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GLC CERTIFIED ISO 9001

Electronic Pellet Burner Controller

NPBC-V3C-1

TECHNICAL MANUAL



INTRODUCTION

NPBC-V3C is an advanced, functionally completed controller for pellet burners. All of the burner's mechanisms and sensors, as well as those for the water heater and the central heating installations, can be directly connected to the controller. NPBC-V3C has a wide range of adjustment for all of its work parameters and can be easily adapted to many different kinds of burners with different power.

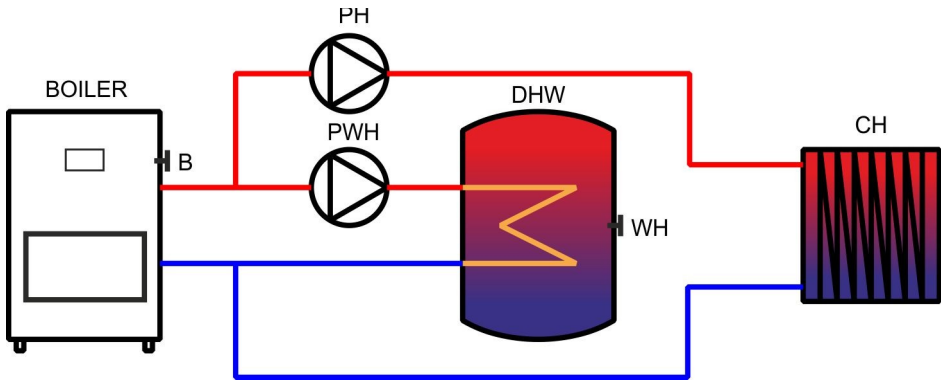
Main advantages of the controller NPBC-V3C:

- Clearer and intuitive user interface with modern looking menus and 6 control buttons.
- Additional warning messages about incorrect parameter input or if parameters from a different menu require corrections after the current changes.
- The Control module NRC-6 can be equipped with a WiFi module NRM-W3 for connection with the Naturela remote monitoring and control system through the web
- 4 preset fuel profiles make switching between different fuels easier than ever
- Statistical information about the fuel consumption divided by hour and based on a calibrating constant parameter for the fuel auger's capacity.
- A list with short description, date and time of the occurred errors and any other event concerning the controller's work.
- More parameters about the burner's work and current state displayed on the main screen at the same time
- Outputs with reliable semiconductive switches with increased carrying capacity up to 16 A
- The inputs are protected from high-voltage peaks, induced in the cables
- Improved input filter to suppress the noises to the mains power supply
- Adjustment of all the parameters concerning the ignition, burning, extinguishing and cleaning processes
- A micro USB coupling on the face panel of the Control module for connection with a computer with software for direct control and monitoring.
- Date and time support allows the controller to restrict the burner's work in up to three time intervals during the day
- Full self diagnostic of the hardware and the sensors. In case of a problem a short message with the reason appears and, if necessary, the work mode automatically changes
- Automatic cleaning procedures with extinguishing the fire (automatic cleaning) or while the fire is burning (intermediate cleaning) provide independent continuous performance and exclude the necessity of any attendance
- An option to control an additional powerful fan for better cleaning
- Automatic three-level power regulation of the burning process and additional Suspend power level to avoid unnecessary ignition and extinction cycles after reaching the boiler's set temperature.
- Control of the pumps of the heating installation and hot water installation.
- **(Optional)** An analog output for a frequency inverter for a powerful air fan allows the controller to run more powerful burners
- **(Optional)** NPBC-V3C has an option to work with two Control modules. The second one can be used as a digital room thermostat and to display the information about the burner's and the heating installation's work and state in another room.

- **(Optional)** A high temperature pt100 sensor measures the temperature of the flue gases to monitor the pollution of the boiler's heat exchanger. If the heat exchanger has gained a lot of soot, the temperature of the flue gases is higher and the boiler works less efficiently.
- The universal power supply and the controller's output power allow it to be used both in 110V/60Hz and in 220V/50Hz grids.
- High reliability.

PELLET BURNER CONTROLLER NPBC-V3C-1

The controller **NPBC-V3C-1** is designed to run burners, which use a photo sensor to detect the burning fire. The pulsing control of the auger motor from the pellet tank allows the precise dosing of the amount of pellets that goes to the burner. **NPBC-V3C-1** can control an optional internal auger motor that forwards the pellets inside the burner. The controller runs two blowers: one that provides the air to the burning chamber and the other is an additional fan, for example, for taking out the exhaust gases from the boiler, if necessary. Both blowers' power can be adjusted from the controller. NPBC-V3C-1 has an option to measure and control the temperature of the exhaust gases with a high temperature sensor pt100, mounted in the entrance of the vent. For more effective cleaning process the controller can also run an additional powerful fan to blow away the ashes from the burning chamber or a mechanical cleaning mechanism with an option to be run by one controlling or powering up voltage. The controller runs up to two circulation pumps: for the heating installation and for the hot water heater installation. **All of the controlled mechanisms must work on 220VAC or 110VAC mains power supply!**

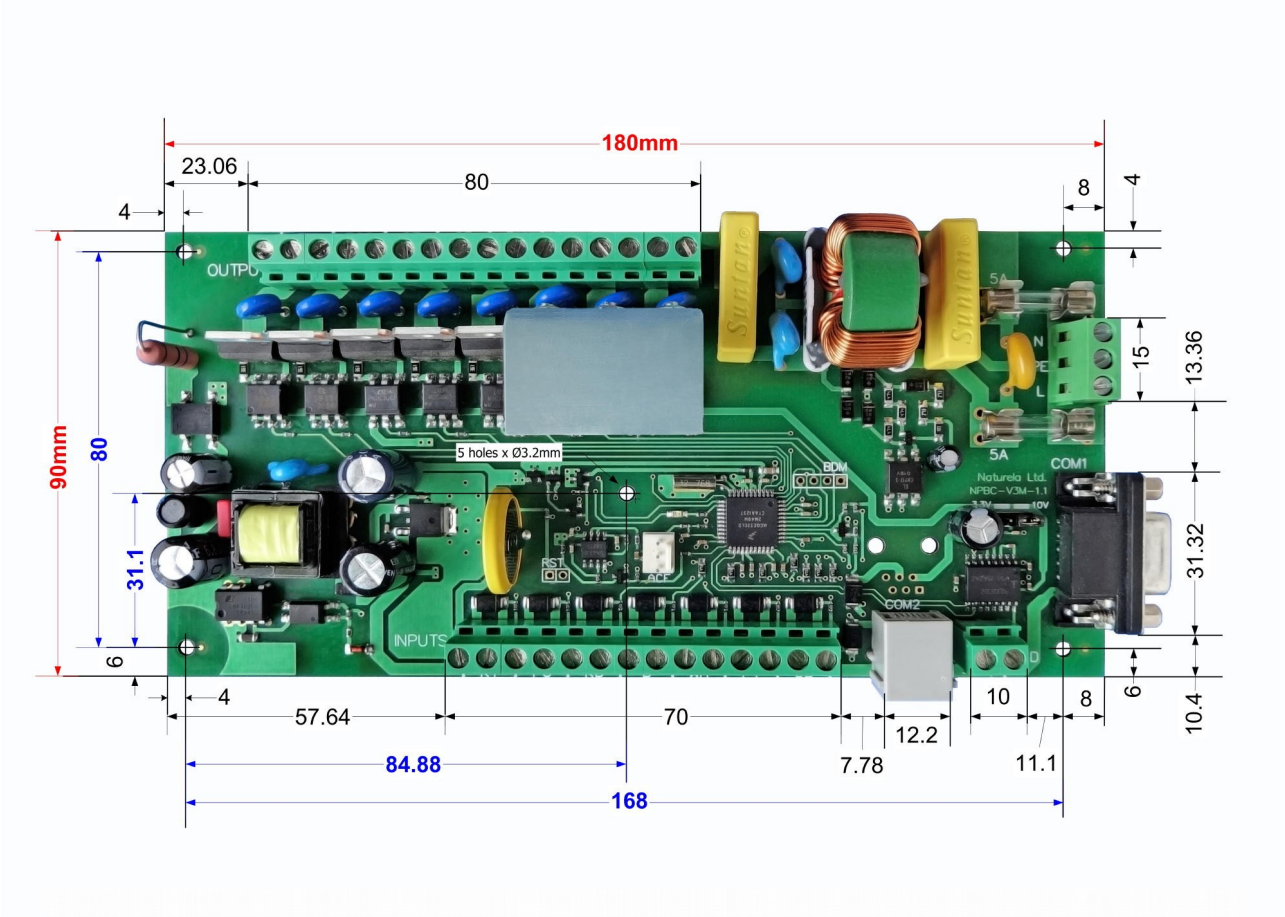


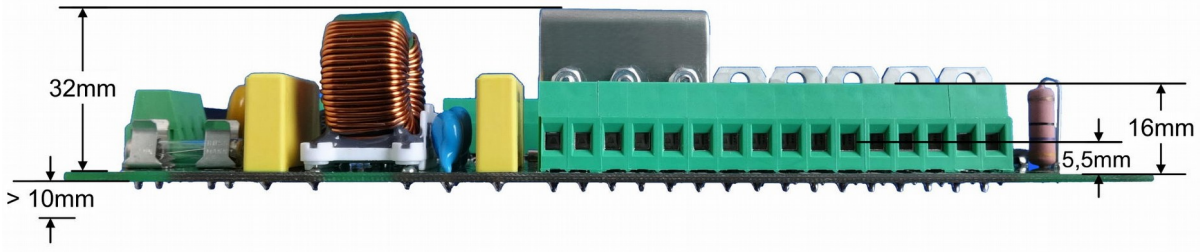
Hydraulic scheme of the heating and hot water installations, controlled by NPBC-V3C

VIEW AND DIMENSIONS OF NPBC-V3C'S MODULES

The controller has two modules: **Executive module – NPBC-V3M** and **Control module** with color display **– NRC-6**. They are connected with 4 wired cable with RJ11 connectors.

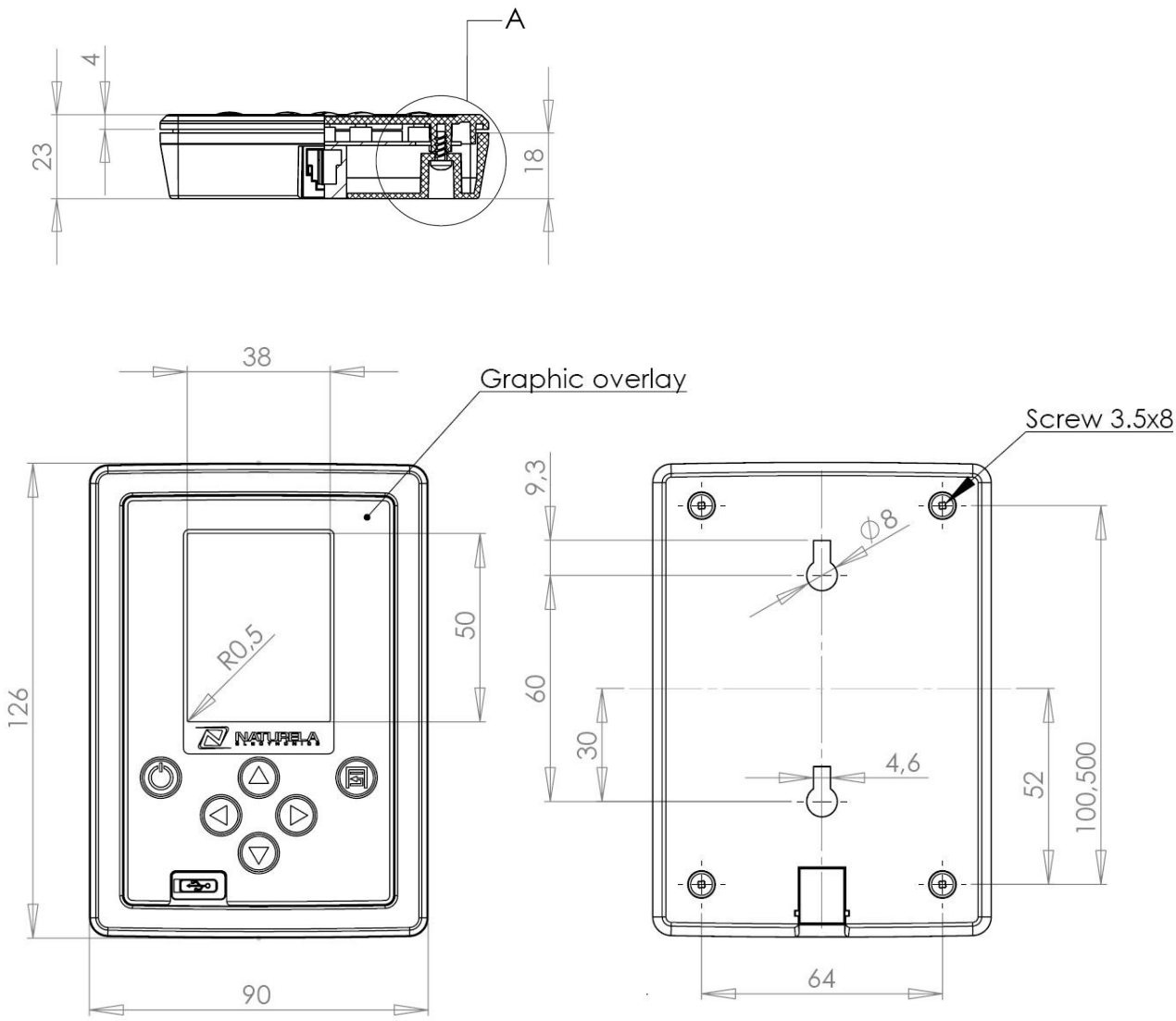
Dimensions and mounting holes of the Executive module





Dimensions and mounting holes of the Control module NRC-6

Outside dimensions of the control module's housing



The control module could be mounted on a wall, by using 2 screws vertically placed on 60 mm from each other with size of the head between 5 mm and 7.8 mm.

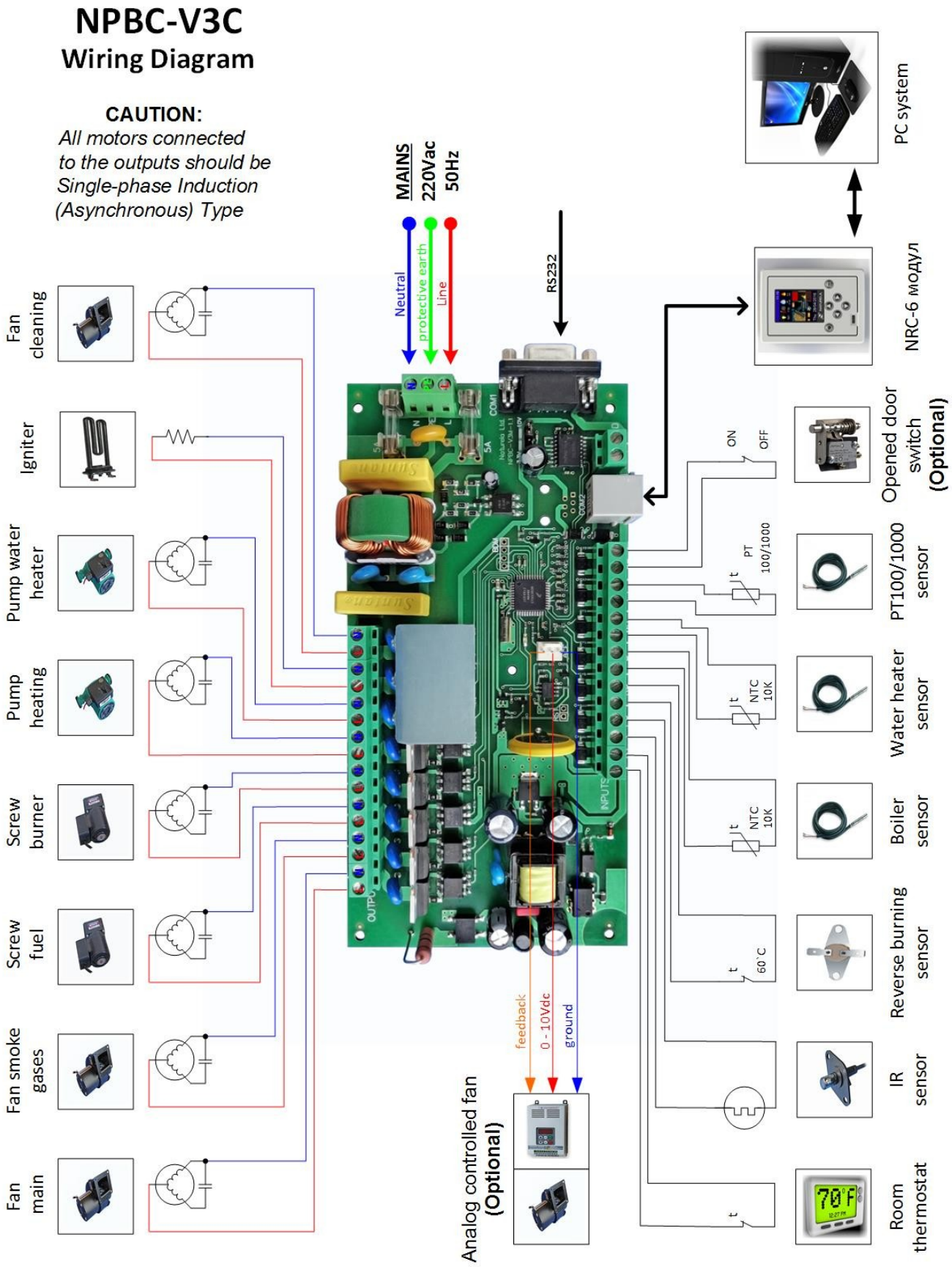
The housing box's construction allows it to be installed in the burner's housing. When they are screwed to each other, the back and the front panel of the box keep the Control module fixed.

MECHANISMS AND SENSORS USED BY NPBC-V3C-1

- Electric feed screw motor to transfer the fuel from the bunker to the burner (power up to 180W)
- Electric internal auger motor to forward the fuel to the burning chamber (power up to 180W)
- Main blower with smooth speed control to regulate the air flow (power up to 180W)
- Additional cleaning fan (power up to 900W)
- Exhaust gases fan with smooth speed control (power up to 180W)
- Heating element to fire the pellets (power up to 800W)
- Hot water heater circulation pump (power up to 180W)
- Central heating installation circulation pump (power up to 180W)
- **(Optional)** Analog output for frequency inverter to power up a powerful air fan
- Photo sensor to detect the burning fire
- Temperature sensor or thermostat to control the back burning
- Temperature sensor to control the temperature of the water in the boiler
- Temperature sensor for the hot water heater
- High temperature pt100 sensor to measure the temperature of the flue gases. *This temperature sensor is not used to detect the burning fire, but only to provide information*
- A potential free contact of a room thermostat for better control of the burning process according to the room temperature.
- USB interface for connection with a computer

NPBC-V3M INPUTS AND OUTPUTS DESCRIPTION:

Outputs		Inputs	
FM	Main fan	RT	Room thermostat. To this input could be connected a normally opened or normally closed contact, with no additional voltage.
FSG	Fan for the flue gases	PS	Photo sensor
SF	Screw for fuel	RB	Reverse burning sensor
SB	Internal screw	B	Boiler temperature sensor
PH	Heating installation pump	WH	Water heater temperature sensor
PWH	Hot water heater pump	PT	pt100 high temperature sensor
IGN	Ignition heater	OD	External stop switch **(Optional)**
FC	Fan for cleaning	LED	
ACF	Analog controlled fan **(Optional)**		


NPBC-V3C
Wiring Diagram
CAUTION:
All motors connected to the outputs should be Single-phase Induction (Asynchronous) Type
MAINS 220Vac 50Hz
Neutral
protective earth
Line
RS232
PC system
NRC-6 модул
Fan cleaning
Igniter
Pump water heater
Pump heating
Screw burner
Screw fuel
Fan smoke gases
Fan main
Opened door switch (Optional)
PT100/1000 sensor
Water heater sensor
Boiler sensor
Reverse burning sensor
IR sensor
Room thermostat
ON
OFF
PT 100/1000
NTC 10K
NTC 10K
60°C
70°F
feedback
0 - 10Vdc
ground
Analog controlled fan (Optional)

NPBC-V3C TECHNICAL SPECIFICATION

1	Number of inputs	7
2	Temperature sensors type	NTC 10K
3	Maximum temperature measured by the NTC sensors	110°C
4	Detecting ignition	By a photo sensor
5	Temperature measuring accuracy	1%
6	Number of outputs	8
7	Supply voltage on each output	Equal to the power supply voltage
8	Type of the main fan's and exhaust gases fan's motors	induction motor with power up to 180W
9	Ignition heater maximum power	800W
10	Additional cleaning blower's maximum power	900W
11	Maximum power consumed by any other output	180W
12	Maximum short time current on each output	16A AC
13	Maximum section of the cables plugged in each terminal	$2.5mm^2$
14	PC connection interface	Micro USB
15	Power supply voltage	90-250V AC 50Hz / (60Hz optional)
16	Power consumed in Standby mode	<1.5W
17	Executive module's PCB dimensions	180x90 mm
18	Control module's PCB dimensions	126x90 mm
19	Maximum length of the wire between Executive module and Control module	up to 40 m