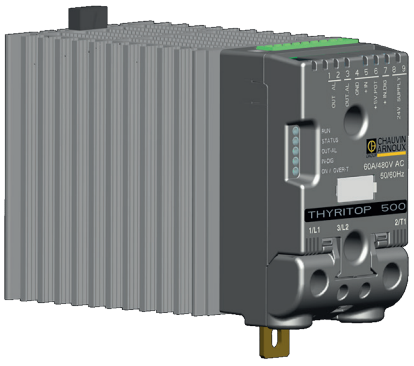
GB - Installation and operation manual

CHAUVIN ARNOUX
PYROCONTROLE

THYRITOP 500 SERIES

25 to 250 A Power Controller



Measure up

INDICE

GRAPHIC SYMBOLS

To indicate the type and importance of the information provided in this User’s Guide, graphic reference symbols have been use to facilitate interpretation of the information.

Indicates contents of sections, general instructions, notes, and other points to which the reader’s attention needs to be called.

Indicates a suggestion based on the experience of CA PYROCONTROLE Technical Personnel that could be especially useful under certain circumstances.

Indicates a particularly delicate situation that could affect the safety or correct operation of the controller, or an instruction that MUST be followed to prevent hazards.

Indicates a reference to Detailed Technical Documents available on the website www.pyrocontrole.com

Indicates a risk to the user’s safety due to high voltage at the points indicated.

1 • PRELIMINARY INSTUCTIONS

1.1 PROFILE

The **THYRITOP 500** series of microprocessor advanced solid state power units controls, in compact and optimized size, high electric powers with different types of heating elements, single-phase, biphase or triphase. Current levels range from 40A to 250A, nominal voltage from 480 VAC to 600VAC.
The command input is configurable and accepts 0-10V, 0/4-20mA signals, potentiometer, logic signals, including with PWM modes for cost effective solutions.
The device can also be operated via Modbus RTU serial communication, with IN/OUT chain connections facilitated by plug-in RJ10 (telephone) connectors.
The several trigger modes are software configurable and provide:
- **ZC** : Zero Crossing constant cycle time (settable in range 1-200sec), for conventional loads.
- **BF** : Burst-Firing, Zero crossing with optimized minimum cycle time, for systems with low thermal inertia, medium-wave IR lamps.
- **HSC** : Half Single Cycle Zero Crossing corresponds to Burst Firing that manages single semi-cycles of conduction or stop cycles, useful for short-wave IR lamps, reduces flickering and limits generation of EMC noise on the power line (applied only to single-phase load or open delta).
- **PA**: Phase angle control, useful for short-wave IR lamps, transformer primaries. Completely eliminates flickering of load filaments, but generates EMC noise on power line (harmonics).
Soft Start and soft stop ramp functions can be assigned to these controls with limitation of current peaks and/or maximum RMS current level.
Thanks to sophisticated Hardware and Software solutions, you can precisely control different types of loads.
Phase angle control (the only control method that completely eliminates IR lamp flickering), matched with current, voltage, or load power feedback functions, allows the easy use of “critical” applications such as (for example), special resistors such as special Super Khantal™ heating elements, Silicon Carbide resistors, or transformer primaries either single-phase or triphase.

THYRITOP 500 runs complete diagnostics of current, voltage, power, and temperature levels:
Current Diagnostics:
- Total and partial load interrupt alarm
- Self-learn function of alarm limit for interrupted load
- Alarm for SCR in short circuit
- Alarm for load in short circuit or overcurrent

Voltage Diagnostics:
- Alarm for absence of phase

Temperature Diagnostics:
- Alarm for over temperature of power module

Power control with Soft start ramp limits load, optimizes the consumptions and increases the load operating duration. Device parameters can be configured from PC, by means of a simple configuration SW which lets you save all parameters in a configuration file that is easy to manage and to copy to other devices.
Moreover, an RS485 serial connection of THYRITOP 500 is offered with Modbus RTU protocol to control currents, voltages, powers, load status, and device status from the supervisor terminal (HMI) or PLC.

*The section contains general information and warnings to be read **before** installing, configuring and using the controller.*

1.2 GENERAL DESCRIPTION

THYRITOP 500 is single-zone advanced solid state power unit, extremely compact, equipped with different optional functions; it offers an exclusive combination of performance, reliability, and flexibility.
In particular, this new line of CA PYROCONTROLE controllers is the ideal solution for sectors demanding high performance and continuity of service, such as :
- Thermoforming
- Blowing
- Hot runners for injection presses
- Texturizing of fibers
- Heat treatment furnaces
- Woodworking machines
- Glass tempering furnaces

The modules series THYRITOP 500 controllers are based on an extremely versatile hardware and software platform, with options to select the best I/O configuration for your system.
THYRITOP 500 is used for the power control of single-phase and 2-phase loads, including resistive loads with high and low temperature coefficient, short wave IR lamps, or transformer primaries.

Attention : the description of programming and configuration parameters are contained in the “Programming and configuration” manual, downloadable from the website www.pyrocontrole.com.

1.3 PRELIMINARY INSTRUCTION

Read the following preliminary instructions before installing and using the THYRITOP 500 modular power controller. This will make start-up faster and avoid some problems that could be mistakenly interpreted as malfunctions or limitations of the controller.

Immediately after unpacking the unit, check the order code and the other data on the label attached to the outside of the container. Write them on the following table. This data must always be available and given to CA PYROCONTROLE Customer Care representatives are available if technical service is needed.

SN	(Serial number)
CODE	(Product code)
TYPE	(Order code)
SUPPLY	(Power Supply)
VERS	(Firmware version)

Check that the controller is in perfect condition, was not damaged during shipment, and that the package also contains the “Configuration and Programming” manual.
Immediately report any errors, shortages, or signs of damage to your CA PYROCONTROLE dealer. Check that the order code matches the configuration requested for the intended application by consulting the section: “Technical-Commercial Information”.

Example	TH 500	90	480	0	1	0	M
Model							
Nominal current							
Nominal voltage							
Control option, Absent							
Diagnostic option: HB							
Fuse : absent							
Serial Modbus							

See paragraph 2.1 “ Dimensions and mounting” before installing the THYRITOP 500 on the machine/host system control panel. For configuration via PC, use the PYROTOOLS software and its connection cable.

For the order code, see Section: “Technical-Commercial Information ”.

Users and/or systems integrators seeking more detailed information on serial communication between a standard PC and/or an industrial PC and CA PYROCONTROLE programmable instruments can access the various technical reference documents in Adobe Acrobat format on the www.pyrocontrole.com website :

- Serial Communication
- MODBus Protocol

Before calling CA PYROCONTROLE Customer Care in case of assumed malfunctions, please see the Troubleshooting Guide in the “Maintenance” section and, if necessary, the F.A.Q. (Frequently Asked Questions) section on the website **www.pyrocontrole.com**

2 • INSTALLATION AND CONNECTION

This section contains the instructions needed for correct installation of THYRITOP 500 controllers on the machine/host system control panel and for correct connection of the power supply, inputs, outputs and interfaces.

Carefully read the following warnings before installing the instrument. Disregard of such warnings could create electrical safety and electromagnetic compatibility problems, as well as void the warranty.

2.1 ELECTRICAL POWER SUPPLY

- The controller THYRITOP 500 DOES NOT have an On/Off switch: the user must install switch/isolator conforming to safety requisites (CE mark) to cut off the power supply up-line of the controller. The switch must be installed in the immediate vicinity of the controller in easy reach of the operator. A single switch can be used for multiple devices.

* The earth connection must be made with a specific lead

- If the product is used in applications with risk of harm torisques persons or damage to machines or materials, it must be equipped with auxiliary alarm devices.
  It is advisable to provide the ability to check for tripped alarms during regular operation.
  Do not install the THYRITOP 500 in rooms with hazardous (inflammable or explosive) atmosphere; it may be connected to elements that operated in such atmosphere only by means of appropriate interfaces that conform to current safety standards.

2.2 NOTES ON ELECTRICAL SAFETY AND ELECTROMAGNETIC COMPATIBILITY:

2.2.1 CE MARKING:
EMC (electromagnetic compatibility) conformity

in compliance with Directive EMC 2014/30/EU.
THYRITOP 500 power controllers are mainly intended to operate in industrial environments, installed in the control cabinets of machines or production systems. For electromagnetic compatibility, the most restrictive general standards have been applied, as indicated in the corresponding table.

2.2.2 LV conformity (low voltage)

in compliance with Directive 2014/35/EU.

EMC conformity has been verified.
See the information in tables 1 and 2.

2.3 RECOMMENDATIONS FOR CORRECT INSTALLATION FOR PURPOSES OF EMC:

2.3.1 Instrument power supply

- The power supply for the electronic instrumentation on the panels must always come directly from a cut-off device with fuse for the instrument part.
- Electronic instrumentation and electromechanical power devices such as relays, contactors, solenoids, etc., MUST ALWAYS be powered by separate lines.
- When the power supply line of electronic instruments is heavily disturbed by switching of thyristor power groups or by motors, you should use an isolation transformer only for the controllers, grounding its sheathing.
- It is important for the system to be well-grounded:
  - voltage between neutral and ground must not be > 1V
  - Ohmic resistance must be < 6Ω;
- If the grid voltage is highly unstable, use a voltage stabilizer.
- In proximity of high-frequency generators or arc welders, use adequate grid filters.
- The power supply lines must be separate from instrument input and output lines.

2.3.2 Input and output connections

Before connecting or disconnecting any connection, always check that the power and control cables are isolated from voltage.
Appropriate devices must be provided : fuses or automatic switches to protect power lines.
The fuses present in the module function solely as a protection for the THYRITOP 500 semiconductors.

- Connected outside circuits must be doubly isolated.
- It is necessary to :
  - physically separate the input cables from those of the power supply, outputs, and power connections.
  - use braided and shielded cables, with sheathing grounded at a single point.

2.3.3 Installation notes

Use the extra-rapid fuse indicated in the catalogue according to the connection example equipped.

- Moreover, the applications with solid-state units require a safety automatic switch to section the load power line.
To ensure maximum reliability, the device must be correctly installed in the panel in such a way as to obtain adequate heat exchange between the heat sink and the surrounding air under conditions of natural convection. Fit the device vertically (maximum angle 10° to the vertical axis) see figure 3.

- Vertical distance between a device and the panel wall >100mm
- Horizontal distance between a device and the panel wall at last 20mm
- Vertical distance between a device and the next one at last 300mm
- Horizontal distance between a device and the next one at last 20mm.

Check that the cable holder runners do not reduce these distances ; in this case fit the cantilever units opposite the panel so that the air can flow vertically on the dissipator without any obstacles.

- Dissipation of device thermic power with effects on installation room temperature.
- Thermal power dissipation with limits on installation room temperature.
- Obligation d'installation (distance entre les produits pour garantir la dissipation en condition de convection naturelle)
- Tension maxi de ligne du thyristor et limites en transitoire, le relais statique est équipé de dispositifs de sécurité internes (en fonction des modèles).
- présence de courant de dispersion dans le THYRITOP 500 en condition de non-conduction (courant de quelques mA, dû au circuit RC Snubber de protection du thyristor).

CA PYROCONTROLE ne saurait être tenue en aucun cas pour responsable d'éventuels dommages corporels ou matériels résultant d'altérations ou d'une utilisation erronée, inappropriée ou non conforme aux caractéristiques du contrôleur et aux prescriptions contenues dans le présent Manuel Utilisateur.

Tableau 1 ***Emission EMC***

AC semiconductor motor controllers and conductors for non-motor loads	EN 60947-4-3	Classe A Group 2
Emission enclosure Class A Group 2 compliant in firing mode single cycle and phase angle if external filter fitted	EN 60947-4-3 CISPR-11 EN 55011	

Tableau 2 ***EMC Immunity***

Generic standards, immunity standard for industrial environments	EN 60947-4-3	
ESD immunity	EN 61000-4-2	4 kV contact discharge 8 kV air discharge
RF interference immunity	EN 61000-4-3 /A1	10 V/m amplitude modulated 80 MHz-1 GHz 10 V/m amplitude modulated 1.4 GHz-2 GHz
Conducted disturbance immunity	EN 61000-4-6	10 V/m amplitude modulated 0.15 MHz-80 MHz
Burst immunity	EN 61000-4-4	2 kV power line 2 kV I/O signal line
Surge immunity	EN 61000-4-4/5	Power line-line 1 kV Power line-earth 2 kV Signal line-earth 2 kV Signal line-line 1 kV
Magnetic fields immunity	Test are not required. Immunity is demostrated by the successfully completion of the operating capability test	
Voltage dips, short interruptions and voltage immunity tests	EN 61000-4-11	100%U, 70%U, 40%U

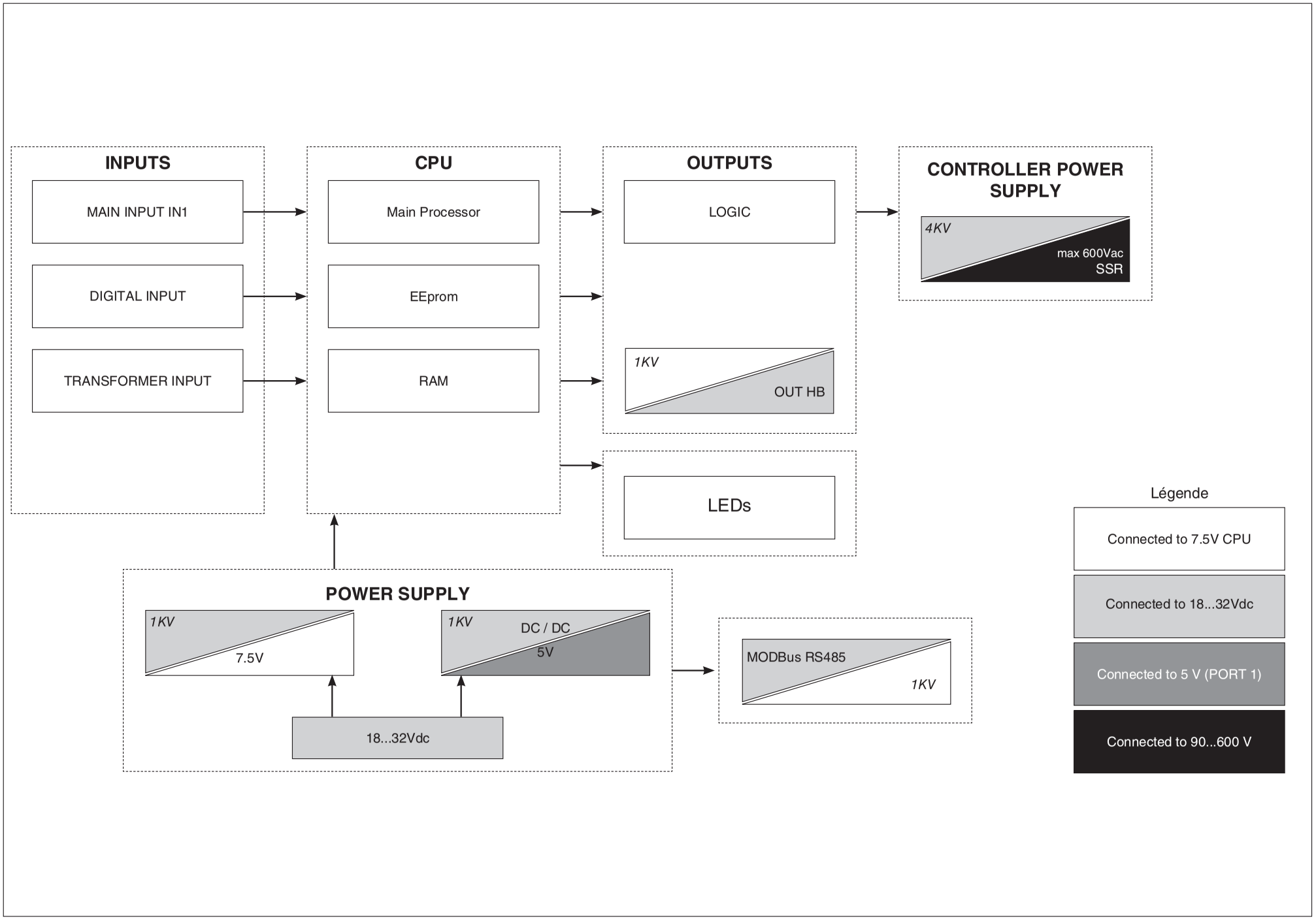
Tableau 3 ***LVD Safety***

Safety requirements for electrical equipment for measurement, control and laboratory use	EN 61010-1 UL 508

ATTENTION
This product has been designed for class A equipment. Use of the product in domestic environments may cause radio interference, in which case the user may be required to employ additional mitigation methods.

EMC filters are required in PA mode (Phase Angle, i.e., SCR trigger with phase angle modulation). The filter model and current level depend on the configuration and load used. The power filter MUST by connected as close as possible to the THYRITOP 500. You can use a filter connected between the power line and GTF or an LC group connected between the THYRITOP 500 output and the load.

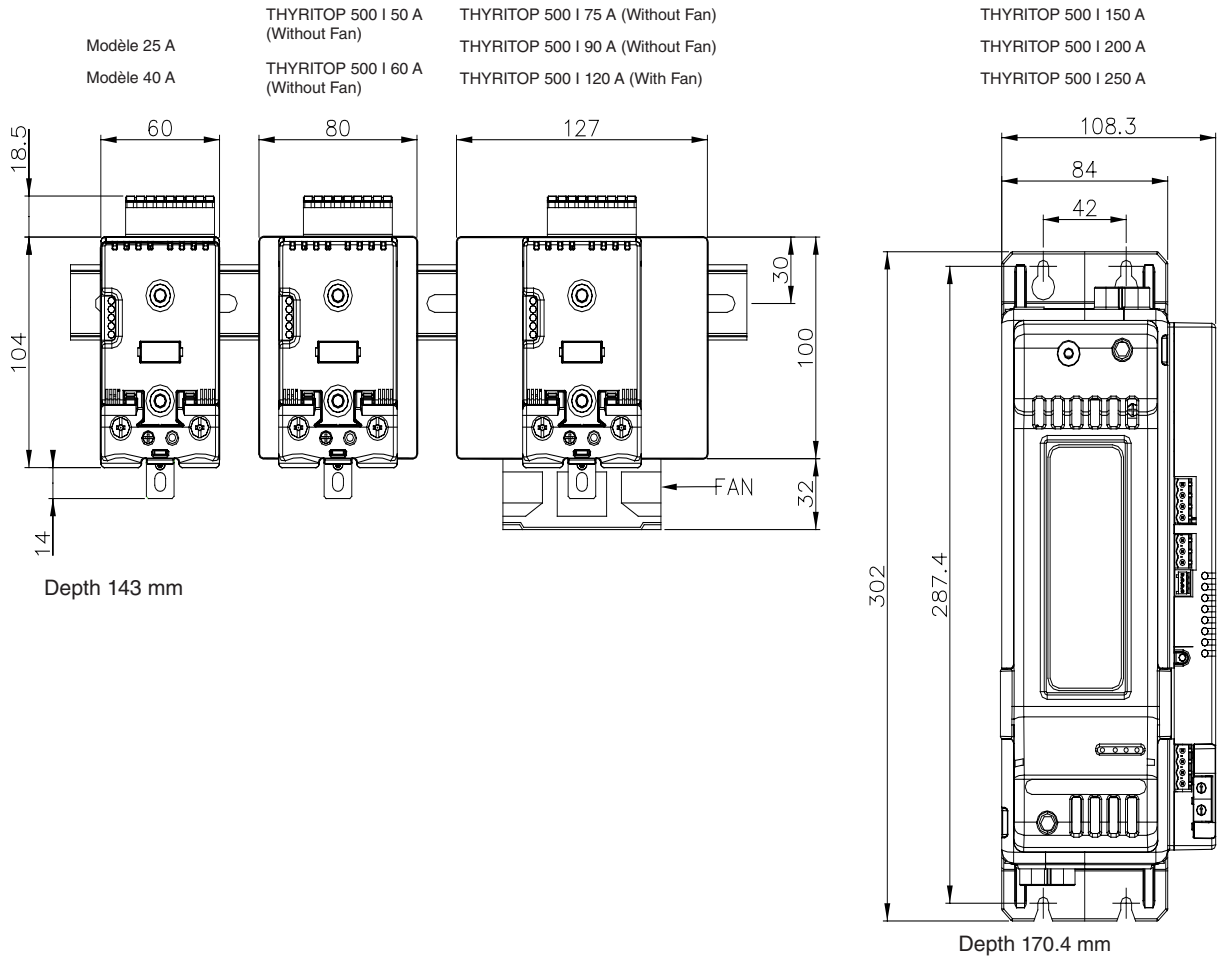
The CE declaration of conformity is available on request.


INPUTS
MAIN INPUT IN1
DIGITAL INPUT
TRANSFORMER INPUT
CPU
Main Processor
EEprom
RAM
OUTPUTS
LOGIC
1KV
OUT HB
LEDs
CONTROLLER POWER SUPPLY
4KV
max 600Vac
SSR
POWER SUPPLY
1KV
7.5V
1KV
DC / DC
5V
18...32Vdc
MODBus RS485
1KV
Légende
Connected to 7.5V CPU
Connected to 18...32Vdc
Connected to 5 V (PORT 1)
Connected to 90...600 V

2.4 DIMENSIONS

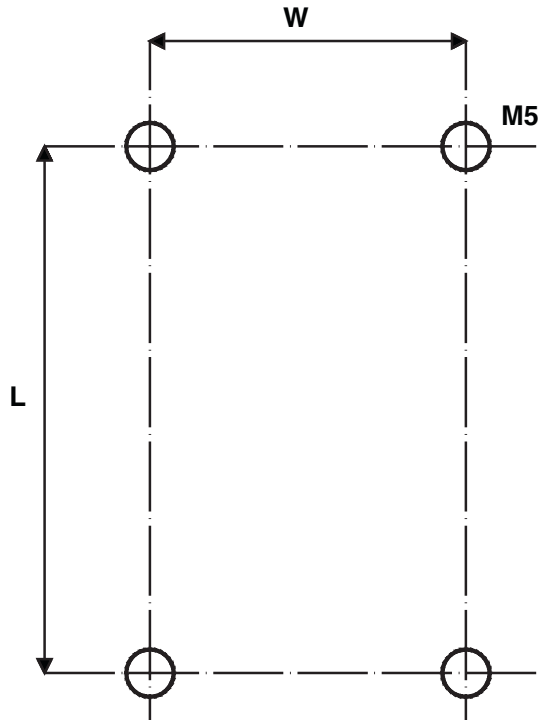
Fastening may be done on DIN guide (EN50022) or with (5MA). See figures 1 and 2.
All dimensions are expressed in mm.

Figure 1



2.4.1 TEMPLATE FOR PANEL MOUNTING

Figure 2

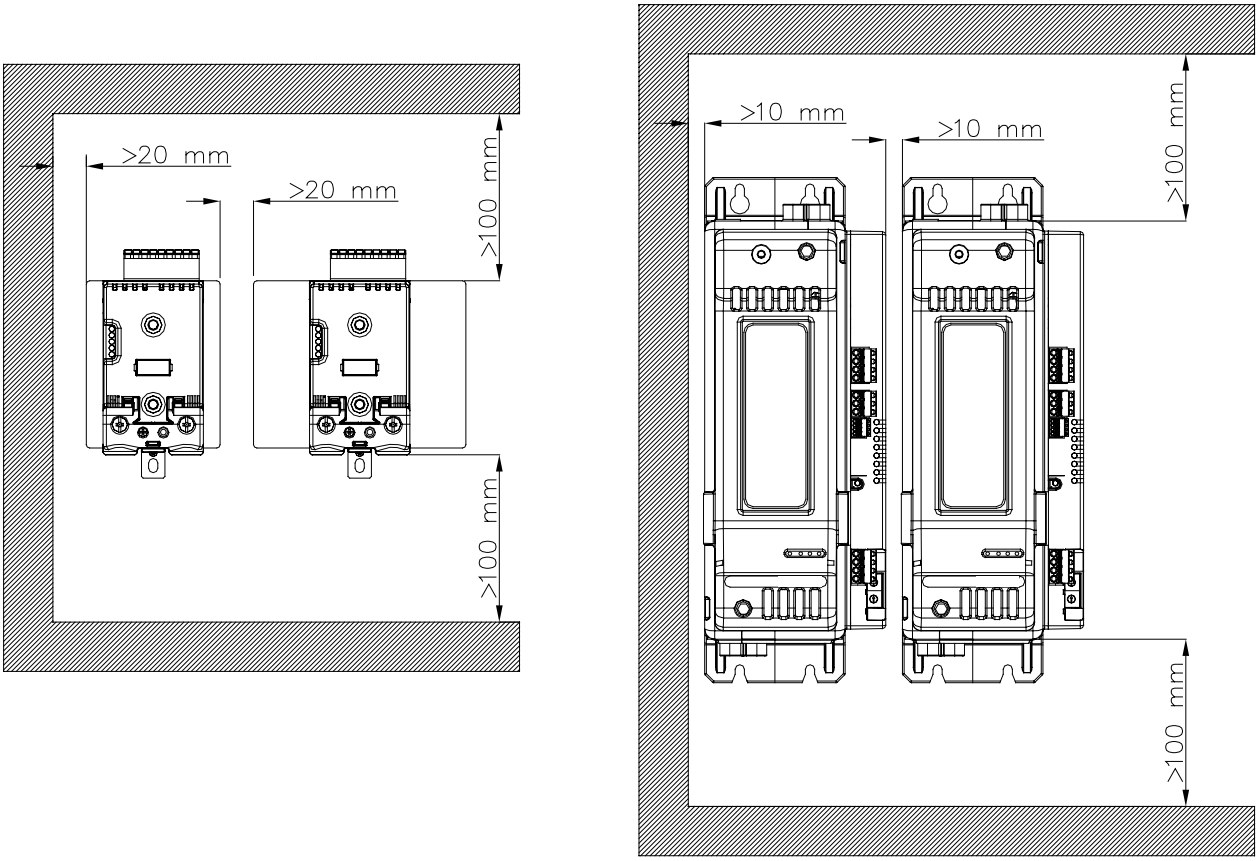


THYRITOP 500	H (mm)	L (mm)
25 - 40 - 50 - 60 A	112	44
75 - 90 - 120 A	112	113
150 - 200 - 250A	287	42

2.5 INSTALLATION

Attention: respect the minimum distances shown in figure 3 to provide adequate air circulation.

Figure 3



For correct attachment/release of the module on the DIN guide, do as follows: :
- keep the attach/release cursor pressed
- insert/remove the module
- release the cursor

Figure 4

PHASE ATTACHMENT

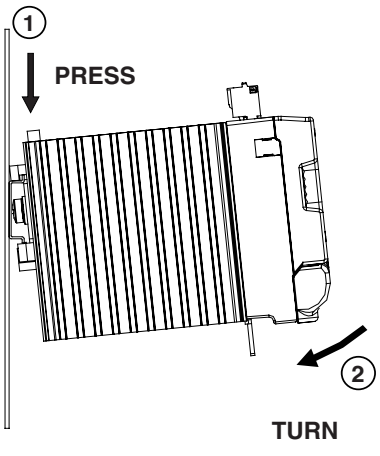


Figure 5

THYRITOP 500
locked properly to DIN bar

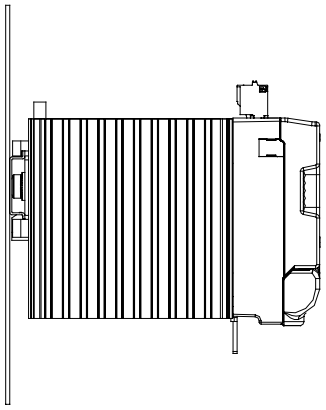
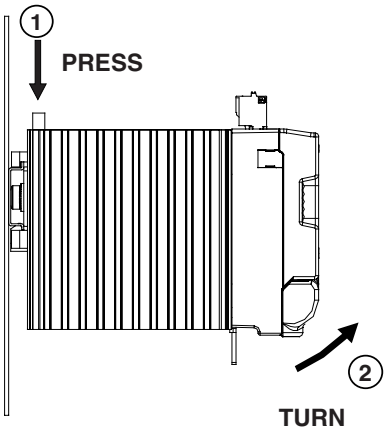


Figure 6

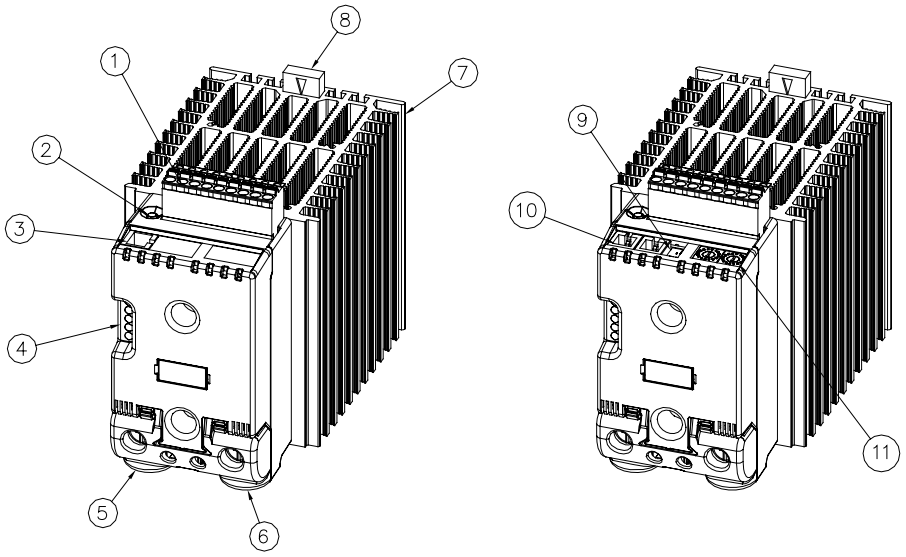
PHASE RELEASE



2.6 DESCRIPTION THYRITOP 500 I 25-120 A

Figure 7

THYRITOP 500 Standard **THYRITOP 500 with option sérieRS485**

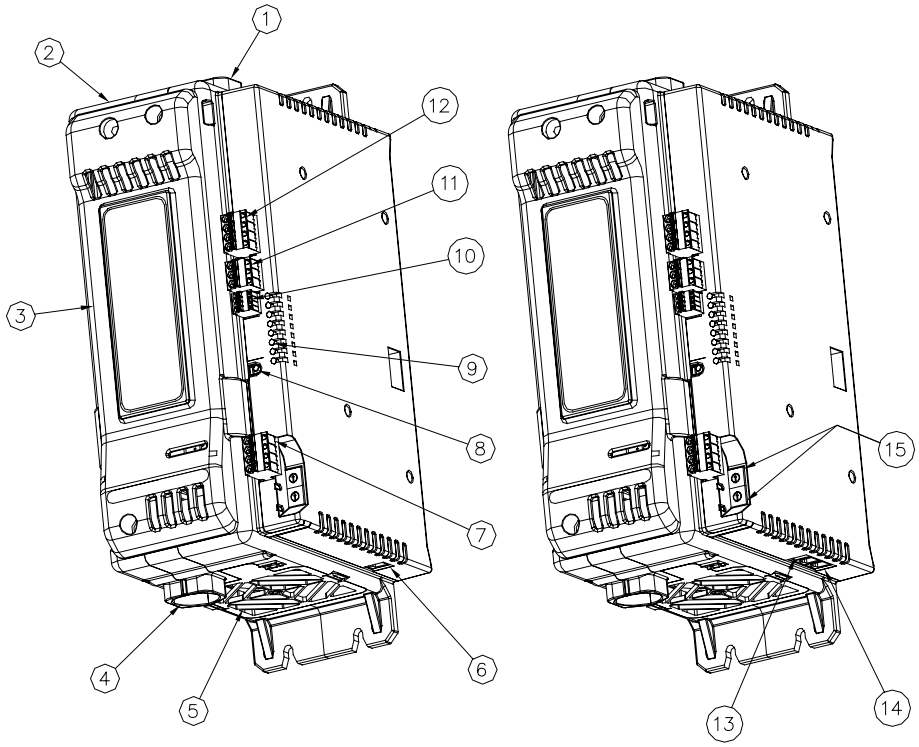


1. Supply/control connnector
2. HB key calibration
3. TTL port for configuration
4. LED indicators
5. Power terminal “Line” (1/L1)
6. Power terminal “Load” (2/T1)
7. Heatsink
8. Attachment DIN bar
9. Switch serial line terminal
10. RS485 serial port connector
11. Address Rotary switch

2.7 GENERAL DESCRIPTION THYRITOP 500 I 150-250 A

Figure 8

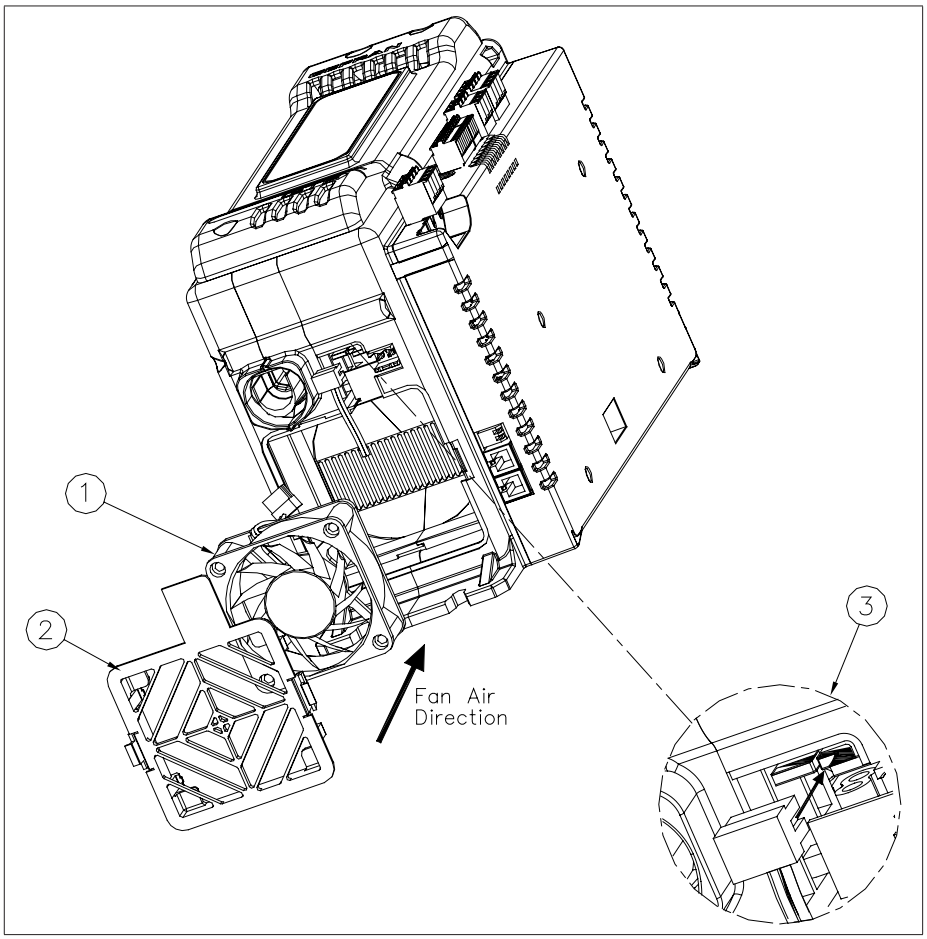
THYRITOP 500 I 150-250 A Standard **THYRITOP 500 I 150-250 A with serial option RS485**



1. “Line” terminal (1/L1)
2. Line voltage connector
3. Internal fuse protection cover
4. “Load” terminal (2/T1)
5. Cooling fan
6. TTL port for configuration by PC
7. Control input connector
8. HB key calibration
9. LED indicators
10. Input connector
11. Supply connector
12. Output connector
13. Dip Switch serial line
14. RJ10 connector serial port RS485
15. Address rotary switch

2.8 CLEANING/CHECKING OR REPLACING THE FAN THYRITOP 500 I 150-250 A

Figure 9



1. Fan
2. Lower grille (ventilation intake)
3. Detail of insertion of fan connector in PCB

PERIODIC CLEANING

Every 6-12 months (depending on the dust level of the installation) blow a compressed air jet downward through the upper rectangular cooling grilles (on the side opposite the fan).
This will clean the internal heat dissipater and the cooling fan.

IN CASE OF OVERHEAT ALARM

Before and during the inspection/maintenance cut power to the fan controller and verify that the system is isolated for operator safety. If periodic cleaning does not eliminate the problem, do as follows :

- **a** Remove the fan support grille by detaching the two support tabs
- **b** Disconnect the fan connector from the board
- **c** Check the condition of the fan
- **d** Clean or replace the fan
  Attention: check that the arrow (on the fan indicating the direction of air flow is pointing to the heat sink
- **e** Insert the connector into the board
- **f** Insert the fan support grille until it attaches
- **g** Power up the device and check fan rotation when at least one load is on

2.9 REPLACING THE INTERNAL FUSE (OPTIONAL ONLY FOR THYRITOP 500 I 150-250A)

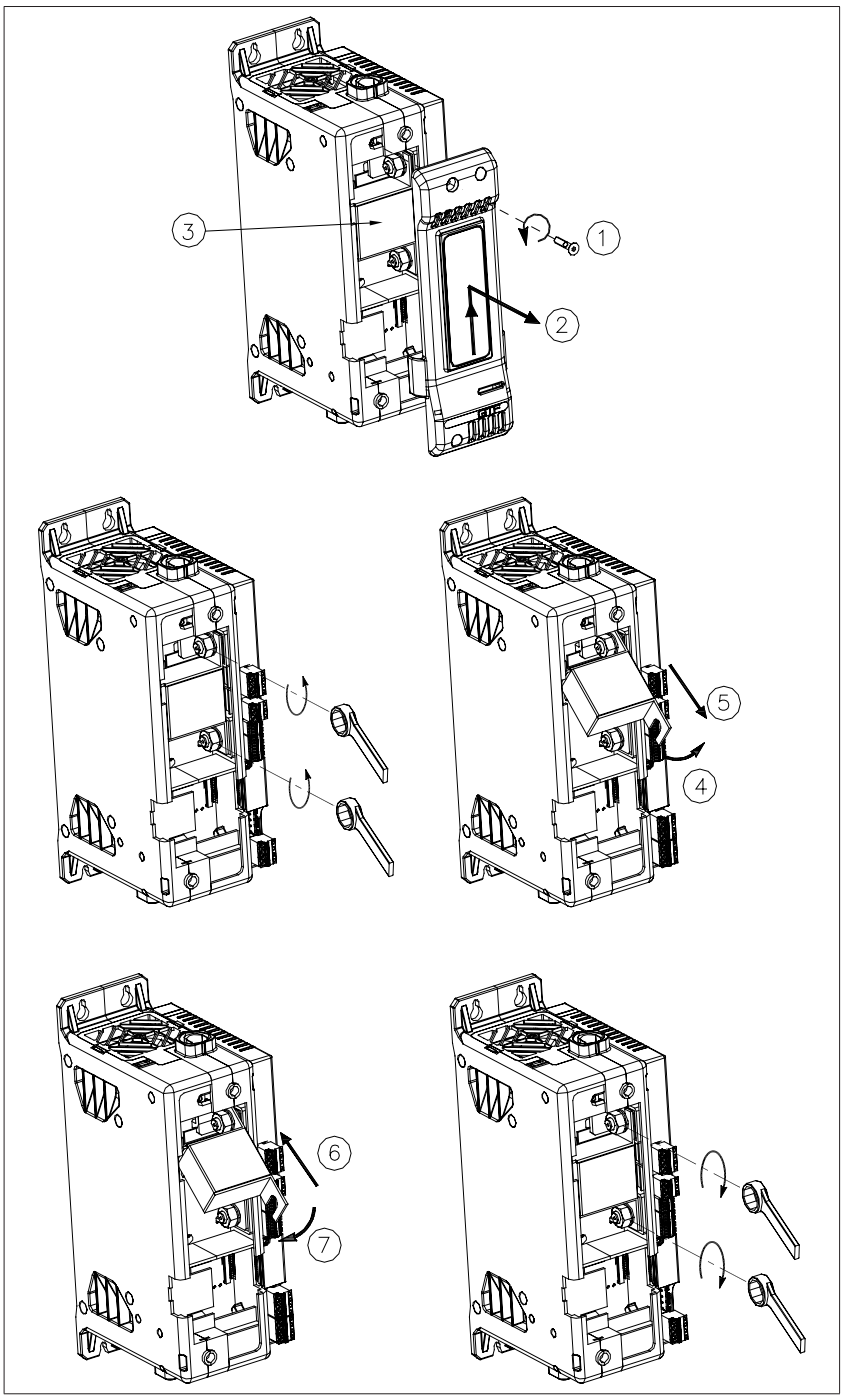
ATTENTION

Before and during the inspection/maintenance cut power to the fuse controller and verify that the system is isolated for operator safety

- Undo the cover fastening screw (1)
- Remove the cover following the movement indicated by the arrow (2)
- In this way the fuse is discovered (3)
- Unscrew the two nuts fastening the fuse using an N.13 wrench (THYRITOP 500 I 150 A) or a size-17 wrench (THYRITOP 500 I 200-250 A)
- It is not necessary to remove the nuts because the fuse is removed from its housing by turning it (4) and withdrawing it (5) as indicated by the arrows
- Insert the new fuse as indicated by the arrows (6,7)

ATTENTION: the washer must remain between the dice and the fuse (NOT under the fuse).

Figure 10



- Fasten the two nuts by the 3-4 Nm torque tube-shaped spanner N. 16.
- Replace the cover pointing it to the lower part (pay attention to the connection tooth).
- Fasten the cover by the specific screw.

3 • ELECTRICAL CONNECTIONS

3.1 POWER CONNECTIONS

CABLE SECTIONS

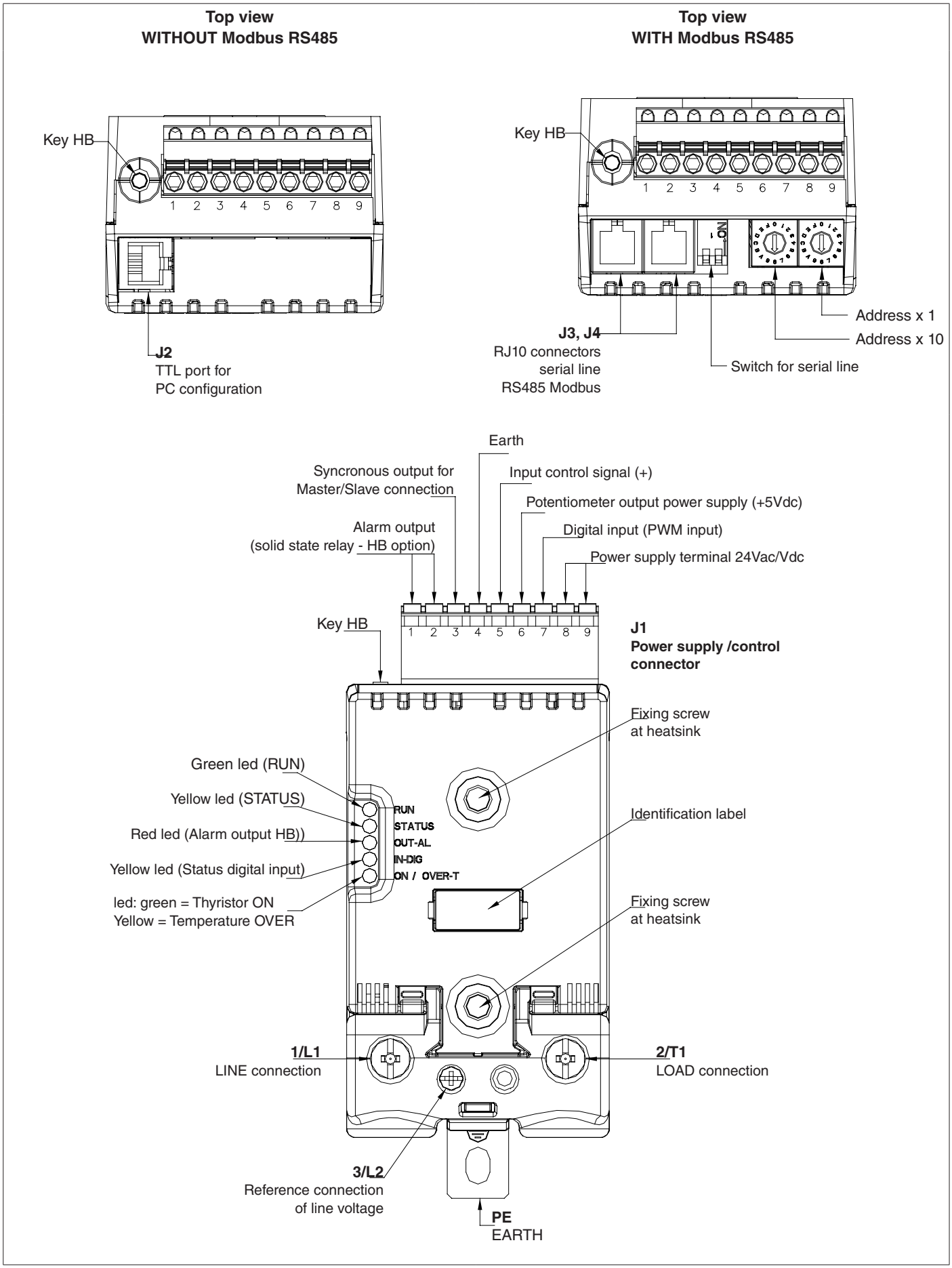
Table 4

CURRENT LEVEL	TERMINAL	CABLE WIRE	WIRE TERMINAL	TIGHTENING TORQUE / TOOL
25A	1/L1, 2/T1, PE	4 mm² 10 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / Phillips screwdriver PH2 - PH3
40A	1/L1, 2/T1, PE	10 mm² 7 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / Phillips screwdriver PH2 - PH3
50A	1/L1, 2/T1, PE	10 mm² 7 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / Phillips screwdriver PH2 - PH3
60A	1/L1, 2/T1, PE	16 mm² 5 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / Phillips screwdriver PH2 - PH3
75A	1/L1, 2/T1, PE	25 mm² 3 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / Tournevis cruciforme PH2 - PH3
90A	1/L1, 2/T1, PE	35 mm² 2 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / Phillips screwdriver PH2 - PH3
120A	1/L1, 2/T1, PE	50 mm² 1/0 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / Phillips screwdriver PH2 - PH3
-	3/L2 (Ref. Vline)	0.25 ...2.5 mm² 23...14 AWG	wire terminal tip	0.5 ...0.6 Nm / Screwdriver blade 0.6 x 3.5 mm
150A	1/L1, 2/T1	70 mm² 2/0 AWG	Wire stripped for 25 mm or with crimped pre-insulated terminal tube CEMBRE PKC70022	6 Nm / No. 6 pans N. 6
200A	1/L1, 2/T1	95 mm² 4/0 AWG	Wire stripped for 25 mm or with crimped pre-insulated terminal tube CEMBRE PKC95025	6 Nm / No. 6 hex head wrench
250A	1/L1, 2/T1	120 mm² 250 AWG	Wire stripped for 25 mm	6 Nm / No. 6 hex head wrench
-	3/L2 (Ref. Vline)	0.25 ...2.5 mm² 23...14 AWG	Wire stripped for 8 mm or with tag terminal	0.5 ...0.6 Nm / Flat-head screwdriver tip 0,6 x 3.5 mm

Note:
Cables must be copper “Stranded Wire” or “Compact-Stranded Wire” type with maximum operating temperature 60/75°

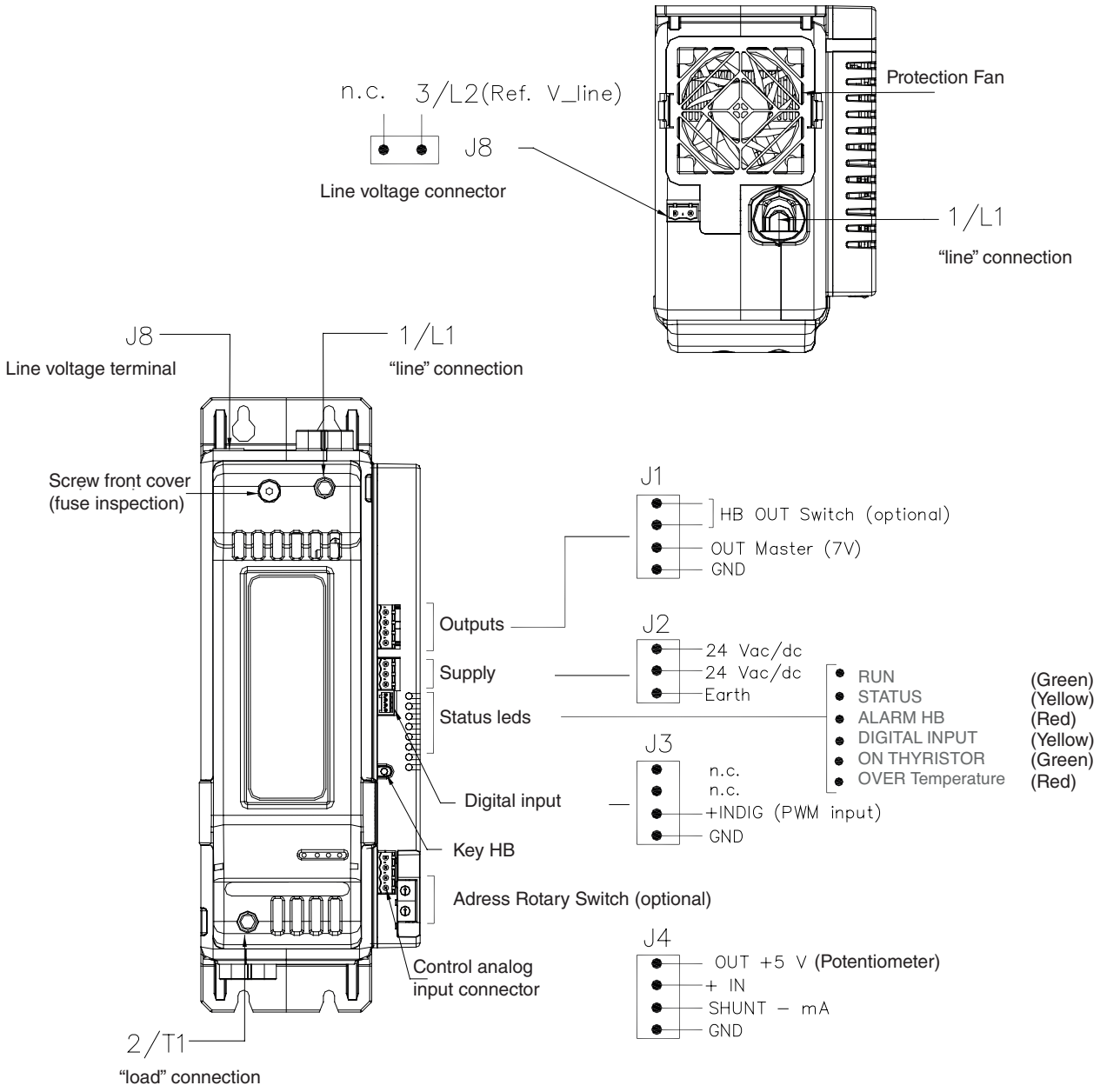
3.2 THYRITOP 500 I 25-120 A INPUT/OUTPUT CONNECTIONS

Figure 11

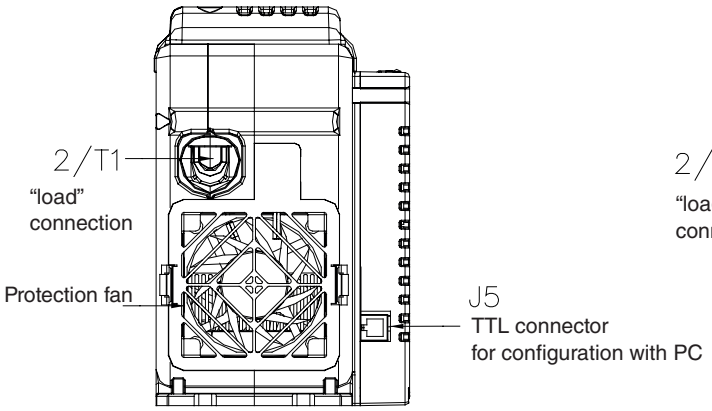


3.3 THYRITOP 500 I 150-250A INPUT/OUTPUT CONNECTIONS

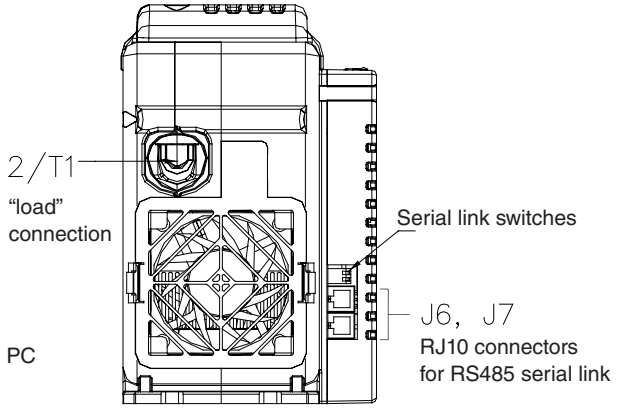
Figure 12



Low view
Without option RS485 serial line



Low view
With option RS485 serial line



3.4 FUNCTIONS OF INDICATOR LEDS

Description of LEDs

Table 5

LED	DESCRIPTION	COLOR
RUN	Flashing : during normal operation	green
	Fixed On : depending on FW programming (see Software Manual)	
STATUS	Off : during normal operation	yellow
	On : depending on FW programming (see Software Manual)	
ALARM	State HB alarm output / Power Fault Alarm / Fuse Open	red
DI	State digital input	yellow
ON / OVER-TEMP	Green : thyristor on control state	green
	Yellow : ON Thyristor overtemperature alarm	yellow
☞	The state of the LEDs matches the corresponding parameter, except in the following special cases : - LED 1 (green) + LED 2 (yellow) both flashing rapidly: autobaud in progress - LED 2 (yellow) flashing rapidly: SSR temperature sensor broken or SSR Over Heat or Rotation Error or Fuse_open (modèles150...250 A) or Short_Circuit_Current or Line-Load Terminals Over Heat (modèles 150...250A)	

3.5 CONTROL CONNECTOR

3.5.1 CONNECTOR J1 THYRITOP 500 I 25-120 A

Figure 13

CONNECTOR J1 THYRITOP 500 I 25-120 A (CONTROL)

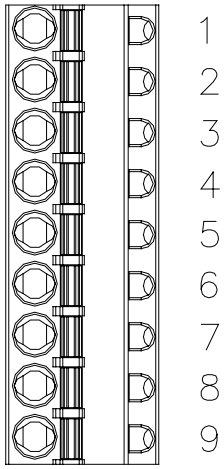


Figure 14
Connection schema J1 THYRITOP 500 for 25-120 A

CONNECTEUR J1 THYRITOP 500 I 25-120 A

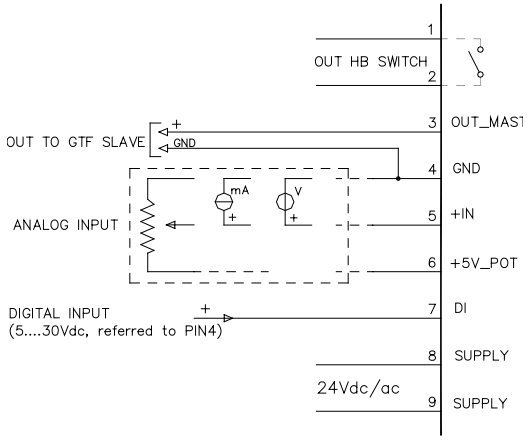


Tableau 6

	**0,2 - 2,5mm²**	**24-14AWG**
		
	**0,25 - 2,5mm²**	**23-14AWG**
		

Tableau 7

PIN	NOM	DESCRIPTION
1	OUT AL HB	OUT Alarm Switch (HB)
2		
3	OUT_Master	Control output Slave (+7V)
4	GND	GND Control analog input
5	+ IN	+ Control analog input
6	+5V_POT	Output alim. potentiometer
7	IN_DIG	Digital input & PWM Input
8	24V Supply	Supply 18...32 Vac/Vdc
9	24V Supply	

3.5.2 Connector J1 THYRITOP 500 I 150-250 A OUTPUTS

Figure 15

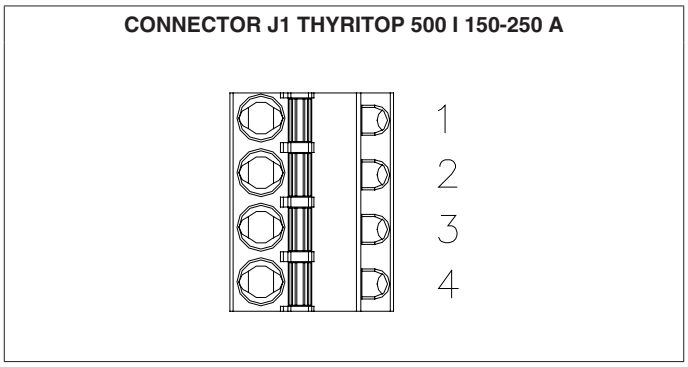


Tableau 8

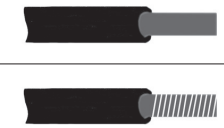
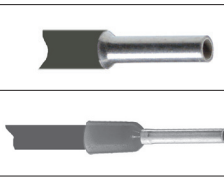
	**0,2 - 2,5mm²**	**24-14AWG**
	**0,25 - 2,5mm²**	**23-14AWG**

Figure 16
Connection schema J1 THYRITOP 500 I 150-250 A

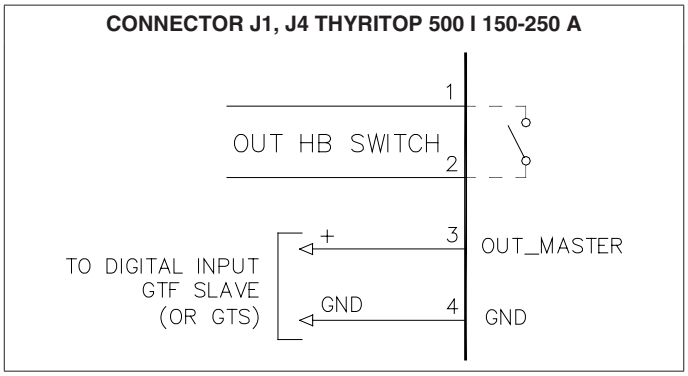


Tableau 9

PIN	NOM	DESCRIPTION
1	OUT AL HB	Contact output N.A. Alarm HB
2		
3	+OUT_Master	Output 7Vdc for control slave module
4	GND	GND output OUT_Master

3.5.3 Connector J2 THYRITOP 500 I 150-250 A Supply 24V

Figure 17

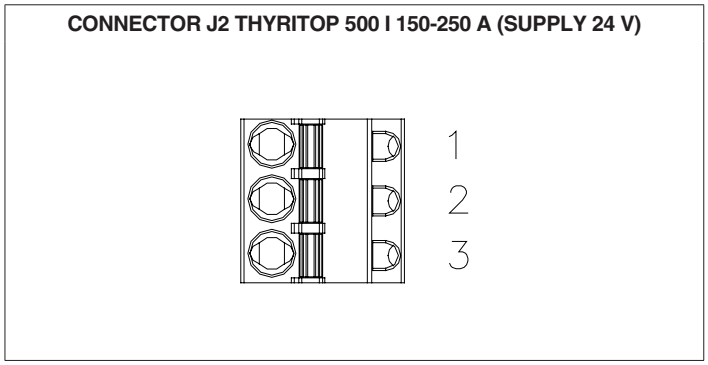


Tableau 10

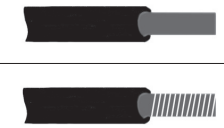
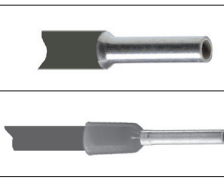
	**0,2 - 2,5mm²**	**24-14AWG**
	**0,25 - 2,5mm²**	**23-14AWG**

Figure 18
Connection schema J2 for THYRITOP 500 I 150-250 A

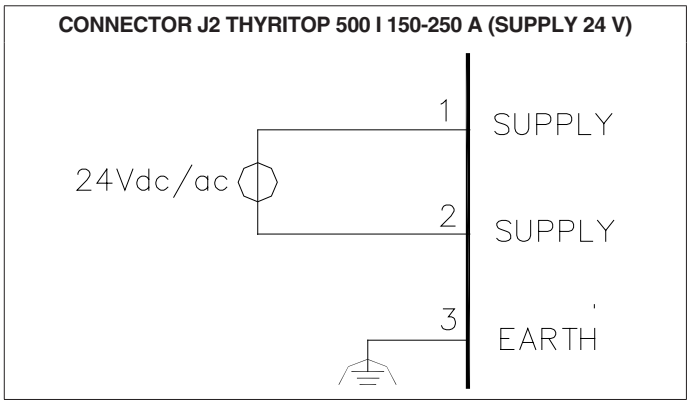


Tableau 9

PIN	NOM	DESCRIPTION
1	24Vdc/Vac	24V Supply
2	24Vac/Vdc	
3	EARTH	Earth EMC

3.5.4 **Connector J3 THYRITOP 500 I 150-250 A**
Digital inputs

Figure 19

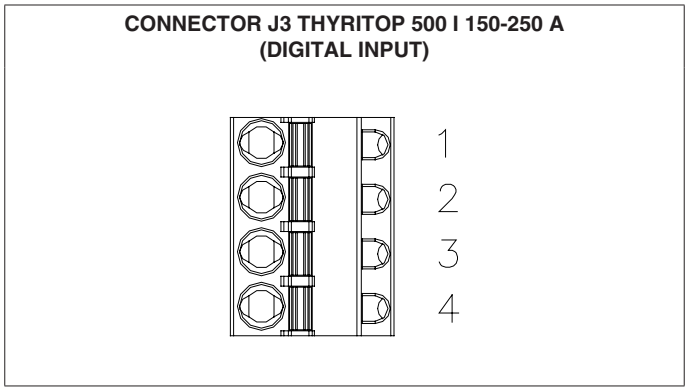


Tableau 12

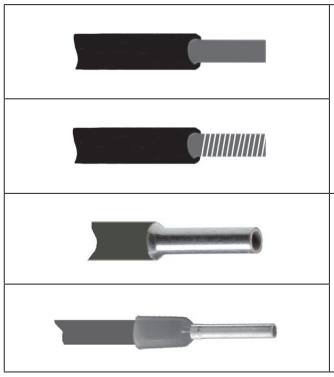
	**0,2 - 2,5mm²**	**24-14AWG**
	0,25 - 2,5mm²	**23-14AWG**

Figure 20
Connection schema J3 for THYRITOP 500 I 150-250 A

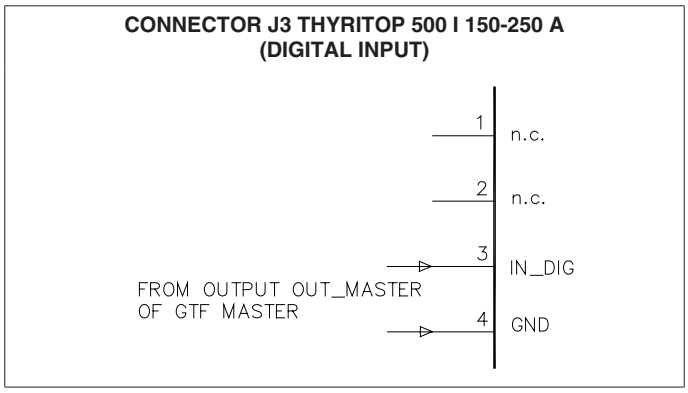


Tableau 13

PIN	NOM	DESCRIPTION
1	---	Not connected
2	---	Not connected
3	+IN_DIG	Entrées numérique (& PWM input)
4	GND	24V Supply

3.5.5 **Connector J4 THYRITOP 500 I 150-250A**
Digital control inputs

Figure 21

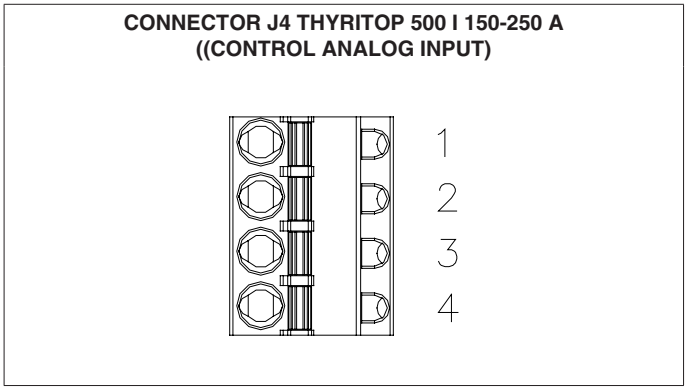


Tableau 14

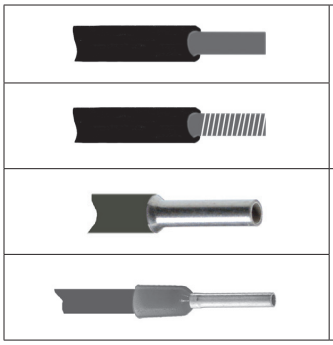
	**0,2 - 2,5mm²**	**24-14AWG**
	0,25 - 2,5mm²	**23-14AWG**

Figure 22
Connection schema J4 for THYRITOP 500 150-250A

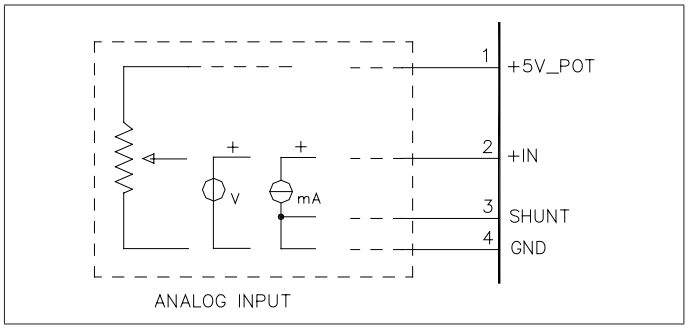
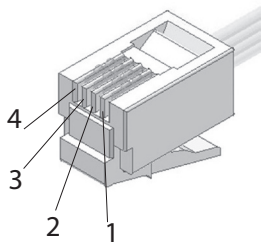


Tableau 15

PIN	NOM	DESCRIPTION
1	OUT AL HB	Supply output 5V potentiometer
2	+IN	Control voltage input
3	SHUNT	Shunt for input mA
4	GND	GND control signal

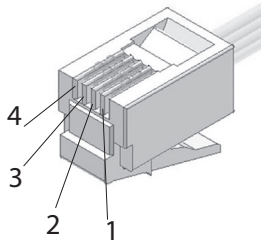
3.6 CONFIGURATION TTL PORT (THYRITOP 500 Standard)

Connector THYRITOP 500 I 25-120 A - Connector J5 THYRITOP 500 I 150-250 A

Connector S1/S2 RJ10 4-4 pin	Nr. Pin	Name	Description	Note
	1	GND	Ground	You are advised only to use this port for configuration of the parameters by means of the cables : code P01665999 (RS485) code P01665998 (RS232)
	2	RX_TTL	Data reception TTL from TH 500	
	3	TX_TTL	Data transmission TTL to TH 500	
	4	(Reserved CA PYROCONTROLE)	DO NOT connect	
Cable type: flat telephone cable for pin 4-4 conductor 28AWG				

3.7 SERIAL COMMUNICATION PORTS MODBUS RS485 (OPTION)

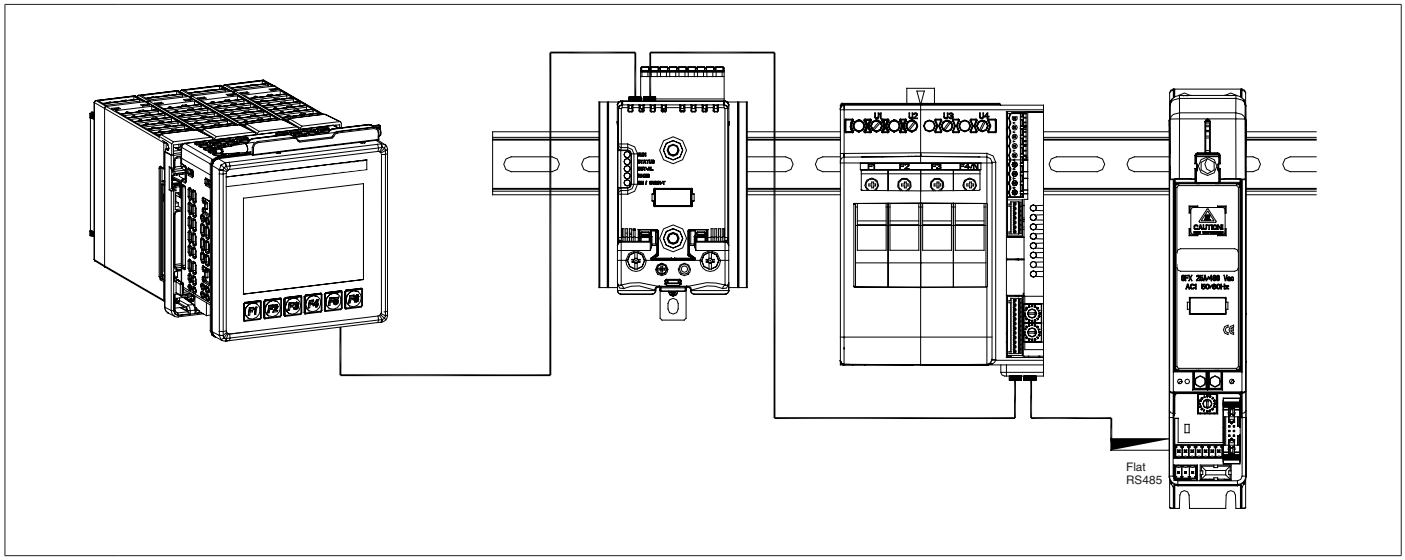
CONNECTOR J3-J4 THYRITOP 500 I 25-120 A - CONNECTOR J6-J7 THYRITOP 500 I 150-250 A

Connector S1/S2 RJ10 4-4 pin	Nr. Pin	Name	Description	Note
	1	GND1 (**)		(*) You are advised to insert the RS485 line termination in the last Modbus line device (see “Switches”). **(**)** You are also advised to connect the GND signal between the Modbus devices with a line distance > 100 m.
	2	Tx/Rx+	Data reception/transmission (A+)	
	3	Tx/Rx+	Data reception/transmission (B-)	
	4	+V (reserved)		
Cable type : flat telephone cable for pin 4-4 conductor 28AWG				

3.8 CONNECTION EXAMPLE : COMMUNICATION PORTS

Example of THYRITOP 500 integration with THYRITOP 704/714 modules connected via RS485 Modbus

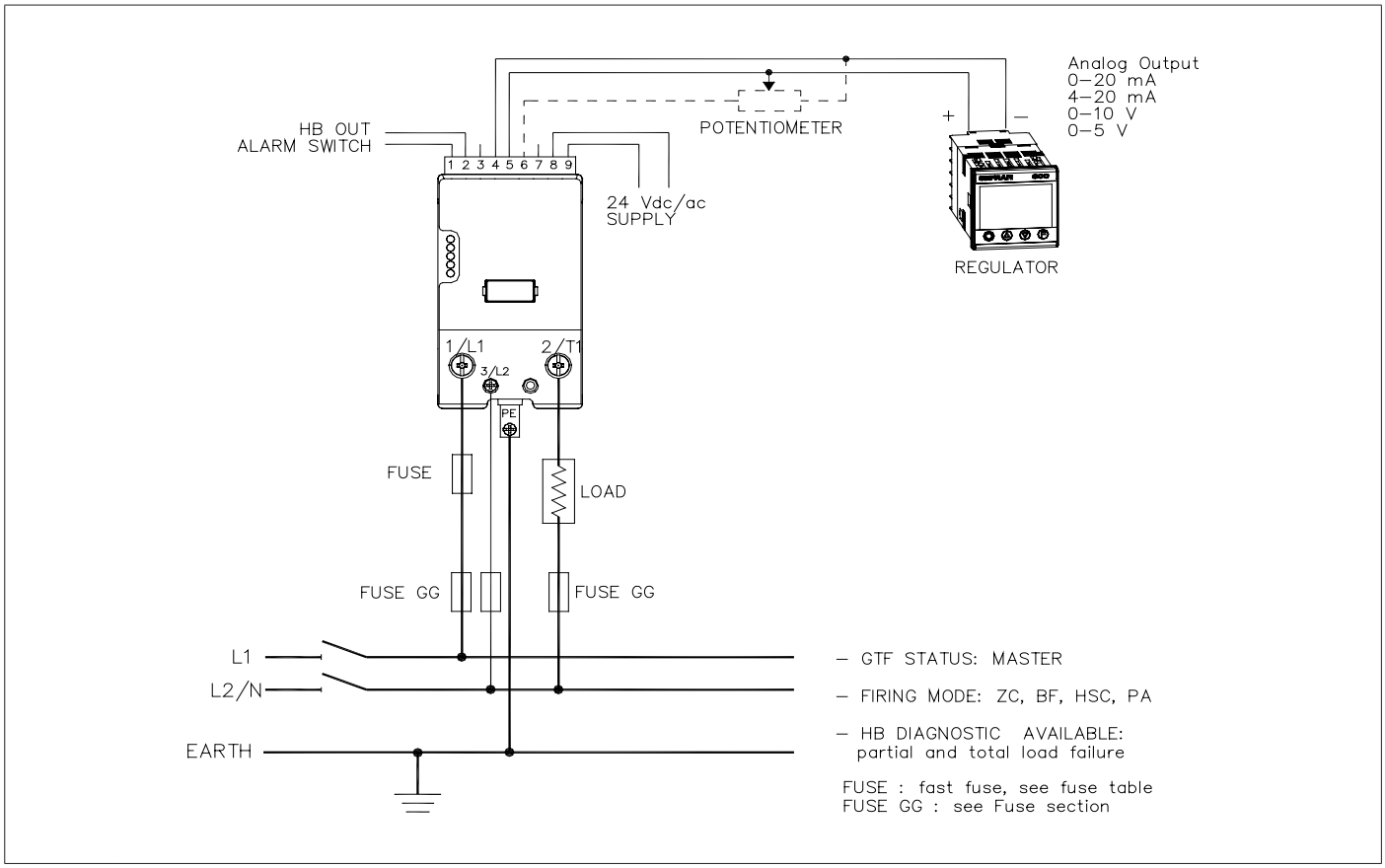
Figure 23



3.9 CONNECTION EXAMPLE : POWER SECTION

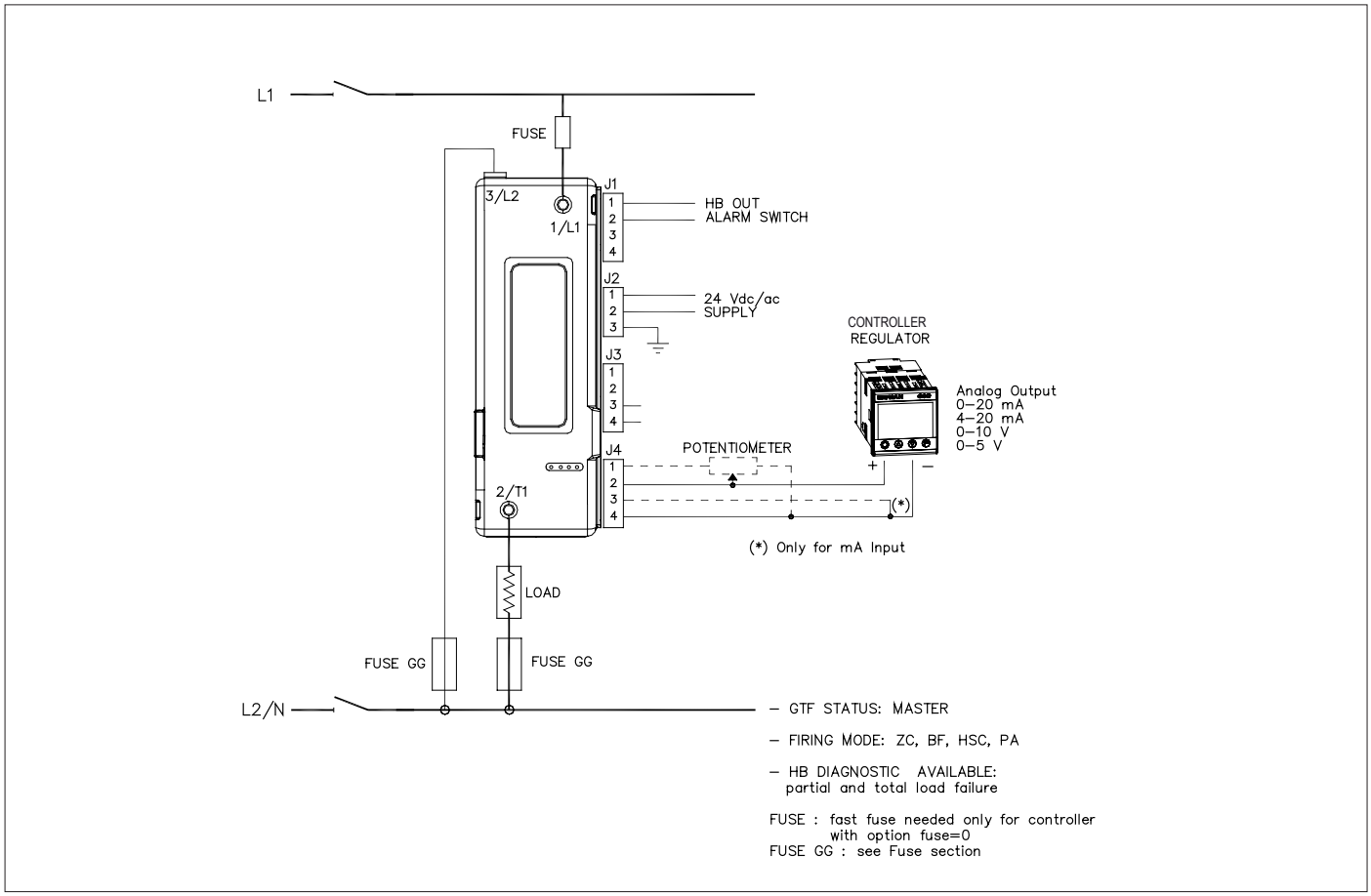
Connection example THYRITOP 500 I 25-120 A for one single-phase load, single-phase line (L1-N) or open delta (L1-L2)

Figure 24



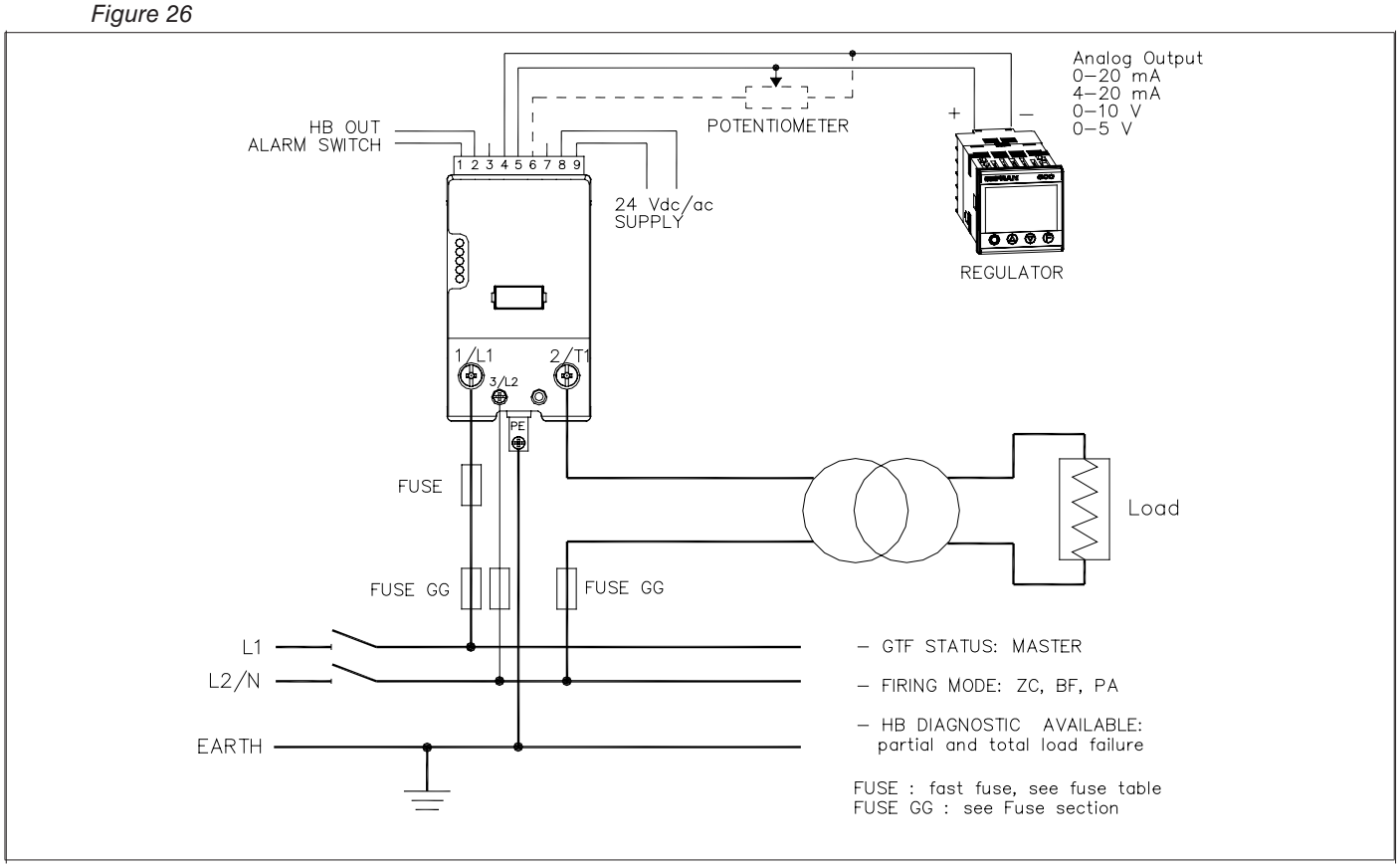
Connection example THYRITOP 500 I 150 A -250 A for 1 single-phase load, single-phase line L1-L2/N

Figure 25



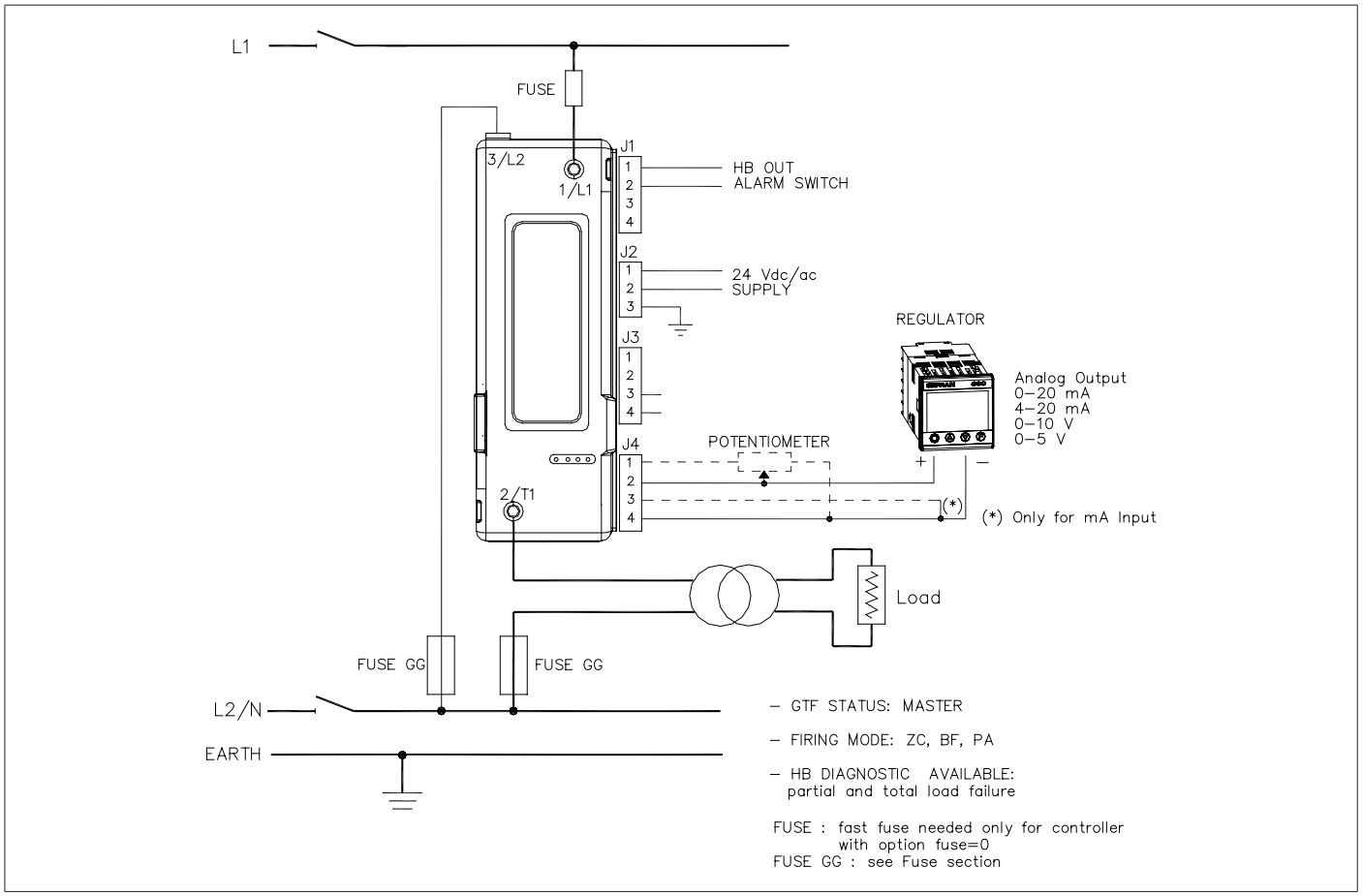
Connection example THYRITOP 500 I 25-120A for one single-phase load with transformer single-phase line (L1-N) or open delta (L1-L2)

Figure 26



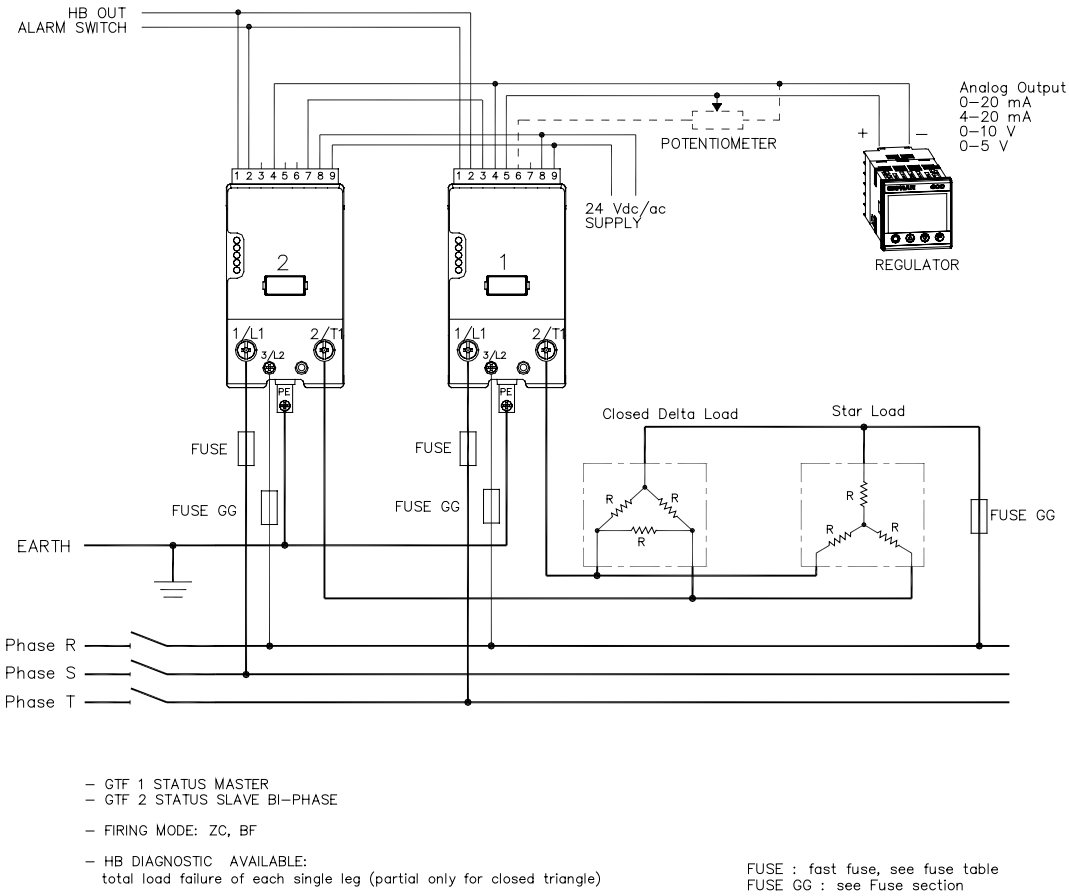
Connection example THYRITOP 500 I 150 A -250 A for 1 single-phase load with transformer single-phase line L1-L2/N.

Figure 27



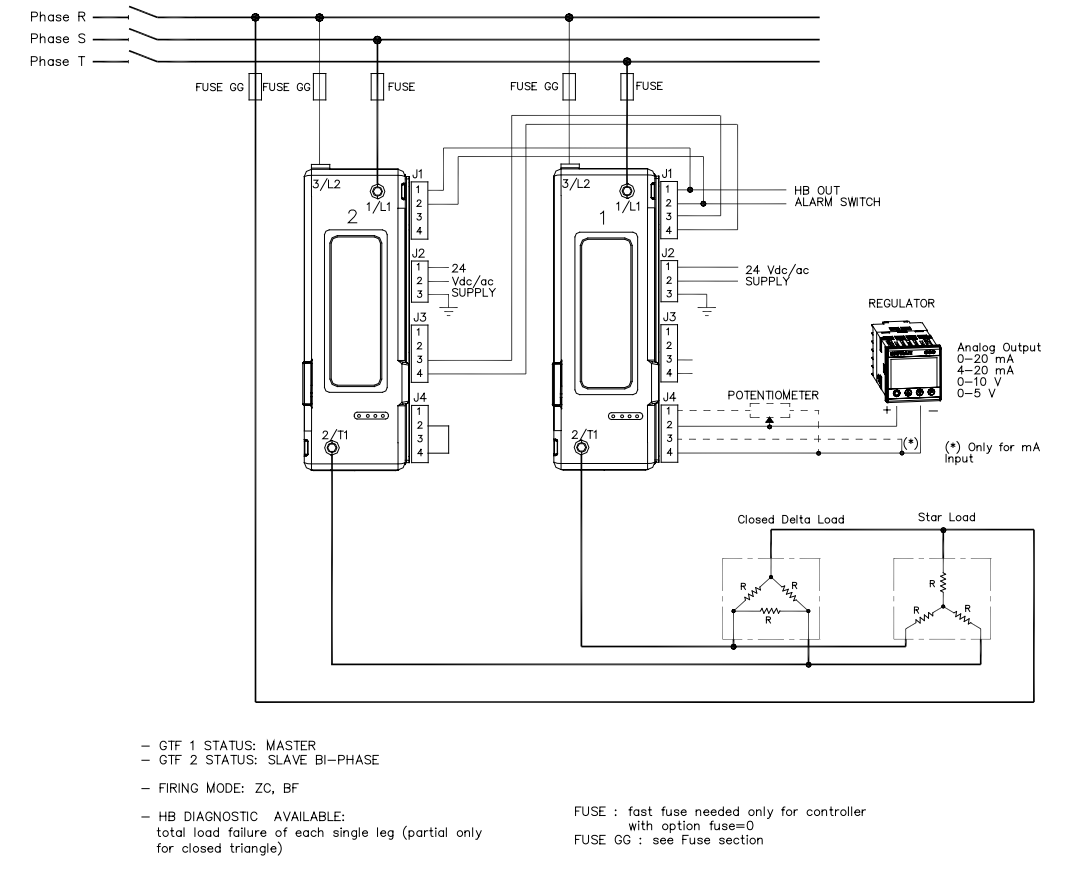
Connection example 2-phase (Master-Slave) THYRITOP 500 I 25-120A for one load 3-phase.

Figure 28



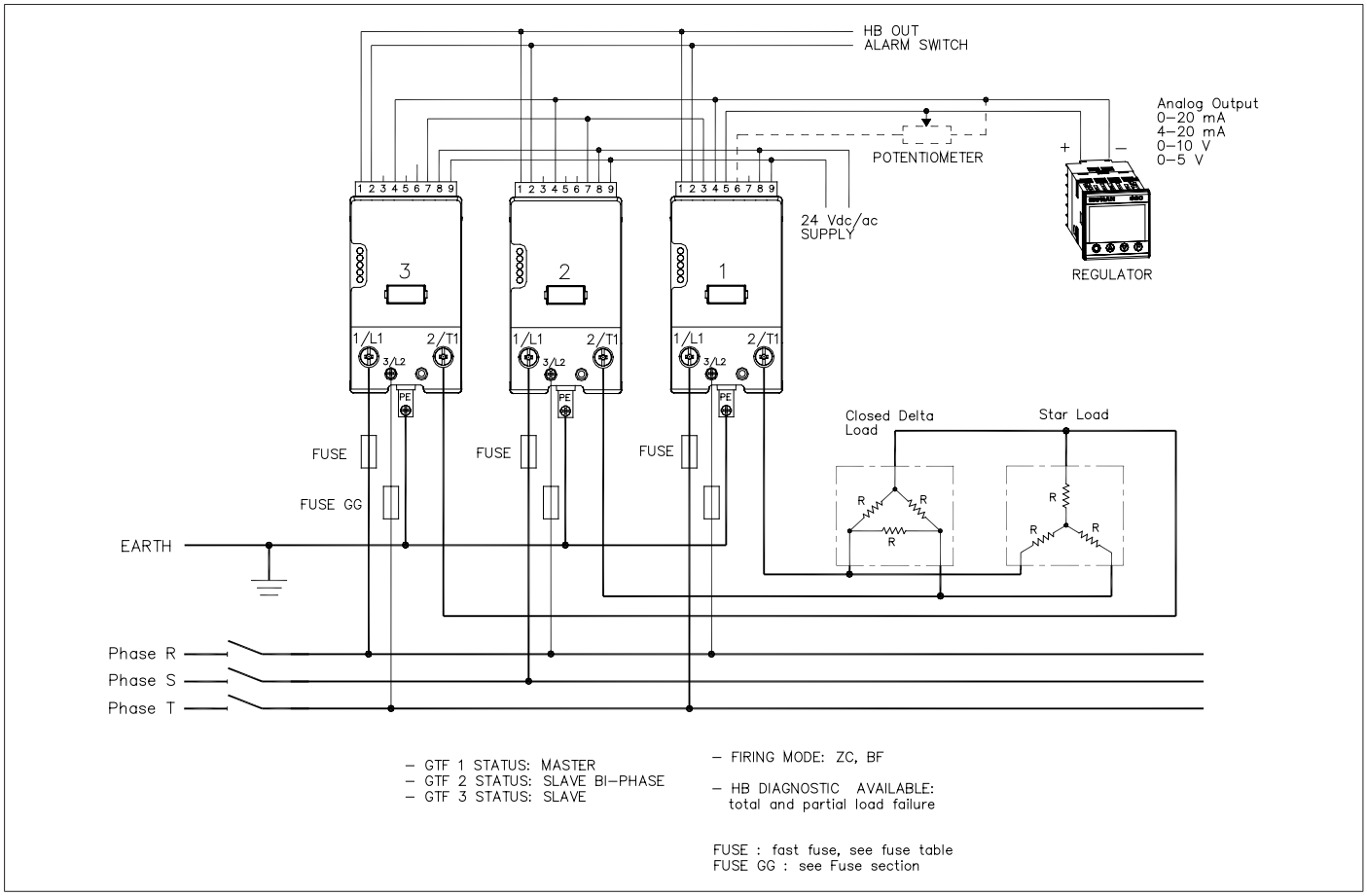
Connection example 2-phase (Master-Slave) THYRITOP 500 I 150-250A for one load 3-phase.

Figure 29



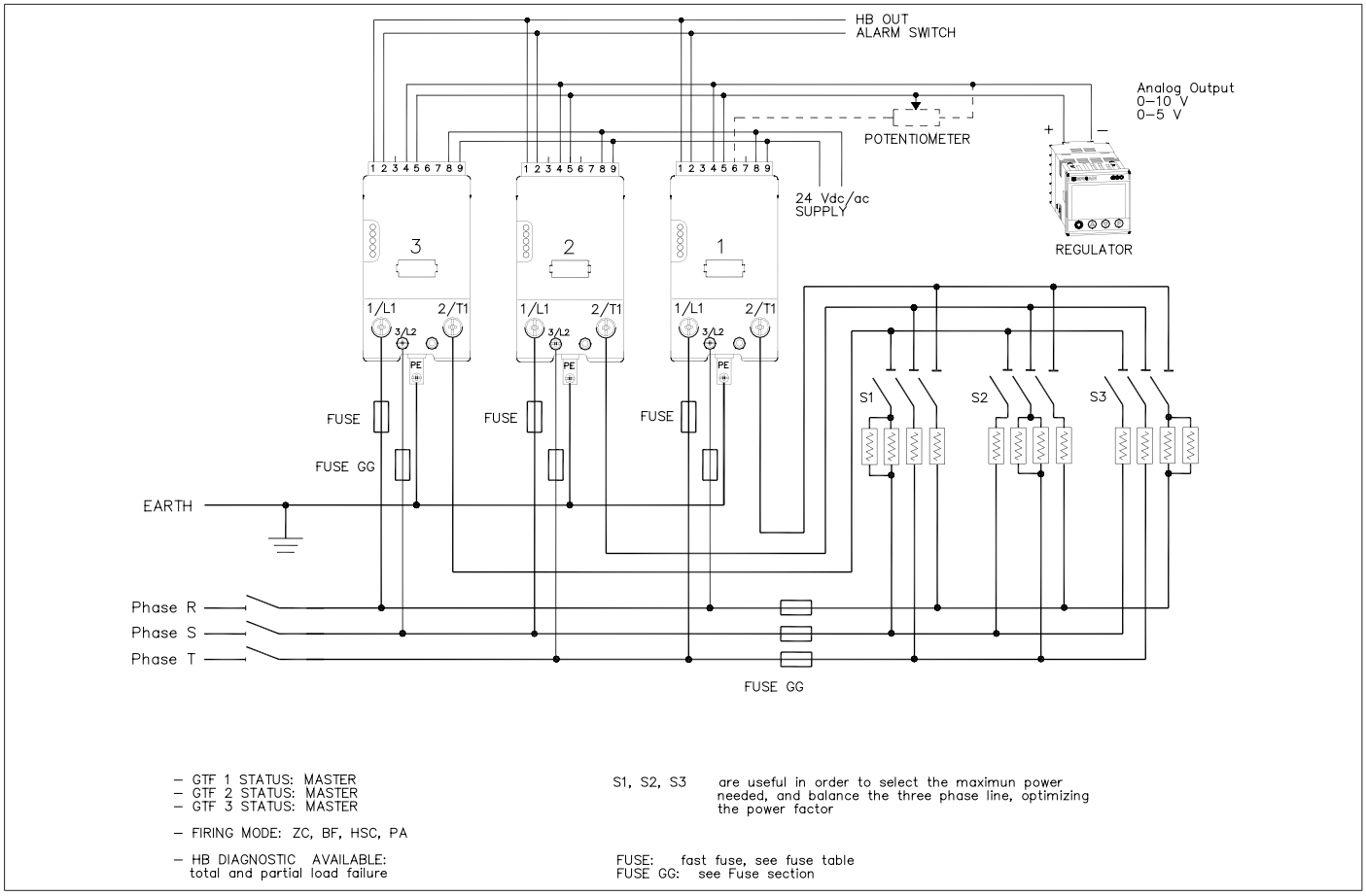
Connection example 3-phase (Master-Slave with control on 3 lines) THYRITOP 500 I 25-120A for one load 3-phase.

Figure 30



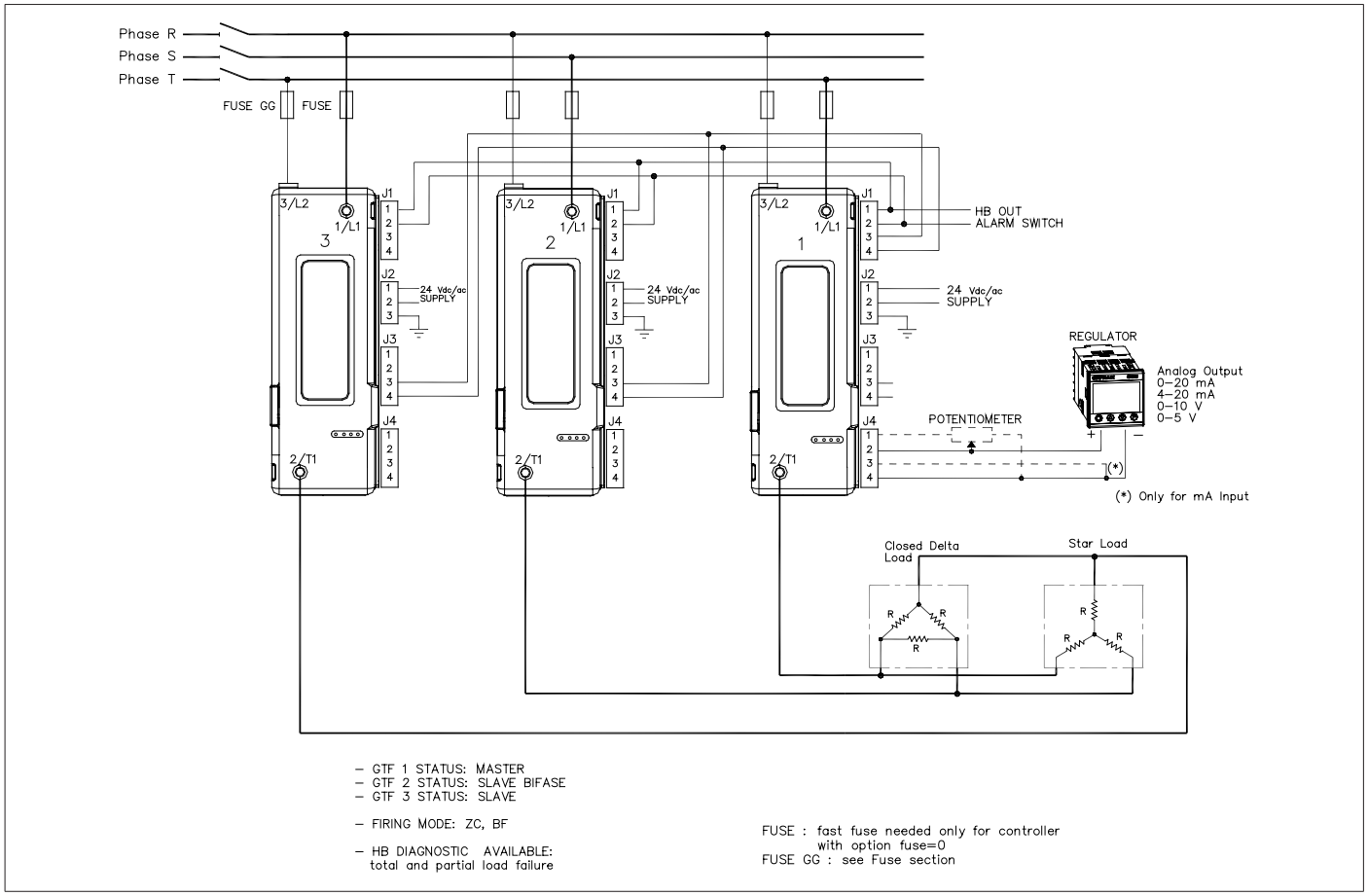
Connection example THYRITOP 500 I 25-120A three-phase (3 master units) for single-phase loads, with division of maximum load with isolators S1, S2, S3, maintaining balance of three-phase line.

Figure 30b



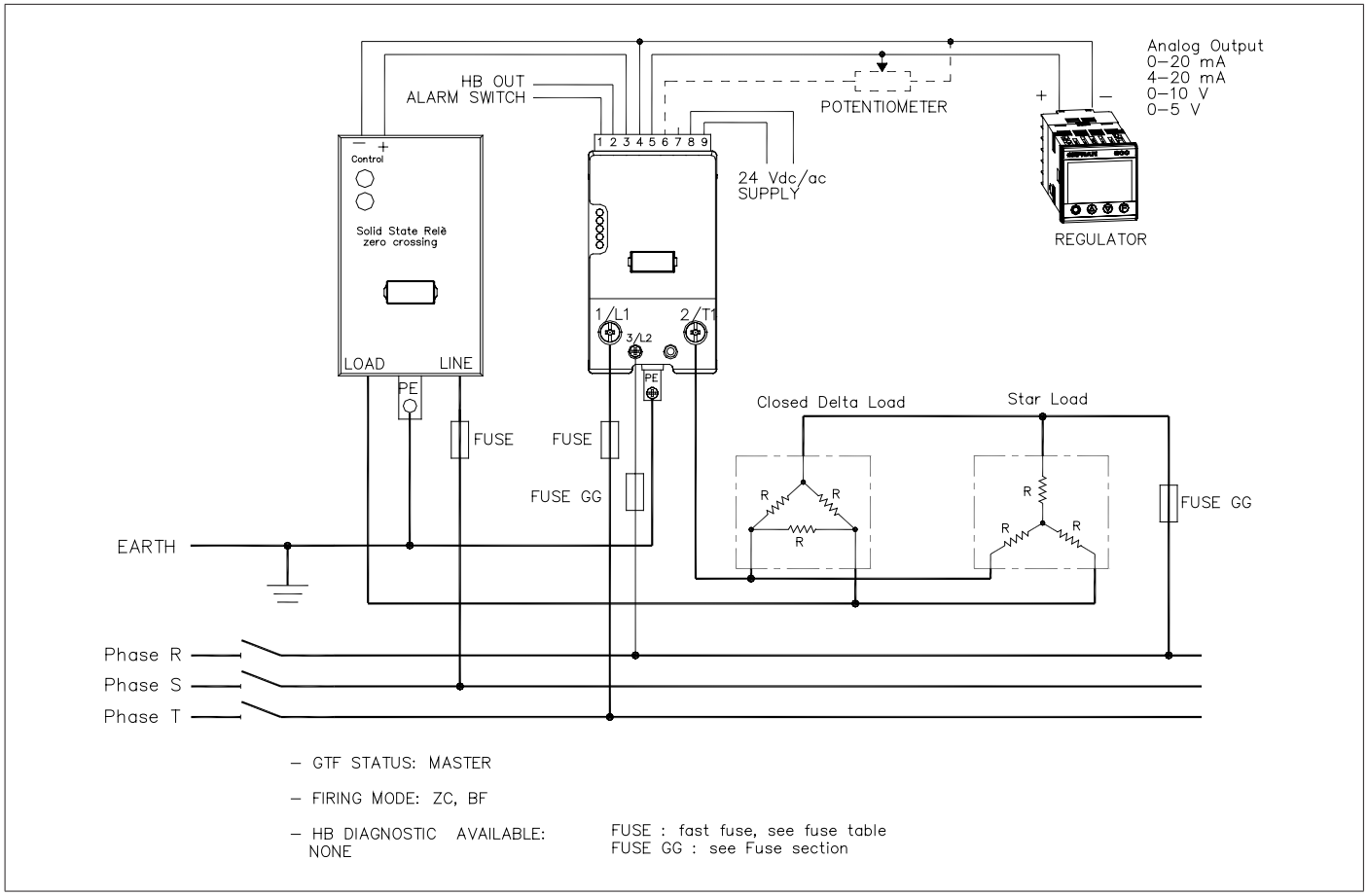
Connection example 3-phase THYRITOP 500 I 150-250A (Master-Slave control on 3 lines) for one load 3-phase.

Figure 31



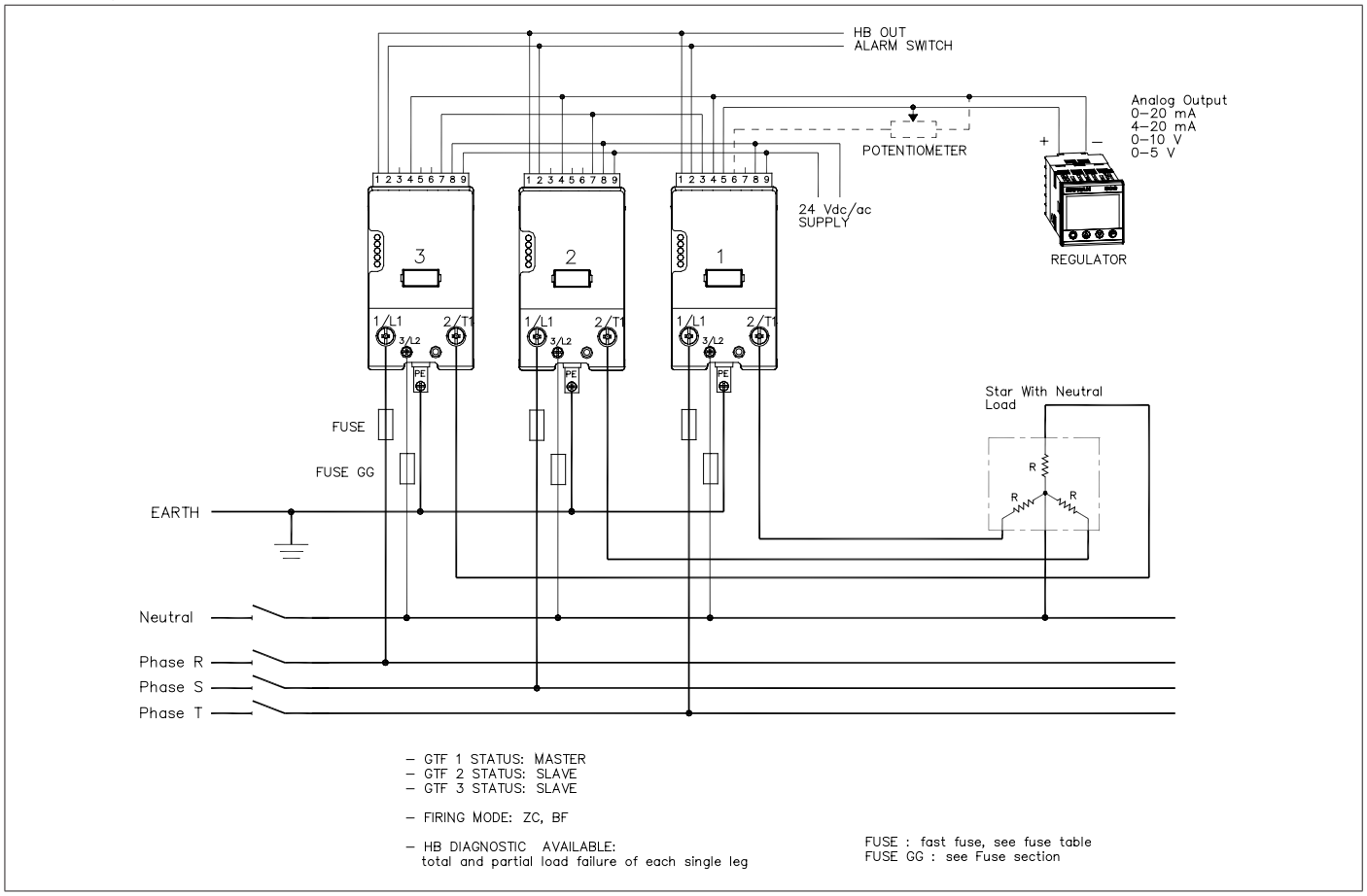
Connection example 2-phase THYRITOP 500 I 25-120A (Master) with THYRITOP 200-1P (slave) for one load 3-phase.

Figure 32



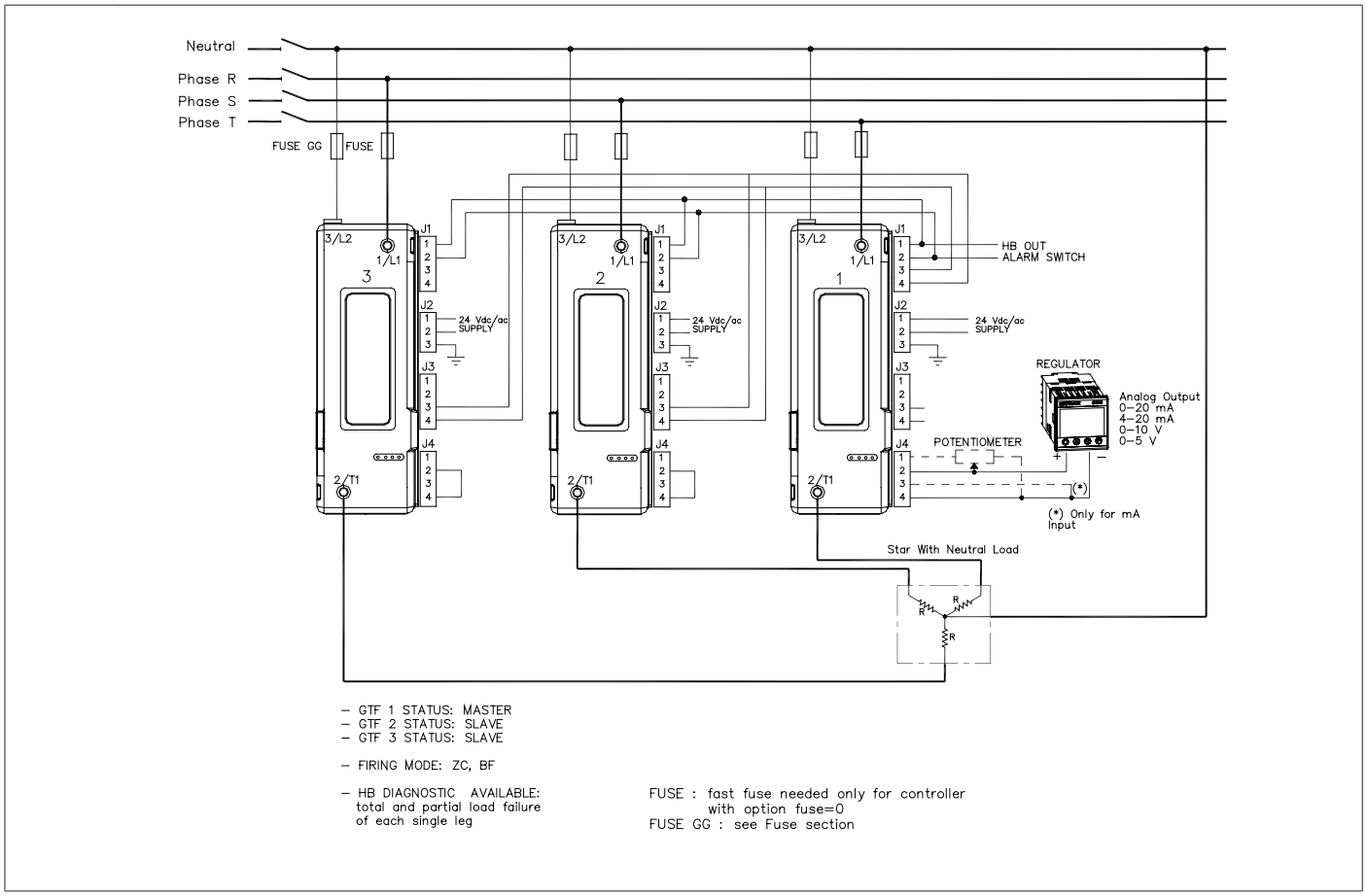
Connection example THYRITOP 500 I 25-120A (with N. 3 THYRITOP 500) for 3-phase star load with neutral.

Figure 33



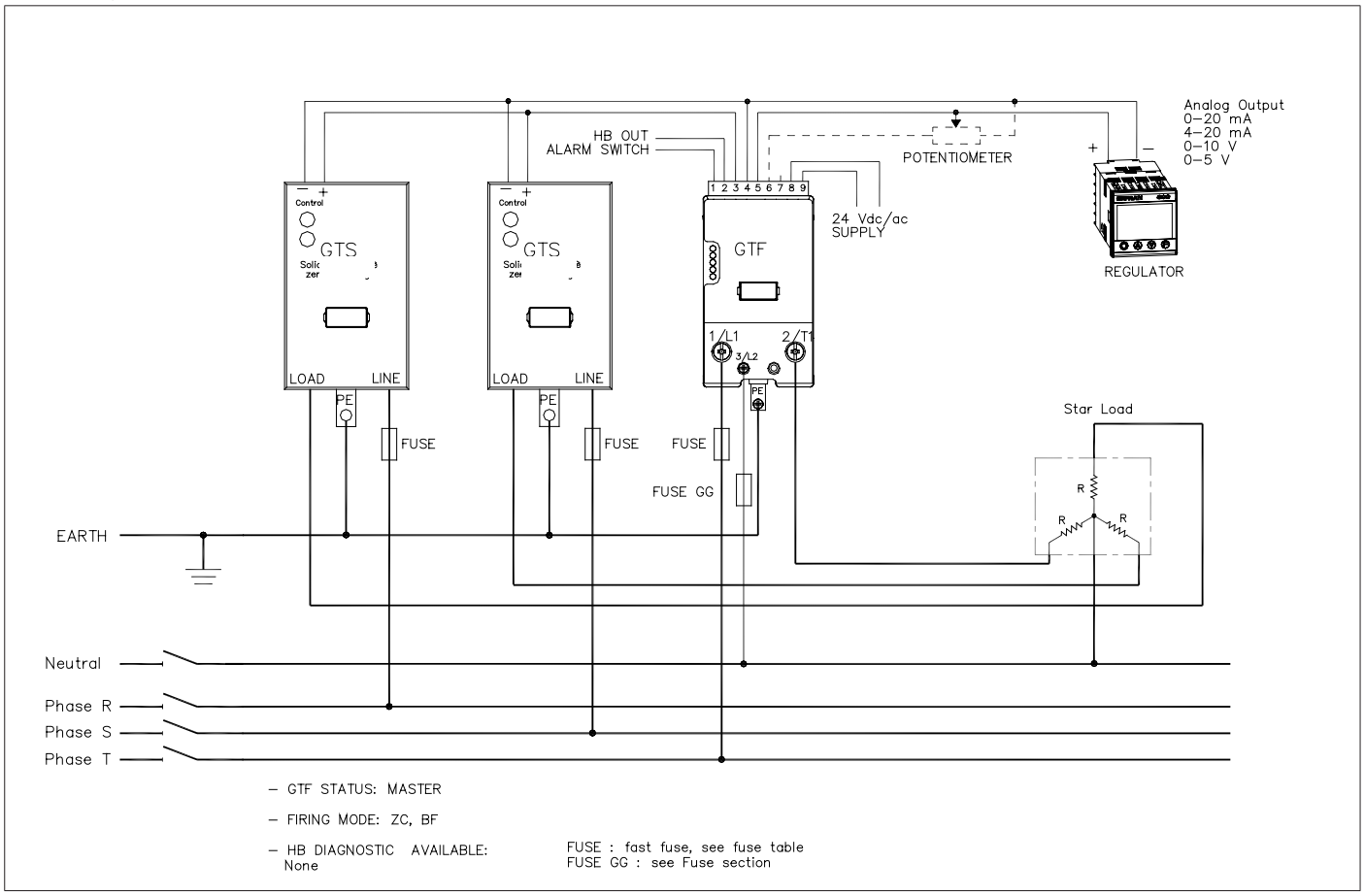
Connection example THYRITOP 500 I 150-250A (with N. 3 THYRITOP 500)for 3-phase star load with neutral.

Figure 34



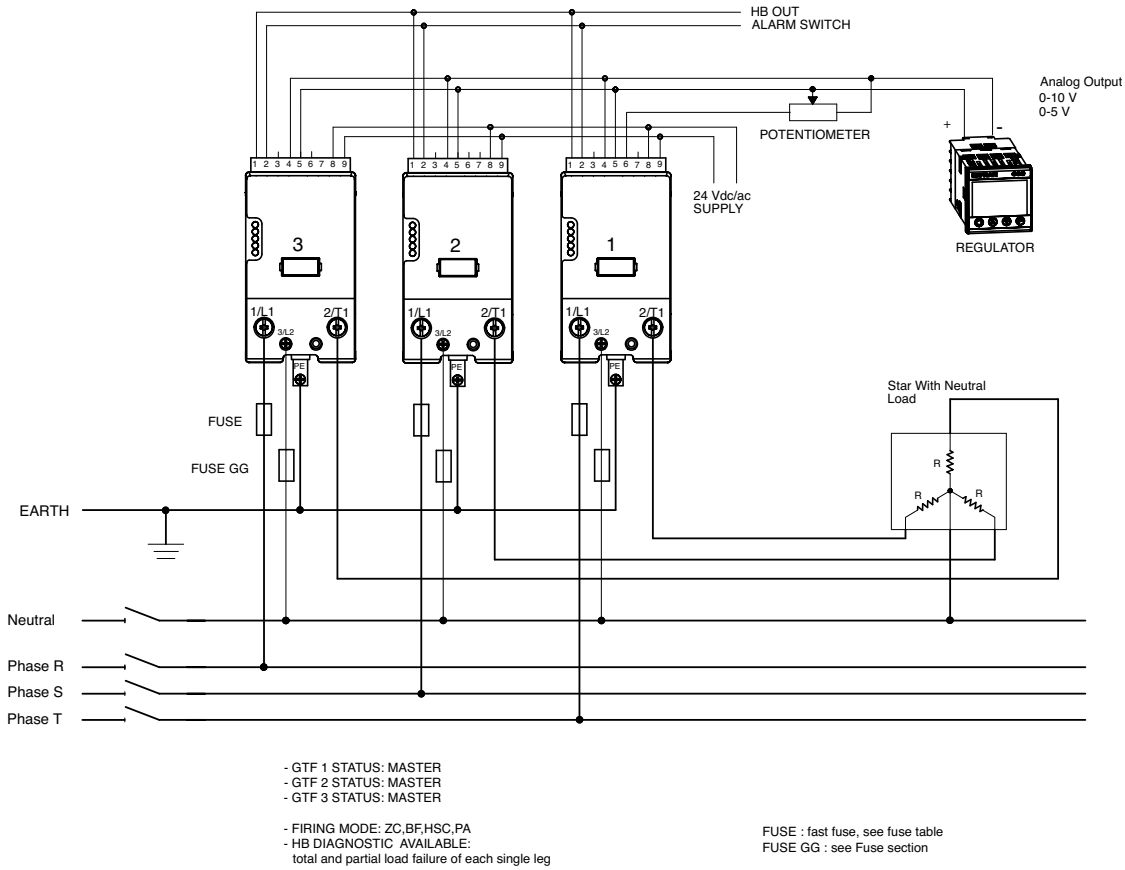
Connection example THYRITOP 500 I 25-120A (Master with 2 Slave THYRITOP 200-1P) for 3-phase star load with neutral.

Figure 35



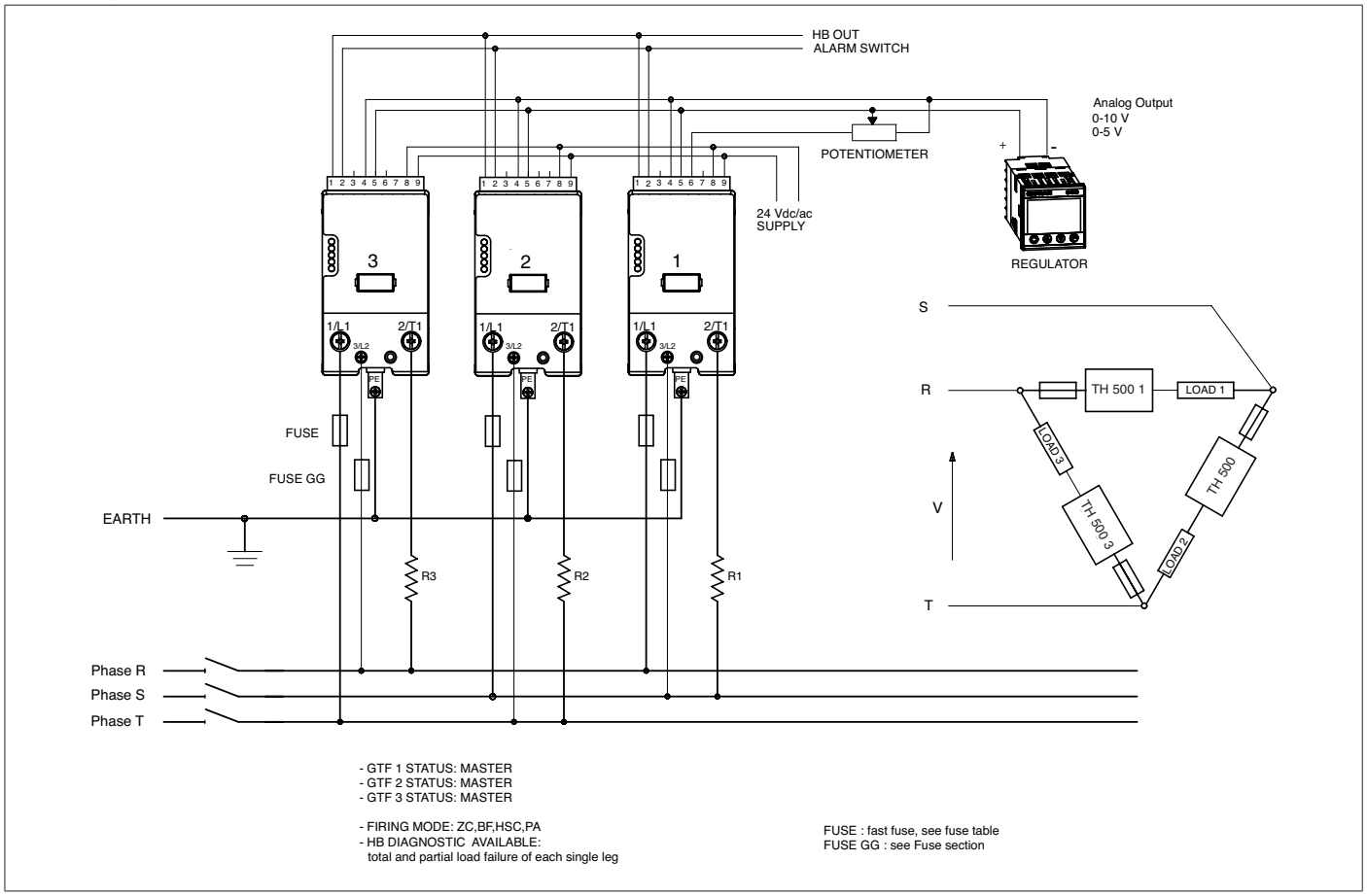
Connection example THYRITOP 500 I 25-120A (3 Master) for 3-phase star load with neutral.

Figure 36



Connection example THYRITOP 500 I 25-120A (3 Master) for a three-phase open delta load.

Figure 37



NOTES USE WITH INDUCTIVE LOADS AND TRANSFORMERS

a Connect a varistor (MOV) between each wire of the primary transformer and ground.
Varistor data: rated voltage 660Vrms,…, 1000Vrms; minimum energy 100J

b The maximum current controllable by the device is less than the product's rated value (see technical data).

c In ZC and BF trigger mode, use the Delay-triggering function to limit peak magnetization current.

d In PA trigger mode, use the Softstart function.

e **DO NOT use HSC trigger mode**

f DO NOT connect RC snubbers in parallel to the transformer primary.

g Select the inductive load using the Hd.1 parameter (ref. Software manual).

Trigger modes

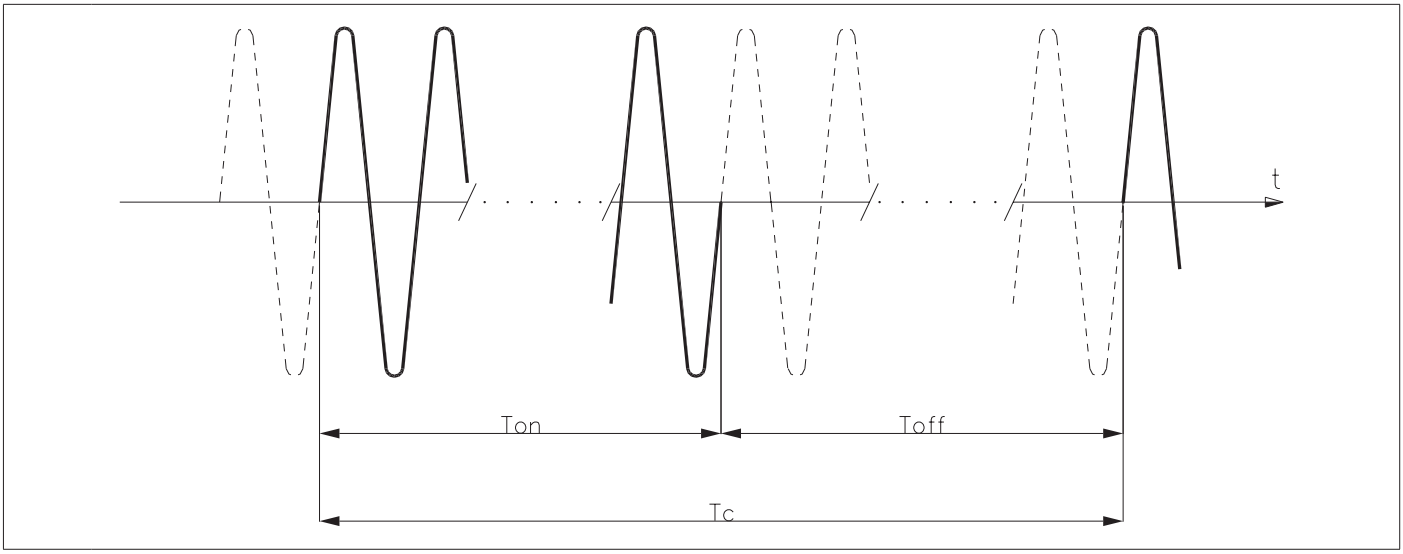
The THYRITOP 500 has the following power control modes :
- modulation via variation of number of conduction cycles with zero crossing trigger.
- modulation via variation of phase angle

"Zero Crossing" Mode

This function eliminates EMC noise. This mode controls power on the load via a series of conduction ON and non conduction OFF cycles.

ZC Constant cycle time (Tc ≥ 1 sec, settable from 1 to 200 sec) Cycle time is divided into a series of conduction and non conduction cycles in proportion to the power value to be transferred to the load.

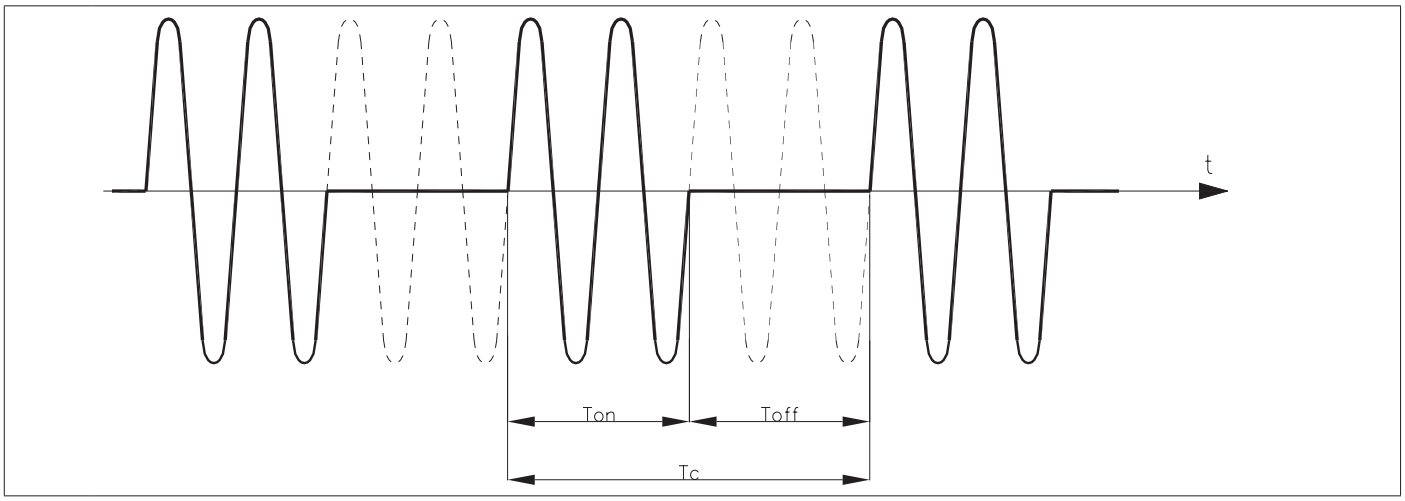
Figure 38



For example, if Tc = 10sec, if the power value is 20% there is conduction for 2 sec (100 conduction cycles @ 50Hz) and non conduction for 8 sec (400 non conduction cycles @ 50Hz).

BF variable cycle time (GTT).
This mode controls power on the load via a series of conduction ON and non conduction OFF cycles.
The ratio of the number of ON cycles to OFF cycles is proportional to the power value to be supplied to the load.
The CT repeat period is kept to a minimum for each power value (whereas in ZC mode the period is always fixed and not optimized)
A parameter bF.Cy defines the minimum number of conduction cycles settable from 1 to 10.
In the following example, the parameter = 2.

Figure 39



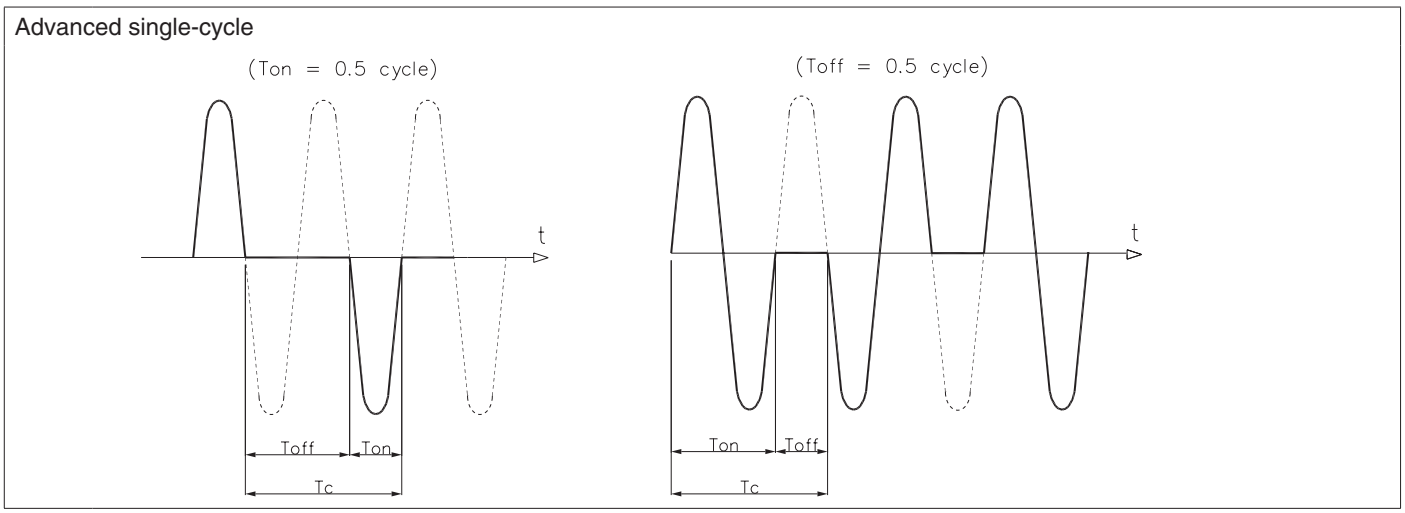
Example of operation in BF mode with power equal to 50%

HSC Half single cycle

This mode corresponds to Burst Firing that manages ON and OFF half-cycles. It is useful for reducing the flickering of filaments with short/medium-wave IR lamp loads. With these loads, to limit operating current with low power, it is useful to set a minimum power limit (for example, Lo.p = 10%).

NB.: This mode is NOT allowed with inductive loads (transformers) It is used with resistive loads in single-phase, star with neutral, or open delta configuration.

Figure 40

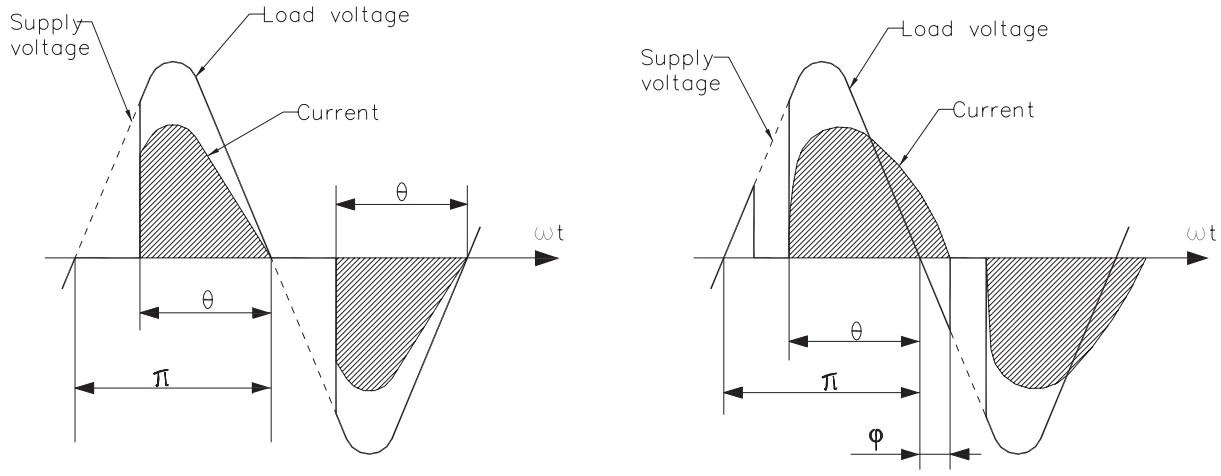


Example of operation in HSC mode with power at 33 and 66%

Phase angle (PA)

This mode controls power on the load via modulation of trigger angle θ,
Example: if power to be transferred to the load is 100%, q = 180° or if power to be transferred to the load is 50%, q = 90°

Figure 41



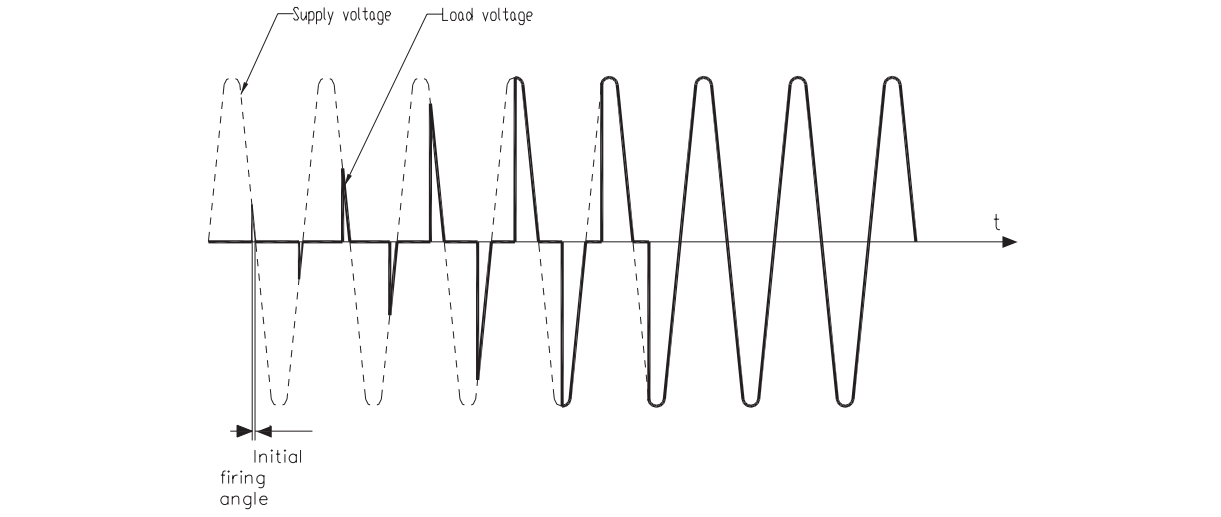
Resistive load Inductive load

ADDITIONAL FUNCTIONS

Softstart or ramp at power-up

This type of start can be enabled either in phase control or pulse train mode and in zero-crossing mode (ZC, BF, HSC).
In phase control, the increment of conduction angle q stops at the corresponding value of the power to be transferred to the load.
Control of maximum peak current (useful in case of short circuit on the load or of loads with high temperature coefficients to automatically adjust start time to the load) can be enabled during softstart.
When the load shut-off time (settable) is exceeded, the ramp is reactivated at the next power-on.

Figure 42

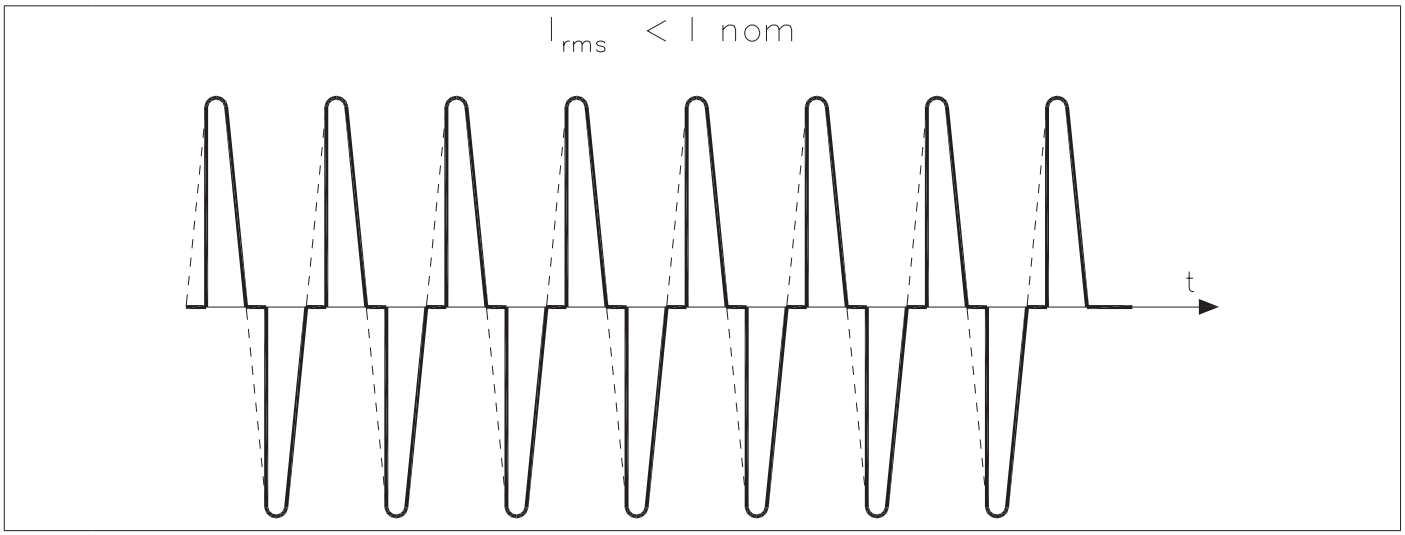


Example of firing ramp with phase Soft-Start

RMS current limit

The option for controlling the load current limit is available in all work modes. If the current value exceeds the limit (settable in the nominal full-scale range) in mode PA the conduction angle is limited, while in zero-crossing mode (ZC, BF, HSC) the cycle time conduction percentage is limited.
This limitation ensures that the RMS value (i.e., not the instantaneous value) of the load current does NOT exceed the set RMS current limit.

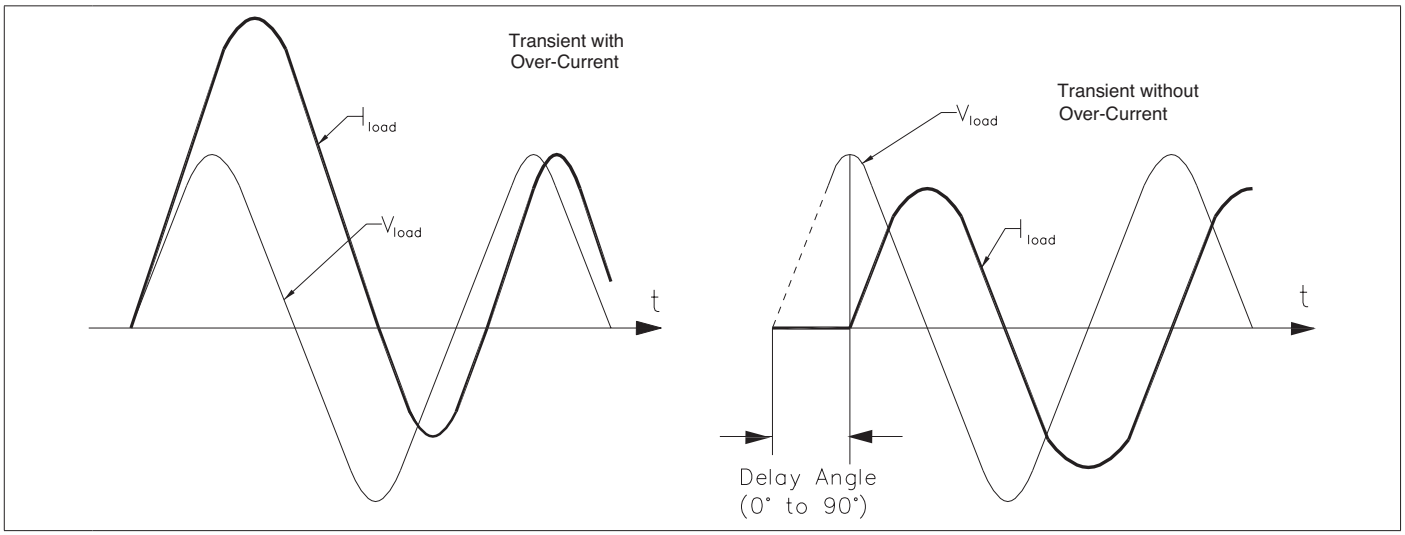
Figure 43



Example of conduction angle limitation in PA mode
to respect an RMS current limit below the nominal current of the load.

DT "Delay triggering" (for ZC, BF control modes only) Settable from 0° to 90°.
Useful for inductive loads (transformer primaries) to prevent current peak that in certain cases could trip the high-speed fuses that protect the SCRs.

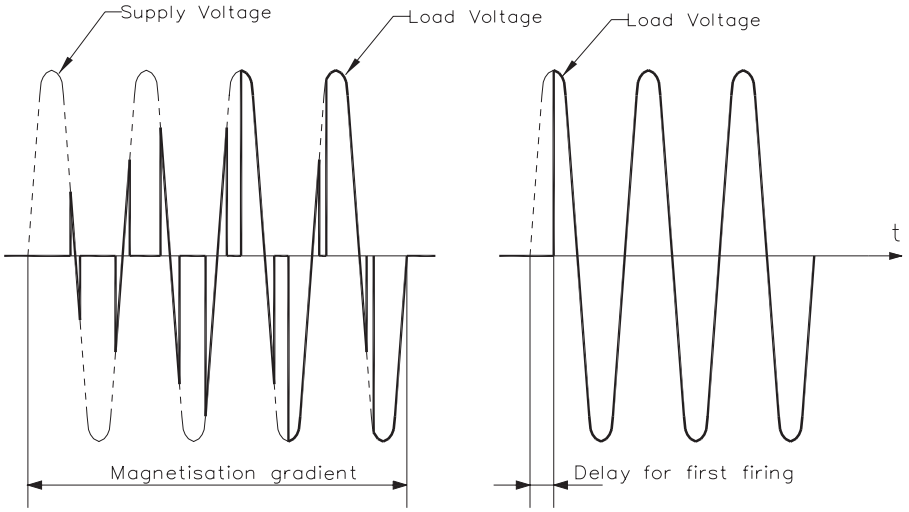
Figure 44



Example of firing of inductive load with/without delay-triggering.

To conduct inductive loads controlled in PA mode, do not use delay triggering; instead, use the phase Soft-Start ramp.

Figure 45



Example of phase ramp to fire
a transformer in PA mode

Example of firing with Delay-Triggering
of a transformer in ZC mode

Comparaison of method to fire a transformer : Soft-Start Ramp (for PA mode) / Delay triggering (for ZC and BF mode)

3.10 DIGITAL INPUT (PWM)

This digital input can be used to receive information on the % of power to be supplied to the load.
The signal can be generated by a controller or external plc via digital outputs (logic output for CA PYROCONTROLE instrumentation).
This is obtained by alternating the output in ON for time TON with the output in OFF for time TOFF.
The sum of TON+TOFF is constant, and is called CycleTime.

CycleTime= TON+TOFF

The power level is given by the ratio = TON/ CycleTime and is normally expressed in %.
The THYRITOP 500 digital input automatically adapts to the cycle time from 0.03Hz to 100Hz and obtains the power % to be supplied to the load from the TON/(TON+TOFF) ratio.

Connection example

Temperature control with CA PYROCONTROLE with D type logic output (out2) (cycle time: 0.1sec), logic output can drive max 3 THYRITOP 500 in series (preferred configuration).
This connection allowed only if THYRITOP 500 do not have interconnected GNDs (if so, make parallel connection).
If necessary, set up a parallel connection. To use Digital PWM, the THYRITOP 500 can be controlled with the configuration 5 -x - M or must be configured with the dIG (digital input) parameter = 7 (see Fig. 46, 47).

Figure 46

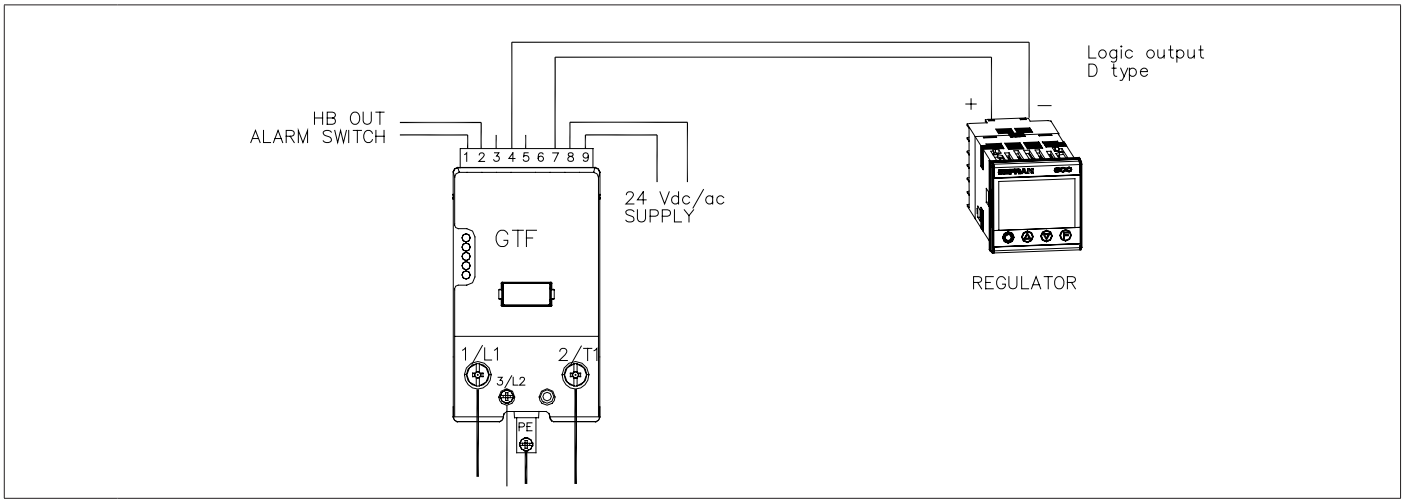
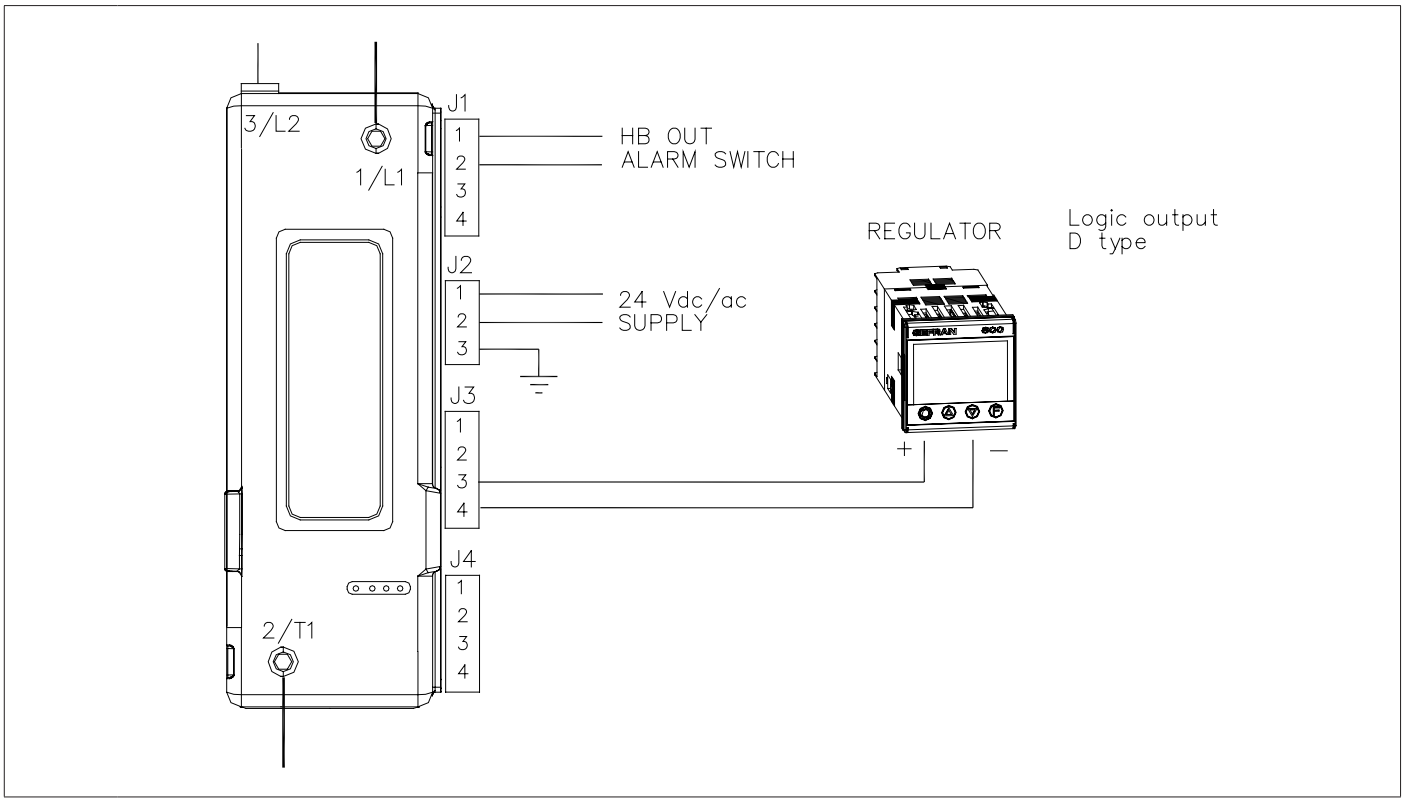


Figure 47



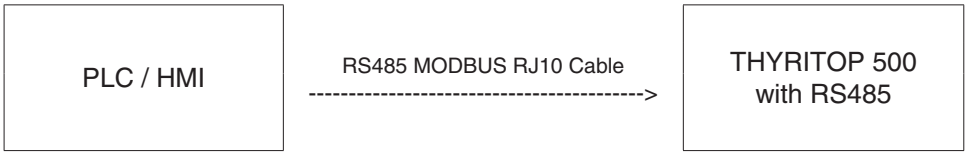
4 • INSTALLATION OF THE SERIAL PORT

A network typically has a Master that “manages” communication by means of “commands,” and Slaves that carry out these commands. THYRITOP 500 modules are considered Slaves to the network master, which is usually a supervision terminal or a PLC. It is positively identified by means of a node address (ID) set on rotary switches (tens + units).
A maximum of 99 THYRITOP 500, modules can be installed in a serial network, with node address selectable from “01” to “99”
THYRITOP 500 modules have a ModBus serial (Optional)
The MODBUS RTU port 1 has the following factory settings (default):

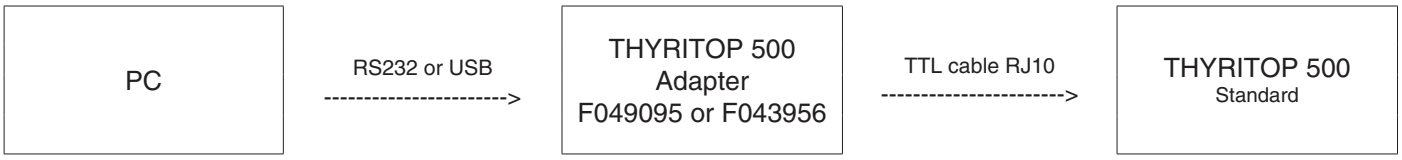
Parameter	Default	Range
ID	1	1...99
BaudRate	19,2Kbit/s	1200...19200bit/s
Parity	aucune	parité paire, impaire, aucune
StopBits	1	-
DataBits	8	-

The following procedures are indispensable for the Modbus protocol.
Set the rotary switch at “0+0” for AutoBaud function

Parameter	Position rotary switches tens	unit	
AutoBaud	0	0	Allows setting of thecorrect BaudRate value automatically detecting the master transmission frequency.



NOTE
The standard products DO NOT feature the comunication RS485 Modbus serial port, but can be configured via PC with a software PYROTOOLS. In this case, connect the TTL port of the THYRITOP 500 to the PC using the TTL cable delivered with the software.



NEVER connect TTL adaptator to RS485 serial port of THYRITOP 500.
NEVER connect TTL connector or THYRITOP 500 to a RS485 serial web.
Danger of product damage !

4.1 SEQUENCE AUTOBAUD

Function

Adapt the serial communication speed and parity of the THYRITOP 500 modules to the connected supervision terminal or PLC.

The "RUN"and "STATUS" LEDs mentioned in the procedure can vary its behavior based on on he parameters Ld.1 e Ld.2

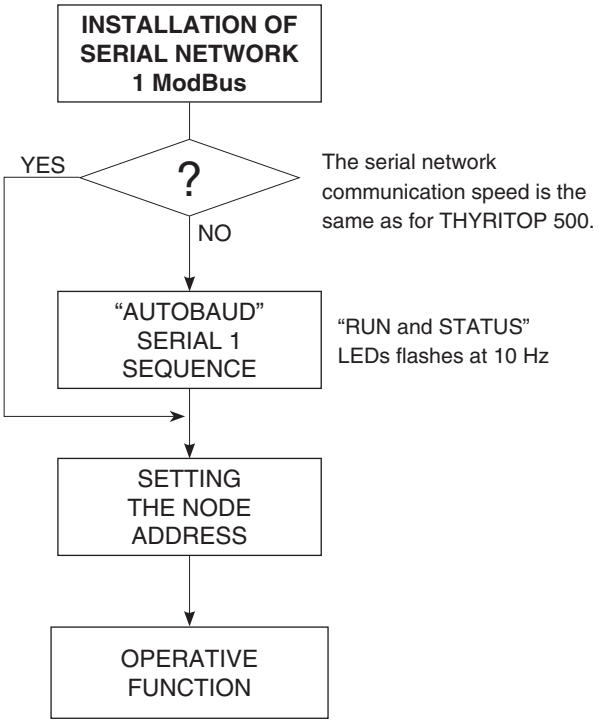
Procedure

1. Connect the serial cables for all modules on the network t and to the supervision terminal.
2. Set the rotary switch on the THYRITOP 500 modules to be installed, or on all modules present in case of first installation, to position "0+0". *
3. Check that the "RUN" and "STATUS" LEDs flash at high frequency (10Hz).
4. The supervision terminal must transmit a series of generic "MODBUS" read messages to the network.
5. The procedure is over when all of the "RUN" and "STATUS"LEDs on the THYRITOP 500 modules flash at a normal frequency (2Hz) (if parameter 50 Ld.1 = 16 as default).

The new speed parameter is saved permanently in each THYRITOP 500, therefore, the "AUTOBAUD SERIAL" sequence does not have to be run at subsequent power-ups.

When the rotary switch is turned, the green "STATUS" LED stays on steadily for about 6 seconds, after which it resumes normal operation and saves the address.

*** Note:** The address set by the rotary switches is acquired only at power-on.



5 • GENERAL CHARACTERISTICS

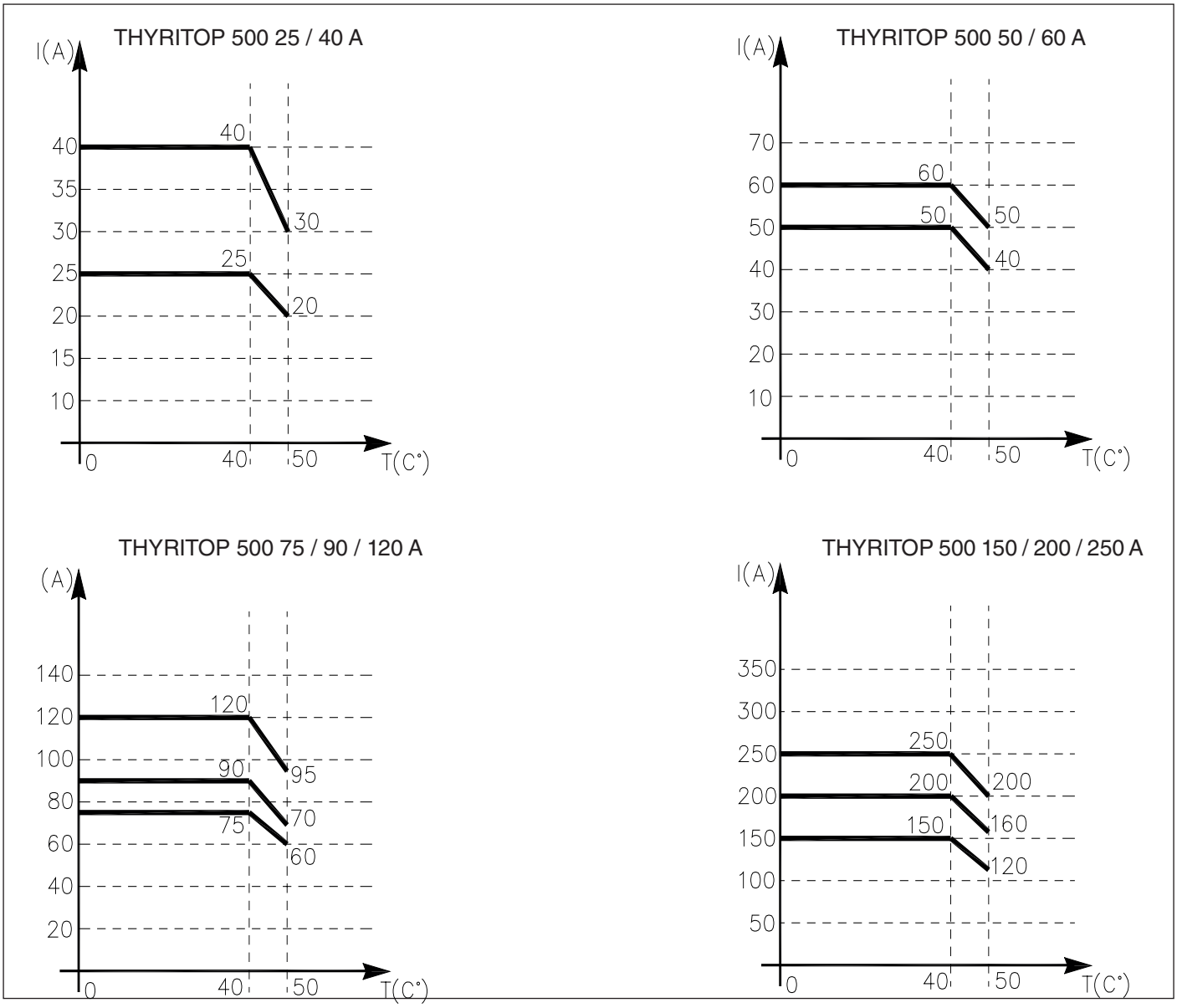
INPUTS	
IN1 Analogic control inputs	
Function	Acquisition of control power
Max. error	1% f.s.+/- 1 scale point at ambient temperature of 25°C
Thermal drift	< 100 ppm/°C of P.E
Sampling time	60 ms
Scale 0 -10V	Input impedance > 40 Kohms
Scale 0-5V	Input impedance > 40 Kohms
Scale 0-20mA or 4-20mA	Internal Shunt resistance: 125 ohm
Potentiometer input	Potentiometer resistance: from 1 Kohm to 47 Kohm Potentiometer supply: +5V (supplied by GTF, max 10mA)
Linear input read scale	0 .... 100.0 %
INDIG Digital Input	
Function	Power Disable input or PWM input
Voltage range	5-30V (max 7 mA)
State “0” read safe voltage	< 2 V
State “1” read safe voltage	> 5V
PWM input	Maximum frequency: (0.03Hz,...,100 Hz) maximum resolution 1% (0.1ms)
Measures voltage and line current	
Function measures the load current	Measures RMS voltage by integral calculation of sampled values Meas. range: 0 ... 2 * rated_product
Accuracy RMS current measurement	3 % f.s. at room temperature of 25°C In PA mode with conduction angle >90° : 5% fs Thermal drift: < 200 ppm/°C
RMS line current measurement function	RMS voltage meas. by integral calculation of sampled values Work voltage range: 90...600Vac)
Accuracy RMS voltage measurement	1 % f.s. at room temperature of 25°C Thermal drift: < 100 ppm/°C
Sampling time current/voltage	0,25 ms
Line frequency	50 / 60 Hz
OUTPUTS	
CONTROL OUTPUT MASTER/SLAVE	
Function	Control for synchronising another THYRITOP 500 or GTS slave (4 slave max.) Voltage: 7.5V , max 25 mA
HB ALARM OUTPUT (Optional)	
Function	HB alarm output or of other configurable alarms
Type	Solid state relay (MOS opto) Isolated contact, normally open Imax: 150mA Vmax. 30 Vac / Vdc Closing resistance < 15 ohm
COMMUNICATIONS PORTS	
RS485 Modbus (Optional)	
Function	Local serial communication
Protocol	ModBus RTU
Baudrate	Settable 1200 …19200 bit/s (default 19,2Kbit/s)
Node address	Settable with two rotary-switches (rotary-switches)
Type	RS485 - double connector RJ10 telephone type 4-4
Isolation	500V
TTL serial connector (Standard)	
Function	Only for initial configuration of the product via PC. Use a PC connected to the THYRITOP 500 ONLY via the adapter cable : code P01660100 (USB) or code P01660101 (RS485).
Isolement	TTL serial NOT isolated of CPU

POWER (SOLID-STATE)										
CATEGORY OF USE (TAB. 2 EN60947-4-3)	AC 51 resistive or low inductance loads AC 55b infrared lamps AC 56a: transformer									
Trigger mode	**PA** - Load management by adjusting the firing angle (only configuration single-phase or delta open) **ZC** - Zero Crossing with constant cycle time (settable in range 1-200sec) **BF** - Burst Firing with variable cycle time (GTT) optimized minimum. **HSC** - Half Single Cycle corresponds to Burst Firing that includes ON and OFF half-cycles. Useful for reducing flicker with short-wave IR loads (applied only to single-phase resistive or 3-phase 6-wire open delta loads).									
Feedback mode	**V, V2:** Voltage feedback proportional to RMS voltage value on load (useful to compensate possible variations in line voltage). **I, I2:** Current feedback: bound to RMS current value on load to compensate variations in line voltage and/or variations in load impedance. **P:** Power feedback: proportional to real power value on load (useful to keep constant values of electrical power assigned regardless of load impedance or line voltage variations).									
Max rated voltage	480Vac				600Vac			690Vac		
Work voltage range	90…530Vac				90…660Vac			90…760Vac		
Non-repetitive voltage	1200Vp				1600Vp			1600Vp		
Rated frequency	50/60Hz auto-determination									
Rated current AC51 -AC55b non-inductive or slightly inductive loads, IR lamps (@ Tamb = 40°C)	MODEL THYRITOP 500									
	25	40	50	60	75	90	120	150	200	250
	25A	40A	50A	60A	75A	90A	120A	150A	200A	250A
Rated current AC56A permitted trigger modes: ZC, BF con DT (Delay Triggering),PA with softstart (@ Tamb =40 °C)	20A	32A	40A	50A	60A	75A	100A	125A	160A	200A
Non-repetitive overcurrent (t=10msec)	400A	520A	520A	1150A	1150A	1500A	1500A	5000A	8000A	8000A
I^2t for melting (t=1…10msec) A^2s	450	1800	1800	6600	6600	11200	11200	125000	320000	320000
Critical Dv/dt with output deactivated	1000V/µsec									
Held nominal voltage of on the impulse	4KV									
Nominal current for short circuit condition	5KA									
FUNCTION										
Diagnostics	Detection of short load circuit absence line voltage, HB alarm (partial breakage of load)									
OPTIONS										
Options	- Timed Soft-Start firing ramp, with or without peak current control - Soft-Start firing ramp, specific for infrared lamps - Timed shut-off ramp - Limitation of RMS current in load - 0-90° Delay-Triggering for firing inductive loads in ZC and BF mode									
Diagnostic	- SCR in short circuit (presence of current with OFF control) - No voltage - Absence of SCR current when under load - Overtemperature alarm <u>Current read</u> • HB alarm interrupted or partially interrupted load • Automatic calibration of HB alarm setpoint starting from current value in load • Alarm for load in short circuit or overcurrent <u>Voltage read</u> • No line voltage									
GENERAL DATA										
Power supply	THYRITOP 500 25-120 A: 24 Vac 50-60 Hz / Vdc ± 25 %, max 3 VA THYRITOP 500 150-250 A: 24 Vac 50-60 Hz / Vdc ± 25 %, max									
Power supply external fan (only for THYRITOP 500120A model)	24 Vdc ± 10%, max 200mA									
Signals	5 diodes: RUN: run state of CPU STATUS: operating state ALARM: state of alarm output DIGITAL INPUT: state of digital inputs ON / OVER-TEMP.: state control tirystor / Alarm for overheating									

GENERAL DATA	
Load type and connection	Single phase load Independent single-phase load in open delta 3-phase load 3-phase load (star without neutral or closed triangle) with bi-phase control
Protection	IP20
Work/storage temperature	0…40°C (refer to dissipation curves) / -20 °C - +70 °C average temperature over a period of 12:0 am not exceeding 35° C (according to EN 60947-4-3 § 7.1.1)
Relative humidity	20…85% HR non-condensing
Ambient conditions for use	indoor use, altitude up to 2000m
Installation	DIN bar EN50022 or panel with screws
Installation requirements	Installation category II, pollution level 2, double isolation (only for model >120A): - Max. temperature of air surrounding device 40°C; for temperature >40°C refer at derating curves - Device type: “UL Open Type”
Weight THYRITOP 500 25, 40 A	0,81 Kg
THYRITOP 500 50, 60 A	0,97 Kg
THYRITOP 500 75, 90 A	1,3 Kg
THYRITOP 500 120 A	1,5 Kg
THYRITOP 500 150, 200, 250 A	Max 2,6 Kg

5.1 Derating Curves THYRITOP 500

Figure 48



6 • TECHNICAL / COMMERCIAL INFORMATION

This chapter contains information concerning the control symbols of the controller and its main accessories.

As indicated in the preliminary warnings in this User's Guide, correct identification of the controller's control symbol will help you immediately identify the hardware configuration of the device.
This is why it is necessary to indicate the control code every time you contact the CA PYROCONTROLE After-Sales Department to solve any problems.

THYRITOP 500 - ☐ ☐ ☐ ☐ ☐ ☐

NOMINAL CURRENT	
25A	25
40A	40
50A	50
60A	60
75A	75
90A	90
120A	120
150A	150
200A	200
250A	250

NOMINAL VOLTAGE	
480V	480
600V	600
690V (**)	690

(**) (Only for model with current ≥150A)

FIELDBUS	
0	Absent
M	MODBUS RTU

FUSIBLE	
0	Absent
1	Self-contained ((for current sizes >=150A)

DIAGNOSTICS ALARMS OPTIONS	
0	Absent
1	Alarm breach partial or total of load (HB)

CONTROL OPTIONS	
0	Absent
1	Current limit
2	Current limit and feedback V, I, P

1 B M

Signal control (configurable)	
10V (Default)	1
5V/Potentiomètre	2
0-20mA	3
4-20mA	4
PWM/Digital input	5

Trigger modes (configurable)	
ZC	Z
BF (Default)	B
HSC	H
PA	P

Function type (configurable)	
Master (Default)	M
Slave	S
Slave dual-phase	S2

Note:

Configurator Standard 1-B-M, if not differently specified.

Substitution model:

GTS ***GTF - X - 480 - 0 - 0 - 0 - 0 - 5 - Z - S***

GTT without load interrupted option

GTF - X - 480 - 0 - 0 - 0 - 0 - 1 - B - M

GTT with load interrupted option

GTF - X - 480 - 0 - 1 - 0 - 0 - 1 - B - M

6.1 ACCESSORIES

CONFIGURATION KIT

KIT PC USB / RS485 or TTL

PYRO tools

Kit for PC via the USB port (Windows environment) for THYRITOP 500 standard configuration (TTL port) for configuration of THYRITOP 500 with the RS485 option

Lets you read or write all of the parameters of a single THYRITOP 500
A single software for all models.
- Easy and rapid configuration.
- Saving and management of parameter recipes.
- On-line trend and saving of historical data

The kit comprises :
- Connection cable PC USB‹--› THYRITOP 500 port TTL
- PYROTOOLS software CD

Le kit comprends:
- Connection cable PC USB ‹--› THYRITOP 500 RS485 port
- PYROTOOLS software CD

6.2 FUSE / FUSEHOLDERS

Model	EXTRARAPID FUSES				FUSEHOLDERS
	Size I^2t	Sign Form	Reference CA PYROCONTROLE	Power dissipation @ In	Reference CA PYROCONTROLE
THYRITOP 500 25 A	25A 390A² s	10x38	P01660026	6W	P01660015
THYRITOP 500 40 A THYRITOP 500 50 A	50A 1600A² s	22x58	P01660028	9W	P01660017
THYRITOP 500 60 A	63A 3080A² s	22x58	P01660029	11W	P01660017
THYRITOP 500 75 A	80A 6600A² s	22x58	P01660030	14W	P01660017
THYRITOP 500 90 A	125A 6950A² s	/	P01660032	25W	Contact CA PYROCONTROLE
THYRITOP 500 120 A	125A 6950A² s	/	P01660032	25W	Contact CA PYROCONTROLE
THYRITOP 500 150 A	200A 31500A² s	/	P01660033	19W	/
THYRITOP 500 200/250 A 480V/600V	450A 196000A² s	/	P01660034	17W	/
THYRITOP 500 200/250 A 690 V	400A 150000A² s	FUS-400S	Contacter CA PYROCONTROLE	20W	/

EXTRARAPID FUSE FOR GTS WHEN USED AS A SLAVE OF GTF	
Model	**Fuse Model size**
GTS-T 10/230	FWC10A10F 10x38
GTS 15/230, GTS 15/480	FWC16A10F 10x38
GTS 25/480, GTS-T 20/230, GTS-T 25/230	FWC25A10F 10x38
GTS 40/230, GTS 40/480	FWP40A14F 14x51
GTS 50/230, GTS 50/480	FWP63A22F 22x58
GTS 60/230, GTS 60/480, GTS 75/230, GTS 75/480	FWP80A22F 22x58
GTS 90/230, GTS 90/480	FWP100A22F 22x58
GTS 120/230, GTS 120/480	170M1418 000-TN/80

6.2.1 Fuse GG

The electric protection device called FUSE GG must be done in order to grant the protection against the electric cable short cirrcuit (see EN60439-1, par. 7.5 “Short-circuit protection and short-circuit with stand strength” and 7.6 “Switching devices and components installed in assemblies”, otherwise the equivalent EN61439-1 paragraphs)

NOTES

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To order a manual, please contact the technical assistance department by sending an email to info@pyrocontrole.com

NF_906121686_THYRITOP500_11-2019

CE	EMC: Complies with Directive 2014/30/EU with reference to the EN 61326-1 standard Emission in industrial environments: class A - LVD safety: Complies with Directive 2014/35/EU with reference to the EN 61010-1 standard.
UL	UL Pending

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