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

# **INTERFACE MANUAL**

# **Translation of the original instructions**

# **EVOLUTION+**

Version 34



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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.

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# **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 information of particular importance which should not be neglected.

#### 1 USABILITY



#### **INFORMATION:**

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

This document **exclusively** refers to systems managed by the EVOLUTION+ electronic controller running on **ME34r00 software or later versions**. Information on the version of the electronic controller is shown in the **"Unit" menu**. The access procedure is given below.

#### Press [PRG] to access the "Main" group.

| Mask of the terminal      | Description   |
|---------------------------|---|
| 🏫 Main                    | "Main" group menu selection mask.   |
| Service                   | Press [ENTER] to access the "Unit" menu.  |
|                           |   |
| Unit                      |   |
| Setpoint                  |   |
| In/Out                    |   |
|                           | Access mask to Unit menu.   |
| ETT .                     | Dress (UD) to view the "Allow to see I  |
| Unit                      | Press [UP] to view the About mask.  |
| UIILC                     |   |
| $\leftarrow$ $\downarrow$ |   |
| Unit - About              | Mask indicating the installed software version (the example shows version ME33r00). |
| Evolution+                |   |
| HW PCOOEM+ M              |   |
| NAND 50MB                 |   |
| Flash 2MB + 7MB + 4MB     |   |
| Ram 2048KB                |   |
| BOOL 03.01 BIOS 00.31     |   |

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 the unit must be used for each one.

Even if the serial boards 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.



2.

3.

#### CAUTION:

The boards must not be powered during these operations.

1. Identify the electronic controller on board the unit.

Remove the "BMS Card" cover from the controller.

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









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

## 3 INTERFACING WITH THE MODBUS SYSTEM

#### 3.1 COMPONENTS REQUIRED

• Modbus serial interface board

Electronic control board (Already installed on the unit)



| 2 1 (k) 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |  |
|---|--|
| BMS card                                      |  |
|   |  |
|   |  |

# 3.2 INSTALLING THE SERIAL INTERFACE BOARD

Follow the points in the chapter "Installing the serial board" to insert the Modbus serial board into the controller.

#### 3.3 SETTING SUPERVISOR PARAMETERS

To enable communication with this type of protocol, certain parameters have to be set in the "Serial" menu as follows.

See the chapter "Parameter modification masks" for detailed information on access to the menu and the masks that can be shown.

| Mask of the terminal  | Description  | Par.N.         |
|---|--|----------------|
| Serial<br>P30.02<br>BMS address:<br>011<br>P30.03<br>BMS protocol type:<br>Modbus | BMS address.<br>- Set with the identification number of the unit (from <b>001</b> to <b>200</b> , default 011)<br>Type of BMS Protocol.<br>[Standard   Modbus   GSM Modem   LON   Bacnet   TCP/IP   WinLoad]<br>- Set at <b>Modbus</b> | 30.02<br>30.03 |
| Serial<br>P30.04<br>BMS baudrate:<br>19200  | Baudrate for BMS communication.<br>[1200   2400   4800   9600   19200   38400]<br>- Set at <b>19200</b>  | 30.04          |

#### 3.4 SETTING UP THE SUPERVISOR NETWORK

The supervisor network must be set up as shown in the diagram below.



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 up to 1000 m is guaranteed as standard. It is recommended to use a shielded and twisted 3 x AWG 22/7 cable for the network.

If the reference signal must be equalised use the third wire.

The serial connection must be 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 plant is proportional to the number of units supervised by the BMS.

#### 3.5 MODBUS CHARACTERISTICS

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

As regards serial communication with the Modbus protocol, the characteristics are:

None (not modifiable)

- 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:
- 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. When using the addresses with the Modbus protocol, add 128 for whole variables. (For example: Software address  $3 \rightarrow$  Modbus address 131 [128+3])

#### Туре

- B: Boolean variable (Coil for the Modbus protocol).
- A and I: Whole variable (Register for the Modbus protocol).

#### Flow

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

#### Scale factor

As regards the value read (OUT) or written (IN) by the BMS:

- Value x1: The value is the true value, no conversion factor is required.
- Value x10: The value must be <u>multiplied by 10</u> after being read, or before being written.
- Value x100: The value must be <u>multiplied by 100</u> after being read, or before being written.
- Value/10: The value must be divided by 10 after being read, or before being written.
- Value/100: The value must be divided by 100 after being read, or before being written.

#### Example: Writing and reading of the temperature setpoint

| • whiting.                |  |                    |                                   |           |    |                              |
|---------------------------|--|--------------------|-----------------------------------|-----------|----|------------------------------|
| 40002                     | 001  | A                  | IN                                | Value x10 | °C | Cooling temperature setpoint |
| If the "Cool<br>The BMS r | ing temperature setpoint" va<br>nust multiply the value to ser | riable mind to the | N) at 21.3 °C<br>): 21.3x10 = 213 |           |    |                              |

| ٠ | Read | only: |
|---|------|-------|
|   |      |       |

Writing

| 40002   | 001 | А | OUT | Value/10 | °C | Cooling temperature setpoint |  |  |  |
|---|-----|---|-----|----------|----|------------------------------|--|--|--|
| If the "Cooling temperature setpoint" variable must be read (OUT) |     |   |     |          |    |                              |  |  |  |

The BMS must divide the value received from the controller by 10: 213/10 = 21.3 °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: Reading a value of 221 from the controller

| <ul> <li>Read only:</li> </ul> |     |   |     |          |     |               |
|--------------------------------|-----|---|-----|----------|-----|---------------|
| 40013                          | 012 | А | OUT | Value/10 | bar | High pressure |

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                | Read                     | 1              |
|               |                      | Write one variable       | 5              |
|               | (boolean)            | Write multiple variables | 15             |
|               |                      | Read                     | 4              |
| (ar           | Registers            | Write one variable       | 6              |
|               | (analogue and whole) | Write multiple variables | 16             |

Coil Modbus addresses (Boolean variables):

| Register/Coil<br>Modbus protocol | Protocol addresses:<br>Standard   Trend   Bacnet | Туре |             |  |  |  |  |  |  |
|----------------------------------|--|------|-------------|--|--|--|--|--|--|
| Boolean                          |  |      |             |  |  |  |  |  |  |
| 001                              | 000  | В    | Not managed |  |  |  |  |  |  |
| 002                              | 001  | В    | Boolean 001 |  |  |  |  |  |  |
| 003                              | 002  | В    | Boolean 002 |  |  |  |  |  |  |
| 004                              | 003  | В    | Boolean 003 |  |  |  |  |  |  |
|                                  |  | В    |             |  |  |  |  |  |  |
| 182                              | 181  | В    | Boolean 181 |  |  |  |  |  |  |
| 183                              | 182  | В    | Boolean 182 |  |  |  |  |  |  |
| 184                              | 183  | В    | Boolean 183 |  |  |  |  |  |  |

Register Modbus addresses (Analogue and Whole variables):

| Register/Coil<br>Modbus protocol | Protocol addresses:<br>Standard   Trend   Bacnet | Туре |              |  |  |  |  |  |  |
|----------------------------------|--|------|--------------|--|--|--|--|--|--|
| Analogue                         | Analogue   |      |              |  |  |  |  |  |  |
| 40001                            | 000  | А    | Not managed  |  |  |  |  |  |  |
| 40002                            | 001  | А    | Analogue 001 |  |  |  |  |  |  |
| 40003                            | 002  | А    | Analogue 002 |  |  |  |  |  |  |
| 40004                            | 003  | А    | Analogue 003 |  |  |  |  |  |  |
|                                  |  |      |              |  |  |  |  |  |  |
| 40127                            | 126  | А    | Analogue 126 |  |  |  |  |  |  |
| 40128                            | 127  | А    | Analogue 127 |  |  |  |  |  |  |
| 40129                            | 128  | А    | Analogue 128 |  |  |  |  |  |  |
| Whole                            |  |      |              |  |  |  |  |  |  |
| 40129                            | 000  | I    | Not managed  |  |  |  |  |  |  |
| 40130                            | 001  | I    | Whole 001    |  |  |  |  |  |  |
| 40131                            | 002  | I    | Whole 002    |  |  |  |  |  |  |
| 40132                            | 003  | I    | Whole 003    |  |  |  |  |  |  |
|                                  |  |      |              |  |  |  |  |  |  |
| 40255                            | 126  | I    | Whole 126    |  |  |  |  |  |  |
| 40256                            | 127  | I    | Whole 127    |  |  |  |  |  |  |
| 40257                            | 128  | I    | Whole 128    |  |  |  |  |  |  |

#### 3.6 INTERFACE DATABASE

The reference database for systems using the Modbus networks is shown below. The addresses not indicated in the database must not be used.

| Register/Coil<br>Modbus | Protocol addresses:<br>Standard   Trend   Bacnet | Туре | Flow | Conversion<br>factor | Unit<br>of<br>Measurement | Description   |
|-------------------------|--|------|------|----------------------|---------------------------|---|
| Boolean                 | 1  | 1    | 1    | 1                    | 1                         | 1   |
| 001                     | 000  | В    |      | 1                    |                           | Not managed   |
| 002                     | 001  | В    | OUT  | -                    | -                         | Unit status (0: Off - 1: On)                            |
| 003                     | 002  | В    | OUT  | -                    | -                         | Presence of Alarm (0: Unit OK – 1: Alarm)               |
| 009                     | 008  | B    | IN   | -                    |                           | On/Off command by supervisor (0:Off - 1:On)             |
| 005                     | 000  |      | OUT  | -                    |                           |   |
| 016                     | 015  | В    | OUT  | -                    | -                         | Status step 1 heating elements                          |
| 017                     | 016  | В    | OUT  | -                    | -                         | Status step 2 heating elements                          |
|                         |  |      | IN   | -                    |                           | Average status from Climapro (0: Error                  |
| 025                     | 024  | В    | OUT  | -                    | -                         | calculating/sending Average; 1: Average calculated/sent |
|                         |  |      | OUT  | -                    | -                         | correctly)  |
| Analogue                |  |      |      |                      |                           |   |
| 40001                   | 000  | Α    |      |                      |                           | Not managed   |
| 40000                   | 004  |      | IN   | Value x10            | *0                        |   |
| 40002                   | 001  | A    | OUT  | Value/10             | - <sup>-</sup> C          | Cooling temperature setpoint                            |
| 40000                   | 000  | •    | IN   | Value x10            |                           |   |
| 40003                   | 002  | A    | OUT  | Value/10             | °C                        | Heating temperature setpoint                            |
| 40004                   | 002  | •    | IN   | Value x10            | °C                        | Fan adjustment temperature setpoint with adjustment     |
| 40004                   | 003  | A    | OUT  | Value/10             |                           | according to delivery air temperature enabled           |
| 40005                   | 004  | Α    | OUT  | Value/10             | °C                        | Cooling temperature active setpoint                     |
| 40006                   | 005  | Α    | OUT  | Value/10             | °C                        | Heating temperature active setpoint                     |
| 40007                   | 006  | A    | OUT  | Value/10             | °C                        | Ambient temperature                                     |
| 40009                   | 008  | Α    | OUT  | Value/10             | °C                        | Temperature used for adjustment                         |
| 40017                   | 016  | A    | OUT  | Value/10             | bar                       | Low pressure  |
| 40022                   | 021  | Α    | OUT  | Value/10             | %                         | Ambient humidity  |
| 40024                   | 023  | Α    | OUT  | Value/10             | °C                        | Remote T probe address 129                              |
| 40025                   | 024  | Α    | OUT  | Value/10             | %                         | Remote H probe address 129                              |
| 40026                   | 025  | A    | OUT  | Value/10             | °C                        | Suction temperature                                     |
| 40041                   | 040  | A    | OUT  | Value/10             | %                         | Fan speed   |
| 40055                   | 054  | A    | OUT  | Value/10             | %                         | Humidifier request                                      |
| 40064                   | 063  | Α    | OUT  | Value/10             | °C                        | Return 1 temperature                                    |
| 40065                   | 064  | Α    | OUT  | Value/10             | °C                        | Return 2 temperature                                    |
| 40066                   | 065  | Α    | OUT  | Value/10             | °C                        | Supply air 1 temperature                                |
| 40067                   | 066  | Α    | OUT  | Value/10             | °C                        | Supply air 2 temperature                                |
| 40068                   | 067  | Α    | OUT  | Value/10             | °C                        | OC High Pressure  |
| 40069                   | 068  | Α    | OUT  | Value/10             | °C                        | Cond Temp OC  |
| 40070                   | 069  | Α    | OUT  | Value/10             | °C                        | Ext Air Temp OC   |
| 40071                   | 070  | Α    | OUT  | Value/10             | °C                        | OS High Pressure  |
| 40072                   | 071  | Α    | OUT  | Value/10             | °C                        | Cond Temp OS  |
| 40073                   | 072  | Α    | OUT  | Value/10             | °C                        | Ext Air Temp OS   |
| 40074                   | 073  | Α    | OUT  | Value/10             | °C                        | Evap Temp   |
| Whole                   |  |      | 1    |                      |                           |   |
| 40129                   | 000  | I    |      |                      |                           | Not managed   |

# SM\_Evolutionplus\_ME34\_00\_09\_20\_EN

| Register/Coil<br>Modbus | Protocol addresses:<br>Standard   Trend   Bacnet | Туре | Flow      | Conversion factor    | Unit<br>of<br>Measurement | Description   |  |  |  |  |
|-------------------------|--|------|-----------|----------------------|---------------------------|---|--|--|--|--|
| 40132                   | 003  | I    | OUT       | Value x1             | -                         | Software version  |  |  |  |  |
| 40133                   | 004  | I    | OUT       | Value x1             | -                         | Software version (revision)   |  |  |  |  |
| 40141                   | 012  | I    | OUT       | Value x1             | -                         | Unit status<br>(0: ON from keyboard, 1: ON from a digital input, 2 ON<br>from PLAN, 3: ON from time bands, 4: ON from<br>supervision, 5: OFF from alarm, 6: OFF from supervision,<br>7: OFF from time bands, 8: OFF from Plan, 9: OFF from<br>digital input 10: OFF from keyboard, 11: OFF from<br>deselected ventilation, 12: Switching off) |  |  |  |  |
| 40143                   | 014  | I    | OUT       | Value x1             | -                         | Unit operating mode<br>(0: Unit OFF, 1: Ventilation only, 2: Cooling, 3: free<br>cooling, 4: cooling+free cooling, 7: Humidification, 8:<br>Cooling+Humidification, 9: Heating, 10:<br>Heating+Humidification)  |  |  |  |  |
| 40154                   | 025  | l    | OUT       | Value x1             | -                         | Year  |  |  |  |  |
| 40155                   | 026  | I    | OUT       | Value x1             | -                         | Month   |  |  |  |  |
| 40156                   | 027  | I    | OUT       | Value x1             | -                         | Day   |  |  |  |  |
| 40157                   | 028  | I    | OUT       | Value x1             | h                         | Time  |  |  |  |  |
| 40158                   | 029  | I    | OUT       | Value x1             | m                         | Minutes   |  |  |  |  |
| 40161                   | 032  | I    | OUT       | Value x1             | -                         | Active alarm code (with greater priority)   |  |  |  |  |
| 40163                   | 034  | I    | OUT       | Value/10             | %                         | Cooling thermoregulator demand (%)  |  |  |  |  |
| 40166                   | 037  | I    | OUT       | Value/10             | %                         | Heating demand (%)  |  |  |  |  |
| 40169                   | 040  | I    | OUT       | Value/10             | %                         | Post-heating request (%)  |  |  |  |  |
|                         |  |      | IN        | Value x10            |                           |   |  |  |  |  |
| 40171                   | 042  | I    | OUT       | Value/10             | °C                        | Value of the average calculated by BMS  |  |  |  |  |
|                         |  |      | OUT       | Value x1             |                           |   |  |  |  |  |
| 10170                   | 0.17   |      | IN        | Value x1             | <b>0</b> /                |   |  |  |  |  |
| 40176                   | 047  | I    | OUT       | Value x1             | %                         | numication setpoint (%)   |  |  |  |  |
| 40177                   | 048  | I    | OUT       | Value x1             | h                         | Unit operating hours (Thousands)  |  |  |  |  |
| 40178                   | 049  | I    | OUT       | Value x1             | h                         | Unit operating hours (Units)  |  |  |  |  |
| 40191                   | 062  | I    | OUT       | Value x1             | h                         | Heating element 1 operating hours (Thousands)   |  |  |  |  |
| 40192                   | 063  | I    | OUT       | Value x1             | h                         | Heating element 1 operating hours (Units)   |  |  |  |  |
| 40193                   | 064  | I    | OUT       | Value x1             | h                         | Heating element 2 operating hours (Thousands)   |  |  |  |  |
| 40194                   | 065  | I    | OUT       | Value x1             | h                         | Heating element 2 operating hours (Units)   |  |  |  |  |
| 40195                   | 066  |      | OUT       | Value x1             | h                         | Humidifier operating hours (Thousands)  |  |  |  |  |
| 40196                   | 067  |      | OUT       | Value x1             | h                         | Humidifier operating hours (Units)  |  |  |  |  |
| 40197                   | 068  | I    | IN<br>OUT | Value x1<br>Value x1 | - °C                      | High ambient temperature set point  |  |  |  |  |
| 40198                   | 069  | I    | IN<br>OUT | Value x1<br>Value x1 | °C                        | Low ambient temperature set point   |  |  |  |  |
| 40199                   | 070  | I    | IN<br>OUT | Value x1<br>Value x1 | %                         | Ambient humidity high set point   |  |  |  |  |
| 40000                   | 074  |      | IN        | Value x1             |                           |   |  |  |  |  |
| 40200                   | 071  | I    | OUT       | Value x1             | %                         | Low ambient numidity set point  |  |  |  |  |
| 40209                   | 080  | I    | OUT       | Value x1             | V                         | Voltage measured between L1 and N   |  |  |  |  |
| 40210                   | 081  | I    | OUT       | Value x1             | V                         | Voltage measured between L2 and N   |  |  |  |  |
| 40211                   | 082  | I    | OUT       | Value x1             | V                         | Voltage measured between L3 and N   |  |  |  |  |
| 40212                   | 083  | I    | OUT       | Value x1             | V                         | Voltage measured between L1 and L2  |  |  |  |  |
| 40213                   | 084  | I    | OUT       | Value x1             | V                         | Voltage measured between L2 and L3  |  |  |  |  |
| 40214                   | 085  | I    | OUT       | Value x1             | V                         | Voltage measured between L3 and L1  |  |  |  |  |
| 40215                   | 086  | I    | OUT       | Value x1             | A                         | Current measured at L1  |  |  |  |  |

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| Register/Coil<br>Modbus | Protocol addresses:<br>Standard   Trend   Bacnet | Туре | Flow | Conversion<br>factor | Unit<br>of<br>Measurement | Description  |
|-------------------------|--|------|------|----------------------|---------------------------|--|
| 40216                   | 087  | I    | OUT  | Value x1             | А                         | Current measured at L2   |
| 40217                   | 088  | I    | OUT  | Value x1             | A                         | Current measured at L3   |
| 40218                   | 089  | I    | OUT  | Value x1             | А                         | Current measured at N  |
| 40219                   | 090  | I    | OUT  | Value x1             | W                         | L1 Power   |
| 40220                   | 091  | I    | OUT  | Value x1             | W                         | L2 Power   |
| 40221                   | 092  | I    | OUT  | Value x1             | W                         | L3 Power   |
| 40222                   | 093  | I    | OUT  | Value x1             | W                         | Total power  |
| 40223                   | 094  | I    | OUT  | Value x1             | kWh                       | Energy   |
| 40239                   | 110  | I    | OUT  | Value x1             | -                         | m-MOCU status: (0: Unavailable or Invelid, 1: Permission,<br>2: Trial Run, 3: Stand-by, 4: Prohibition, 7: Oil recovery<br>low freq) |
| 40240                   | 111  | I    | OUT  | Value x1             | %                         | Current indoor units request   |
| 40241                   | 112  | I    | OUT  | Value x1             | -                         | Error code external unit   |
| 40242                   | 113  | I    | OUT  | Value x1             | -                         | Sub error code external unit   |
| 40243                   | 114  | I    | OUT  | Value x1             | -                         | Error code attribute external unit   |
| 40247                   | 118  | I    | OUT  | Value x1             | ps                        | Current frequency OC   |
| 40248                   | 119  | I    | OUT  | Value x1             | ps                        | Current frequency OS   |



### INFORMATION:

Refer to the chapter "Configuration of the Functions" for management of certain functions from the Supervisor.

#### 4 INTERFACING WITH THE LONWORKS SYSTEM

#### 4.1 COMPONENTS REQUIRED

LonWorks interface board

Electronic control board

(Already installed on the unit)





#### 4.2 INSTALLING THE SERIAL INTERFACE BOARD

Follow the points in the chapter "Installing the serial board" to insert the LonWorks serial board into the controller.

#### 4.3 SETTING SUPERVISOR PARAMETERS

To enable communication with this type of protocol, certain parameters have to be set in the "Serial" menu as follows.

See the chapter "Parameter modification masks" for detailed information on access to the menu and the masks that can be shown.

| Mask of the terminal                      | Description   | Par.N.         |
|---|---|----------------|
| Serial<br>P30.02<br>BMS address:<br>001   | BMS address.<br>- Cannot be set (fixed at <b>001</b> )  |                |
| BMS protocol type:                        | [Standard   Modbus   GSM Modem   LON   Bacnet   TCP/IP   WinLoad]<br>- Set at <b>LON</b> (LonWorks)   | 30.02<br>30.03 |
| Serial<br>P30.04<br>BMS baudrate:<br>4800 | Baudrate for BMS communication.<br>[1200   2400   4800   9600   19200   38400]<br>- Cannot be set (fixed at <b>4800</b> *)                                      |                |
|   | * Communication speed between pCO and serial interface board.<br>The speed of communication between the interface board and the external BMS is always 78 kbps. | 30.04          |

#### 4.4 SETTING UP THE SUPERVISOR NETWORK

The supervisor network is set up by LonWorks staff.

Note: MEHITS 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.

#### 4.5 MEANING OF VARIABLES

**Analogue** (type A) variables are expressed with a decimal number (e.g. 12,0 bar  $\rightarrow$  120; 33.8°C  $\rightarrow$  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.

#### 4.6 INTERFACE DATABASE

The reference database for systems using the LonWorks networks is shown below: The addresses not indicated in the database must not be used.

| Address  | Туре | NV type | Flow | Conversion<br>factor | Unit<br>of<br>Measuremen<br>t | Description  |  |  |  |
|----------|------|---------|------|----------------------|-------------------------------|--|--|--|--|
| Boolean  | 1    |         |      |                      | 1                             | 1  |  |  |  |
| 0        | В    |         |      |                      |                               | Not managed  |  |  |  |
| 1        | В    | 95      | OUT  | -                    | -                             | Unit status (0:Off - 1:On)   |  |  |  |
| 2        | В    | 95      | OUT  | -                    | -                             | Presence of Alarm (0: Unit OK – 1:Alarm)   |  |  |  |
| 8        | в    | 95      | IN   | -                    |                               | On/Off command by supervisor (0:Off -  |  |  |  |
| 0        | D    | 50      | OUT  | -                    |                               | 1:On)  |  |  |  |
|          |      |         | OUT  | -                    |                               |  |  |  |  |
| Analogue |      | 1       |      |                      | 1                             |  |  |  |  |
| 0        | A    |         |      |                      |                               | Not managed  |  |  |  |
| 1        | А    | 105     | IN   | Value x10            | - °C                          | Cooling temperature setpoint   |  |  |  |
| · .      |      |         | OUT  | Value/10             |                               |  |  |  |  |
| 2        | Δ    | 105     | IN   | Value x10            | - °C                          | Heating temperature setpoint   |  |  |  |
| L        |      | 105     | OUT  | Value/10             |                               |  |  |  |  |
| 3        | А    | 105     | IN   | Value x10            | - °C                          | Fan adjustment temperature setpoint with<br>adjustment according to delivery air   |  |  |  |
|          |      |         | OUT  | Value/10             |                               | temperature enabled  |  |  |  |
| 6        | A    | 105     | OUT  | Value/10             | 0°                            | Room temperature   |  |  |  |
| 16       | A    | 30      | OUT  | Value/10             | bar                           | Low pressure   |  |  |  |
| 21       | A    | 81      | OUT  | Value/10             | %                             | Ambient humidity   |  |  |  |
| 40       | A    | 81      | OUT  | Value/10             | %                             | Fan speed  |  |  |  |
| 63       | A    | 105     | OUT  | Value/10             | °C                            | Return temp 1  |  |  |  |
| 64       | A    | 105     | OUT  | Value/10             | °C                            | Return temp 2  |  |  |  |
| 65       | A    | 105     | OUT  | Value/10             | °C                            | Supply temp 1  |  |  |  |
| 66       | A    | 105     | OUT  | Value/10             | °C                            | Supply temp 2  |  |  |  |
| 67       | A    | 30      | OUT  | Value/10             | bar                           | High Pressure OC   |  |  |  |
| 69       | A    | 105     | OUT  | Value/10             | °C                            | Ext Air Temp   |  |  |  |
| 70       | A    | 30      | OUT  | Value/10             | bar                           | High Pressure OS   |  |  |  |
| Whole    |      |         |      |                      | 1                             | 1  |  |  |  |
| 0        | I    |         |      |                      |                               | Not managed  |  |  |  |
| 12       | I    | 0       | OUT  | Value x1             | -                             | Unit status<br>(0:ON from keypad, 1:ON from digital input,<br>2:ON from PLAN, 3: ON from time bands,<br>4:ON from supervision, 5: OFF from alarm,<br>6: OFF from supervision, 7:OFF from time<br>bands, 8: OFF from Plan, 9: OFF from digital<br>input 10: OFF from keypad, 11:OFF from<br>deselected ventilation, 12:disconnection) |  |  |  |
| 14       | I    | 0       | OUT  | Value x1             | -                             | Unit operating mode<br>(0: Unit OFF, 1: Ventilation only, 2: Cooling,<br>3: free cooling, 4: cooling+free cooling, 7:  |  |  |  |

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| Address  | Туре | NV type | Flow | Conversion<br>factor | Unit<br>of<br>Measuremen<br>t          | Description   |  |  |  |  |
|----------|------|---------|------|----------------------|--|---|--|--|--|--|
|          |      |         |      |                      |  | Humidification, 8:Cooling+Humidification,<br>9:Heating, 10: Heating+Humidification)   |  |  |  |  |
| 16       | I    | 0       | OUT  | Value x1             | -                                      | Compressor 2 status   |  |  |  |  |
| 17       | I    | 0       | OUT  | Value x1             | -                                      | Compressor 3 status   |  |  |  |  |
| 32       | I    | 0       | OUT  | Value x1             | -                                      | Active alarm code (with greater priority)   |  |  |  |  |
| 34       | I    | 81      | OUT  | value/10             | %                                      | Cooling thermoregulator demand (%)  |  |  |  |  |
| 37       | I    | 81      | OUT  | value/10             | %                                      | Heating demand (%)  |  |  |  |  |
|          |      |         | OUT  | Value x1             |  |   |  |  |  |  |
| 47       |      | 04      | IN   | Value x1             | 0/                                     |   |  |  |  |  |
| 47       |      | 01      | OUT  | Value x1             | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | Humidification setpoint   |  |  |  |  |
| <u> </u> |      | 105     | IN   | Value x1             | *0                                     | Link endient termentung och neint   |  |  |  |  |
| 00       | 1    | 105     | OUT  | Value x1             |  |   |  |  |  |  |
| <u> </u> |      | 105     | IN   | Value x1             | *0                                     |   |  |  |  |  |
| 69       | 1    | 105     | OUT  | Value x1             |  | Low amplent temperature set point   |  |  |  |  |
| 70       |      | 01      | IN   | Value x1             | 0/                                     | Lich ambient humidity and point   |  |  |  |  |
| 70       | 1    | 01      | OUT  | Value x1             | - %<br>/0                              | High ambient numicity set point   |  |  |  |  |
| 71       |      | 01      | IN   | Value x1             | 0/                                     | Low ombient temperature act point   |  |  |  |  |
| / 1      |      | 01      | OUT  | Value x1             | 70                                     | Low ambient temperature set point   |  |  |  |  |
| 110      | I    | 0       | OUT  | Valore x1            | -                                      | m-MOCU status (0: Unavailable or Invelid, 1:<br>Permission, 2: Trial Run, 3: Stand-by, 4:<br>Prohibition, 7: Oil recovery low freq) |  |  |  |  |
| 111      | I    | 81      | OUT  | Valore x1            | %                                      | Current indorr units request  |  |  |  |  |
| 112      | I    | 0       | OUT  | Valore x1            | -                                      | Error codeexternat unit   |  |  |  |  |
| 113      | I    | 0       | OUT  | Valore x1            | -                                      | Sub Error code external unit  |  |  |  |  |
| 114      | I    | 0       | OUT  | Valore x1            | -                                      | Error code attribute external unit  |  |  |  |  |
| 118      | I    | 0       | OUT  | Valore x1            | -                                      | Current frequency OC  |  |  |  |  |
| 119      | I    | 0       | OUT  | Valore x1            | -                                      | Current frequency OS  |  |  |  |  |

#### 5 INTERFACING WITH THE BACNET SYSTEM

#### 5.1 COMPONENTS REQUIRED

• BACnet serial interface board

As well as the BACnet MS/TP board (for RS485 network) the BACnet TCP/IP serial board is also available





#### • Electronic control board (Already installed on the unit)

#### 5.2 INSTALLING THE SERIAL INTERFACE BOARD

Follow the points in the chapter "Installing the serial board" to insert the BACnet serial board into the controller.

#### 5.3 SETTING SUPERVISOR PARAMETERS

To enable communication with this type of protocol, certain parameters have to be set in the "Serial" menu as follows.

See the chapter "Parameter modification masks" for detailed information on access to the menu and the masks that can be shown.

| Mask of the terminal  | Description  | Par.N.         |
|---|--|----------------|
| Serial<br>P30.02<br>BMS address:<br>011<br>P30.03<br>BMS protocol type:<br>Bacnet | BMS address.<br>- Set with the identification number of the unit (from <b>001</b> to <b>200</b> , default 011)<br>Type of BMS Protocol.<br>[Standard   Modbus   GSM Modem   LON   Bacnet   TCP/IP   WinLoad]<br>- Set at <b>Bacnet</b>   | 30.02<br>30.03 |
| Serial<br>P30.04<br>BMS baudrate:<br>19200  | Baudrate for BMS communication.<br>[1200   2400   4800   9600   19200   38400]<br>- Set at <b>19200*</b><br>* Communication speed between pCO and serial interface board.<br>The speed of communication between the interface board and the external BMS can be<br>9600 – 19200 – 36400 – 76800. | 30.04          |

#### 5.4 MEANING OF VARIABLES

Analogue (type A) variables are expressed with a decimal number (e.g. 12,0 bar  $\rightarrow$  120; 33.8°C  $\rightarrow$  338).

The scale factor of the analogue variables must be multiplied by 10 before being applied to the read or written variable value.

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.

#### 5.5 SETTING UP THE SUPERVISOR NETWORK

The supervision network is set up by the technicians developing the BACnet interface. **The Modbus protocol database is used for interfacing.** 

For the MS/TP version of the BACnet protocol, the supervisor network must be set up as shown in the diagram below.



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 up to 1000 m is guaranteed as standard. It is recommended to use a shielded and twisted 3 x AWG 22/7 cable for the network.

If the reference signal must be equalised use the third wire.

The serial connection must be 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 plant is proportional to the number of units supervised by the BMS.

For the TCP/IP version of the BACnet protocol, the supervisor network must be set up using ETHERNET RJ45 CAT5e cables.

#### 6 INTERFACING WITH THE SNMP SYSTEM

#### 6.1 COMPONENTS REQUIRED

• BACnet TCP/IP serial interface board

Electronic control board

(Already installed on the unit)

This Ethernet board is used for connection to the SNMP v1, v2c, v3 networks





#### 6.2 INSTALLING THE SERIAL INTERFACE BOARD

Follow the points in the chapter "Installing the serial board" to insert the BACnet TCP/IP serial board into the controller.

#### 6.3 SETTING SUPERVISOR PARAMETERS

To enable communication with this type of protocol, certain parameters have to be set in the "Serial" menu as follows.

See the chapter "Parameter modification masks" for detailed information on access to the menu and the masks that can be shown.

| Mask of the terminal  | Description  | Par.N.         |
|---|--|----------------|
| Serial<br>P30.02<br>BMS address:<br>011<br>P30.03<br>BMS protocol type:<br>Standard | BMS address.<br>- Set with the identification number of the unit (from <b>001</b> to <b>200</b> , default 011)<br>Type of BMS Protocol.<br>[Standard   Modbus   GSM Modem   LON   Bacnet   TCP/IP   WinLoad]<br>- Set at <b>Standard</b>   | 30.02<br>30.03 |
| Serial<br>P30.04<br>BMS baudrate:<br>19200  | Baudrate for BMS communication.<br>[1200   2400   4800   9600   19200   38400]<br>- Set at <b>19200*</b><br>* Communication speed between pCO and serial interface board.<br>The speed of communication between the interface board and the external BMS can be<br>9600 – 19200 – 36400 – 76800. | 30.04          |

#### 6.4 SETTING UP THE SUPERVISOR NETWORK

The supervisor network is set up by the technicians developing the SNMP interface.

The Modbus protocol database is used for interfacing.

*Note*: MEHITS will provide the boards and some files required by the SNMP engineers to configure the network. A file in .MIB format will be supplied. The board is programmed by the technician in charge of the integration.

#### 6.5 MEANING OF VARIABLES

**Analogue** (type A) variables are expressed with a decimal number (e.g. 12,0 bar  $\rightarrow$  120; 33.8°C  $\rightarrow$  338) If a probe is in an alarm condition a value equal to -99.9 is sent. If a probe or a parameter is not configured a value equal to -88.8 is sent.

## 7 ANNEXES

#### 7.1 AWG (AMERICAN WIRE GAUGE) CONVERSION TABLE

Conversion: AWG number – Diameter in mm – Area in mm<sup>2</sup>

| AWG no. | Diameter mm | Area mm <sup>2</sup> |
|---------|-------------|----------------------|
| 1       | 7.350       | 42.400               |
| 2       | 6.540       | 33.600               |
| 3       | 5.830       | 26.700               |
| 4       | 5.190       | 21.200               |
| 5       | 4.620       | 16.800               |
| 6       | 4.110       | 13.300               |
| 7       | 3.670       | 10.600               |
| 8       | 3.260       | 8.350                |
| 9       | 2.910       | 6.620                |
| 10      | 2.590       | 5.270                |
| 11      | 2.300       | 4.150                |
| 12      | 2.050       | 3.310                |
| 13      | 1.830       | 2.630                |
| 14      | 1.630       | 2.080                |
| 15      | 1.450       | 1.650                |
| 16      | 1.290       | 1.310                |
| 17      | 1.150       | 1.040                |
| 18      | 1.024       | 0.823                |
| 19      | 0.912       | 0.653                |
| 20      | 0.812       | 0.519                |
| 21      | 0.723       | 0.412                |
| 22      | 0.644       | 0.325                |
| 23      | 0.573       | 0.259                |
| 24      | 0.511       | 0.205                |
| 25      | 0.455       | 0.163                |
| 26      | 0.405       | 0.128                |
| 27      | 0.361       | 0.102                |
| 28      | 0.321       | 0.080                |
| 29      | 0.286       | 0.065                |
| 30      | 0.255       | 0.050                |

#### 7.2 ETHERNET SERIAL INTERFACE: INTERFACING WITH THE BACNET OR SNMP SYSTEM

#### 7.2.1 Use

The ETHERNET board acts as a "gateway", in other words, a translator between the proprietary protocol and the BACnet and SNMP protocols. These are the emerging protocols in the world of HVAC and based on the Ethernet standard. The board has an extensive memory (8MB flash, 4MB of which available to the user) and calculation capacity (ARM7 74MHz processor with Linux operating system).

The Ethernet board is used to connect to the following networks:

- LAN or the Internet:
  - Thanks to its web-server capability, users can download, via FTP, the HTML pages relative to their application and then use a browser such as Internet Explorer to view/edit the variables sent to the supervisor.
- SNMP v1, v2c, v3 networks;
- BACnet Ethernet ISO8802-2 over 8802-3 networks;
- BACnet/IP networks.

The network parameters can also be configured automatically if a DHCP server is present.

By connecting the Ethernet board to an Ethernet network, the following functions can be used:

WEB Server:

Allows the user to check or change the operating status of the EVOLUTION+ controller using a remote computer with, for example, Internet Explorer<sup>™</sup> or Mozilla Firefox. It is possible to insert dynamic web pages built by the user; it supports CGI technology; it supports web page access protection.

Logger:

The Ethernet board can save the values of some EVOLUTION+ controller variables to a non-volatile memory file. This file can be downloaded to a PC via Internet Explorer™.

- Charts:
- The trends of the data recorded using the Logger function can be consulted in chart form.
- E-mails:

The Ethernet board can send e-mails if events that can be programmed by the EVOLUTION+ controller occur (tripped alarms, exceeded thresholds), or at preset time intervals. An XML file containing the values of variables can be attached.

FTP Push:

The Ethernet board can send a XML file containing values of variables to a suitably configured computer. Transmission can be programmed in the same way as for sending e-mails (events or time intervals). The file is sent using the FTP protocol;

SNMP v1 & v2:

To access the Ethernet board from a computer using supervision software based on the SNMP protocol. The Ethernet board can send programmable "enterprise" type Trap or Inform to notify alarms.

BACnet Ethernet ISO8802-2 over 8802-3:

To access the Ethernet board of the EVOLUTION+ controller using supervision software based on the BACnet Ethernet protocol.

- BACnet/IP (Addenda A/Annex J):
- For access using supervision software based on the BACnet/IP protocol.
- FTP Server:

To easily copy data files or web pages from/to the Ethernet board, using programs where icons are simply dragged from one window to another.

DHCP:

To connect the Ethernet board to a local network that automatically assigns addresses from the central server, rather than static addresses set in the individual devices.

- Plugin:
- To insert additional applications realised by the user in script or compiled format.
- Firmware update:
  - The Ethernet board firmware can be updated via computer.

Before a PC can communicate with the Ethernet board, the settings of both devices must be correctly aligned.

As the factory settings of the Ethernet 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 Ethernet board.

The configuration procedures are described in the following sections.

#### 7.2.2 PC settings

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



Follow these steps to set the Personal Computer to use the IP address 172.16.0.2 instead of the DHCP. The Subnet mask field also needs to be specified. The Gateway does not need to be specified.

- 1. Access the "Control Panel".
- 2. Double click "Network Connections".
- 3. Double click on "Local Area Connection (LAN)".
- 4. Click "Properties".
- 5. Double click "Internet Protocol (TCP/IP)".

Before changing the settings, take note of all existing settings. They will be needed to reset them after work so that the PC is once again able to communicate with the data network it was previously connected.

- 6. Click "Use the following IP address".
- 7. Set the following parameters:
  - IP address = 172.16.0.2
    - Subnet mask = 255.255.0.0
- 8. Press OK to close the windows.

|  | 🖕 Proprietă - Connessione alla rete locale (LAN) 🛛 🔋 🔀  | Proprietà - Protocollo Internet (ТСРЛР)  |  |  |  |  |
|--|---|--|--|--|--|--|
| Connessione alla rete locale<br>(LAN)<br>Cavo di rete scollegato, con fi | Generale Avanzate Connetti tramite: Broadcom Ne®0treme 57xx Gigabit Cc Configura La connessione utilizza i componenti seguenti: Candivisione file e stampanti per reti Microsoft Condivisione file e stampanti per reti Microsoft Condicisione file e stampanti per reti Microsoft Cond | Generale         É possibile ottenere l'assegnazione automatica delle impostazioni IP se la rete supporta tale caratteristica. In caso contrario, sarà necessario nichiedere all'amministratore di rete le impostazioni IP corrette.         O Ottieni automaticamente un indrizzo IP         Indrizzo IP:         Indrizzo IP:         Indrizzo IP:         Subnet mask:         255         Gateway predefinito: |  |  |  |  |
|  | Installa Disinistration Proprietà   | Ottiern indiczco servei DNS automaticamente<br>Ottiern indiczo servei DNS:<br>Server DNS preferito:<br>Server DNS alternativo:<br>Avanzate   |  |  |  |  |
| в.,  | Mostra un'icona sull'area di notifica quando connesso     Notifica in caso di connettività limitata o assente   |  |  |  |  |  |
|  | OK Annulla  | OK Annu  |  |  |  |  |

The Personal Computer 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. Access the "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.

| Proprietà - Internet   | Proprietà - Internet 🔹 🎅 🔀   |   |
|--|--|---|
| Connession Programmi Avanzate<br>Protezione Privacy Contenuto  | Generale Protezione Privacy Contenuto<br>Connessioni Programmi Avanzate  |   |
| Pagina iniziale<br>Per creare le schede della pagina iniziale, digitare ogni indrizzo<br>sulla riga corrispondente.<br>http://www.google.tt/           | Per impostare una connessione Internet, Imposta<br>scepiere Imposta.<br>Impostazioni connessioni remote e VPN  | Impostazioni rete locale (LAN) Configurazione automatica È possibile che con la configurazione automatica le impostazioni manuali vengano ignorate. Per utilizzare tali impostazioni, disattivare |
| Pagina corrente     Pagina predefinita     Pagina vuota     Cronologia esplorazioni     Concente di eliminaria i fla temperanei la conclusia la        | Aggiung<br>RimupVI<br>Impostazioni   | la configurazione automatica.<br>Rileva automaticamente impostazioni<br>Utilizza script di configurazione automatica<br>Indiritzzo  |
| Conserve di alumita e in formazioni di moduli Web.     Elimina     Impostazioni     Ricerca     Consente di modificare le impostazioni di Impostazioni | Per configurare un server proxy per una<br>connessione, scegliere Impostazion.   | Server proxy<br>Utilizza un server proxy per le connessioni LAN. Queste<br>prostazioni non verranno applicate alle connessioni remote o   |
| Schede Consente di modificare la visualizzazione Impostazioni delle pagne Web.   | Unizza sempre la convessione remota presennita<br>convessione Nessuno<br>predefinita<br>Impostazioni rete locale (LAN)<br>Le impostazioni LAN noi vengono applicate alle<br>Impostazioni LAN | Indirizzo: 126.200,1.4 Porta: 8080 Avanzate   |
| Aspetto Colori Lingue Caratteri Accesso facilitato   | connession remota, Per le impostazioni di<br>connessione remota, scegliere il pulsante<br>Impostazioni.  | OK Annulia  |
| OK Annula Applica  | OK Annula Applica  |   |

7.2.3 Starting the Ethernet board with factory settings



#### CAUTION:

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

- 1. Switch on the EVOLUTION+ controller.
- Make sure that both LEDs of the Ethernet board connector light up within a few seconds.
- 3. As soon as it restarts and the Status LED turns a steady **green**, press and hold the button to activate the factory settings.
- 4. Keeping the button held down, after about 20 seconds the Status LED slowly flashes **red** 3 times. Release the button during these 3 flashes.
- 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).
- 6. The Status LED starts flashing when the Ethernet board is effectively running.

In this way, the Ethernet board does 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 remain **active until the Ethernet board is restarted**. After restart, the Ethernet board will return to the "User" configuration values.

It is recommended that the network communication parameters are configured immediately.



#### 7.2.4 Access the Ethernet board via the PC

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



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

Nome utente:

Password:

١ 👷

Memorizza password

OK

🖉 Google - Windows Internet Explorer

1. Open a web browser on the PC. Enter 172.16.0.1 in the address bar and press Send.

2. The main page of the Ethernet board appears ("index.html"). Click on "Go to Administrator Area".



\*

Annulla

admin

fadmin

- 3. At the login request enter the factory values:
  - Username: admin
  - Password: fadmin

 If the details entered during the previous access stage are correct, the page shown in the figure appears. Update the data of the variables by clicking the Information button.

| taters • 🔘 📄                | G Pa            | -      | -    | e : | .)     | 19     | - 8    |      | 3   |            |       |        |        |      | -    |      |
|-----------------------------|-----------------|--------|------|-----|--------|--------|--------|------|-----|------------|-------|--------|--------|------|------|------|
| 1991                        | -               |        |      |     |        |        |        |      |     |            |       |        |        |      |      |      |
| Information                 | INCOME.         |        |      |     |        |        |        |      |     |            |       |        |        |      |      |      |
| Configuration               | 16-30           | 0      |      |     | 0      | 1      | 20     | 90   |     | 9          |       | 0      |        | 10   | 0    | 0    |
| ock and Longer              | 46-60           | ž      | 0    | 0   | 0      | (B)    | 1      | 0    | .0  | 0          | - 0-1 | 0      | 0      | 0    | 0    |      |
| Events                      | 76:90           | 0      | 0    | 0   | ě.     | 1000   | 0      | - 6  | 0   | 0          |       | 0      | 0      |      | 0    | 0    |
| Tests                       | 106-120         | ů.     | 0    | 0   | 0      | 1980   | 0      | 0    | 10  | 0          | - 2   | 0      | 0      | 0    | 0    | 0    |
| I CONS                      | 136-150         | 0      |      | 6   | 0      | 181    | 2      | - di | 181 | 0          | 1.61  | 8      | 0      |      | ě.   | 0    |
| Customer Site               | 166-100         | ě.     | 0    | .0  | 0      | 1.01   | Ű      | 141  | 0   | 0          | ÷.    | Ű.     | 0      | ě.   |      |      |
| Info & Contact              | 106-207         | ě      | ő    | 0   |        | - iic  | ő      | - ŭ  | .0  | - <u>0</u> | ő     | Ű      | ů.     |      | . 9. | 10.0 |
| Fallent                     | 1-15            | -000.0 | 89.9 |     | .999.9 | -999.0 | -999.0 | 0.0  | 0.0 | 70.0       | 0.0   | -999.9 | 22     | 0.0  | 0.0  | 0.0  |
|                             | 31-45           | 0.0    | 0.0  | 0.0 | 0.0    | 0.0    | 0.0    | 0.0  | 0.0 | 0.0        | 0.0   | 0.0    | 0.0    | 0.0  | 0.0  | 0.0  |
| And and the second party of | 61-75           | 0.0    | 0.0  | 0.0 | 0.0    | 0.0    | 9.0    | 10   | 0.0 | 0.0        | 0.0   | 0.0    | 0.0    | 0.0  | 0.0  | 0.0  |
|                             | 76-90<br>91-105 | 0.0    | 0.0  | 0.0 | 0.0    | 0.0    | 0.0    | 0.0  | 0.0 | 0.0        | 8.0   | 0.0    | 0.0    | 0.0  | 0.0  | 0.0  |
| 1.1.1.1.1.1.1.1.1           | 106-120         | 50     | 8.0  | 0.0 | 80     | 0.0    | 0.0    | 8.0  | 6.0 | 0.0        | 0.0   | 0.0    | 0.0    | 0.0  | 0.0  | 0.0  |
|                             | 136-150         | 0.0    | 4    |     | 0.     |        | 10     | 14.1 | -ŭ. | ų.         | ÷.    | U.     | ų.     | - ŭ  | ŭ.   | - ŭ  |
|                             |                 |        |      |     | - 10   | - 58   | 1.0    |      |     |            | - 18  | - 12   | - 12   | - 14 |      | 1.00 |
| milache sur 22. or.         | 151-105         | ů.     | 1.61 | .W  | W.     | 14     | 10     | 10 U | .0  | ÷.         | - M   | -W     | - M. 1 | M    | 10   |      |

|  | Information   | General Network pCO Com                                       |
|--|---|---|
|  | Configuration<br>Clock and Logger   | System Information  |
|  | Events<br>Tests   | View used/free disk space                                     |
| As the Ethernet heard in its factory configuration is set with   | Customer Site   | View factory bootswitch parame     View network configuration |
| DHCP addressing (automatic addressing), it will already be   | Info & Contact  | 2   |
| <ul> <li>operational and no further action will be required.</li> <li>5. To set the user network parameters, click on "Configuration", then on the "Network" board and set the following basic network parameters: <ul> <li>IP address</li> <li>NetMask</li> </ul> </li> </ul> | Cannal Réverir pCO Com<br>R View network configuration<br>Ip Addresses and Subnet Hasks<br>OND<br>IP Addresses and Subnet Hasks<br>OND<br>IP Addresses and Subnet Hasks<br>OND<br>IP Addresses and Subnet Hasks<br>OND<br>IP Addresses<br>IP Adaption<br>IP Addresses<br>IP Adaption<br>Cateway<br>Cateway Addresses<br>DMS servers<br>Primary Office | SIGNE         Plagins         Users         Firmware          |

The set values will only be used from the next time the Ethernet board is restarted.

#### 7.2.5 Configuring the board for the BACnet or SNMP protocol

The configuration of the parameters for the BACnet protocol is available

The Ethernet 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

on the corresponding page of the "Configuration" menu.

| Device Properties              |  |                          |
|--------------------------------|--|--------------------------|
| BAChet LAN Type                | ◎ BACnettP 4   | BACnet Ethemet           |
| BACNEEP OOP                    | BACO   | hisiadecimal             |
| pCOWeb Device Inst             | 77000  | (0 to #194303)           |
| Description                    | Carel BACnet G   | atewa                    |
| Location                       | Unknown  |                          |
| APDU Timedut                   | 5000   | millisecunds             |
| APOU Retries                   | 3  |                          |
| Password for Restart           | 1234   |                          |
| Alarm Parameters               |  |                          |
| Alarming Enabled               | O Yes @ No   |                          |
| Broodcast Alarms               | O Yes @ No   |                          |
| Alarm Destination Devior Inst. | 0  | (0 to #194303)           |
| Alarm Process 1d               | 0  |                          |
|                                |  |                          |
|                                |  |                          |
| and a second                   |  |                          |
| and a                          |  |                          |
|                                |  |                          |
|                                |  | Canada States States The |
| Date and County                | Configuration  |                          |
|                                | and the second sec | (H)                      |
| Funda                          |  |                          |

The configuration of the parameters for the SNMP protocol is available or the corresponding page of the "Configuration" menu.

The set values will only be used from the next time the Ethernet board is restarted.



#### CAUTION:

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

10.00

3 13 17

#### 7.2.6 Notification events

The transmission of notification messages when events occur can be programmed. The following message notification types are available:

- E-mail, the body of which can contain a custom text or a web page with the EVOLUTION+ controller variable values read at the moment of transmission; a custom XML file containing the variable values can also be attached.
- XML file, identical to the one that can be forwarded by e-mail, but sent through the FTP protocol (FTP Push function).
- Trap or Inform SNMP, to which a selection of up to 5 variable values can be attached.

#### Setting of recipients

1. On the main page of the Ethernet board, open the "Events" page.

2. Open the recipient settings window and the attachable "View and modify the events recipients" files for e-email configuration (these must be supplied by the system administrator).

The settings of this window are common to all generated events.

| COMet Configuration Ma        | Cressift Discreet Laplaces   |    |
|-------------------------------|--|----|
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| 200                           |  |    |
| 10                            |  |    |
| Information                   |  |    |
| and an and a second second    | Events Handlers  |    |
| Contiguration                 | Asynchronous Events  |    |
| Clock and Logger              |  |    |
| Events                        | 🗰 Events, trippered by digitals variables  |    |
| Tests                         | Events trippered by drohops surisities   |    |
| Customer Site                 | # Events tripperent by integers wielables  |    |
| Info & Contact                |  |    |
|                               | Eynchronous Events   |    |
| Rebest                        | Events triggered by the scheduler  |    |
| Andrew Province               | Messages Receivers Configuration   |    |
|                               | Charles and Charles an   |    |
| 41.1.4-32.2.2                 | In Allow and toodily the events' neithernty  |    |
|                               |  |    |
| 10104-5-10.775w               | Were and movility the status messages  |    |

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| estination #2  |   |   |
| estination #3  |   |   |
| estination #4  |   |   |
| estination #5  |   |   |
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| (***) #ddBog "Dlatts)" to Henimitia<br>g015Wmb'n septem chick data;<br>Using 204473 septem chick data;<br>Using 204432 septem, and 1055223 a<br>membr, 27 that dag and 1055223 a | I part of "Attached Blassana name", p103<br>, in Asserglin, 1994-87-27, 195523-surput<br>m Ba Inserv, materies and seconds. | rah vell autoatettata (gata) weth the<br>control otherw 2000 in the gate, 7 the |
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Transmission of notifications regarding variable variations

- 1. Click one of the following:
  - "Events triggered by digital variables"
  - "Events triggered by analogue variables"
  - "Events triggered by integer variables"

An example of setting a digital variable is shown in the figure.

2. Click the check box of the variable. (Digital variable 1 in the example)

3. Customise the parameters.

For all the functions and details of the individual menus, see the full Ethernet board manual.







#### 8 CONFIGURATION OF THE FUNCTIONS

In this section, the meanings of the variables are explained in relation to the functions enabled.

#### 8.1 SWITCHING OF DX AND CW CIRCUIT FOR MAINTENANCE

Enable: Parameter P30.10

Variables:

• Management of the circuit to which the unit is to be forced:

| Register/Coil<br>Modbus protocol | Protocol addresses:<br>Standard   Trend   Bacnet | Туре | Flow | Conversion<br>factor | Unit<br>of<br>measurem<br>ent | Description                                    |
|----------------------------------|--|------|------|----------------------|-------------------------------|--|
| 014                              | 012  | D    | IN   | -                    |                               | CW/ DX switch by supervisor (0: DX 1:CW)       |
| 014                              | 013  | D    | OUT  | -                    | -                             | CVV-DA switch by supervisor (0. $DA = 1.CVV$ ) |

• Management of effective forcing:

| Register/Coil<br>Modbus protocol | Protocol addresses:<br>Standard   Trend   Bacnet | Туре | Flow | Conversion<br>factor | Unit<br>of<br>measurem<br>ent | Description                            |
|----------------------------------|--|------|------|----------------------|-------------------------------|--|
| 027                              | 026  | р    | IN   | -                    |                               | Forcing of the circuit for maintenance |
| 037                              | 030  | Б    | OUT  | -                    | -                             | (DF unit)                              |

Restarting the unit stops forcing for maintenance.

#### 8.2 ADJUSTMENT WITH TEMPERATURE PROVIDED BY THE SUPERVISOR

Enable: Parameter P30.09

Variables:

• Temperature provided by the Supervisor:

| Register/Coil<br>Modbus protocol | Protocol addresses:<br>Standard   Trend   Bacnet | Туре | Flow | Conversion<br>factor | Unit<br>of<br>measurem<br>ent | Description                                 |
|----------------------------------|--|------|------|----------------------|-------------------------------|---|
| 40171                            | 042  | I    | IN   | Value/10             | С°                            | Value of the average calculated by Climapro |

Variable for notification of errors or inaccuracy of the value:

| Register/Coil<br>Modbus protocol | Protocol addresses:<br>Standard   Trend  <br>Bacnet | Туре | Flow | Conversion<br>factor | Unit<br>of<br>measurement | Description                                     |
|----------------------------------|---|------|------|----------------------|---------------------------|---|
| 025                              | 024   | В    | IN   | -                    | -                         | Average status from Climapro (0: Error   1: OK) |

This variable indicates whether the Supervisor has succeeded in sending the temperature (or succeeded in calculating the average temperature, if used for this purpose). In case of error notification, the controller sends the temperature measured by the probe of the unit instead of the variable sent by the Supervisor.

The variable is managed as follows:

- 0: Error sending temperature / Error calculating Average.
- 1: Temperature send correctly / Average calculated correctly.



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