INSTALLATION AND CONNECTION

his section contains the instructions needed for correct installation of THYRITOP 600 modular power controller on the machine/host system control panel and for correct connection of the power supply, inputs, outputs and interfaces.

arefully 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.

ELECTRICAL POWER SUPPLY

- the controller 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 to 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.

NOTES ON ELECTRICAL SAFETY AND ELECTROMAGNETIC COMPATIBILITY:

CE: Conformity EMC (electromagnetic compatibility) conformity) in compliance with Directive 2014/30/EU and following modifications. Series THYRITOP 600 are mainly intended for industrial use, installed on panels or control panels of production process machines or systems. For purposes of electromagnetic compatibility, the most restrictive generic standards have been adopted, as shown on the table.

LV (low voltage) conformity in compliance with Directive 2014/35/EU.

EMC conformity has been verified with the connections indicated on table 1 (see user's manual).

RECOMMENDATIONS FOR CORRECT INSTALLATION FOR PURPOSES OF EMC

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

⚠ • Supply from Class II or from limited energy source

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 600 semiconductors.

- Connected outside circuits must be doubly isolated.
- To connect analog inputs, strain gauges, linears, (TC, RTD), you have 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.

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 the high reliability of the device, it is necessary to install it properly inside the panel so to obtain an adequate thermal exchange.
  Fit the device vertically (maximum angle 10° to the vertical axis)
- Vertical distance between a device and the panel wall >100mm
- Horizontal distance between a device and the panel wall at last 10mm
- Vertical distance between a device and the next one at last 300mm.
- Horizontal distance between a device and the next one at last 10mm.

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 without any obstacles.

- Dissipation of device thermal power with effects on installation room temperature.
- Thermal power dissipation with limits on installation room temperature.
- Requires exchange with external air or an air conditioner to transfer dissipated power outside the panel.
- Maximum limits of voltage and derived power of transients on the line, for which the solid state power unit contains protective devices (based on the model).
- Presence of dispersion current in THYRITOP 600 in non-conducting state (current of a few mA due to RC Snubber circuit to protect the thyristor).
- Suitable for use on a circuit capable of delivering not more than 100,000A RMS Symmetrical Amperes, 600 Volts maximum when protected by class J fuses rated xxxA. (Refer to the *SCCR fuse protection table this report for the details of the current size fuses for each model)
- Use fuses only.

ATTENTION: The opening of the branch-circuit protective device may be an indication that a fault has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the device should be examined and replaced if damaged. If burnout of the device occurs, the complete device must be replaced or equivalent

⚠ ***CA PYROCONTROLE S.p.A. assumes no liability for any damage to persons or property deriving from tampering, from incorrect or improper use, or from any use not conforming to the characteristics of the controller and to the instructions in this User Manual.***

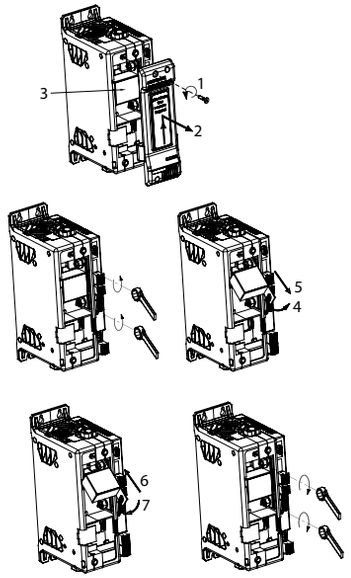
CE	The devices are manufactured according to the Community Directives 2011/65/EU (RoHS) 2014/30/EU (EMC), 2014/35/EU (LVD) in reference to product standard: EN 50581:2012 e EN 60947-4-3:2014
UL	UL Pending

ELECTRICAL CONNECTIONS

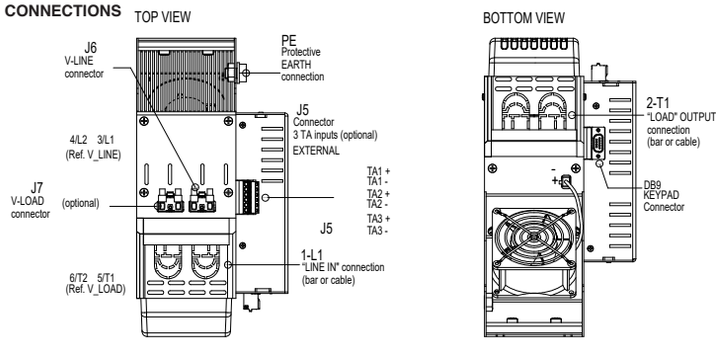
REPLACING THE INTERNAL FUSE (OPTIONAL)

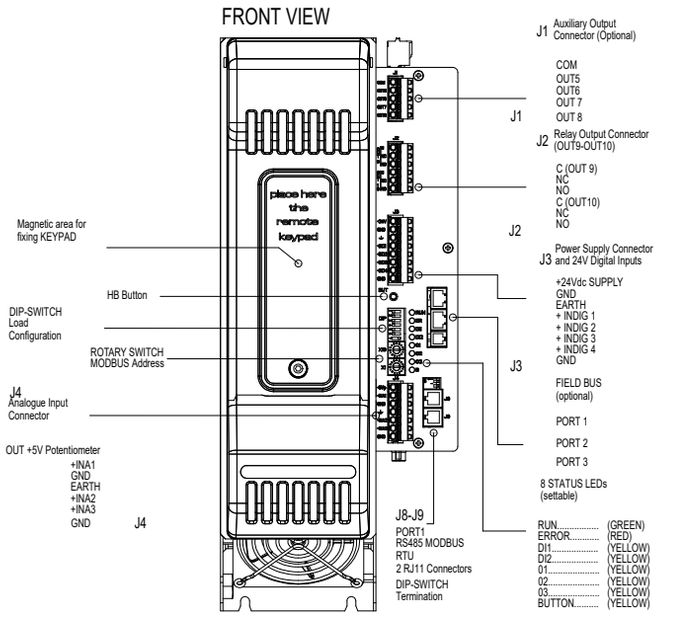
⚠ **CUT OFF POWER BEFORE AND DURING FUSE SUBSTITUTION PROCEDURE**

- 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)
- Loosen the two fastening nuts of fuse by means of tube-shaped spanner N.13 (THYRITOP 600 40-150)
- It is not necessary to remove the nuts as the fuse N.17 (THYRITOP 600 200-300A) is slipped off its seat by turning it (4) and extracting it (5) as indicated by the arrows
- Insert the new fuse as indicated by the arrows (6,7 WARNING: the washer must stay between the nut and the fuse (NOT under the fuse).
- Fasten the two nuts by the 3-4 Nm torque tube-shaped spanner N. 13 (THYRITOP 600 40-150) ,tube-shaped spanner N17 (THYRITOP 600 200-300A)
- Replace the cover pointing it to the lower part (pay attention to the connection tooth)
- Fasten the cover by the specific screw in side (1)



CONNECTIONS





CHAUVIN ARNOUX
PYROCONTROLE

THYRITOP 600 SERIES

40 to 300 A power controllers

NFS - **906121690 - Ed.2 - 05-2021**

INSTALLATION AND OPERATION MANUAL

Recto
- Installation and Connection
- Electrical connections

Verso
- Technical-Commercial information
- General Information
- Dimensions
- Fixing/Installation
- Derating curves

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RECOMMENDED WIRE GAUGES

CURRENT LEVEL	TERMINAL	WIRE GAUGE	TERMINAL TYPE	TIGHTENING / TOOL TORQUE
40 A	1/L1, 2/T1	10 mm² 7 AWG	Wire stripped for 25 mm or with crimped pre-insulated terminal tube CEMBRE PKC1018	5 Nm / Flat-head screwdriver tip 1 x 5.5 mm
60 A	1/L1, 2/T1	16 mm² 5 AWG	Wire stripped for 25 mm or with crimped pre-insulated terminal tube CEMBRE PKC1618	5 Nm / Flat-head screwdriver tip 1 x 5.5 mm
100 A	1/L1, 2/T1,	35 mm² 2 AWG	Wire stripped for 25 mm or with crimped pre-insulated terminal tube CEMBRE PKC35025	5 Nm / Flat-head screwdriver tip 1 x 5.5 mm
150 A	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 hex head wrench
200 A	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
250 A	1/L1, 2/T1	120 mm² 250 AWG	Wire stripped for 25 mm	6 Nm / No. 6 hex head wrench
300 A	1/L1, 2/T1	185 mm² 350 KCMIL	Wire stripped for 25 mm	6 Nm / No. 6 hex head wrench
---	3/L2 (Ref. Vline) 4/T2 (Ref. Vload)	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°C

TECHNICAL CHARACTERISTICS / GENERAL DATA

POWER (SOLID-STATE RELAY)			
CATEGORY OF USE (Tab. 2 EN60947-4-3)	AC 51 resistive or low inductance loads AC 55b short wave infrared lamps (SWIR) AC 56a transformers, resistive loads with high temperature coefficient		
Trigger mode	**PA** - load control via adjustment of firing phase angle **ZC** - Zero Crossing with constant cycle time (settable in range 1-200s) **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 calibrate each time you change feedback mode)		
Feedback mode	**V, V2:** Voltage feedback: proportional to RMS voltage value on load to compensate possible variations in line voltage. **I, I2:** Current feedback: proportional to RMS current value on load to compensate variations in line voltage and/or variations in load impedance. **W:** Power feedback: proportional to real power value on load to compensate variations in line voltage and/or variations in load impedance. You have to calibrate each time you change feedback mode.		
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		
Critical Dv/dt with output deactivated	1000V/µsec		
Nominal voltage for maintaining pulse on	4KV		
Nominal current for short circuit condition	5KA		
Protection	RC, extrarapid fuses		
Thermic Dissipation	THYRITOP 600 models dissipate thermic power based on load current: Pdissipation = I_load_Arms * 1.3V (W) For models with integrated fuse, also consider dissipated power at rated current shown on the fuse table		
Rated current AC51 non-inductive or slightly inductive loads, resistance furnaces	**THYRITOP 600 I 40A** Nominal current 40Arms @40°C in continuous service Non-repetitive overcurrent t=10ms: 1400A I²t for blowout: 10000A²s **THYRITOP 600 I 60A** Nominal current 60Arms @40°C in continuous service Non-repetitive overcurrent t=10ms: 1500A I²t for blowout: 12000A²s **THYRITOP 600 I 100A** Nominal current 100Arms @40°C in continuous service Non-repetitive overcurrent t=10ms: 1900A I²t for blowout: 18000A²s **THYRITOP 600 I 150A** Nominal current 150Arms @40°C in continuous service Non-repetitive overcurrent t=10ms: 5000A I²t for blowout: 125000A²s **THYRITOP 600 I 200A** Nominal current 200Arms @40°C in continuous service Non-repetitive overcurrent t=10ms: 8000A I²t for blowout: 320000A²s **THYRITOP 600 I 250A** Nominal current 250Arms @40°C in continuous service Non-repetitive overcurrent t=10ms: 8000A I²t for blowout: 320000A²s **THYRITOP 600 I 300A** Nominal current 300 Arms @ 40°C in continuous service Non-repetitive overcurrent t=10ms: 8000 A I²t for blowout: 320000 A²s **NOTE (for all models)** Minimum load controllable: 5 % of product current rated level.		
Rated current AC56A permitted trigger modes: ZC, BF with DT (Delay Triggering),PA with softstart	Derating: 20% of rated current value.		

GENERAL DATA	
Power supply	24Vdc ±10%, Class II, max 8VA Max 10VA terminal KB-ADL Isolation 1000V
Fan power supply	24Vdc ±10%, 500mA @ 25Vdc
Signals	Eight led: **RN** (Green) run state of CPU **ER** (Red) error signal **DI1, DI2**, (Yellow) state of digital inputs INDIG1, INDIG2 **O1,O2,O3** (Yellow) state of power control **BT** (Yellow) state key HB
Protection	IP20
Work/storage temperature	0…50°C (refer to dissipation curves) / -20 °C - +70 °C
Relative humidity	20…85% Ur non-condensing
Ambient conditions for use	indoor use, altitude up to 2000m
Installation	panel with screws
Installation requirements	Installation category II, pollution level 2, double isolation Max. temperature of air surrounding device 40°C for temperature >40°C refer at derating curves Device type: "UL Open Type

Weight

Model with internal fuse	Master	Master +1 Expansion	Master +2 Expansins
40A	2,2 kg	4,2 kg	6,2 kg
60A	2,2 kg	4,2 kg	6,2 kg
100A	2,2 kg	4,2 kg	6,2 kg
150A	2,3 kg	4,4 kg	6,5 kg
200A	2,6 kg	5,0 kg	7,4 kg
250A	2,6 kg	5,0 kg	7,4 kg
300A	2,6 kg	5,0 kg	7,4 kg

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 600. You can use a filter connected between the power line and THYRITOP 600 or an LC group connected between the THYRITOP 600 output and the load.

Graphic simbol

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

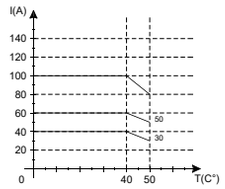
Indicates a particularly delicate situation that could affect the safety or correct operation of the controller, or an instruction that MUST be followed to prevent hazards.

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

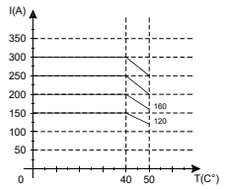
Model	EXTRARAPID FUSES			
	Size I²t	Code Format	Model Code	Power Dissipated @ In
THYRITOP 600 I 40	80A 2500A²s	FUS-080S	P01660035	5 W
THYRITOP 600 I 60	125A 8900A²s	FUS-125S	P01660036	6 W
THYRITOP 600 I 100	160A 16000A²s	FUS-160S	P01660037	12 W
THYRITOP 600 I 150	200A 31500A²s	FUS-200S	P01660033	19 W
THYRITOP 600 200/250 480/600V	450A 196000A²s	FUS-450S	P01660034	17 W

DERATING CURVES

GFW 40 / 60 / 100A

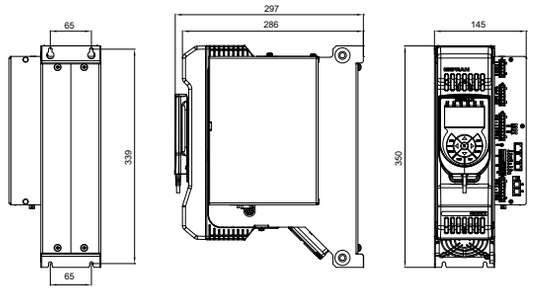


GFW 150 / 200 / 250 / 300A

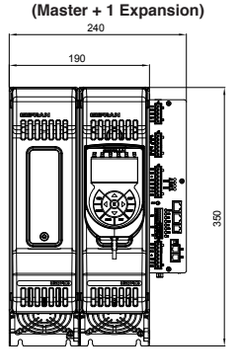


DIMENSIONS

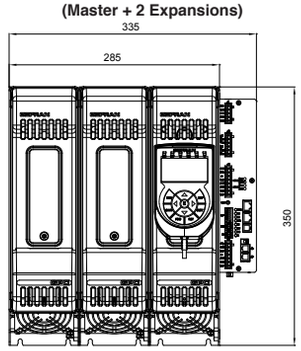
THYRITOP 600 I MASTER



THYRITOP 600 SPLIT-PHASE (Master + 1 Expansion)



THYRITOP 600 THREE-PHASE (Master + 2 Expansions)



FIXING / INSTALLATION

- **Panel mounting and cut-out dimensions**
- **Installation**

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