INSTALLATION, CONNECTION AND SETTINGS WALL MOUNTED CONTROL EDA649, EDB649, ECA644, ECA647 FOR USE IN A MODBUS RTU SERIAL NETWORK

Warnings

⚠ This instruction manual forms an integral part of the device and therefore must be carefully preserved and must ALWAYS travel with it, even if you transfer the device to another owner or relocate it to other premises.

If the manual gets damaged or lost, download a copy from the website.

⚠ For a rapid and right assembly of the components follow carefully the sequences described in the various sections.

⚠ All the operations must be performed by qualified personnel using the required Personal Protective Equipment.

⚠ This document is restricted in use to the terms of the law and may not be copied or transferred to third parties without the express authorization of the manufacturer.

Description

The terminal board +AB- of the INN-FR-B32 Printed circuit board allows the connection of the same present in the control panels ECA644, ECA647, ESE645 and ESE648 to a serial communication network "Modicon ModBus" RTU.

⚠ The ESE645 kit can only be installed in combination with the electronic controls EDA649 e EDB649. In this case the connection from the electronic board INN-FR_B32 is not necessary because the electronic controls EDA649 e EDB649 have a specific serial port to connect.

A	INN-FR-B32 board
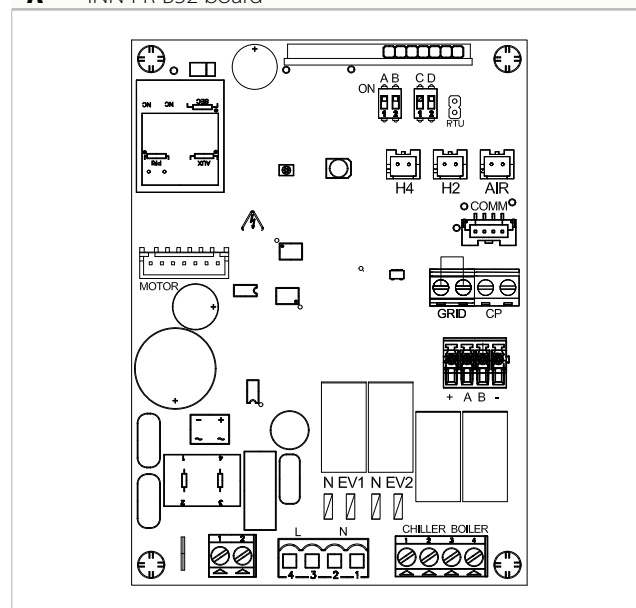
Electric connections

Preliminary warnings

⚠ Before each intervention:
- disconnect the device from the power mains by turning the system master switch to "OFF"
- wait for the components to cool down in order to avoid any burns

⚠ Make sure that there is no voltage before operating.

⊝ Any technical intervention before disconnecting the unit from the power supply is forbidden.
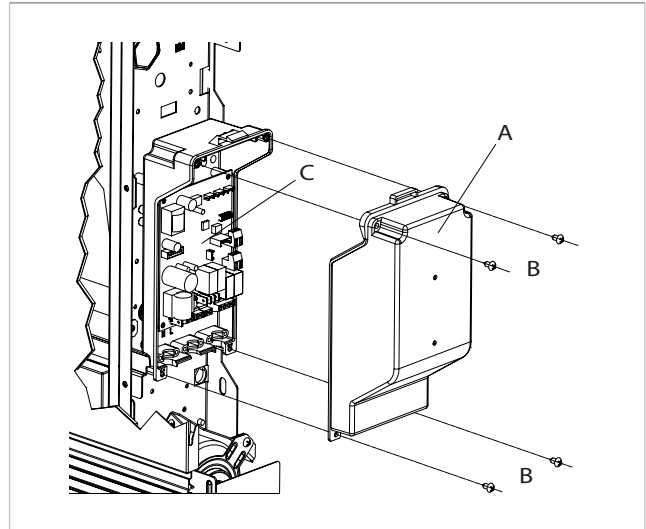
Access to the printed circuit board

To access the electrical connection area:
- follow the instructions in the installation manual of the appliance

To access the Printed circuit board:
- access the electrical connection area
- unscrew the fixing screws of the electric box
- remove the cover

A	Cover of the electrical box
B	Fixing screws
C	PCB

Electrical connections ECA644 - ECA647

For connection of the electronic board to a "Modicon Mod-Bus" RTU serial communication network:
- follow the indication on the connection diagram
- connect to the ModBus connector with serigraphy on the board

- connect respecting the indication "A" and "B"

⚠ For all other connections, refer to the diagrams and instructions in the installation manual.

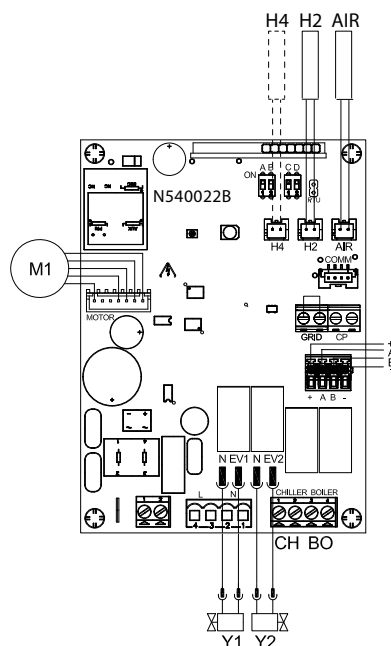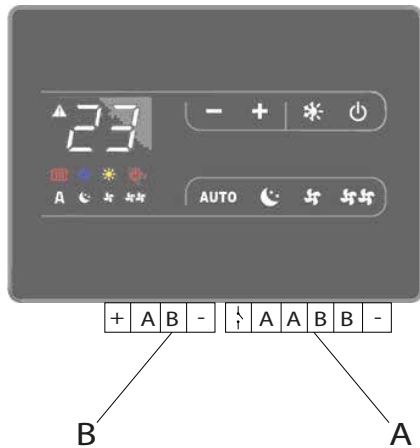| +AB-	ModBus RTU serial connection
H2	Hot water temperature probe 10 kΩ
H4	Water temperature probe 10kΩ (only for ECA647)
AIR	Optional air probe
M1	Fan motor DC Inverter
CP	Presence input sensor
Y1	(N-EV1) Water solenoid valve (230 V/50 Hz 1 A power output)
Y2	(N-EV2) Hot water solenoid valve (only for ECA647, voltage output 230 V/50 Hz 1 A)
L-N	230 V/50 Hz electrical power supply connection
BO	Boiler contact output (free contact max 1 A)
CH	Chiller consent output (free contact max 1 A)

Electrical connections EDA649 - EDB649 with on-board Printed circuit board ESE645

A	ModBus RTU Serial Connection
B	Serial connection for fancoil

For connection of the electronic board to a "Modicon ModBus" RTU serial communication network:

– connect to the terminal block on the wall control unit

⚠ For all other connections, refer to the diagrams and instructions in the installation manual.

⚠ The choice of materials and the routing of the connection are fundamental for correct operation.

⚠ Use a bipolar shielded cable suitable for the RS485 serial connection with a minimum section of 0,35 mm².

⚠ The connection can be maximum of 500 m in total.

⚠ A maximum of 50 units can be connected to each wall panel.

⚠ Keeping the bipolar cable separate from power supply cables.

⚠ Chase out the wall in order to minimize the length of the leads.

⚠ Complete the line with the 120 Ω resistance.

⊖ It is forbidden make "star" connections.

1.	Terminal block for device connection
2.	The terminal block for CP presence contact connection
3.	PCB
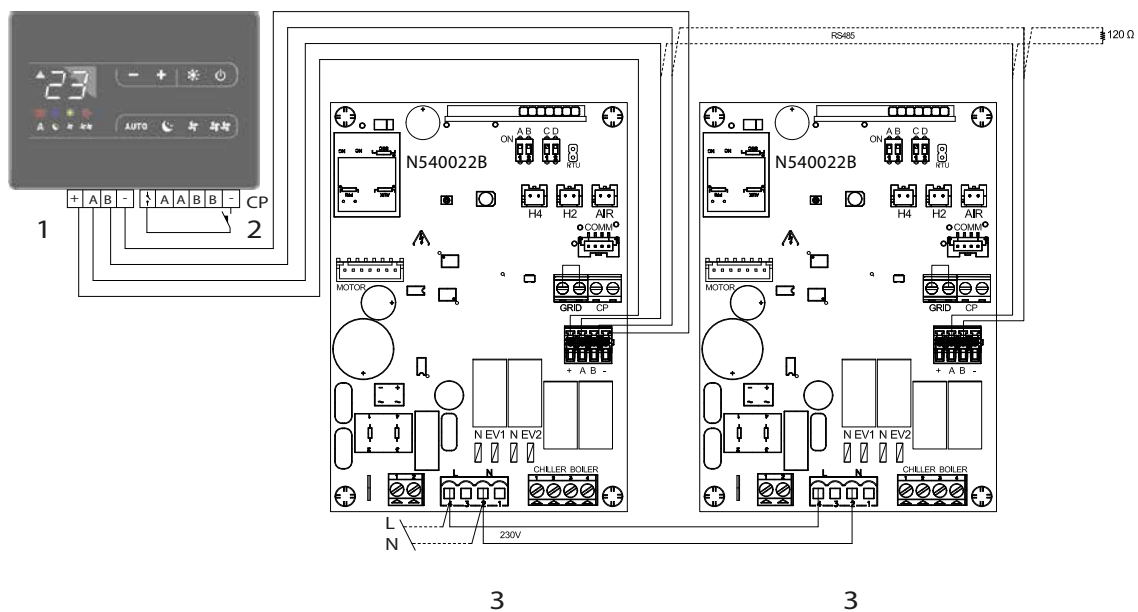
Serial Port Features

Protocol

The serial communication protocol is "Modicon Modbus" in RTU mode with the following settings:
- baudrate=9600
- data bits=8
- parity=none
- stop bit=1

The implemented functions are:

- "03" and "06" respectively for the reading and writing of a single register
- the main adjustment parameters (R/W), the acquired temperature and the operating status are made available

Network accessible parameters

Configuration registers

The table below shows the addresses of the control parameters resident on the INN-FR-B32 eESE645 - ESE648 board and the ECA644, ECA647, EDA649 e EDB649 wall-mounted control panel.

In the typ column, it is specified if these registers are read only (R) or writable (R/W). Please take into account the multiplication factor mlt during reading of the parameters.

⚠ The limit values must be respected!

Reg.	Mnemonic	Limit values	Description	typ	mlt	Std. value
000	T1	0...100.0 °C	Air temperature	R	0.1	-
001*	T2	0...100.0 °C	Hot water temperature H2	R	0.1	-
002*	T3	0...100.0 °C	Cold water temp. H4 (only for ECA647)	R	0.1	-
008	SP	0...100.0 °C	Real setpoint	R	0.1	-
009*	OUT	-	Output status relay (see below)	R	Flag	-
015*	MOT_SET	0...1700	Motor speed (set)	R	1	-
104*	STAT	-	Flag status	R	Flag	-
105	ALR_STAT	-	Flag alarms	R	Flag	-
200	ADR	1...255	Device address (Note 1)	R/W	1	1
201	PRG	-	Flag configuration	R/W	Flag	0
202	SPL	5.0...SPH °C	Minimum setpoint	R/W	0.1	16.0
203	SPH	SPL...35.0 °C	Maximum setpoint	R/W	0.1	28.0
209	E_SAVING	0...8.5 °K	Contact presence offset/stand-by	R/W	0.1	0
210*	MVV5	400...MVV3-4	Minimum speed in MIN and Night mode	R/W	1	400
211*	MVV4	MVV5...MVV2	Maximum speed in Night Mode and Minimum in AUTO	R/W	1	550
212*	MVV3	MVV5...MVV1	Maximum speed in MIN and Minimum in MAX	R/W	1	680
230	MVVP3	MVV5...MVVP1	Maximum speed in MIN and Minimum in MAX with Performance enabled	R/W	1	920
213*	MVV2	MVV4...1500	Maximum speed in AUTO	R/W	1	1100
234	MVVP2	MVV4...1500	Maximum speed in AUTO with Performance enabled	R/W	1	1220
214*	MVV1	MVV3...1500	Maximum speed in MAX	R/W	1	1500
215*	MVVP1	MVV1...1700	Maximum speed in MAX with Performance enabled	R/W	1	1700
218*	LLO	0.0...100.0 °C	Minimum water temperature for heating	R/W	0.1	30.0
219*	LHI	0.0...100.0 °C	Maximum water temperature for cooling	R/W	0.1	20.0
221	ACL	0...32000 hours	Maintenance frequency 0 excluded	R/W	1	0
222	ACL_TIM	0...ACL	Motor fan working hours count	R/W	1	-
231	SP	SPL...SHP SPL_W...SPH_W	Absolute setpoint value (Note 2)	R/W	0.1	20.0
233	Man	0/3 (inv)/5 (est)	Seasonal auto/manual	R/W	1	3
242	OS1	-12.0...12.0 °K	T1 air probe offset	R/W	0.1	0
243*	OS2	-12.0...12.0 °K	H2 water probe offset	R/W	0.1	0
244*	OS3	-12.0...12.0 °K	H4 water probe offset	R/W	0.1	0
245	SPL_W	5.0...SPH_W °C	WEB Minimum setpoint	R/W	0.1	20.0
246	SPH_W	SPL_W...40 °C	WEB Maximum setpoint	R/W	0.1	24.0
247	WEB	-	WEB Flag (see dedicated paragraph)	R/W	Flag	0

Only for INN-FR-B32 board
Note 1: The device address can be set individually on various devices by writing it on register 200 or set manually via the keyboard of the ECA644 - ECA647 e EDA649 - EDB649 kits (see paragraph "Device address setting" 6).
Note 2: Absolute setpoint value from 5 to 40. For the setpoint, write the value within the selected scale.

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Status and configuration flag registers:

You can set the mode and view the alarms and status of the controller via the relevant flags of some registers.

Operation mode setting register PRG, address 201

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	-	Stby	-	-	LOCK	-		PRG	

- – **PRG:** 000=Sutomatic; 001=Silent; 010=Night; 011=Maximum
- – **LOCK:** 0= Keyboard enabled; 1= Keyboard disabled locally
- – **Stby:** 0=Normal operation; 1=Stand-by mode
- – **8-15:** System Flags reserved, do not change the status

Output status relay register OUT, address 009

7	6	5	4	3	2	1	0
-	-	-	-	BOILER	CHILLER	EV2	EV1

Flag STAT status, address 104

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	H4 asnt	H2 asnt	Com err.	stby	test	alrm	Antig	0	B.A.	F.V. H4	F.V. H2			Mod. Risc.	Mod. Raff.

- – **Mod. Risc./Mod. Rafr:** Active mode;
- – **F.V. H2:** Fan stop water not suitable on H2;
- – **F.V. H4:** Fan stop water not suitable on H4;
- – **B.A.:** Stop for unsuitable water (machine in standby for 45 minutes)
- – **Antig.:** Device in antifreeze mode
- – **Alrm:** At least one alarm present
- – **Test:** Instrument in test mode for testing
- – **Stby:** Device in standby
- – **Com err:** Timeout master (vers. Centralised B32) of 300sec
- – **H2 asnt:** on board with H2 probe, the probe is absent on start up
- – **H4 asnt:** on board with H4 probe, the probe is absent on start up

Alarm flag ALR_STAT, address 105

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	2 AIR M5	Filter	H2 n. id	SW GRL	Mot	Hi Res	H4 n. id	H2	Acq. Dan.	H4	AIR	Com.

- – **Com.:** "Blind" version communication error
- – **AIR:** AIR probe
- – **H4:** H4 probe
- – **Acq. Dan.:** Block for harmful water
- – **H2:** H2 probe
- – **H4 n. id:** Coil hot water temperature not suitable (version 2 and 4 pipes)
- – **Hi Res:** High temperature resistance
- – **Mot.:** Motor fault
- – **GRID:** GRID contact open
- – **H2 n. id:** Main coil water temperature not suitable (version 2 and 4 pipes)
- – **Filtro:** Maintenance required (dirty filter)
- – **2 AIR M4 (only for M4 control panel):** Communication error with fancoil with remote air probe or presence of more than one board with air probe ('E2' displayed)

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Advanced functions (address 247)

For the interaction with a webserver supervisor, some control flags have been added. The flags are grouped in a single register, accessible in reading/writing.

⚠ If the power supply is cut off, the data is maintained. The selections carried out by the user are maintained if the power supply is cut off, except for "FLAG 7" that will be deleted.

If restrictions are enabled for pressing keys, the ⚠ icon will flash on the display.

FLAG #	FUNCTION	EFFECT
FLAG 0 (247.0)	Led WEB OFF	If = 1, the ⚠ icon is always set to off
FLAG 1 (247.0)	Forced off	The machine is off and the user cannot switch it on. When the ⏻ button is pressed, the ⚠ icon flashes temporarily.
FLAG 2 (247.2)	Disables the rotation of the programmes	The user cannot change the program. The other keys maintain their normal functions. When a program button is pressed, the ⚠ icon flashes temporarily.
FLAG 3 (247.3)	Disables select/deselect of the stby function	The user cannot switch the unit on and off. When the ⏻ button is pressed, the ⚠ flashes temporarily.
FLAG 4 (247.4)	Inhibits the extremes	The user can adjust the set point within the preset scale, but the extremes 5°C and 40°C are disabled. Pressing the SET+ e SET- keys outside the limits makes the icon flash temporarily ⚠. In AUTO, the icon does not flash because normal regulation is set.
FLAG 5 (247.5)	Enables the set point restriction	The user can adjust the setpoint within SPL_W-SPH_W, preventing off-scale values at the same time. Pressing the SET+ and SET– keys outside the limits makes the icon flash temporarily ⚠.
FLAG 6 (247.6)	Disables all keys	The user cannot perform any action. All the keys are blocked and when any button is pressed the ⚠ icon flashes temporarily.
FLAG 7 (247.7)	Webserver function bypassed for one hour ⏻ and SET+ keys for 5 sec.	The status of this flag indicates the user's decision to bypass the webserver settings for 1 hour. Condition: FLAG 1…6=1 ⏻ and SET+ keys pressed for at least 5 seconds. "nr" (not restricted) is displayed for 4 seconds. Action: FLAG 7=1 inhibition of FLAGS 1/6 for 1 hour.
FLAG 8 (247.8)	Seasonal key disabled	The seasonal key is locked. If the ☀ key is pressed, the ⚠ icon flashes temporarily.

The setpoint can normally be adjusted locally within the limits SPL-SPH or SPL_W and SPH_W with Flag 5=1.

To enter the setpoint, write the absolute value within the selected scale in register 231 SP.

Device address setting

From the keyboards of the ECA644, ECA647, EDA649 and EDB649 kits (or using a "detachable" one for the ESD659 kits) the peripheral address (associated with register 200) can be displayed and modified.

To view and change the address:
> with the panel in standby
> press and hold the AUTO key for 5 seconds
– address 001 appears flashing
> with the ➕ and ➖ keys set a value from 1 to 255
> press the "standby" key or wait 10 seconds to confirm the setting

It is advisable to write the addresses for the individual fancoils in a table so that they can be easily identified once they are recognised by the system.
Proceed as follows

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Fancoil address	Destination
Address 001	Leave free!
Address 002	Kitchen
Address 003	Living room
Address 004	Bedroom 1
...	...

⚠ Do not assign any fancoil to 001. This precaution will allow any replacements and/or additions of network devices in the future.

Troubleshooting

Problem	Cause	Solution
You cannot turn the unit on with the button ⏻	The button is disabled and the programming has set the status to off	Check that flag 1 of the WEB register (247) is not active
	The CP input of the board is closed	If the E_SAVING (209) register is set to 0 when the CP contact presence closes, the PCB goes into standby mode. Check the input status.
You cannot turn off the appliance using the ⏻ button or change function	All the keys are disabled	Check that Flag 6 of the WEB register (247) is not active
It is not possible to increase or decrease the temperature setting outside of set values	The programming imposes a limit range for adjusting the temperatures	Check that Flag 5 of the WEB register (247) is not active and, if necessary, change the values of the SPL_W (245) and SPH_W (246) registers

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