	Always	G
201083	I	OUT	value/10	°C	Unit 3 condenser outlet temperature	Always	G
201084	I	OUT	value/10	°C	Unit 4 condenser outlet temperature	Always	G
201097	I	OUT	value/10	°C	Cold/hot circuit inlet temperature	Always	G
201098	I	OUT	value/10	°C	Cold/hot circuit outlet temperature	Always	G
201101	I	IN	valuex10	°C	Cold temperature setpoint	Always	G
		OUT	value/10	°C			
201102	I	IN	valuex10	°C	Cold temperature adjustment band	Always	G
		OUT	value/10	°C			
201103	I	OUT	value/10	°C	Hot temperature setpoint	Always	G
		IN	value/10	°C			
201104	I	OUT	value/10	°C	Hot temperature adjustment band	Always	G
		IN	value/10	°C			
201107	I	OUT	value/10	°C	Cold/hot active temperature setpoint	Always	G
201109	I	OUT	value/10	°C	External air temperature	Always	G
201110	I	OUT	valuex1	%	Unit 1 cold/hot demand percentage	Always	G
201111	I	OUT	valuex1	%	Unit 2 cold/hot demand percentage	Always	G
201112	I	OUT	valuex1	%	Unit 3 cold/hot demand percentage	Always	G
201113	I	OUT	valuex1	%	Unit 4 cold/hot demand percentage	Always	G
201114	I	OUT	valuex1	%	Unit 5 cold/hot demand percentage	Always	G
201115	I	OUT	valuex1	%	Unit 6 cold/hot demand percentage	Always	G
201116	I	OUT	valuex1	%	Unit 7 cold/hot demand percentage	Always	G
201117	I	OUT	valuex1	%	Unit 8 cold/hot demand percentage	Always	G
201126	I	OUT	valuex1	%	Unit 1 cold/hot active percentage	Always	G
201127	I	OUT	valuex1	%	Unit 2 cold/hot active percentage	Always	G
201128	I	OUT	valuex1	%	Unit 3 cold/hot active percentage	Always	G
201129	I	OUT	valuex1	%	Unit 4 cold/hot active percentage	Always	G
201130	I	OUT	valuex1	%	Unit 5 cold/hot active percentage	Always	G
201131	I	OUT	valuex1	%	Unit 6 cold/hot active percentage	Always	G
201132	I	OUT	valuex1	%	Unit 7 cold/hot active percentage	Always	G
201133	I	OUT	valuex1	%	Unit 8 cold/hot active percentage	Always	G
201142	I	OUT	valuex1	-	Unit status (0:ON from keyboard - 1:ON from digital input - 2:ON from time bands - 3:ON from supervisor - 4:OFF from alarm - 5:OFF from supervisor - 6:OFF from time bands - 7:OFF from digital input - 8:OFF from keyboard - 9:OFF with deselection of compressors - 10:OFF)	Always	G
201143	I	OUT	valuex1	-	Unit 2 status (see unit 1 status)	Always	G
201144	I	OUT	valuex1	-	Unit 3 status (see unit 1 status)	Always	G
201145	I	OUT	valuex1	-	Unit 4 status (see unit 1 status)	Always	G
201146	I	OUT	valuex1	-	Unit 5 status (see unit 1 status)	Always	G
201147	I	OUT	valuex1	-	Unit 6 status (see unit 1 status)	Always	G
201148	I	OUT	valuex1	-	Unit 7 status (see unit 1 status)	Always	G
201149	I	OUT	valuex1	-	Unit 8 status (see unit 1 status)	Always	G
201158	I	OUT	valuex1	-	Unit 1 alarm code active	Always	G
201159	I	OUT	valuex1	-	Unit 2 alarm code active	Always	G
201160	I	OUT	valuex1	-	Unit 3 alarm code active	Always	G
201161	I	OUT	valuex1	-	Unit 4 alarm code active	Always	G
201162	I	OUT	valuex1	-	Unit 5 alarm code active	Always	G
201163	I	OUT	valuex1	-	Unit 6 alarm code active	Always	G
201164	I	OUT	valuex1	-	Unit 7 alarm code active	Always	G
201165	I	OUT	valuex1	-	Unit 8 alarm code active	Always	G
201206	I	OUT	valuex1	-	System status (0:ON from keyboard - 1:ON from digital input - 20:OFF from alarm - 27:OFF digital input - 28:OFF from keyboard)	Always	G
201207	I	OUT	valuex1	-	System alarm code active	Always	G
201208	I	OUT	valuex1	%	Cold/hot circuit demand percentage	Always	G
201209	I	OUT	valuex1	%	Cold/hot circuit active percentage	Always	G
201212	I	IN	valuex1	-	System operating mode (1: cold - 2: hot)	Always	G
		OUT					

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
201213	I	IN	valuex1	%	Cold capacity limit percentage	Always	G
		OUT					
201214	I	IN	valuex1	%	Hot capacity limit percentage	Always	G
		OUT					
201216	I	OUT	valuex1	%	Pump speed percentage with unit 1 cold/hot circuit inverter	Note 1 and 2	G
201217	I	OUT	valuex1	%	Pump speed percentage with unit 2 cold/hot circuit inverter	Note 1 and 2	G
201218	I	OUT	valuex1	%	Pump speed percentage with unit 3 cold/hot circuit inverter	Note 1 and 2	G
201219	I	OUT	valuex1	%	Pump speed percentage with unit 4 cold/hot circuit inverter	Note 1 and 2	G
201220	I	OUT	valuex1	%	Pump speed percentage with unit 5 cold/hot circuit inverter	Note 1 and 2	G
201221	I	OUT	valuex1	%	Pump speed percentage with unit 6 cold/hot circuit inverter	Note 1 and 2	G
201222	I	OUT	valuex1	%	Pump speed percentage with unit 7 cold/hot circuit inverter	Note 1 and 2	G
201223	I	OUT	valuex1	%	Pump speed percentage with unit 8 cold/hot circuit inverter	Note 1 and 2	G
201232	I	OUT	valuex1	%	Unit 1 cold/hot available percentage	Always	G
201233	I	OUT	valuex1	%	Unit 2 cold/hot available percentage	Always	G
201234	I	OUT	valuex1	%	Unit 3 cold/hot available percentage	Always	G
201235	I	OUT	valuex1	%	Unit 4 cold/hot available percentage	Always	G
201236	I	OUT	valuex1	%	Unit 5 cold/hot available percentage	Always	G
201237	I	OUT	valuex1	%	Unit 6 cold/hot available percentage	Always	G
201238	I	OUT	valuex1	%	Unit 7 cold/hot available percentage	Always	G
201239	I	OUT	valuex1	%	Unit 8 cold/hot available percentage	Always	G
201280	I	OUT	valuex1	-	Group master unit address	Always	G
201281	I	OUT	valuex1	-	Address of the unit with KIPlink master of the group in the KIPLAN network	Note 2	G
201282	I	OUT	value/10	°C	Main setpoint variation introduced by dynamic setpoint management	Note 2	G
201283	I	OUT	valuex1	-	01 internal units group status (0:Not -significant - 1:Group ON - 2:Group OFF - 3:OFF due to alarm - 4:Offline from KIPlink - 5:Offline from controller)	Always	G
201284	I	OUT	valuex1	-	02 internal units group status (see 01 internal units group status)	Always	G
201285	I	OUT	valuex1	-	03 internal units group status (see 01 internal units group status)	Always	G
201286	I	OUT	valuex1	-	04 internal units group status (see 01 internal units group status)	Always	G
201287	I	OUT	valuex1	-	05 internal units group status (see 01 internal units group status)	Always	G
201288	I	OUT	valuex1	-	06 internal units group status (see 01 internal units group status)	Always	G
201289	I	OUT	valuex1	-	07 internal units group status (see 01 internal units group status)	Always	G
201290	I	OUT	valuex1	-	08 internal units group status (see 01 internal units group status)	Always	G
201291	I	OUT	valuex1	-	09 internal units group status (see 01 internal units group status)	Always	G
201292	I	OUT	valuex1	-	10 internal units group status (see 01 internal units group status)	Always	G
201293	I	OUT	valuex1	-	11 internal units group status (see 01 internal units group status)	Always	G
201294	I	OUT	valuex1	-	12 internal units group status (see 01 internal units group status)	Always	G
201295	I	OUT	valuex1	-	13 internal units group status (see 01 internal units group status)	Always	G
201296	I	OUT	valuex1	-	14 internal units group status (see 01 internal units group status)	Always	G

Address	Type*	Flow	Conversion factor	Unit of measure	Description	Available to BMS	Ref.*
201297	I	OUT	valuex1	-	15 internal units group status (see 01 internal units group status)	Always	G
201298	I	OUT	valuex1	-	16 internal units group status (see 01 internal units group status)	Always	G
201299	I	OUT	valuex1	-	17 internal units group status (see 01 internal units group status)	Always	G
201300	I	OUT	valuex1	-	18 internal units group status (see 01 internal units group status)	Always	G
201301	I	OUT	valuex1	-	19 internal units group status (see 01 internal units group status)	Always	G
201302	I	OUT	valuex1	-	20 internal units group status (see 01 internal units group status)	Always	G
201303	I	OUT	value/10	%	System individual pump % speed	Always	G

***Type:** B =Binary, A=Analog, I=Integer
***Ref.**: Registers referred to the U = Unit or G = Group

Note 1: availability of the variable to the supervisor system depends on the type of unit and optional devices used.
Note 2: the possibility of using the variable depends on enabling of a parameter on the controller.

17.5.7 Software version and revision interpretation

The version and revision in the controller are given in the entire 200003 and 200004:

200003	I	OUT	valuex1	-	Software version	Always
200004	I	OUT	valuex1	-	Software version (revision)	Always

The information is coded as follows:

Software release (I: 200003)

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Therefore, if for example TA15r00 is in the controller, the entire 200003 will be equal to 2001 (T=**20**, A=**01)**, while the entire 200004 will be equal to 1400 (Version **14**, revision **00**).
By combining the two pieces of information, it is possible to determine the on-board software, its version and revision.

17.5.8 Instructions on configuration of the BACNET TCP/IP board on the PC

Before a PC can communicate with the BACNET TCP/IP board, the settings of both devices must be correctly aligned. As the factory settings of the BACNET TCP/IP board can only be changed after establishing the connection with the PC, when making access for the first time, the Personal Computer will have to be adapted to the factory settings of the BACNET TCP/IP board.

17.5.8.1 PC settings

Disconnect the Personal Computer from any networks and connect it directly to the BACNET TCP/IP board using the cable (crossed).

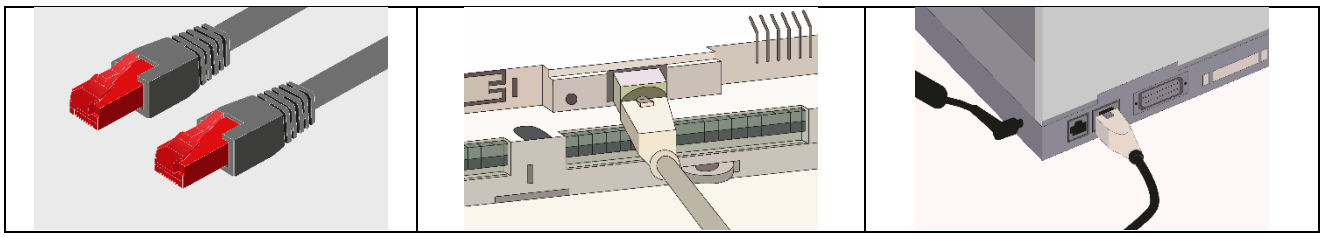


Figure 17-12: *demonstration of configuration of the BACNET TCP/IP board using a PC.*

Set the Personal Computer so that it does not use DHCP, but rather the IP address: 172.16.0.2.
The Subnet mask field also needs to be specified. The Gateway does not need to be specified.

The procedure is described below.
In the “Control Panel”:

1. Double click on “Network Connections”.
2. Double click on “Local Area Connection (LAN)”.
3. Click on “Properties”.
4. Double click on “Internet Protocol (TCP/IP)”.

Before changing the settings, take note of all the existing settings as these will be have to be restored afterwards in order to allow the PC to communicate with the data network it was previously connected to.

6. Click on “Use the following IP address” and set the following parameters:
   IP address = 172.16.0.2
   Subnet mask = 255.255.0.0
7. Click “OK” to close all the windows.

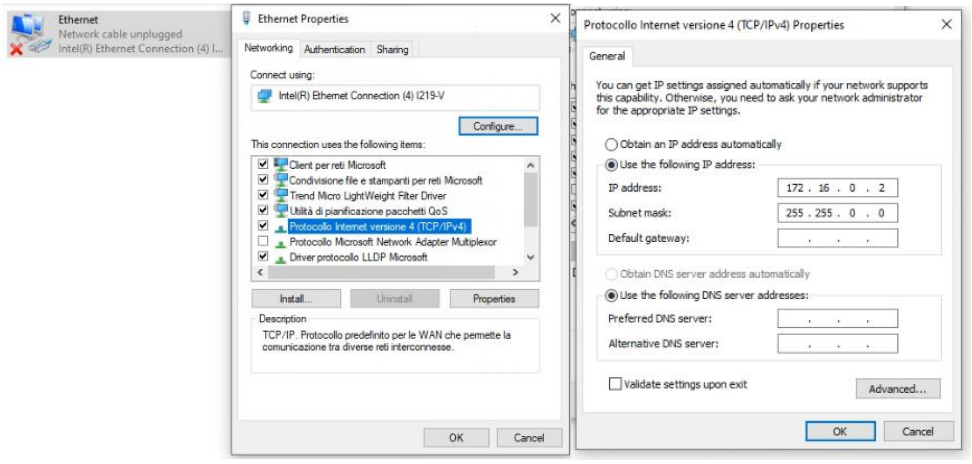


Figure 17-13: *parameter setting window.*

The PC is set so that it does not use the “proxy” network device as a communication channel. In fact, the PC is not networked and if the use of “proxy” were not disabled, communication would become impossible.

1. Open the Windows “Control Panel”.
2. Double click on “Internet Options”.
3. Click “Connections”. Another window will appear.
4. Click “LAN settings”.
5. Disable the proxy server.
6. Press “OK” to close the windows.

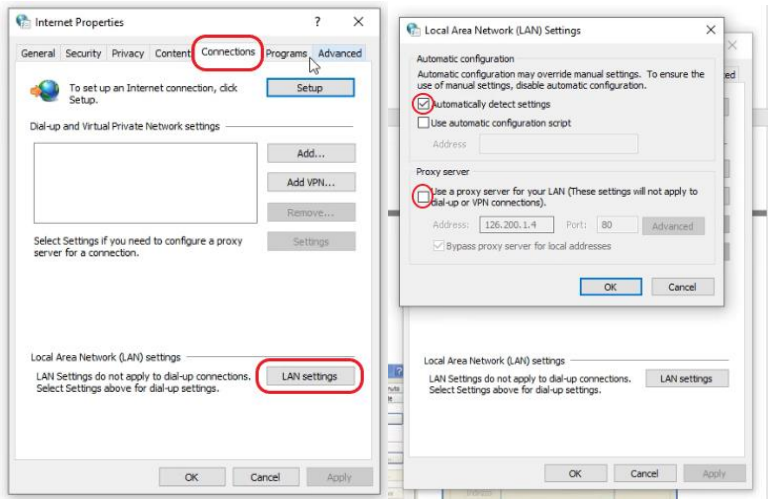


Figure 17-14: *disabling the proxy server.*

17.5.8.2 Starting the BACNET TCP/IP board with the factory settings

1. Switch on the W3000 + controller
2. Make sure that both the LEDs of the BACNET TCP/IP board connector light up within a few seconds.

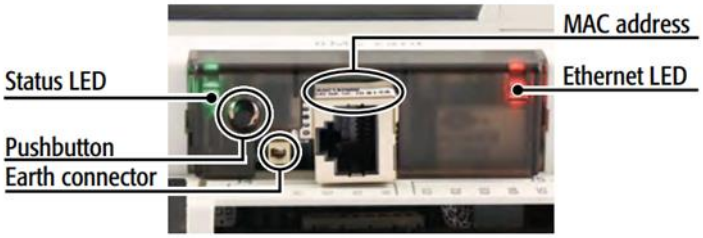


Figure 17-15: *BACNET TCP/IP board detail.*

INFORMATION:
The choice as to whether to activate factory settings or user settings can only be made when starting the BACNET TCP/IP board. The BACNET TCP/IP board restarts whenever it is turned on.

3. As soon as the Status LED turns on GREEN immediately after restart, hold down the button to activate the factory settings;
4. holding the button down for about 20 seconds will cause the status LED to flash RED 3 times. Release the button while this is happening;
5. after the red flashes, the Status LED turns GREEN and, if the procedure has been performed correctly, the Status LED

confirms the button has been pressed and released by rapidly flashing RED 3 times and then shining GREEN for about one minute (completion of the start phase); after completing the start phase, the Status LED starts flashing: the BACNET TCP/IP board has now completely started;

In this way, the BACNET TCP/IP board will not use the “User” set communication configuration parameter values, but rather the following factory values:
IP address: 172.16.0.1
Subnet mask: 255.255.0.0

Note:
These values will remain active until the BACNET TCP/IP BOARD IS RESTARTED.
After restart, the BACNET TCP/IP board will return to the “User” configuration values
It is recommended that the network communication parameters are configured immediately.

17.5.8.3 Access the BACNET TCP/IP board via the PC

To allow the board to communicate with the data network it will be installed to, certain network communication parameters must be set.

INFORMATION:
The network administrator must establish whether the BACNET TCP/IP board can be connected and must communicate essential system data.

1. on the PC open a web browser;
2. write the following number, including dots, in the address field: 172.16.0.1
3. press **Send**.

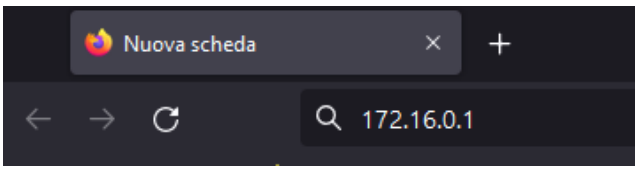


Figure 17-16: *entering the IP address.*

The **first access** page may offer one of the following two alternatives:

- **Restrict access**: you will be asked to customise all passwords and, upon confirmation, all services (except the following) will be disabled: HTTPS, SFTP SSH SCP).
- **Do not restrict access**: no password confirmation will be required. To log in, simply enter your password and default user ID.

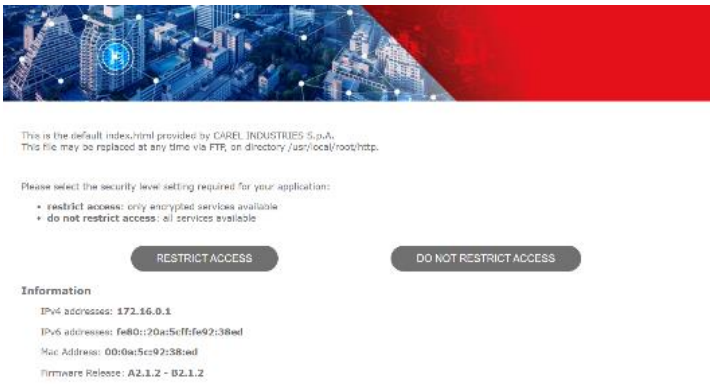


Figure 17-17: *possibility to log in for the first time.*

When logging in for the **second time** (with HTTPS and entering the customised password and user ID), the page displayed will only show the **"administrator area"** button.

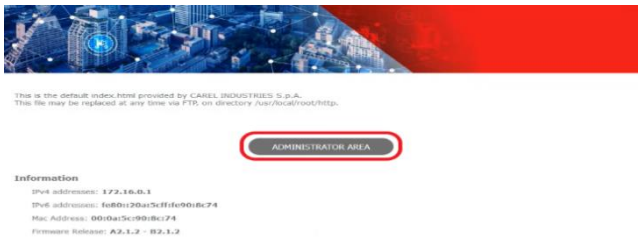
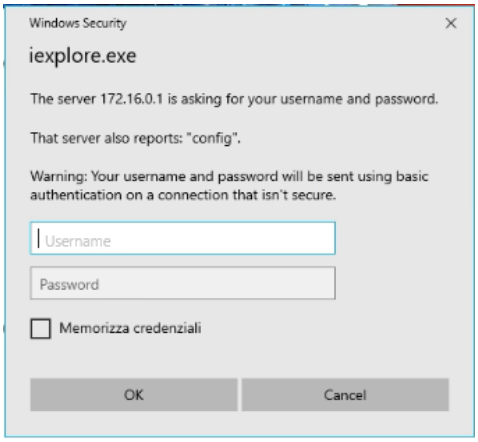


Figure 17-18: *"administrator area" button display.*

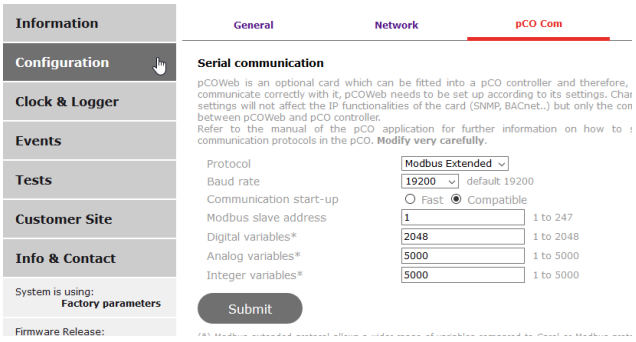
At the login and password request enter the factory values:

Username: **admin**
Password: **fadmin**



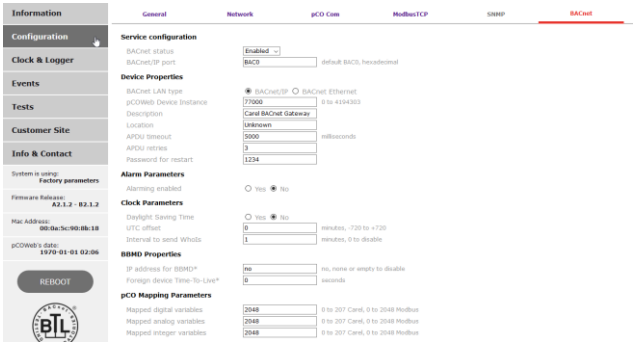
The BACNET TCP/IP board is set at the factory with Carel protocol.
Switch the protocol to Modbus Extended.
Ensure that the address matches the one entered in the controller

All the settings will be enabled the next time the BACNET TCP/IP board is started



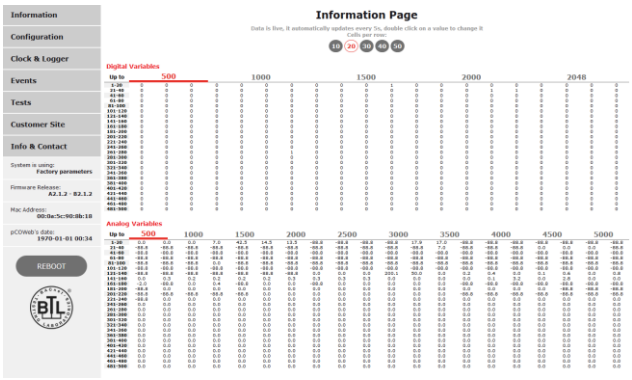
The BACNET TCP/IP board is set at the factory for the reading of maximum 207 digital, analogue and whole variables.
In the BACnet menu change the values in the pCO Mapping Parameters fields from 207 to 2048

All the settings will be enabled the next time the BACNET TCP/IP board is started



If the details entered during the previous access stage are correct, the following page appears:

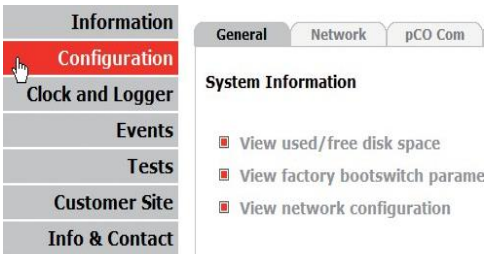
Update the variable data by clicking the Information button

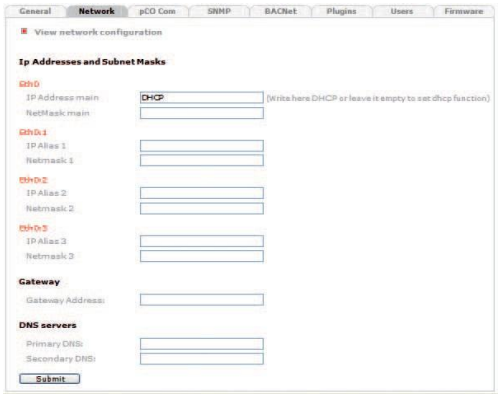


As the BACNET TCP/IP board in its factory configuration is set with DHCP addressing (automatic addressing), it will already be operational and no further action will be required.

To set the user network parameters, click on "Configuration", then on the "Network" board and set the following basic network parameters:
- IP address
- NetMask

The set values will only be used from the next time the BACNET TCP/IP board is restarted





INFORMATION:
The professional system integrator who sets the various parameters, checks the network communication, and starts the supervision system, must be familiar with BACNET.

17.5.9 Instruction for configuration from PC BACNET MS/TP board

Before a PC can communicate with the BACNET MS/TP board, the settings of both devices must be correctly aligned. Since the factory settings of the BACNET MS/TP board can only be changed once the connection to the PC has been established via the BACset software, the Personal Computer must be set to the factory settings of the BACNET MS/TP card the first time it is accessed.

17.5.10 PC settings

Connect the Personal Computer directly to the BACNET MS/TP board via a USB-RS485 converter, EIA-485.

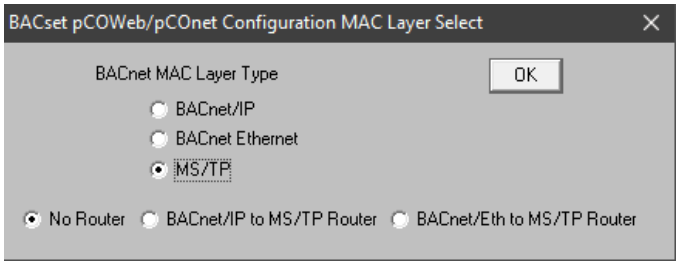
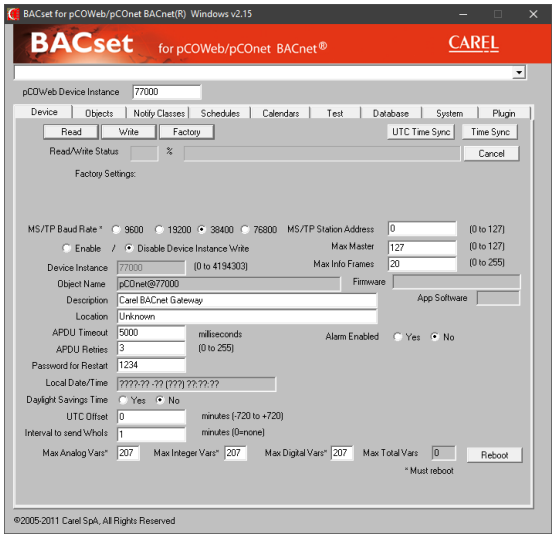
1. To activate the factory settings, switch on the LAN Multi Manager controller by pressing and holding the button for about 10s until the status LED slowly flashes red-off 3 times.
2. Release the button while the LED is flashing: after the 3 red flashes, the LED turns green; then the LED confirms that the button has been released by flashing rapidly 3 times red-off, then turns green again.
3. For the complete start-up of the BACNET MS/TP board it will take another 35 seconds until the Network LED is flashing; only from this moment on will it be possible to access the board remotely.

In this way, the BACNET MS/TP board will use the following factory default values:
Device instance: 77000
Station Address: 0
MaxMaster: 127
Max Info Frames: 20
BaudRate: 38400

17.5.11 Accessing the BACNET MS/TP board from a PC

In order for the board to communicate with the controller, certain communication parameters must be set correctly.

INFORMATION:
When using the BACNET MS/TP board only, make sure that the identification number of the unit is 001.
See paragraph **11.3 - Setting supervisor parameters.**

Start the BACset application on the PC; the pop-up shown in the image will open. Select MS/TP and then No Router.	
If there are no errors, the main page of Bacset will be presented. Continue to the second-to-last point If errors occur, the communication parameters of PC must be changed. Continue with the next steps.	

Check the content of the following system file:
C:\Windows\BACLIB.INI

Specifically check the last 5 rows of the file, shown here as an example:

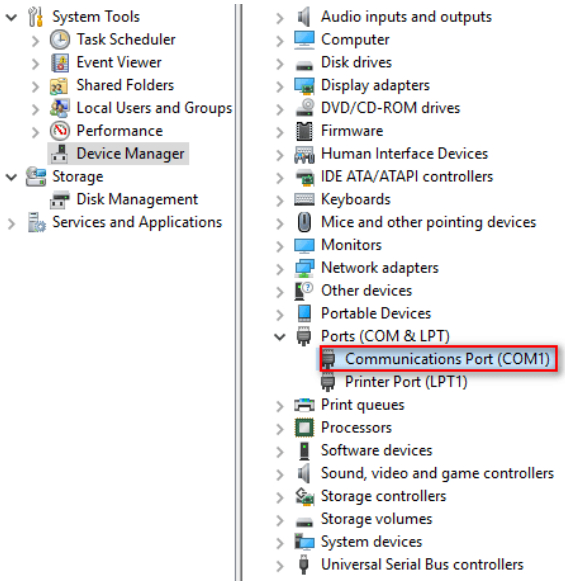
MSTPts=1
MSTPmaxmaster=127
MSTPmaxinfoframes=20
MSTPcom=3
MSTPbaud=38400

If on the BACNET MS/TP board there are default values, the following values must be in BACLIB.INI:

MSTPmaxmaster=127
MSTPmaxinfoframes=20
MSTPbaud=38400

As far as the MSTPts field, its value must be different from the one of the board, which by default is 0. MSTPcom is the port used by the PC for connection through converter USB-RS485; therefore, check on the control panel which port is used

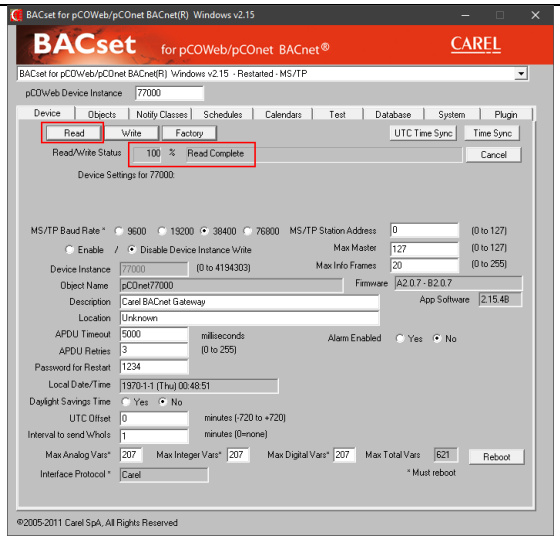
Once you have saved the file and reopened BACset, you can proceed to the second-to-last step.



If the procedure has been carried out correctly, no error messages will be displayed.

Press the "Read" button to verify correct communication between the PC and the BACNET MS/TP board.

When finished, Read Complete will be displayed at 100%.



Select the "System" tab At the bottom, after pressing the "Read" button, the following will be displayed: Interface Protocol: Carel BaudRate: 19200 Replace Carel with MODBUS Extended and press Write. This will align the communication parameters of the BACNET MS/TP board with the controller parameters. Now reboot the board. After restarting, the status LED will flash green-off if communication with the controller is established.	

17.5.12 Instructions on configuration of the BACNET TCP/IP and BACNET MS/TP board on the user interface

The function permits configuration of the BACNET TCP/IP and BACNET MS/TP board communication parameters directly at the PGD keyboard.

The function is available for:

- version 5.16 (and above) of the bios on the controller in which the BACNET TCP/IP - BACNET MS/TP board is slotted
- version A1.5.0 (and above) of the firmware of the BACNET TCP/IP board
- version A485_A1.2.1 (and above) of the firmware of the BACNET MS/TP board

The purpose is to permit configuration of the network (Ethernet for the BACNET TCP/IP board, RS485 for the BACNET MS/TP board) when a board of this type is installed for the first time. The other parameters (alarms, events, etc.) must be configured with the usual instruments: BACset or web interface (only for BACNET TCP/IP board).

INFORMATION:
When using the BACNET MS/TP board only, make sure that the identification number of the unit is 001. See paragraph **11.3 - Setting supervisor parameters.**

The masks below illustrate the procedure for configuring the BACNET TCP/IP board (indicated in the masks as pCOWeb) and the BACNET MS/TP board (indicated in the masks as pCONet)

1	Press **[ALARM]** and **[ENTER]** together. Hold down until the mask shown to the side appears.	> SYSTEM INFORMATION LOG DATA OTHER INFORMATION FLASH NAND FILES
2	Press **[UP]** and **[DOWN]** to move the cursor to the “OTHER INFORMATION” row and press **[ENTER]** to select.	SYSTEM INFORMATION LOG DATA > OTHER INFORMATION FLASH NAND FILES
3	Press **[UP]** and **[DOWN]** to move the cursor to the “PCOWEB/NET CONFIG” row and press **[ENTER]** to select.	ID/PRODUCT CODE > PCOWEB/NET CONFIG MEMORIES STATUS CHIP IO VERSION
4	Select “PCOWEB settings” to configure a BACNET TCP/IP board Select “PCONET settings” to configure a BACNET MS/TP board	> PCOWEB settings PCONET settings

Configuring the BACNET TCP/IP board

1	Select PCOWEB settings and the mask shown to the side appears. The fields are soon populated with the current data. If they are not, check the version of the firmware of the BACNET TCP/IP board and the protocol set for the serial line. The parameters can now be edited. To do so, use the **[ENTER]** key to select a field and the **[UP] / [DOWN]** keys to set the required value. The IP address and Netmask field cannot be edited if the DHCP option is set at ON.	DHCP:--- IP Address: ---.---.---.---
2	Continue pressing **[ENTER]** to view all the available parameters, shown in the masks below:	Netmask: ---.---.---.--- Gateway: ---.---.---.---
3		DNS1: ---.---.---.--- DNS2: ---.---.---.---
4		BACnet ID: ------ BACnet Type: -------
5	After selecting the parameters, it is possible to update them with the new data by selecting “YES” in the window shown to the side and then pressing **[ENTER]**.	PCOWEB CONFIG ENABLE Update pCOWEB? NO
6	The message to the side appears while the parameters are updating:	PCOWEB CONFIG ENABLE Please wait for end of update
7	The mask shown to the side appears at the end of the process:	PCOWEB CONFIG ENABLE Update complete Reboot pCOWEB to apply new setting
8	Next, turn the power off and then on again to the controller in which the BACNET TCP/IP board is slotted. This also causes the BACNET TCP/IP board to restart with the new settings	

Configuring the BACNET MS/TP board

1	Select PCONET settings and the mask shown to the side appears. The fields are soon populated with the current data. If they are not, check the version of the firmware of the BACNET MS/TP board and the protocol set for the serial line. The parameters can now be edited. To do so, use the **[ENTER]** key to select a field and the **[UP] / [DOWN]** keys to set the required value.	BACnet ID: ------- BACnet baud: --------
2	Continue pressing **[ENTER]** to view all the available parameters, shown in the mask to the side:	BACnet MAC: Max Masters: --- Max frames: -----
3	After selecting the parameters, it is possible to update them with the new data by selecting “YES” in the window shown to the side and then pressing **[ENTER]**.	PCONET CONFIG ENABLE Update pCOnet? NO
4	The message to the side appears while the parameters are updating:	PCONET CONFIG ENABLE Please wait for end of update
5	The mask shown to the side appears at the end of the process:	PCONET CONFIG ENABLE Update complete Reboot pCOnet to apply new setting
6	Next, turn the power off and then on again to the controller in which the BACNET MS/TP board is slotted. This also causes the BACNET MS/TP board to restart with the new settings	

17.6 Interfacing with Mitsubishi Electric system remote controllers

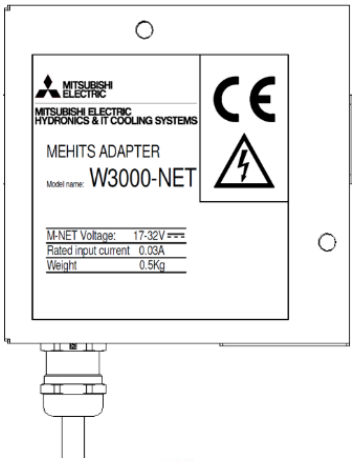
Below is the table showing the compatibility of the Mitsubishi Electric system remote controllers with LAN Multi Manager:

MITSUBISHI ELECTRIC SYSTEMS R/C	AE-200E (Ver.7.68 or later)	
	AE-50E (Ver.7.68 or later) *AE-200E is required on same system	
	EW-50E (Ver.7.68 or later) *AE-200E is required on same system	
MEHITS	2-pipe systems consisting of chiller unit and heat pump Note: Water cooled heat pump units with water-side reversal are excluded	W3000+ (version TA10 or later) LAN Multi Manager (Version TG02 or later)
	ADAPTER MEHITS (version 1.00)	

* The use of ADAPTER requires centralized controller.

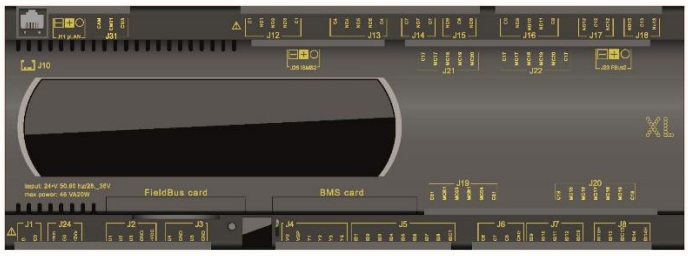
17.6.1 Components required

MEHITS Adapter



Serial interface card.
For the correct installation of the serial board, see the documentation supplied with the same.

LAN Multi Manager dedicated electronic control board.
Already fitted on the machine.
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



17.6.2 Installing the serial interface board

Follow the points in paragraph 2 “Installing the serial board” to insert the serial board into the controller.

17.6.3 LAN Multi Manager serial line parameter setting

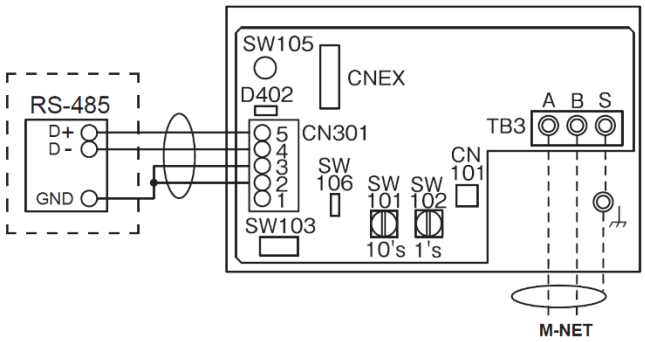
In order to communicate with MITSUBISHI ELECTRIC system remote controllers, it will be necessary to set the parameters below.
You must enter the user menu and, after having given the password, scroll to the masks described below.

Supervision Protocol: Modbus Speed: 19200 baud ID number: 011	The supervisor connection parameters must be set as follows: ▪ Protocol: **W3000-NET** ▪ Communication speed: **19200 baud (*)** unit ID no.: from **011**

17.6.4 Setting up the supervisor network

M-NET Transmission Cable and Modbus cable wiring*

W3000-NET



ITEM	CONTENTS
TB3	M-NET LINE TERMINAL BLOCK
CN301	RS-485 CONNECTOR
CNEX	SOFTWARE UPDATE CONNECTOR
CN101	POWER SUPPLY FOR SW UPDATE
D402	LED(POWER/ERROR)
SW101	M-NET ADDRESS (10th DIGIT)
SW102	M-NET ADDRESS (1st DIGIT)
SW103	SWITCH(FOR FUNCTION SETTINGS)
SW105	SWITCH(RESET)
SW106	SWITCH(TERMINAL RESISTOR RS-485)

Serial Interface board Included.

*Refer to MEHITS Adapter manual for details about connection
The serial cable must be kept separate from the power cables.
The shield of the connection cable must be earthed in just one point.

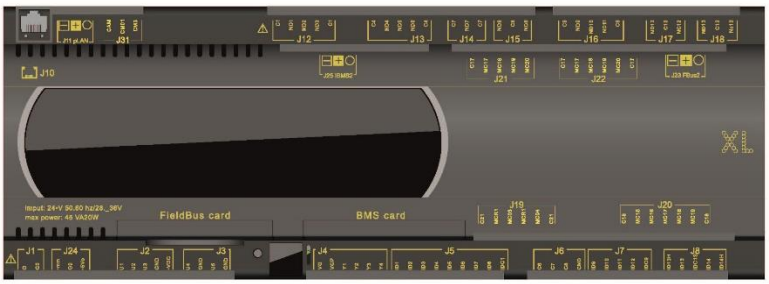
17.7 CONFIGURATION AND ACTIVATION OF THE E-MAIL NOTIFICATION SERVICE

The PCOweb board also offers the possibility of a mail notification service. The configuration of the service requires the use of a FTP protocol access program.
The activation of the mail notification service is through the web interface of the PCOweb board.

17.7.1 Components required

PCOweb interface card.
For the correct installation of the serial board, see the documentation supplied with the same.

LAN Multi Manager dedicated electronic control board.
Already fitted on the machine.
The images refer to the board with the largest number of terminals, but the procedure is the same even for smaller boards.



17.7.2 Installing the serial interface board
Follow the points in paragraph 2 “Installing the serial board” to insert the PCOweb serial board into the controller. Always complete the connection to the ground using the connector on the left of the Ethernet interface.

17.7.3 Setting supervisor parameters
To communicate with the system, set the parameters as shown below.

Go to the support menu, and after entering the password access the group submenu and scroll down to the masks described below.

Supervision Protocol: Standard Speed: 19200 baud ID number: 001	The supervisor connection parameters must be set as follows: ▪ Protocol: **Standard** ▪ Communication speed: **19200 baud (*)** ▪ Unit ID: from **001** to **200 (default 11, …)**

(*) Communication speed between pCO and serial interface board.

17.7.4 Configuring the serial interface board.
The first configuration of the PCOweb serial interface board can be completed using the user interface of the electronic control board (with the exclusion of the touch screen display).
Communication with the PCOweb system is for internal networks. Due to the purpose and intended use of the product, encryption algorithms are not used to prevent interception of Bacnet messages exchanged on the network.

17.7.5 Setting up the supervisor network
The supervision network is set up by the technicians developing the Bacnet interface. For the connection to the Ethernet network use a category 5e or better S/FTP type cable.

17.7.6 Instructions for the configuration of the PCOweb board using a PC

Before a PC can communicate with the PCOweb board, the settings of both devices must be correctly aligned.
As the factory settings of the PCOweb board can only be changed after establishing the connection with the PC, when making access for the first time, the Personal Computer will have to be adapted to the factory settings of the PCOweb board.

17.7.6.1 PC settings

Disconnect the Personal Computer from any networks and connect it directly to the pCOweb board using the cable (crossed).

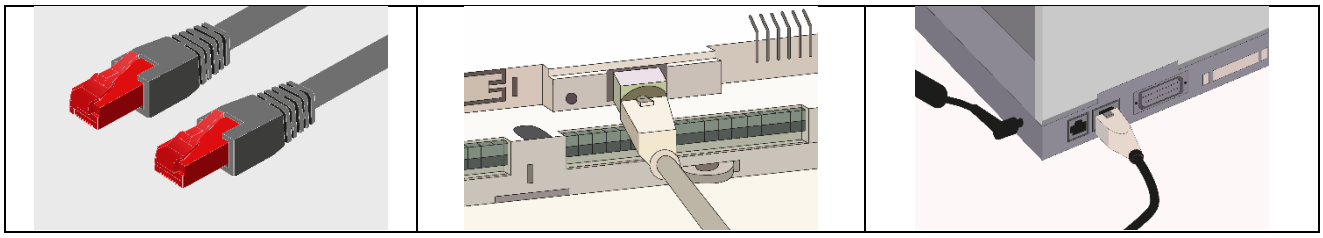


Figure 17-19: *demonstration of configuration of the pCOweb board using a PC.*

Set the Personal Computer so that it does not use DHCP, but rather the IP address: 172.16.0.2.
The Subnet mask field also needs to be specified. The Gateway does not need to be specified.

The procedure is described below.
In the “Control Panel”:

1. Double click on “Network Connections”.
2. Double click on “Local Area Connection (LAN)”.
3. Click on “Properties”.
4. Double click on “Internet Protocol (TCP/IP)”.

Before changing the settings, take note of all the existing settings as these will be have to be restored afterwards in order to allow the PC to communicate with the data network it was previously connected to.

6. Click on “Use the following IP address” and set the following parameters:
   IP address = 172.16.0.2
   Subnet mask = 255.255.0.0
7. Click “OK” to close all the windows.

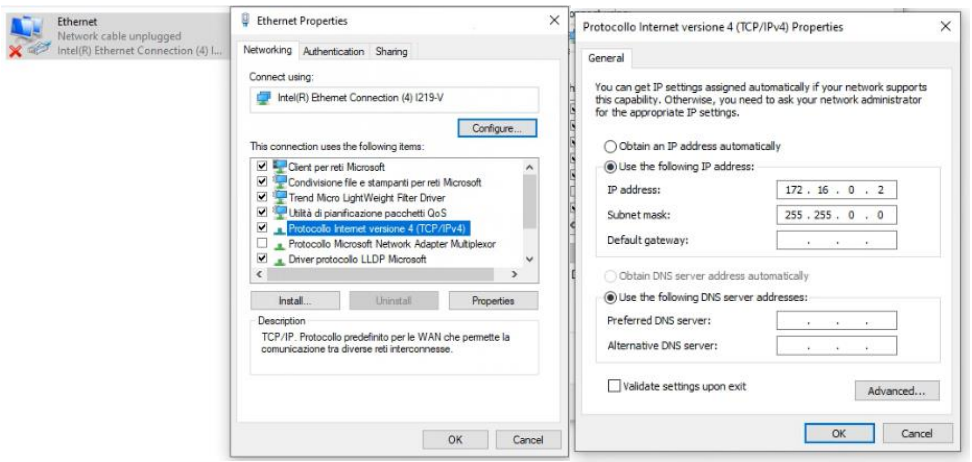


Figure 17-20: *parameter setting window.*

The Personal Computer is set so that communications do not have to pass through the “proxy” network device: in fact, as the PC is not networked, communication would be impossible if the “proxy” were not disabled.

1. Open the Windows “Control Panel”.
2. Double click “Internet Options”
3. Click “Connections”. Another window appears
4. Click “LAN settings”
5. Disable the proxy server.
6. Press Ok to close the windows.

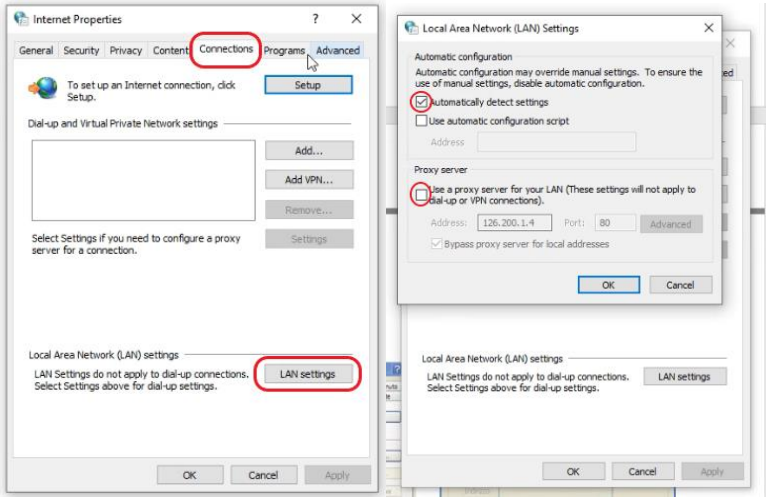


Figure 17-21: *disabling the proxy server.*

17.7.6.2 Starting the PCOweb board with factory settings

5. Switch on the LAN Multi Manager controller
6. Make sure that both the indicator lamps on the PCOweb board connector light up within a few seconds.

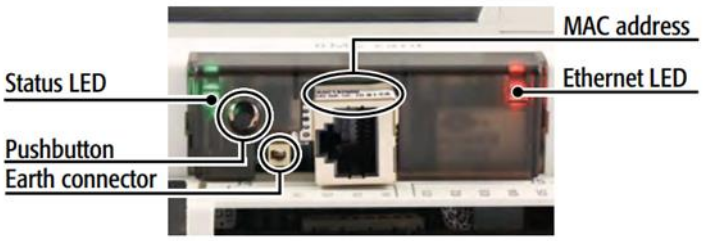


Figure 17-22: *pCOweb board detail.*

INFORMATION:
The choice as to whether to activate factory settings or user settings can only be made when starting the PCOweb board. The PCOweb board restarts whenever it is turned on.

3. As soon as the Status LED turns on GREEN immediately after restart, hold down the button to activate the factory settings;
4. holding the button down for about 20 seconds will cause the status LED to flash RED 3 times. Release the button while this is happening;
5. After the 3 red flashes, the Status LED turns GREEN and, if the procedure has been performed correctly, the Status LED confirms the button has been pressed and released by rapidly flashing RED 3 times and then shining GREEN for

about 1 minute (completion of the start phase); after completing the start phase, the Status LED starts flashing: the ETHERNET board has now completely started.

In this way, the PCOweb board will not use the “User” set communication configuration parameter values, but rather the following factory values:
IP address: 172.16.0.1
Subnet mask: 255.255.0.0

Note:
These values will remain active until the PCOweb BOARD IS RESTARTED.
After restart, the pCOweb board will return to the “User” configuration values.
It is recommended that the network communication parameters are configured immediately.

17.7.6.3 Access the PCOweb via the PC

The PCOweb board can recognise interrogations sent by a supervisor using the MODBUS over IP protocol.
To allow the board to communicate with the data network it will be installed to, certain network communication parameters must be set.

INFORMATION:
The network administrator must establish whether the PCOweb board can be connected and must communicate essential system data.

1. on the PC open a web browser;
2. write the following number, including dots, in the address field: 172.16.0.1
3. press **Send**.

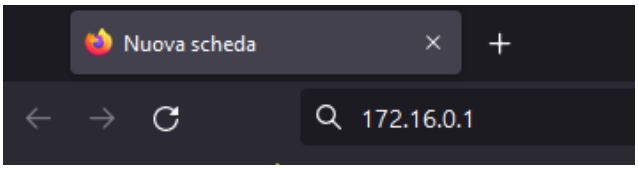


Figure 17-23: *entering the IP address.*

The **first access** page may offer one of the following two alternatives:

- **Restrict access**: you will be asked to customise all passwords and, upon confirmation, all services (except the following) will be disabled: HTTPS, SFTP SSH SCP).
- **Do not restrict access**: no password confirmation will be required. To log in, simply enter your password and default user ID.

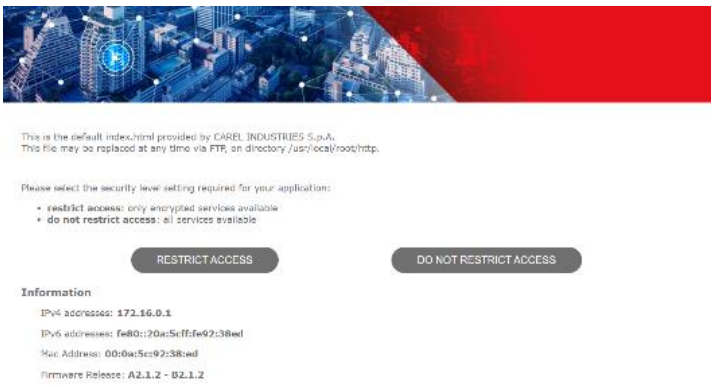


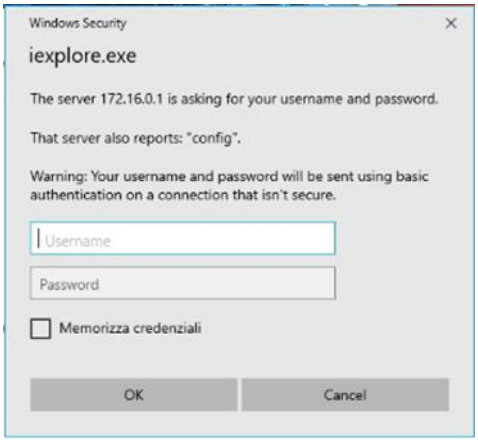
Figure 17-24: *possibility to log in for the first time.*

When logging in for the **second time** (with HTTPS and entering the customised password and user ID), the page displayed will only show the **"administrator area"** button.

Figure 17-25: *"administrator area" button display.*

At the login and password request enter the factory values:

Username: **admin**
Password: **fadmin**



If the details entered during the previous access are correct, the following page appears:

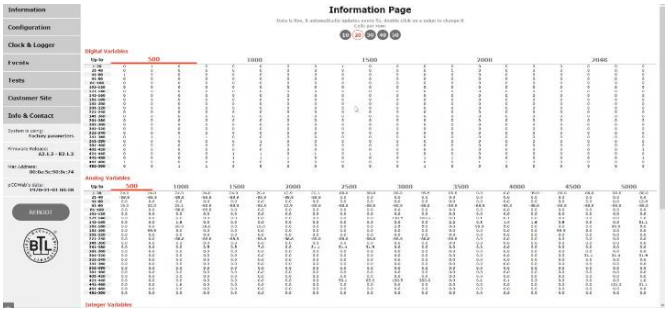


Figure 17-26: *"Information page" display.*

As the PCOweb board in its factory configuration is set with DHCP addressing (automatic addressing), it will already be operational and no further action will be required.

To set the user network parameters, click on "Configuration", then on the "Network" board and set the following basic network parameters:

- IP address.
- NetMask.

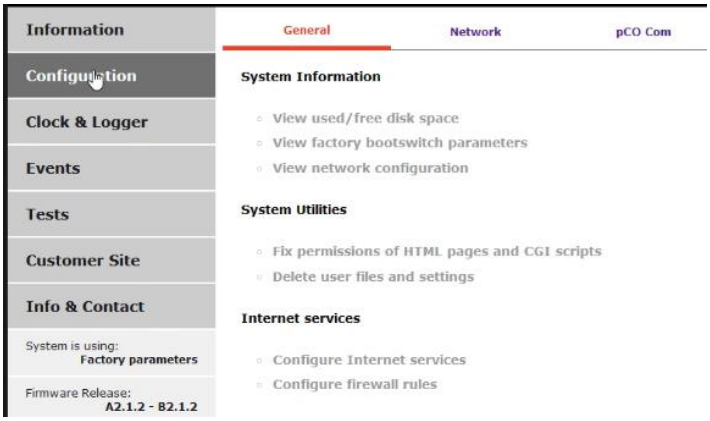


***Figure 17-27**: click "configuration".*

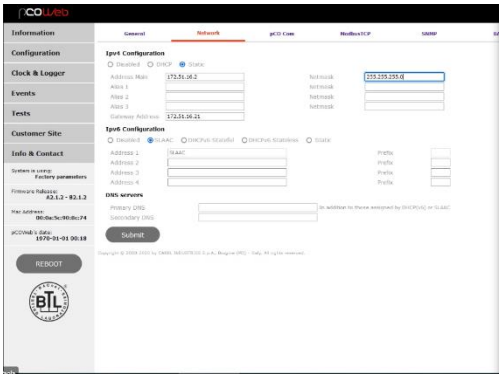


***Figure 17-28**: "configuration" screen.*

INFORMATION:
The professional system integrator who sets the various parameters, checks the network communication, and starts the supervision system, must be familiar with Modbus.

17.7.7 Instructions for the configuration of the PCOweb board on the PC

The function permits configuration of the communication parameters of the PCOweb board directly at the PGD keypad.

The function is available for:

- version 5.16 (and above) of the bios on the controller in which the PCOweb board is slotted.
- version A1.5.0 (and above) of the firmware of the PCOweb board.

The purpose is to permit configuration of the network (Ethernet for the PCOweb board) when a board of this type is installed for the first time. The other parameters (alarms, events, etc.) must be configured with the usual instruments: BACset or web interface.

The following masks show the procedure for the configuration of the pCOweb board

1	Press **[ALARM]** and **[ENTER]** together and hold down until the mask shown to the side appears.	> SYSTEM INFORMATION LOG DATA OTHER INFORMATION FLASH NAND FILES
2	Press [UP] and **[DOWN]** to move the cursor to the “OTHER INFORMATION” row and press **[ENTER]** to select.	SYSTEM INFORMATION LOG DATA > OTHER INFORMATION FLASH NAND FILES
3	Press **[UP] and [DOWN]** to move the cursor to the “PCOWEB/NET CONFIG” row and press **[ENTER]** to select.	ID/PRODUCT CODE > PCOWEB/NET CONFIG MEMORIES STATUS CHIP IO VERSION
4	To configure a PCOweb board, select “PCOWEB settings”	> PCOWEB settings PCONET settings

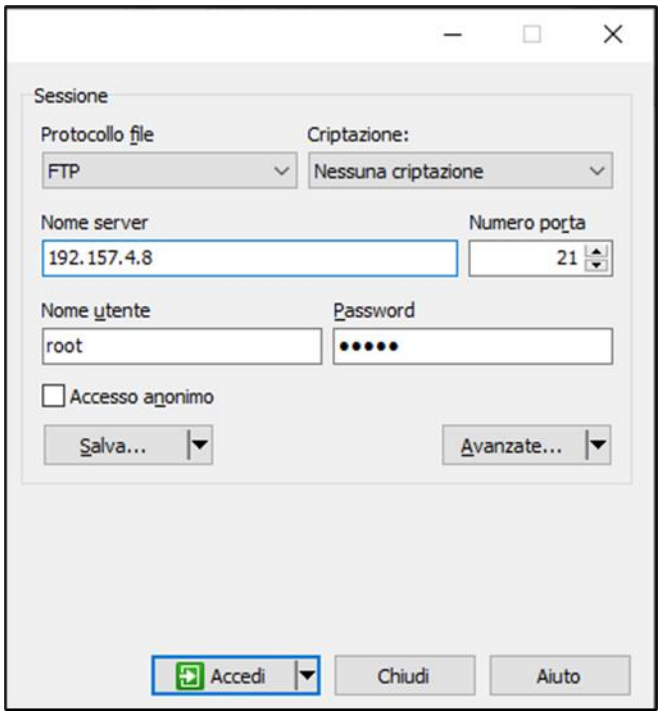
Configuration of the PCOweb board

1	Select PCOWEB settings and the mask shown to the side appears. The fields are soon populated with the current data. If they are not, check the version of the firmware of the PCOweb board and the protocol set for the serial line. The parameters can now be edited. To do so, use the **[ENTER]** key to select a field and the **[UP] / [DOWN]** keys to set the required value. The IP address and Netmask field cannot be edited if the DHCP option is set at ON.	DHCP:--- IP Address: ---.---.---.---
2	Continue pressing **[ENTER]** to view all the available parameters, shown in the masks below:	Netmask: ---.---.---.--- Gateway: ---.---.---.---
3		DNS1: ---.---.---.--- DNS2: ---.---.---.---
4		BACnet ID: ------ BACnet Type: -------
5	After selecting the parameters, it is possible to update them with the new data by selecting “YES” in the window shown to the side and then pressing **[ENTER]**.	PCOWEB CONFIG ENABLE Update pCOWEB? NO
6	The message to the side appears while the parameters are updating.	PCOWEB CONFIG ENABLE Please wait for end of update
7	The mask shown to the side appears at the end of the process.	PCOWEB CONFIG ENABLE Update complete Reboot pCOWEB to apply new setting
8	Next turn OFF and then ON again the power to the controller in which the PCOweb board is installed. This also causes the PCOweb board to restart with the new settings.	

17.7.8 Configuring the mail notification service (FTP)

To start the configuration of the mail notification service, enter the access protocol and the address of the PCOweb board. The credentials are as follows:

User name: root
Password: froot



After logging in, follow this path:

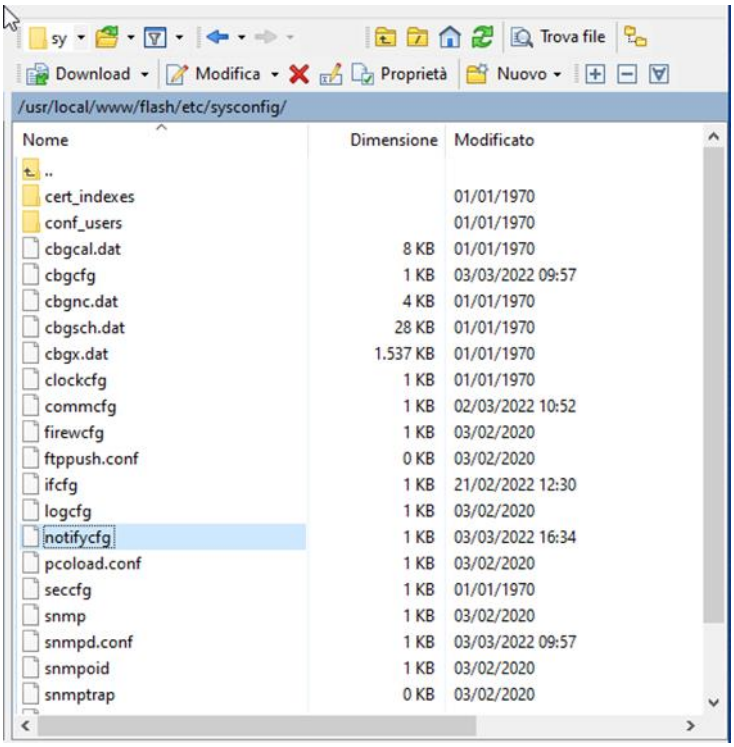
/usr/local/www/flash/http/

2 important files will be required in this path,
1. W3000plus_page.html
2. Alarm_table

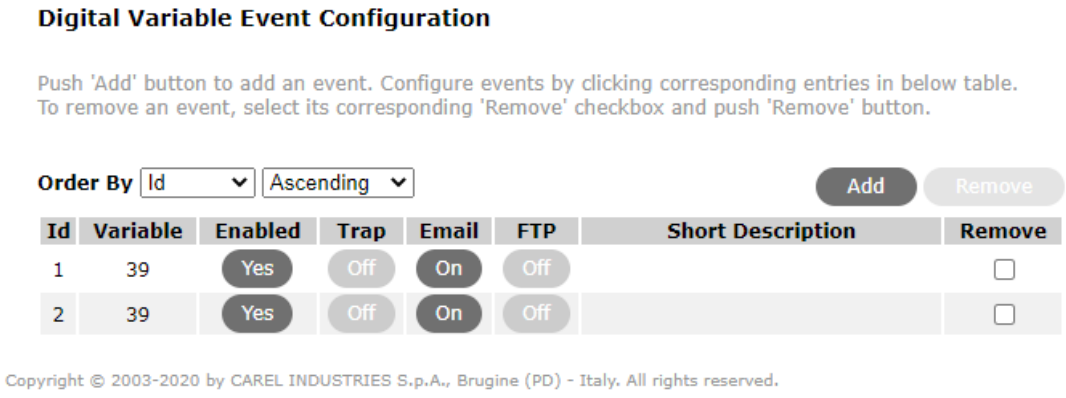
Together with the index.html file, these files make up the body of the mail:

Replace the notifycfg file with the one provided by MEHITS:

/usr/local/www/flash/etc/sysconfig/



The notifycfg file is used to set the events for sending the mail via the pCOweb board. Its presence allows the self-configuration of the information found in the “Digitals” section of the “Events” page:



Once the notifycfg file has been uploaded through ftp server, it will be necessary to access the “Digitals” menu and click on the “Email” entry for each event:

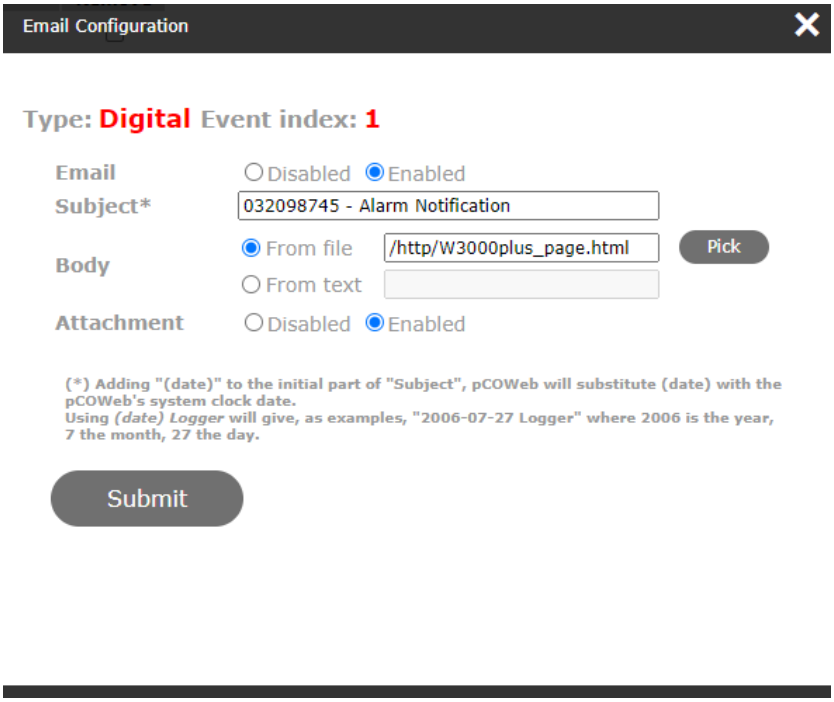
Digital Variable Event Configuration

Push 'Add' button to add an event. Configure events by clicking corresponding entries in below table.
To remove an event, select its corresponding 'Remove' checkbox and push 'Remove' button.

Order By Id Ascending Add Remove

Id	Variable	Enabled	Trap	Email	FTP	Short Description	Remove
1	39	Yes	Off	On	Off		☐
2	39	Yes	Off	On	Off		☐

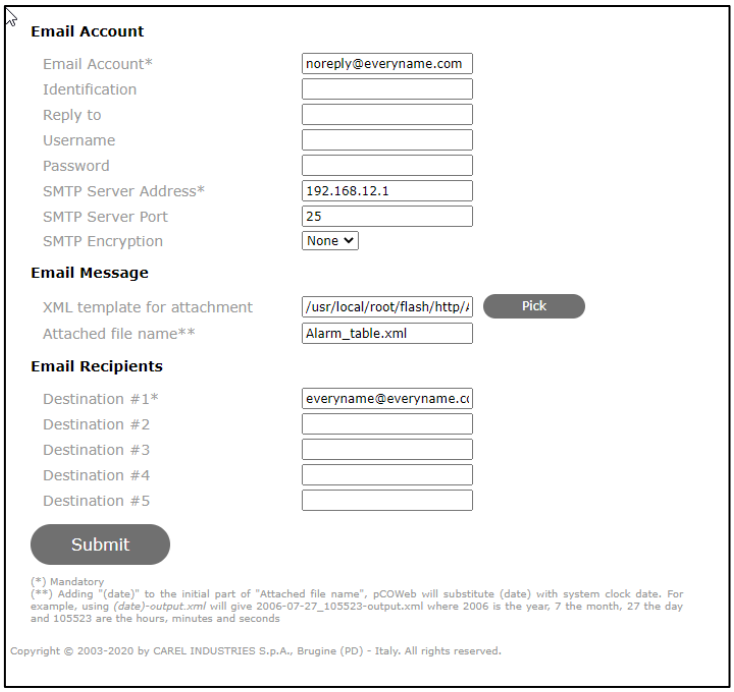
A pop-up will open, with the setting for the forwarding of mail notifications. Using the “Pick” button, it will necessary to select the html file previously uploaded through the ftp server (“W3000plus_page.html”). It will also be necessary to set “Attachment” to “Enabled”.
It is also advisable to fill in the “Subject” field (which is the subject of the mail) with the serial number of the unit to which the pCOweb card is connected, followed by a short description. In this way, in the event of an alarm it will be easier for the user to identify the unit that has raised the alarm.



Press the “Submit” button to save the settings.

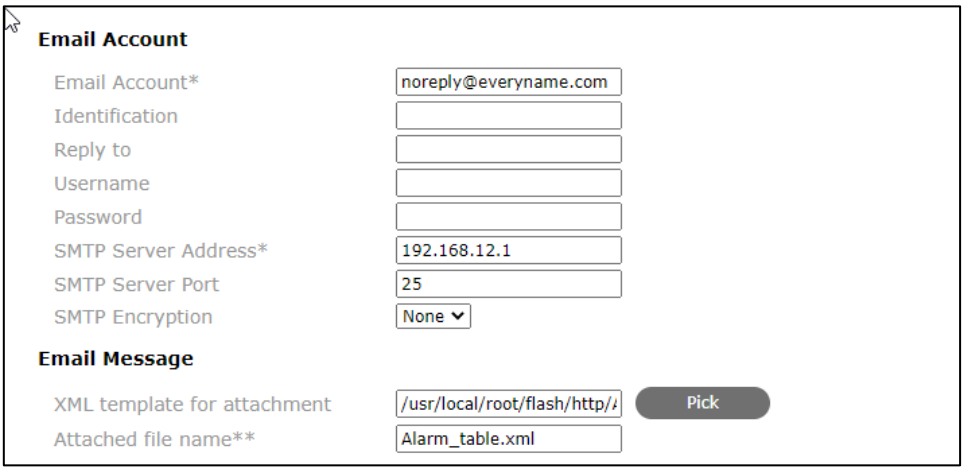
17.7.9 Activation of the email notification service (user interface)

To start the activation of the email notification service, access the pCOweb web service, go to the Events page and select the E-mail item (the configuration can be changed according to your company criteria).

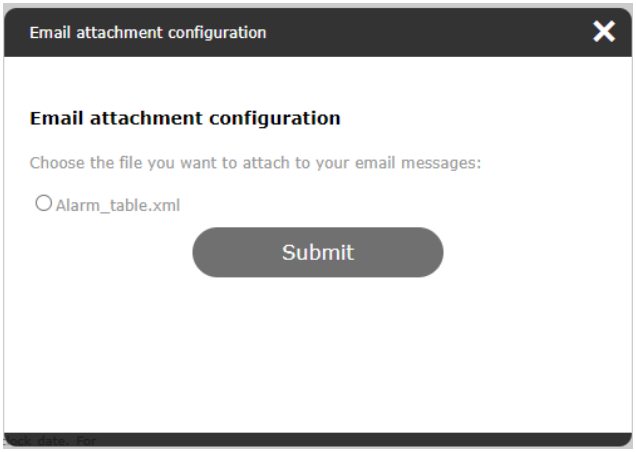


.

Enter the information of the e-mail account to be activated. (If not available, ask your IT department or network provider for the SMTP server address).



Using the Pick button, insert the “alarm.table” file set during the configuration of the service (see section 1.3.1) and click “Submit”:



Enter the recipient account information and click the “Submit” button to refresh the page:

Once the procedures have been completed, the e-mail will be activated.

INFORMATION:
Following a power failure and subsequent power reconnection, the user will by default receive an e-mail notification with the status of any active alarms prior to the time of the power failure.

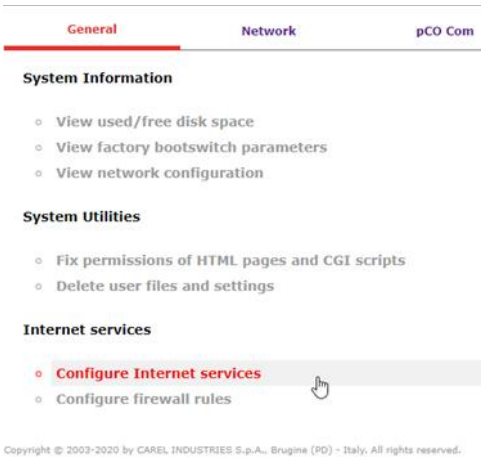
17.7.10 pCOweb notes for the American market

For pCOweb cards intended for the American market, with the exception of the HTTPS service, all pCOweb services are disabled by default.

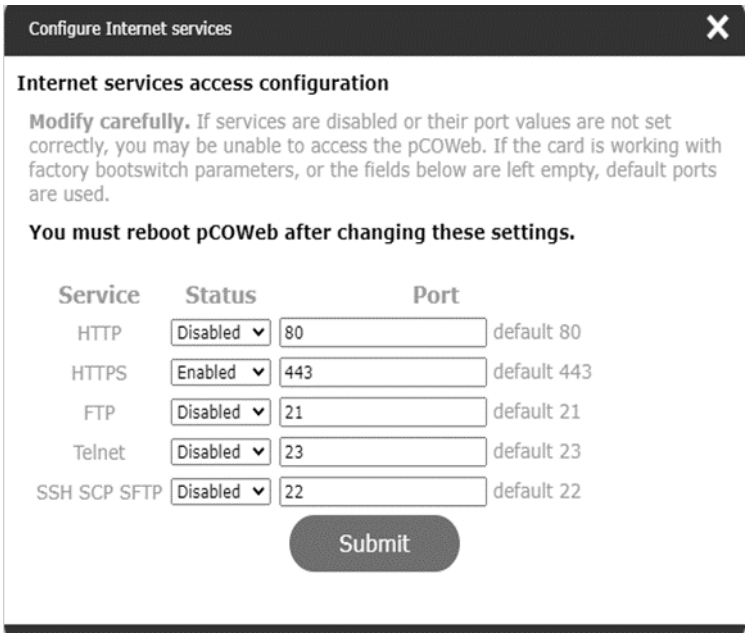
To reactivate the desired services:

3. select and enter a password for each required user;
4. enter the credentials for the admin user.

After entering the credentials, click “Submit” to access the web interface.
Go to the configuration page and under General select “Configure Internet services”.



Using the ”status“ item, enable the desired services



Click ”Submit“ to apply the changes

18 ATTACHMENTS

18.1 AWG (American Wire Gauge) conversion table

Conversion: AWG number – diameter in mm – area in mm^2

AWG n°	Diam. mm	Area mm^2		AWG n°	Diam. mm	Area mm^2
1	7.350	42.400		16	1.290	1.310
2	6.540	33.600		17	1.150	1.040
3	5.830	26.700		18	1.024	0.823
4	5.190	21.200		19	0.912	0.653
5	4.620	16.800		20	0.812	0.519
6	4.110	13.300		21	0.723	0.412
7	3.670	10.600		22	0.644	0.325
8	3.260	8.350		23	0.573	0.259
9	2.910	6.620		24	0.511	0.205
10	2.590	5.270		25	0.455	0.163
11	2.300	4.150		26	0.405	0.128
12	2.050	3.310		27	0.361	0.102
13	1.830	2.630		28	0.321	0.080
14	1.630	2.080		29	0.286	0.065
15	1.450	1.650		30	0.255	0.050

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