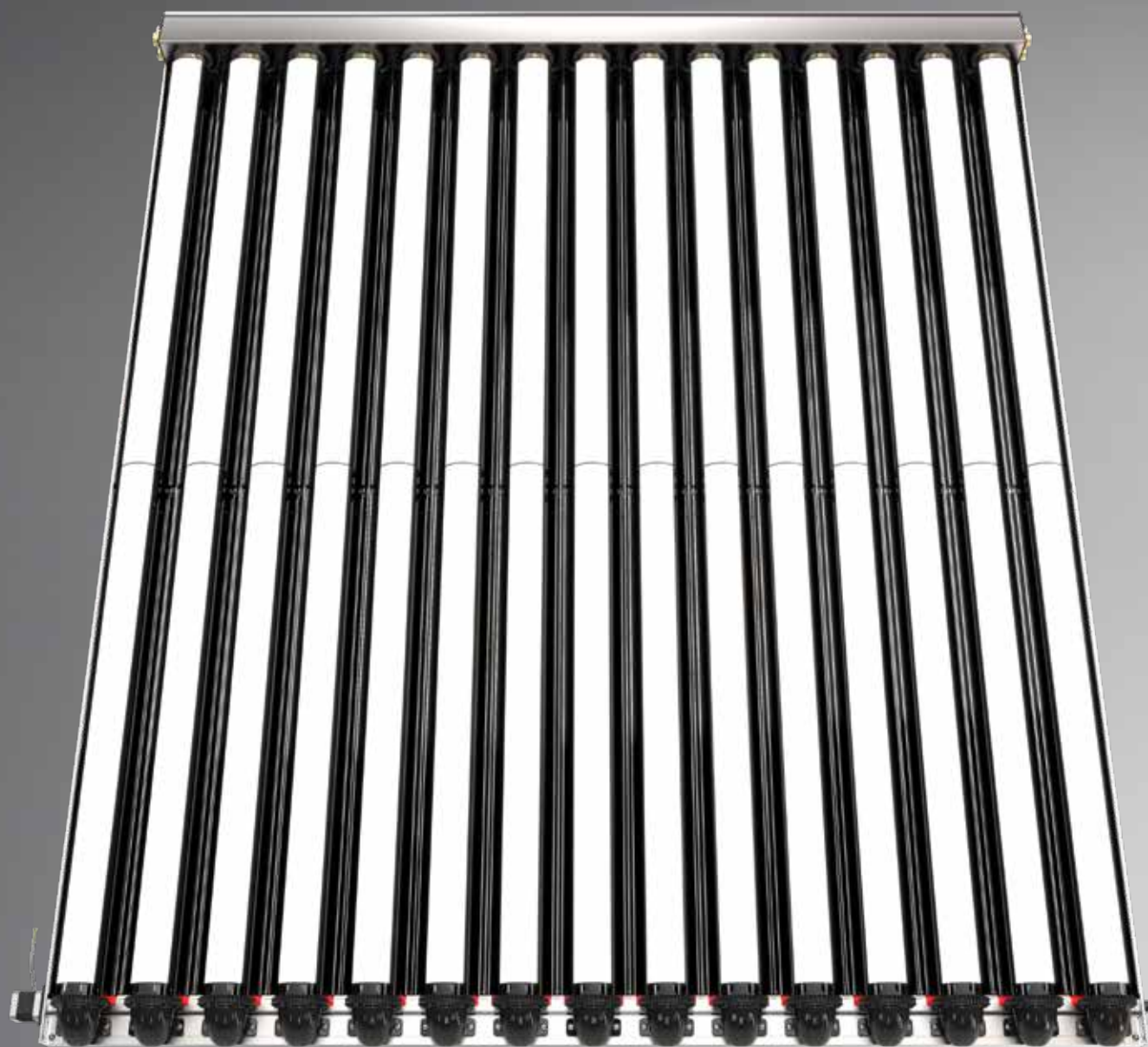




INSTALLATION AND USE
MANUAL FOR ECLIPSE SYSTEM CONTROLLER
ECLIPSE SYSTEM Manual REV 3.1 del 06/03/2024 - EN

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ECLIPSE SYSTEM | ASSEMBLY, USE AND MAINTENANCE

CONTROL AND MANAGEMENT
SOLAR COLLECTORS

ECLIPSE SYSTEM

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ECLIPSE

SYSTEM

ANTI-STAGNATION

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2 CONSTRUCTION AND REFERENCE STANDARDS

- The controller was designed and constructed to control and activate the motors of the X-RAY R collectors with **ECLIPSE SYSTEM**, and any other form of use is prohibited;
- The electrical connections must comply with EU standards for electrical systems;
- The controllers were constructed according to European Union directives and are certified compliant with the CE mark
- All devices connected to the controller must be manufactured according to the regulations in force and comply with the relevant European Community standards.

2.1 TECHNICAL DATASOLAR SYSTEM CONTROLLER

PARAMETER	VALUE
Supply voltage	24 Vdc
Frequency	50 to 60 Hz
Type of electrical connection	24V bipolar cable
Output voltage	24 Vdc
Controller consumption in stand-by	5 W
Inputs/Outputs	IN: 2 x I/O 24V (signal from solar control unit) 1 x four-pole terminals (24 V motor wiring) OUT: 1 +/- 24V (output to other units)
Number of motors controllable	1
Double electrical insulation	SI
Operating temperature	-20 ÷ +70 °C
Protection rating of the electrical devices	IP65
Weight (after installation)	0,2 Kg

2.2 ID PLATE DATA AND MARKINGS

Every controller is CE marked and can be released onto the market and put into service within the European Union without additional formalities. The CE mark applied to the product indicates "presumed compliance with the directives" issued by the European Community. The manufacturer has a technical file containing the documentation proving that the products were examined for assessment of compliance with the directives.

The ID plate data is printed on an adhesive polyethylene label, applied to the outside of the controller's electrical box. The values are compliant with the requirements of the European Community regulations in force.

The production lot, which identifies the controller version, regarding the label applied on the control unit in year-month format.

WARNING: READ THE FOLLOWING SAFETY INSTRUCTIONS CAREFULLY BEFORE STARTING TO INSTALL THIS DEVICE. THEY ARE DESIGNED TO AVOID ELECTRIC SHOCKS, INJURY, AND OTHER PROBLEMS. KEEP THIS MANUAL FOR FURTHER CONSULTATION.

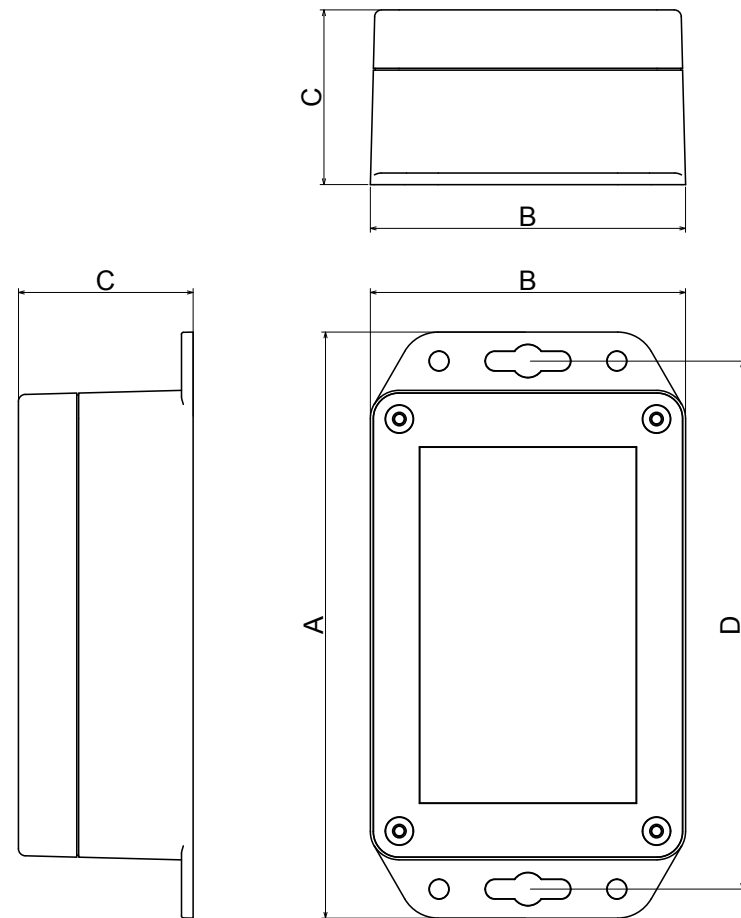
	This controller is intended exclusively for operating the motors of ECLIPSE solar collectors. Uses for applications other than those indicated are not authorized by the manufacturer.
	After unpacking, check that the device is intact.
	Before connecting the device, check that the electrical supply you intend to use has the same characteristics as those indicated on the technical data label on the device.
	This machine is intended exclusively for the use for which it was designed and the manufacturer cannot be held responsible for damage caused by improper use.
	The device must be installed according to the manufacturer's instructions. Failure to comply with these instructions can compromise safety.
	Installation must be conducted by skilled and qualified technical personnel. The electrical supply circuit must be formed in compliance with the regulations in force.
	To avoid the risk of injury or death due to electrocution, disconnect all power from the supply line before conducting any wiring or adjustments.
	In order to ensure effective isolation from the network, it is advisable to fit a two-pole instant stop button (pushbutton) of approved type. For disconnection from the network, a single-pole main power switch must be fitted upstream of the control line with a contact gap of at least 3.5 mm.
	The main connection (Schuko plug) is designed for a single phase 230 Vac supply.
	Use connecting materials adequate to ensure insulation levels compliant with current electrical safety regulations.
	Do not wash the device with solvents or water jets. Do not immerse in water.
	Warning: if there is a fault or malfunction, switch off the device with the main switch and seek assistance from a qualified technician.
	All repairs must only be conducted by qualified personnel from an assistance centre authorized by the manufacturer.
	Before conducting any cleaning or maintenance operations, check that the device is disconnected from the power supply. For increased safety, it is advisable to unplug the electrical connections.
	Only permit the use of original spare parts. Failure to do so could compromise safety and invalidate the device guarantee.
	In cases of problems or uncertainty during assembly or operation, refer to your retailer of choice or directly to the manufacturer.

2.3 ACCESSORIES INCLUDED

Every controller is provided with:

- 1 x electronic controller inside a plastic container;
- 1 x manual of instructions for installation, use, and maintenance;
- 3 IP65 cable glands for the connection cables;

2.4 OVERALL DIMENSIONS FOR INSTALLATION



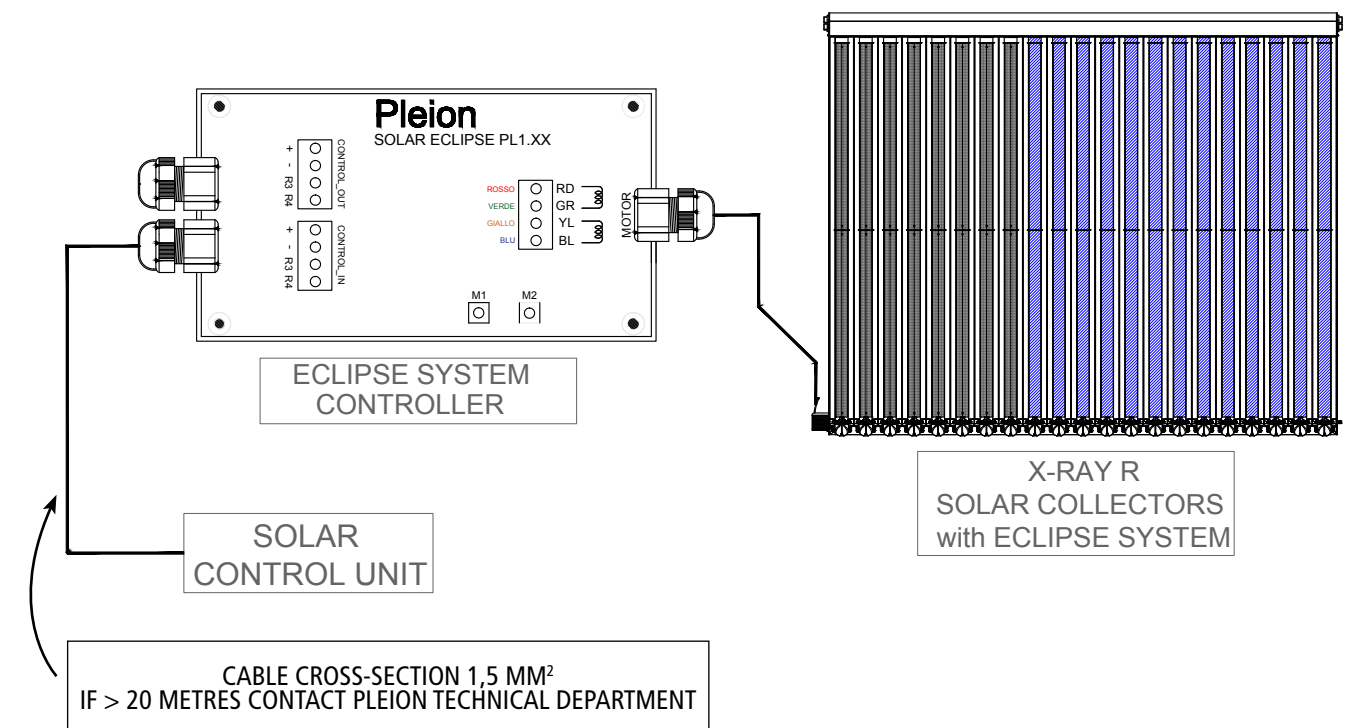
MEASUREMENT	LETTER	VALUE (mm)
Length	A	152
Width	B	82
Depth	C	45
Distance between installation holes	D	136
Transverse distance between installation holes	E	54.5

3 DESCRIPTION

The controller was developed to drive the stepper motors of the **XRAY-R with ECLIPSE SYSTEM**

Each unit is only able to drive one motor. For every XRAY-R solar collector with ECLIPSE SYSTEM, a control unit must be installed.

The motors are activated simultaneously and not sequentially.



Note: The unit system can be automated if correctly connected to a PB404 solar control unit for EAST WEST intelligent control, while for control in one direction only with the PB404, PR404, PR805 and PR21017 control units

IMPORTANT NOTES ON THE FEATURES OF THE ELECTRIC MOTOR

Each motor is provided with a 0.5 m cable for the power supply to the controller. This length was sized for the correct operation of the system.

The CE mark on the controller requires connection of the motors using the electrical cable provided.



WARNING: IT IS NOT POSSIBLE TO CHANGE THE LENGTH OF THE CABLE SUPPLIED.

4 ASSEMBLY AND START-UP

THESE INSTRUCTIONS ARE INTENDED FOR SPECIALIZED TECHNICAL PERSONNEL.

TO FACILITATE INSTALLATION AND ENSURE CORRECT OPERATION OF THE SYSTEM, IT IS ADVISABLE TO FOLLOW THE FOLLOWING INSTRUCTIONS AND WARNINGS.

4.1 PREPARATION AND WIRING

1. Check that the device was not damaged during transport.
2. The control unit is watertight IP65 and does not require any maintenance. The SMART CONTROLLER SOLAR ECLIPSE control unit must be installed on the solar collector; in fact, in the left profile at the motor, there are holes with corresponding fastening screws to accommodate and secure the control unit on the solar collector. Open the cover by unscrewing the 4 closure screws, making sure that the sealing gasket does not come off or is not removed from the cover.
4. Unscrew and open the cable glands taking care not to lose the gaskets that allow the watertight seal for the passage of connection cables.
5. Run out the electrical connection cables and make the electrical connections according to the electrical circuit diagram shown on page 12.

4.2 MOTOR INSTALLATION AND INITIAL START-UP

This chapter describes the motor assembly procedure following panel installation (for panel installation, consult the manual supplied with the XRAY-R panel) and the initial start-up of the unit controller connected to the motor.
The solar collector is supplied with the stepper motor disconnected and the casing in a dedicated box. Once installed, the solar collector has the blinds in closed position.

4.3 SELECTION OF TRANSFORMER FOR SOLAR ECLIPSE CONTROLLER

For each solar field, it is necessary to integrate a current transformer (NOT PROVIDED) with the Eclipse System control units, depending on how many units are to be installed.

Each Eclipse System control unit requires a maximum current of 2.5 A - 60W for proper operation; therefore, it is recommended that a current of 2.5 A be considered for each XRAY-R panel with the ECLIPSE SYSTEM.
Examples of calculating the most suitable transformer:

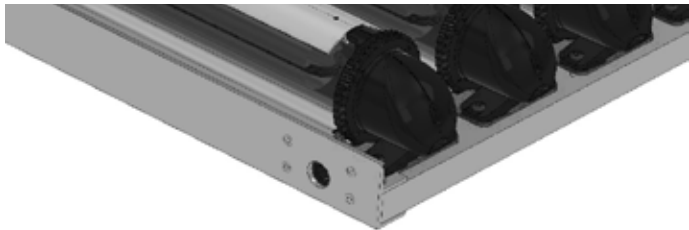
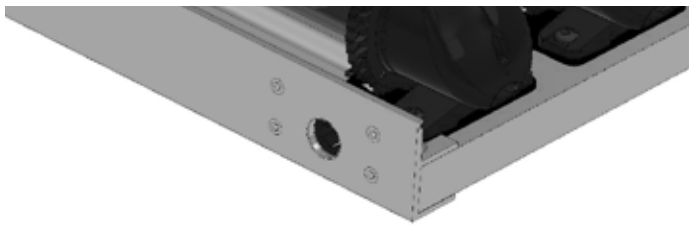
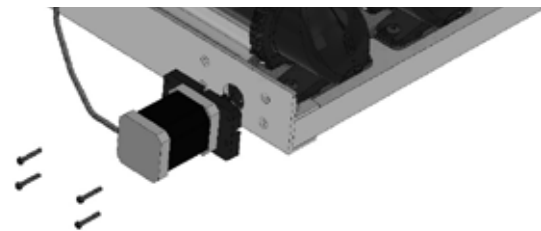
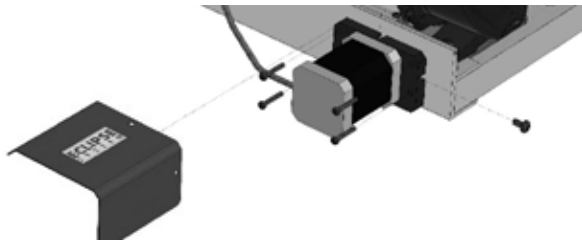
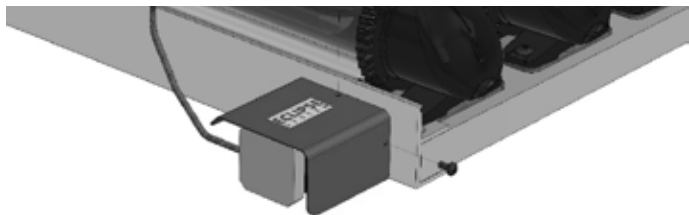
EXAMPLE NO. 1:

Solar field composed of No. 3 panels (regardless of size)
No. 3 Smart Controller control units will be provided
 $3 \times 2.5 \text{ A (60W)} = 7.5 \text{ A (180 W)}$
Therefore, it is necessary to integrate a minimum 24 V dc transformer of 7.5 A / 180 W

EXAMPLE NO. 2:

Solar field composed of No. 8 panels (regardless of size)
No. 8 Smart Controller control units will be provided
 $8 \times 2.5 \text{ A (60W)} = 20 \text{ A (480 W)}$
Therefore, it is necessary to integrate a minimum 24 V dc transformer of 20 A / 480 W

Follow the steps below to install the motor:

1	The motor must be installed on the left side of the solar collector.	
2	Place the stepper motor on the left side using a suitable plastic flange. Make sure that the hexagonal motor coupling has a negative rib that must be aligned and inserted into the worm screw inside the frame, at the base of the solar panel;	
3	Once the coupling has been inserted, rotate the flange to align the 4 holes on the flange with the threaded inserts on the right side frame of the solar panel.	
4	Screw the 4 M3x20 screws supplied to tighten the motor flange to the solar collector	
5	Screw the red motor casing with the 2 M4 x 10 screws supplied with the motor flange.	
6	Connect the 2.5 metre cable coming out of the motor to the solar controller	
7	Control Unit Placement	

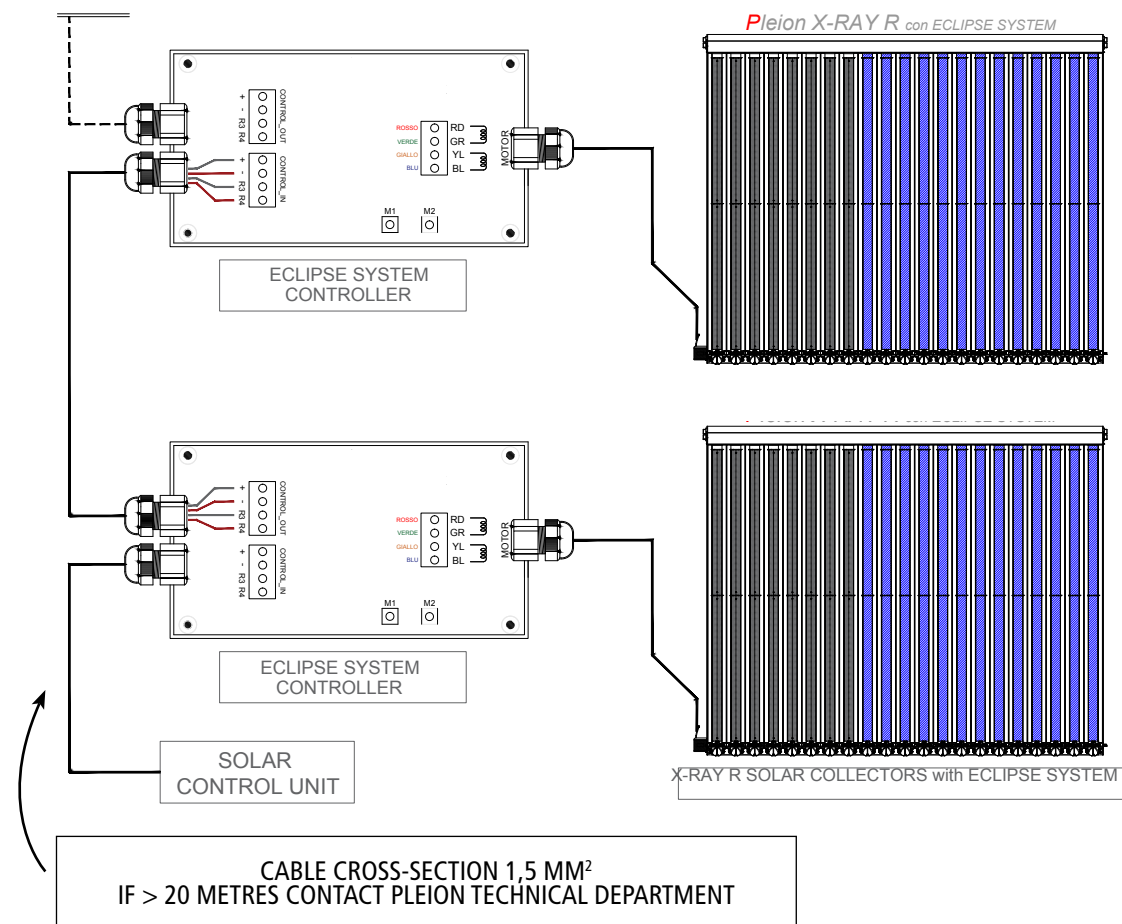
4.4 PROGRAMMING THE CONTROLLER

The solar controller is completely automatic and programmed to perform a reset cycle every time the power to the solar controller is removed and restored. From initial start-up, identifying the electronic limit switches; in this way, the panel and each single blind will find the central closing point.

The SOLAR ECLIPSE CONTROLLER does not require any programming.

4.5 CONNECTING ACCESSORIES

4.5.1 CONNECTING MULTIPLE CONTROLLERS IN SERIES



5 OPERATION

THIS CHAPTER DESCRIBES THE TWO DIFFERENT OPERATING MODES OF THE CONTROLLER AND THEIR MANAGEMENT.
WARNING. THE CONTROLLER WAS PRE-PROGRAMMED IN THE FACTORY. THE SETTINGS CANNOT BE MODIFIED BY USERS OR BY THE TECHNICAL ASSISTANCE SERVICE.

5.1 AUTOMATIC MODE

The solar controller, once the installation is complete, is by default in automatic mode. As described above, as soon as it is energised electrically, the solar controller will perform a reset cycle with an automatic rotation to the right, defining the electronic limit switches of the motor and each individual shading blade. This will make it possible to automatically identify the closing position of the blades themselves. At the end of the automatic reset cycle, the solar control unit will send a signal to allow the panel to rotate according to the set time.

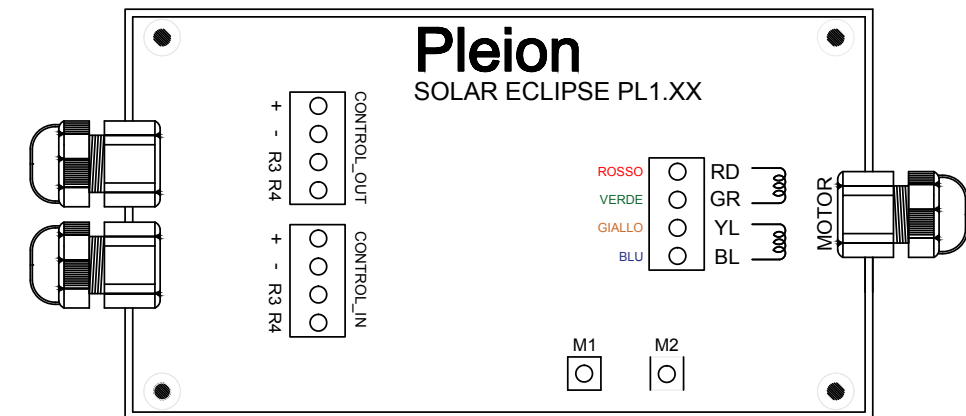
To repeat the automatic Reset operation:

1. Disconnect power to the solar control unit controlling the system.
2. Disconnect power to the unit solar controller SOLAR ECLIPSE.
3. Press the M1 button inside the solar controller and simultaneously power it.
4. When the red LED at button M1 lights up, release this button as soon as the blades start to move.
5. AUTOMATIC RESET operation started.

N.B. If the solar field has several solar controllers, the above procedure must be repeated for each individual solar controller. Check that during the automatic reset procedure, relays R3 and R4 of the control units are not activated.

5.2 MANUAL MODE

The unit controller eclipse is equipped with a manual mode to perform a reset cycle in case of maintenance of the solar collector. In the case of a series connection of more than two XRAY-R solar collectors with SYSTEM ECLIPSE, the manual mode operates individually on each controller. To start the manual reset procedure, open the cover of the SMART CONTROLLER and follow the steps below :



1. Disconnect power to the solar control unit controlling the system.
2. Disconnect power to the solar controller.
3. Simultaneously press the two buttons on the board (M1 and M2) and simultaneously power the solar controller until the red LED starts flashing rapidly.
4. Once the buttons are released, press the M1 button until the blades strike the CPCs to the right.
5. Press the M1 button twice quickly (confirmation will be given by a quick flashing of the green LED).
6. Press the M2 button until the blades strike the CPCs to the left.
7. Press the M1 and M2 buttons simultaneously until the green LED starts flashing quickly.

If there is only one motor, to terminate MANUAL RESET, press and hold M1 and M2 for a few seconds until the green LED flashes slowly. If the second motor is also present, proceed as follows:

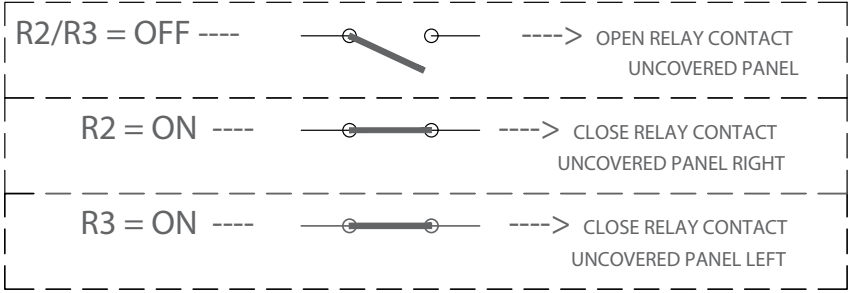
5.3 ERROR DURING RESETTING

If, following automatic or manual resetting, the system is unable to find the final closing position, we recommend that you:

1. Turn off the system for a few minutes and repeat the automatic or manual procedure;
2. Lubricate gears and screws with dry spray silicone lubricant, and repeat the reset procedure.

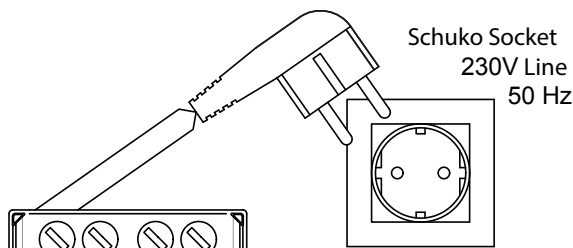
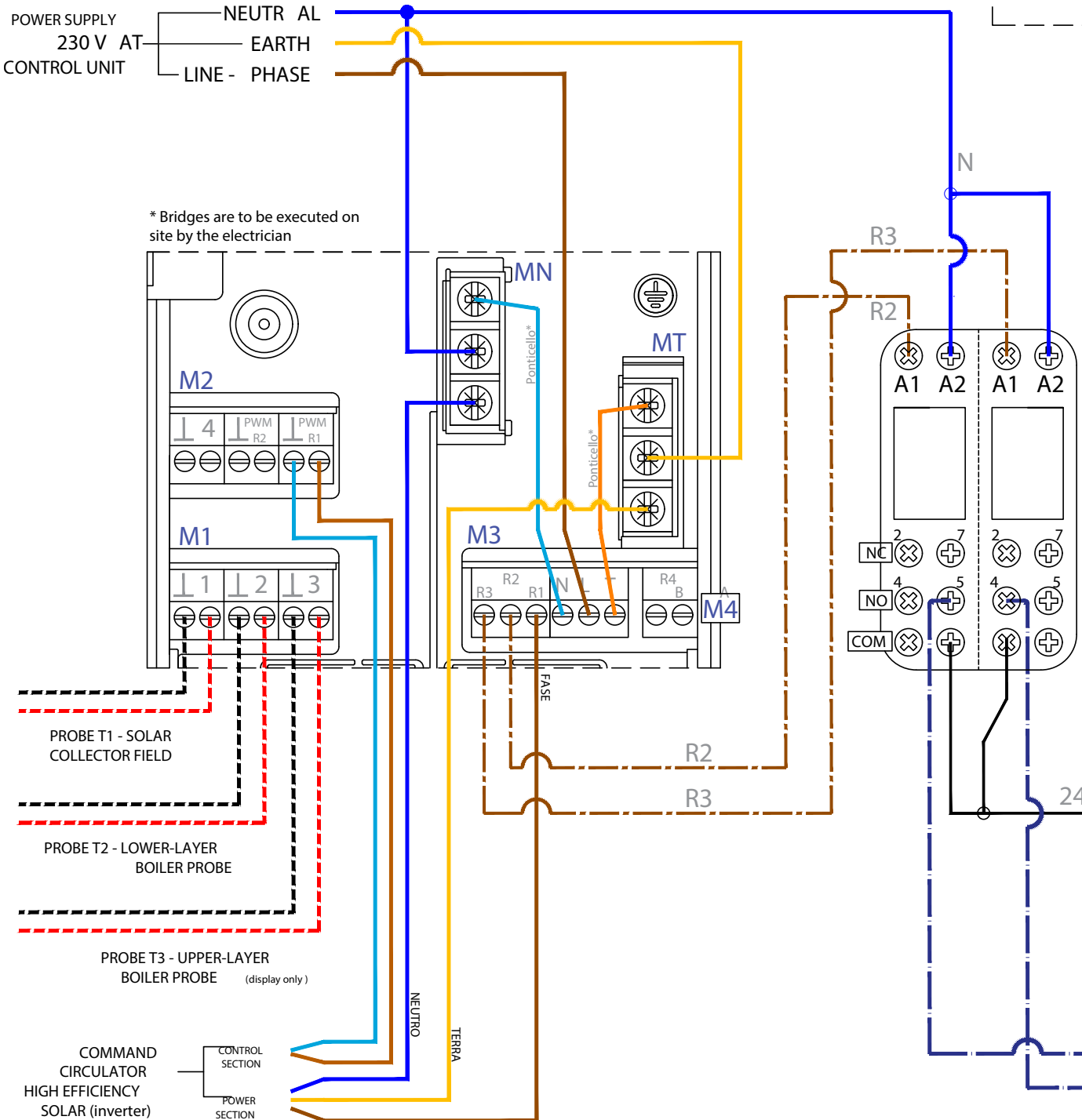
WIRING DIAGRAM OF ECLIPSE SYSTEM CONTROLLER
SOLAR CONTROL UNIT PB404 - PB404 WIFI

Below are the installation diagrams of the ECLIPSE SYSTEM controller, with the different solar control units available.
To ensure the correct functioning of the system, the installation must be completed by following the diagrams provided.

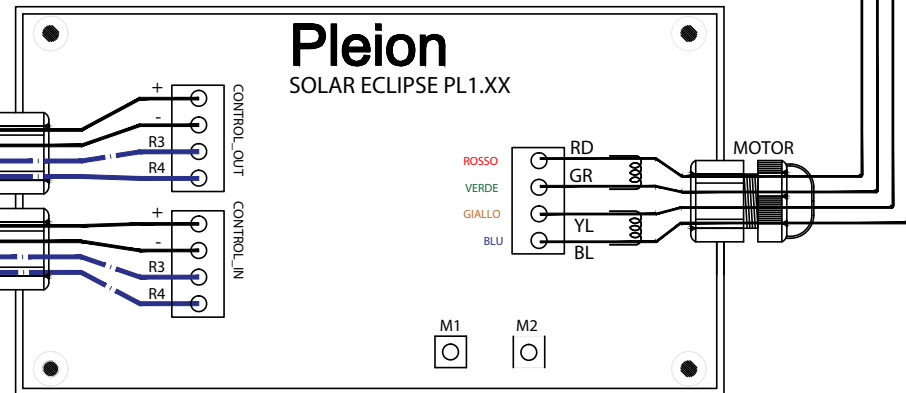
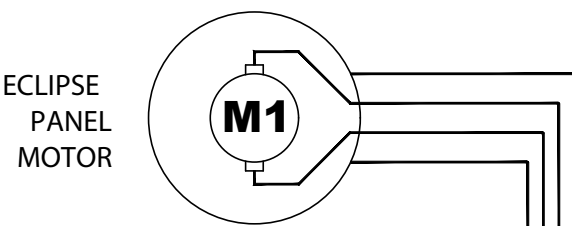
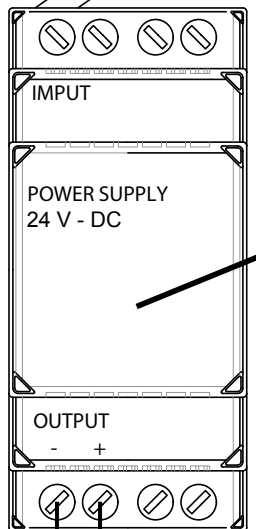


PB 404 CONTROL UNIT
STANDARD ELECTRICAL CONNECTIONS
OF THE CONTROL UNIT TO:

- SOLAR FIELD
- BOILER
- SOLAR CIRCULATOR
- ECLIPSE CONTROL SYSTEM

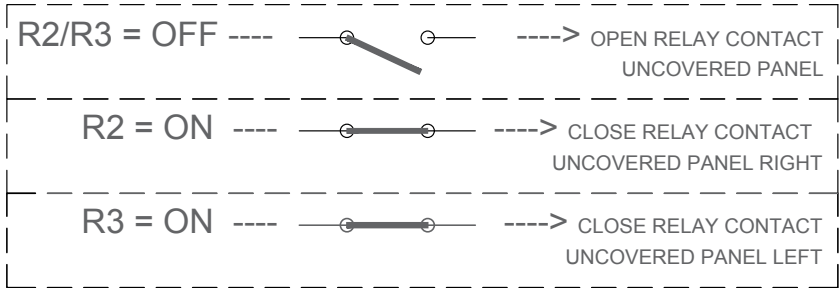


HOW TO SELECT THE TRANSFORMER:
Refer to the table in point 4.3 based upon number of Solar Eclipse units installed



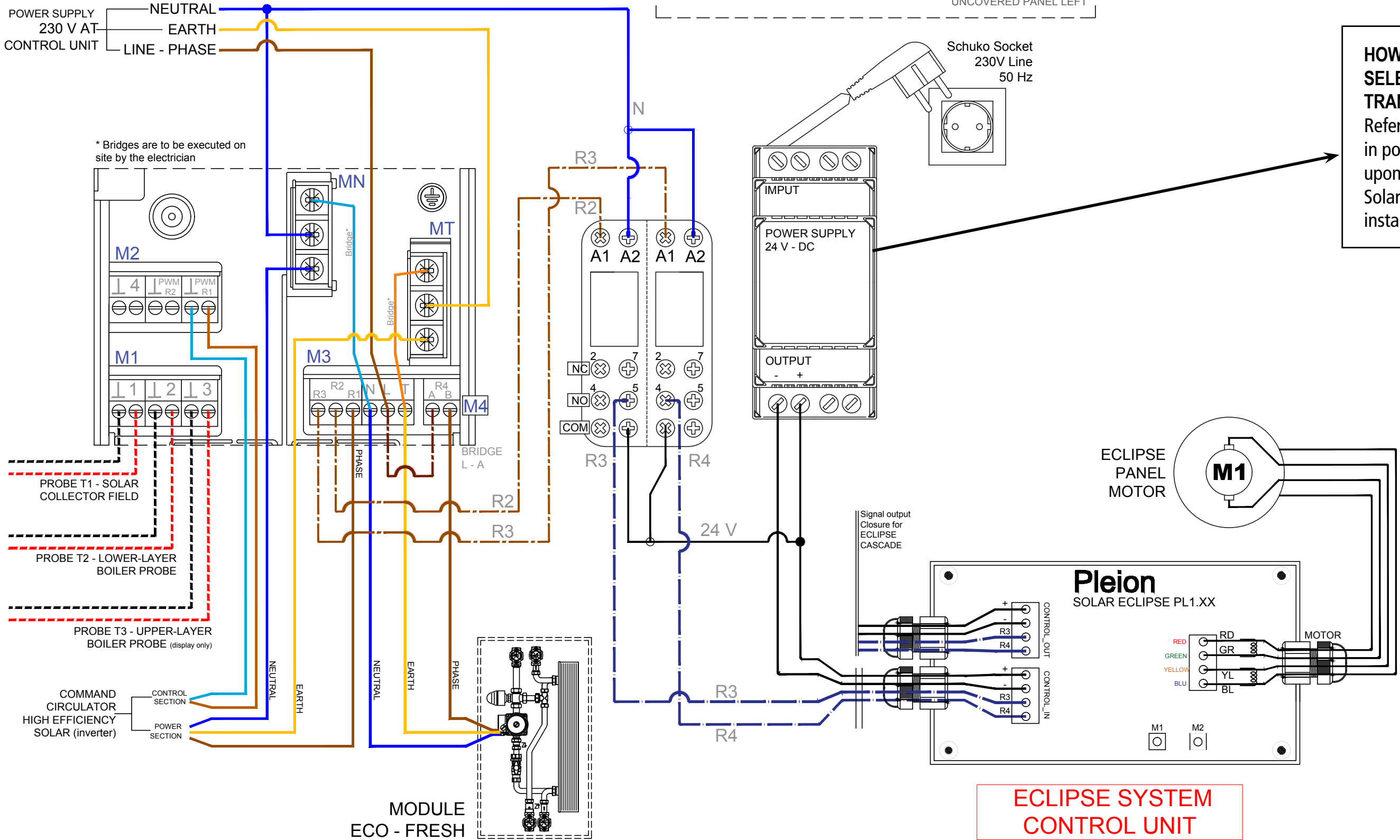
ECLIPSE SYSTEM
CONTROL UNIT

6.1
WIRING DIAGRAM OF ECLIPSE SYSTEM CONTROLLER
SOLAR CONTROL UNIT PB404 - PB404 WIFI + FRESH



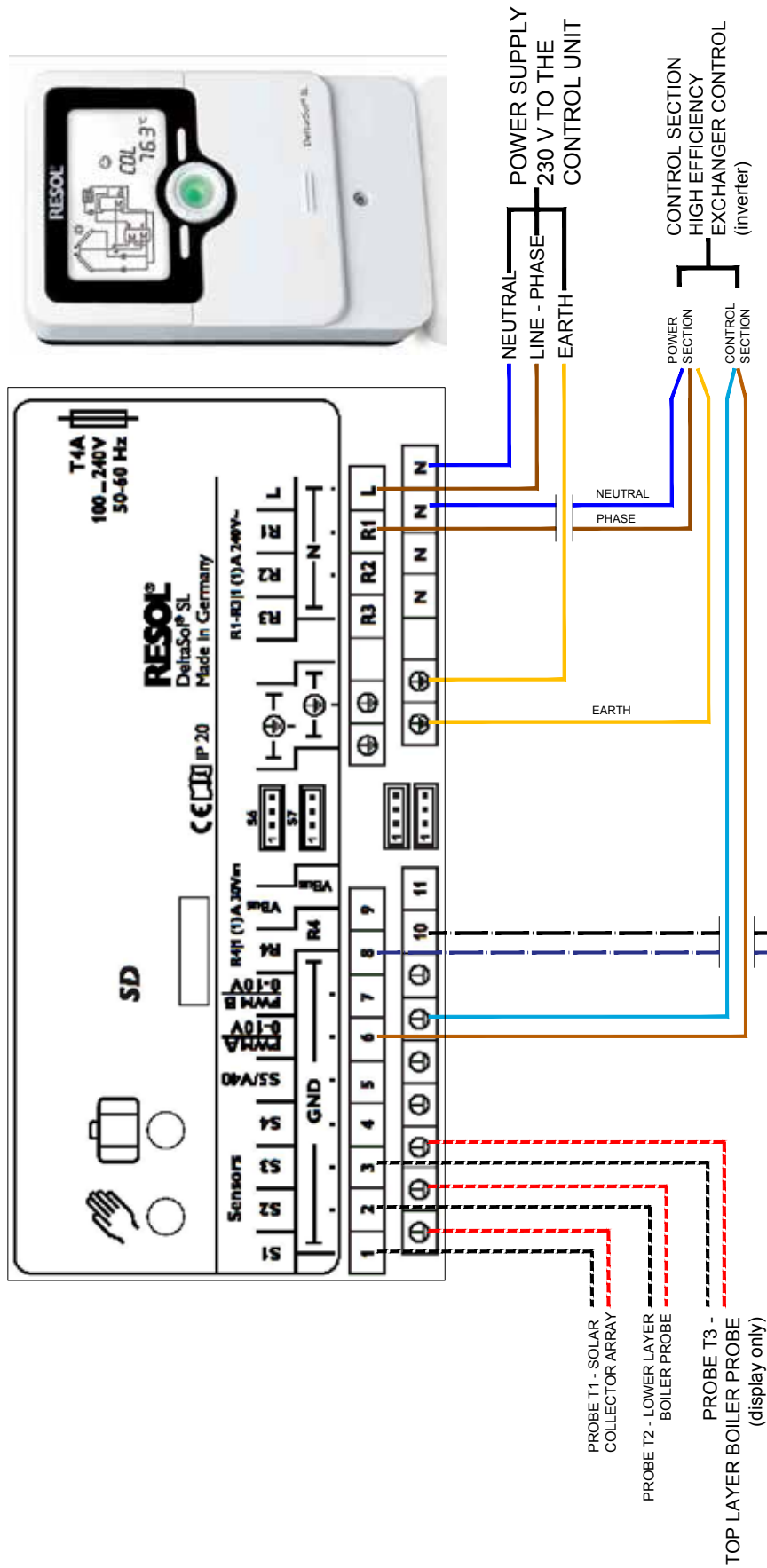
PB 404 - PB404 WIFI CONTROL UNIT
STANDARD ELECTRICAL CONNECTIONS OF THE CONTROL UNIT TO:

- SOLAR FIELD
- BOILER
- SOLAR CIRCULATOR
- ECLIPSE CONTROL SYSTEM



HOW TO SELECT THE TRANSFORMER:
Refer to the table in point 4.3 based upon number of Solar Eclipse units installed

6.2
ELECTRICAL CONNECTIONS OF
ECLIPSE SYSTEM CONTROLLER PR404



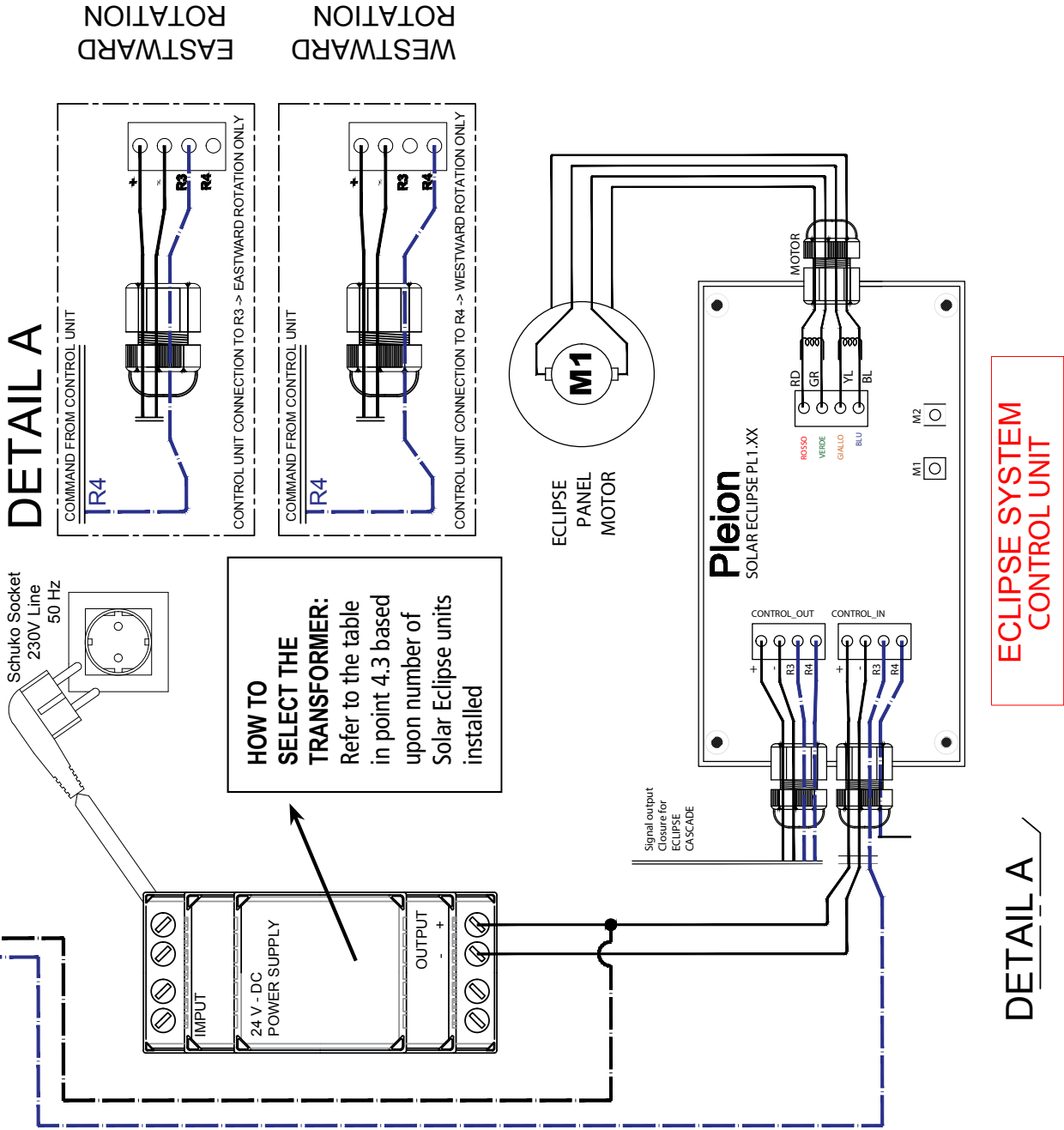
ECLIPSE CONTROL FUNCTION ACTIVATION

FUNCTION FOR ECLIPSE SYSTEM ACTIVATION WITH CONTROL ON A SINGLE TEMPERATURE ACTIVATION: THERMOSTAT FUNCTION (RI 11) → REFERENCE

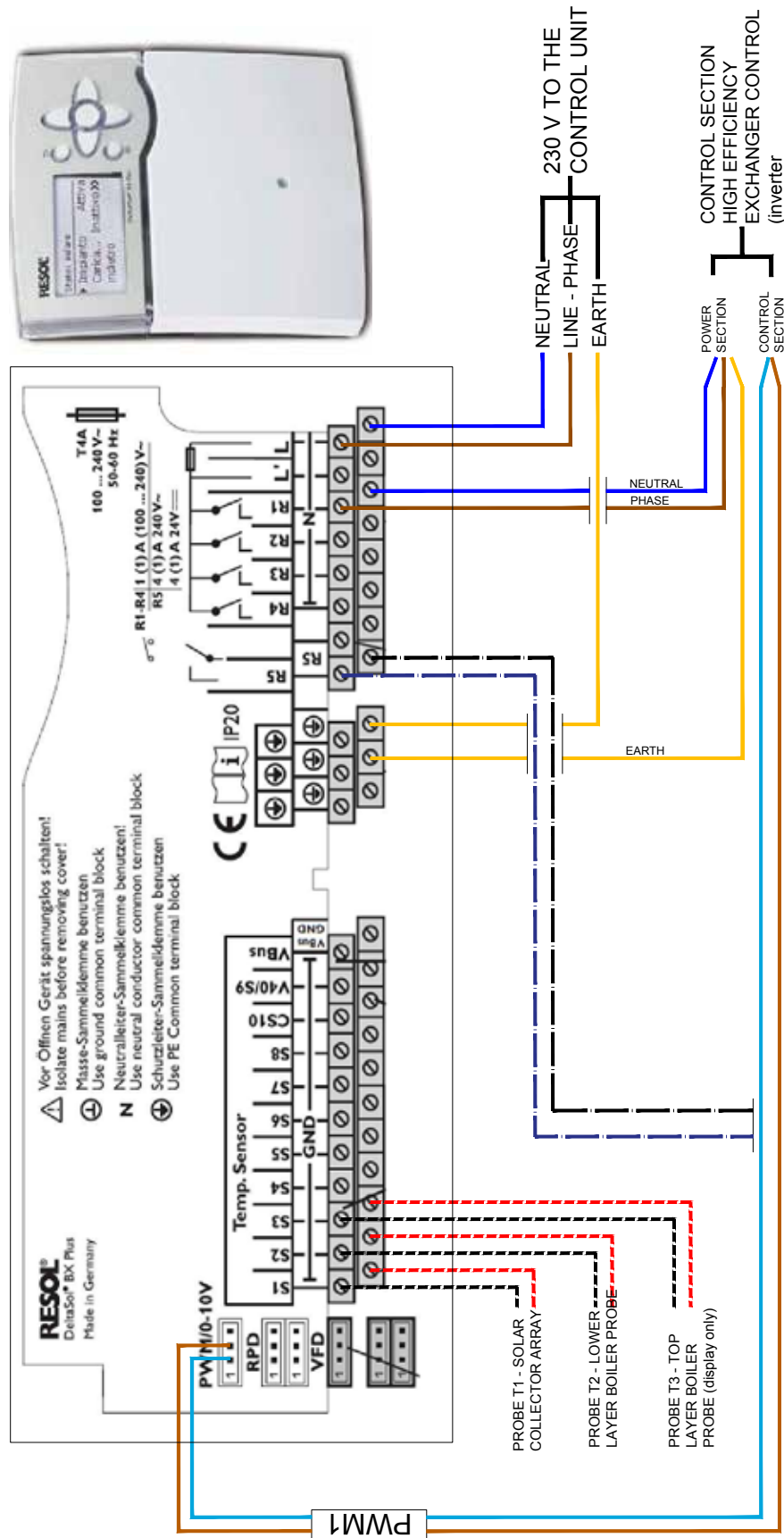
PROBE T2 → OUTPUT R4
RI ON= 70°C
RI OFF=60 °C

ECLIPSE OPERATION WITH REFERENCE TO INTERNAL ACCUMULATOR TEMPERATURE ONLY.

IN PARTICULAR CONDITIONS, IT IS POSSIBLE TO REFER TO PROBE T1 (solar collector) with activation TON=100°C/TOFF=90°C. For more information, contact the PLEION Service Office.



6.3
ELECTRICAL CONNECTIONS OF
ECLIPSE SYSTEM CONTROLLER PR805



ECLIPSE CONTROL FUNCTION ACTIVATION

"COMPOUND" FUNCTION FOR THE ACTIVATION OF THE ECLIPSE SYSTEM WITH TEMPERATURE CONTROL OF BOTH THE SOLAR COLLECTOR AND ACCUMULATOR (DOUBLE CONTROL).

SYSTEM SECTION

ACTIVATION: FUNCTION BLOCK 1

→ THERMOSTAT A

→ OUTPUT R3

→ TON= 100°C / TOFF=90 °C

→ REFERENCE PROBE S1

ACTIVATION: FUNCTION BLOCK 2

→ THERMOSTAT A

→ OUTPUT R4

→ TON= 70°C / TOFF=60 °C

→ REFERENCE PROBE S2

ACTIVATION: FUNCTION BLOCK 3

→ REFERENCE RELAY OR FUNCTION

WITH REFERENCE

→ OUTPUTS R3 and R4

→ ACTIVATION OF OUTPUT R5 (ECLIPSE controller)

PLEASE NOTE: outputs R3, R4, R5 are all "dedicated" to the operation of the ECLIPSE system. Outputs R3 and R4 are fictitious and must not be electrically connected, while output R5 must be connected to the ECLIPSE controller. In this situation, the output that can be used to manage other components is R2.

ALTERNATIVE

"SIMPLE" FUNCTION WITH ECLIPSE SYSTEM ACTIVATION WITH CONTROL ON A SINGLE TEMPERATURE (to be used only in particular cases - for more information, contact the PLEION Service Office).

ACTIVATION: FUNCTION BLOCK 1

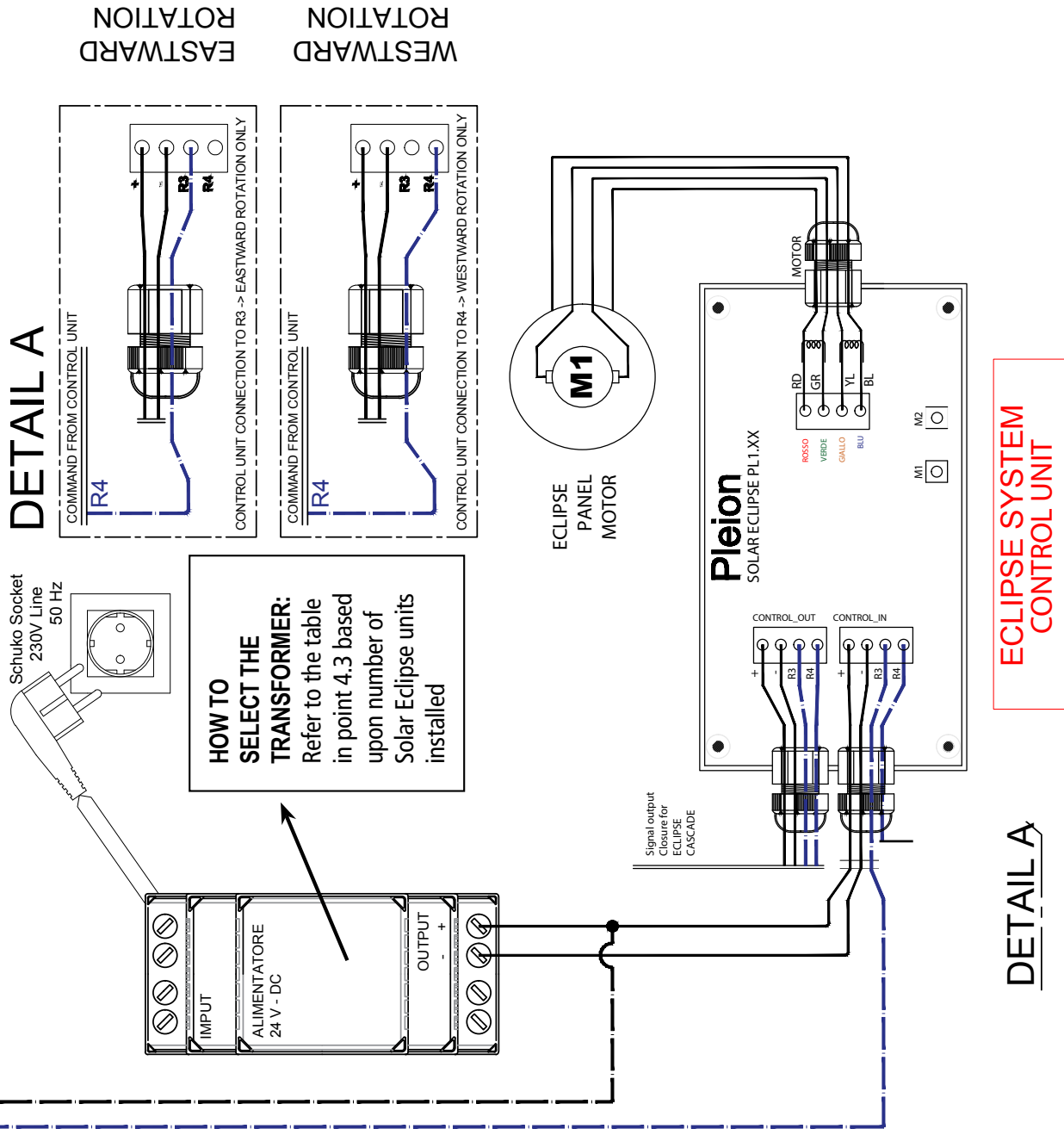
→ THERMOSTAT A

→ OUTPUT R5

→ TON= 70°C / TOFF=60 °C

→ REFERENCE PROBE S2

NOTE: Only output R5 is "dedicated" to the operation of the ECLIPSE system. Remaining outputs R2, R3 and R4 can be used for other purposes.

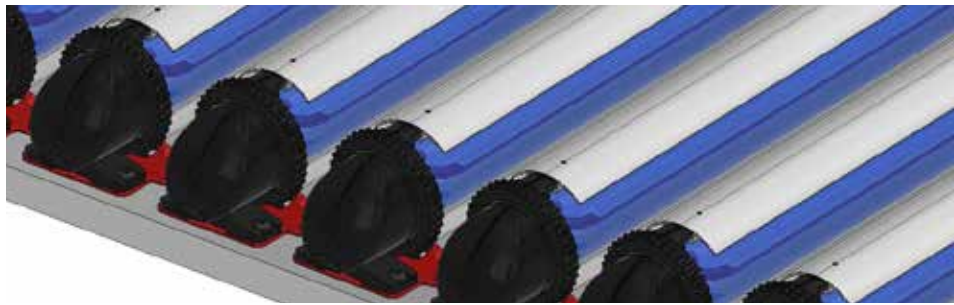
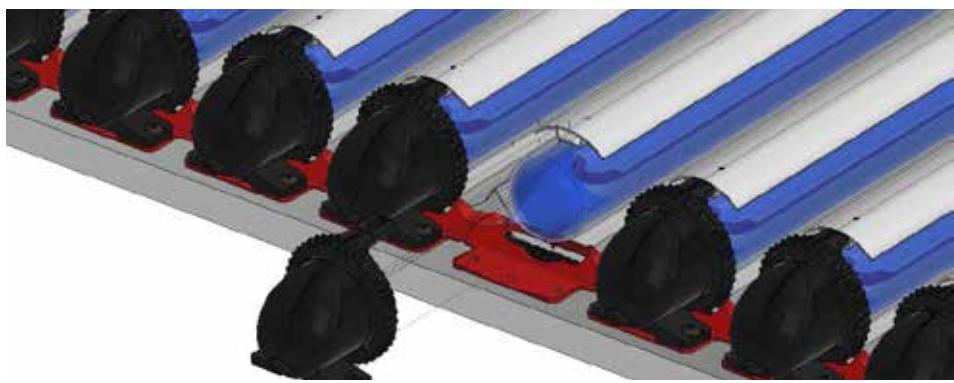
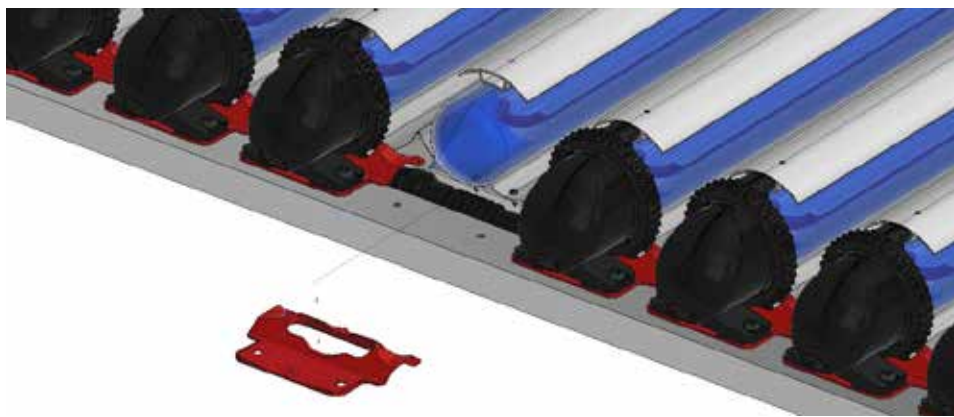


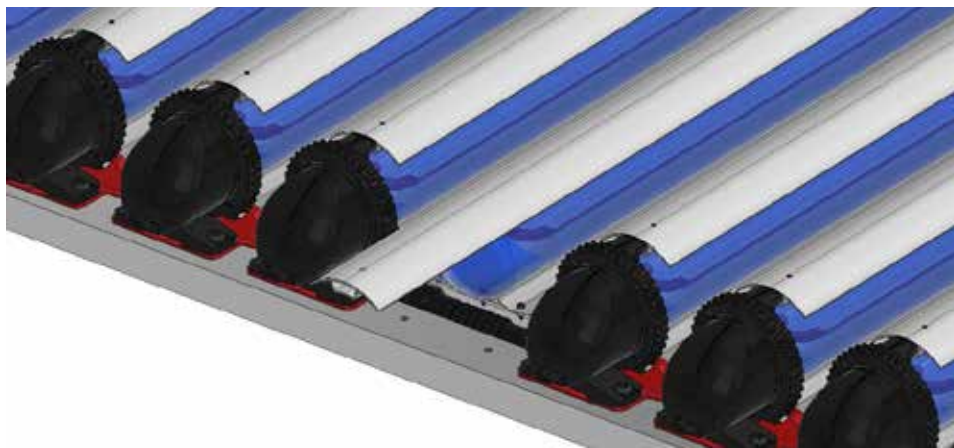
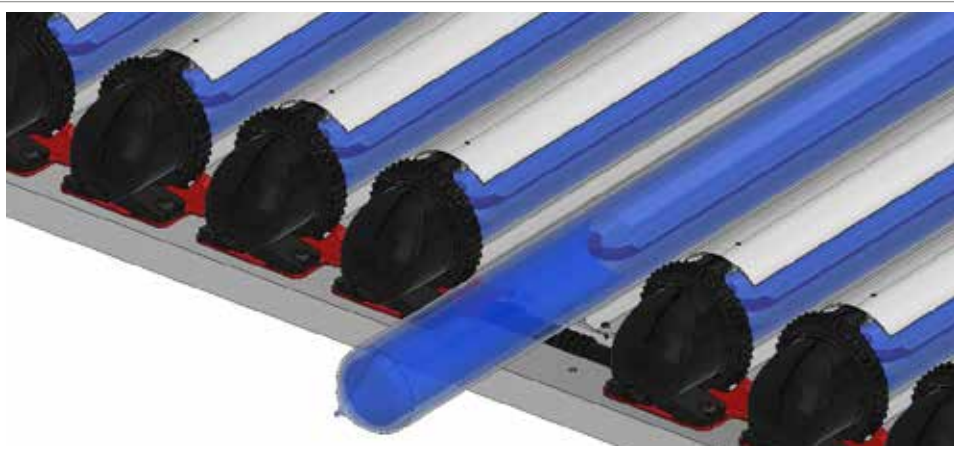
7 MAINTENANCE OF XRAY-R COLLECTOR WITH ECLIPSE SYSTEM

7.1 REPLACEMENT IN CASE OF VACUUM TUBE BREAKAGE

In case of breakage of a vacuum tube, due to accidental impact or a hail storm, replace the tube to ensure the correct performance of the solar collector.

IMPORTANT: in case of breakage of a vacuum tube, the rotation of the blinds by means of the new Eclipse System does NOT lock, but continues. WE RECOMMEND THE USER TO DISCONNECT THE SOLAR CONTROLLER AND CONTACT THE ASSISTANCE SERVICE. To replace the vacuum tube, follow these steps:

1	Locate the damaged tube on the XRAY-R solar collector	
2	Unscrew the 2 M6 screws that block the cup with gear	
3	Remove the cup from the white PVC shutter blind	
4	Remove the component covering the worm screw. If the tube breaks, check whether glass debris is present by the worm screw and, if any, clean thoroughly	

5	Remove the shutter blind from the damaged tube, paying attention to the ring components (cross-piece pivots and terminal pivots) on the blind.	
6	Remove and slide out the damaged vacuum tube.	
7	Position the new vacuum tube, paying attention to the absorber and the copper circuit.	
8	Proceed with the assembly of the plastic components previously removed, proceeding in reverse.	
9	As you position the cup in its location, make sure that the blinds are correctly positioned, and have the same orientation of the other blinds, in order to optimise their synchronism.	

8 PROCEDURES TO BE PERFORMED BY THE END USER

8.1 ANNUAL MAINTENANCE BY THE USER

Periodically check (at least once every 2 years) the state and operation of the Solar Eclipse system (rotation system of the shutter blinds).

Clean the solar collector (using compressed air or water) in order to remove any dirt debris that could affect the performance and operation of the rotation mechanism.

In case the components are deteriorated or damaged, contact your local TAC (Technical Assistance Centre).

8.2. IN CASE OF BAD WEATHER

8.2.1 HAIL STORMS

Forced closing via solar control unit or app is recommended in order to protect the vacuum tubes of the solar collector.

8.2.2. INTENSE SNOW STORMS

To avoid damage to the rotation system, it is advisable to lock the "Eclipse function" in the open position (East or West) via the solar control unit or app.

9 DECLARATION OF CONFORMITY WITH EU DIRECTIVES

BRAHMA Spa
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+39 0442 635211
brahma@brahma.it

The company BRAHMA declares that the products in question are compliant with all the technical standards relevant to the products within the ambit of applicability of EU Directive 2006/95/EC, 2004/108/EC and 99/5/EEC, namely:

ETSI EN 301 489-3 V1.4.1:2002
ETSI EN 301 489-1 V1.8.1:2008
EN 300 220-1 V2.1.1:2006
ETSI EN 300 220 - 2 V2.1.2:2007-06
EN 50371 (2002)
EN 60950-1:2006 EN 60950-1/A11:2009

10 ENVIRONMENTAL PROTECTION

All the materials used for the construction of the controller are recyclable. The machine, accessories, packaging, etc. should all be consigned to a centre for ecological recycling.

11 STATUTORY AND ADDITIONAL GUARANTEES

The manufacturer guarantees the good operation of the machine. Any parts defective as a consequence of poor quality materials or manufacturing defects will be replaced pursuant to the provisions of article 1490 of the Italian Civil Code.

The guarantee of good operation of the device provided by the manufacturer is understood in the sense that the same undertakes to repair or replace any parts that might malfunction during the guarantee period free of charge and as quickly as possible. The purchaser cannot claim any rights to compensation for damages, direct or indirect, or other expenses. Any attempted repairs by personnel not authorized by the manufacturer invalidates the guarantee.

The guarantee does not include delicate parts and parts exposed to natural wear and tear, corrosive agents or processes, overloading even for brief intervals, etc.. The manufacturer does not accept responsibility for any damage caused by incorrect assembly, manoeuvres, engagements, excessive loading, or improper use.

Repairs under guarantee are always understood to be "ex works". The associated transport costs (dispatch / return) are always payable by the purchaser.

The statutory guarantee covers the product and its individual parts for a period of 24 months from the date of purchase.

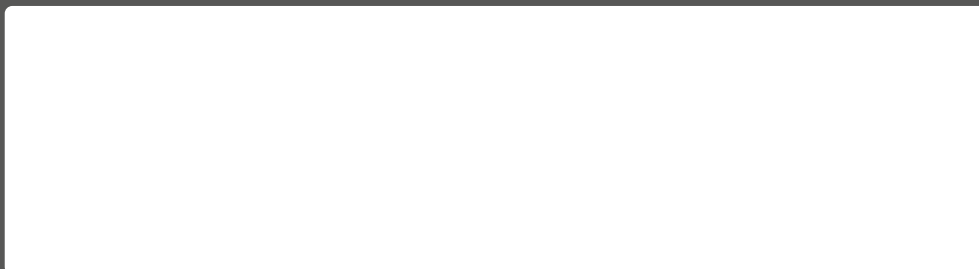
12 FINAL NOTES

The products are manufactured in line with state-of-art safety standards and in compliance with the provisions of the relevant laws in force. When correctly fitted, installed, and used according to these instructions they do not comprise a hazard to people, animals, or property. Products falling under the ambit of application of EEC Directives are compliant with the essential requirements set out in the same. Bearing the CE mark, they can be released onto the market and put into service within the European Union without additional formalities. The CE mark applied to the product, packaging, and instructions for use accompanying the product indicates "presumed compliance with the directives" issued by the EU.



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Pleion Spa reserves the right to make technical,
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