

## INSTALLATION AND CONNECTION

This section contains the instructions needed for correct installation of GTF 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.

### 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 MARKING: EMC (electromagnetic compatibility) conformity** in compliance with Directive 2014/30/EU and following modifications.

Series GTF controllers 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 GTF semiconductors.
- Connected outside circuits must be doubly isolated.
  - it's 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.

#### 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)
- 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.
- 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 GTF in non-conducting state (current of a few mA due to RC Snubber circuit to protect the thyristor).

<b>ERC</b>	Conformity TC RU C-IT.A132.B.00422
<b>CE</b>	The device are manufactured according with 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
<b>UL</b>	Conformity C/ULUS File no. E243386 vol. 1 sez. 5
<b>SCCR RMS SYM 100kA / 600V</b>	Models: 200A, 250A - 480V and 600V, UL508 Conformant. Models up to 120A in combination fuse

- Only for model GTF 200 and GTF 250: 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 "UL508 SCCR FUSES TABLE" for the details of the current size fuses for each model)
- For model GTF up to 120: The product variants listed in the table "SCCR CO-ORDINATION FUSES TABLE" are "Suitable For Use On A Circuit Capable Of Delivering Not More Than 100,000 A rms Symmetrical Amperes, 600 Volts Maximum when Protected by fuses.
- Use fuses only.
- Over-Voltage Control: only for the Canadian Installations, the equipment shall be provided with External Surge Protective Device, R/C (VZCA2/8) or CSA Certified.

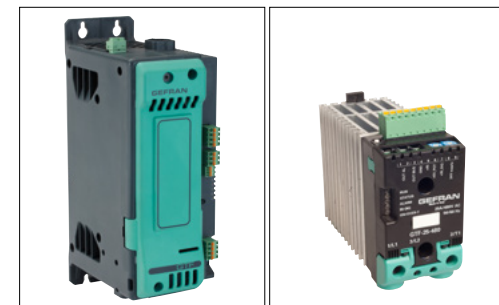
**ATTENTION: The opening of the branch-circuit protective device may be an indication that a fault has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the device should be examined and replaced if damaged. If burnout of the device occurs,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

**GEFRAN 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.**

# GEFRAN

# GTF

POWER CONTROLLER



code 80324L - 03/2023 - ENG

## INSTALLATION AND OPERATION MANUAL

Side 1 Installation and connection  
Electrical connections

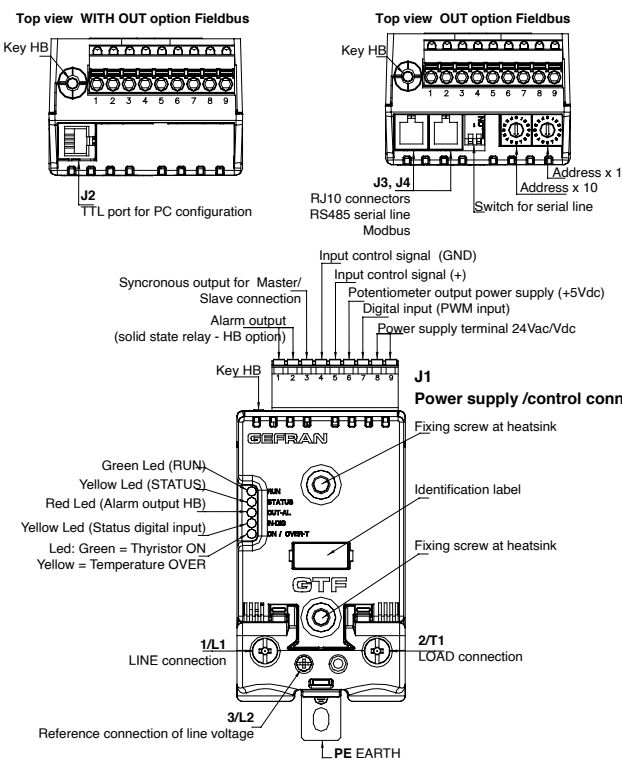
Side 2 Technical characteristics  
General characteristics  
Dimensions  
Template/Installation  
Derating curves

**GEFRAN spa**

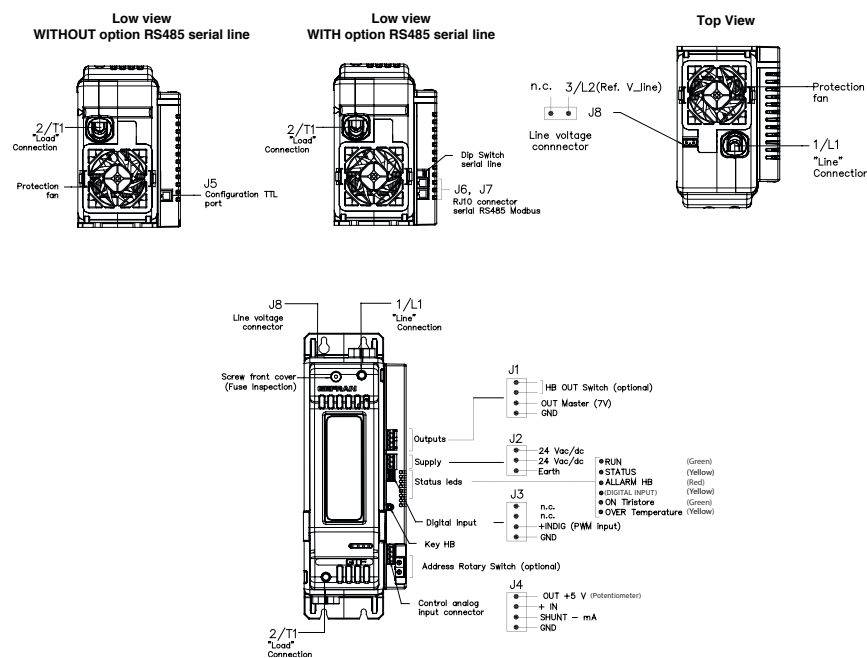
via Sebina, 74 - 25050 Provaglio d'Iseo (BS)  
Tel. 03098881 - fax 0309839063 - Internet: <http://www.gefran.com>

## ELECTRICAL CONNECTIONS

### CONNECTIONS INPUT/OUTPUT GTF 25-120A



### CONNECTIONS INPUT/OUTPUT GTF 150-250A



### RECOMMENDED WIRE GAUGES

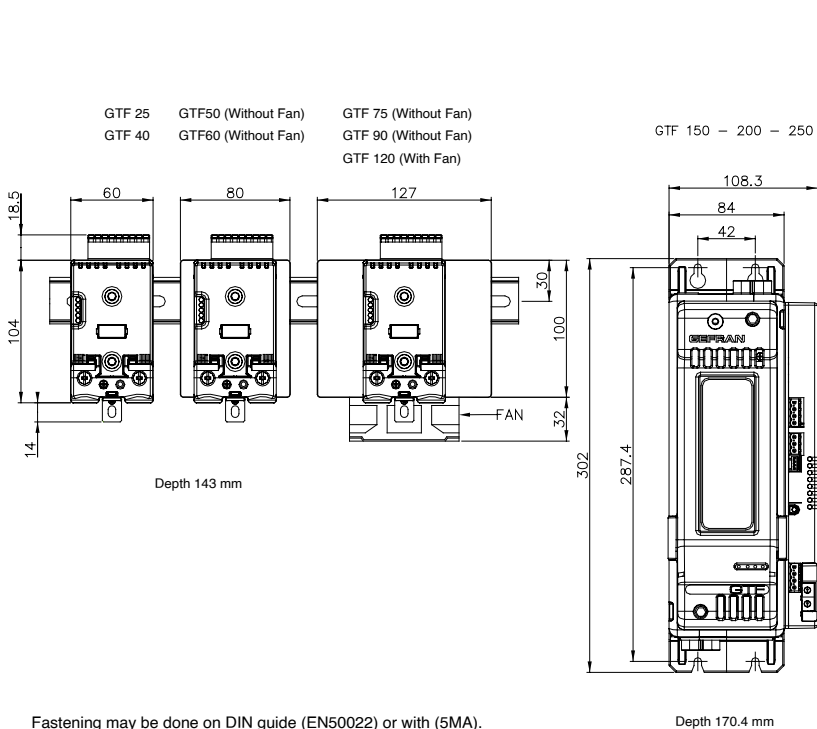
GTF CURRENT LEVEL	TERMINAL	CABLE WIRE	WIRE TERMINAL	TIGHTENING TORQUE / TOOL
25A	1/L1, 2/T1, PE	4 mm <sup>2</sup> 10 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / 22.1 lb.in Phillips screwdriver PH2 - PH3
40A	1/L1, 2/T1, PE	10 mm <sup>2</sup> 7 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / 22.1 lb.in Phillips screwdriver PH2 - PH3
50A	1/L1, 2/T1, PE	10 mm <sup>2</sup> 7 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / 22.1 lb.in Phillips screwdriver PH2 - PH3
60A	1/L1, 2/T1, PE	16 mm <sup>2</sup> 5 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / 22.1 lb.in Phillips screwdriver PH2 - PH3
75A	1/L1, 2/T1, PE	25 mm <sup>2</sup> 3 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / 22.1 lb.in Phillips screwdriver PH2 - PH3
90A	1/L1, 2/T1, PE	35 mm <sup>2</sup> 2 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / 22.1 lb.in Phillips screwdriver PH2 - PH3
120A	1/L1, 2/T1, PE	50 mm <sup>2</sup> 1/0 AWG	Wire terminal / Eye D. 6mm	2.5 Nm / 22.1 lb.in Phillips screwdriver PH2 - PH3
-	3/L2 (Ref. Vline)	0.25 ... 2.5 mm <sup>2</sup> 23...14 AWG	Wire terminal tip	0.5 ... 0.6 Nm / 4.4 ... 5.3 lb.in Screwdriver blade 0.6 x 3.5 mm
150A	1/L1, 2/T1	70 mm <sup>2</sup> 2/0 AWG	Wire stripped for 25 mm or with crimped pre-insulated terminal tube CEMBRE PKC70022	6 Nm / 5.3 lb.in No. 6 hex head wrench
200A	1/L1, 2/T1	95 mm <sup>2</sup> 4/0 AWG	Wire stripped for 25 mm or with crimped pre-insulated terminal tube CEMBRE PKC95025	6 Nm / 5.3 lb.in No. 6 hex head wrench
250A	1/L1, 2/T1	120 mm <sup>2</sup> 250 kcmil	Wire stripped for 25 mm	6 Nm / No. 6 5.3 lb.in hex head wrench
-	3/L2 (Ref. Vline)	0.25 ... 2.5 mm <sup>2</sup> 23...14 AWG	Wire stripped for 8 mm or with tag terminal	0.5 ... 0.6 Nm / 4.4 ... 5.3 lb.in 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

POWER (SOLID STATE)										
Category of use (Table 2 EN60947-4-3)	AC 51 resistive or low inductance loads - AC 55b Infrared lamps AC 56a: transformer primary in single-phase or open configuration only									
Trigger mode	<b>PA</b> - Load management by adjusting the firing angle (only configuration single-phase or delta open) <b>ZC</b> - Zero Crossing with constant cycle time (settable in range 1-200s) <b>BF</b> - Burst Firing with variable cycle time (GTT) optimized minimum. <b>HSC</b> - 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	<b>V, V2</b> : Voltage feedback proportional to RMS voltage value on load (useful to compensate possible variations in line voltage). <b>I, I2</b> : Current feedback: bound to RMS current value on load to compensate variations in line voltage and/or variations in load impedance). <b>P</b> : 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 GTF									
	25	40	50	60	75	90	120	150	200	250
Rated current AC56A permitted trigger modes ZC, BF with DT (Delay Triggering), PA with softstart (@ Tamb = 40 °C)	25A	40A	50A	60A	75A	90A	120A	150A	200A	250A
	20A	32A	40A	50A	60A	75A	100A	125A	160A	200A
Non-repetitive e overcurrent (t=10msec)	400A	520A	520A	1150A	1150A	1500A	1500A	5000A	8000A	8000A
I <sub>t</sub> for melting (t=1...10msec) A <sup>2</sup> s	450	1800	1800	6600	6600	11200	11200	125000	320000	320000
Critical Dv/dt with output deactivated	1000V/μs									
Nominal current for short circuit condition	5kA									
Held nominal voltage of to the impulse	4kV									
Diagnostics	Detection of short load circuit absence line voltage, HB alarm (partial breakage of load)									

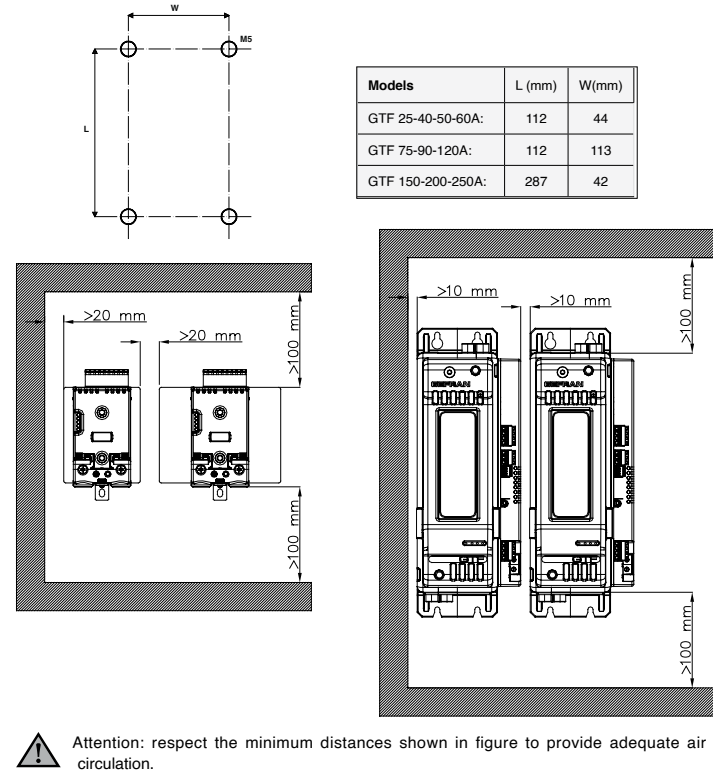
## DIMENSIONS



## GENERAL DATA

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Power supply	GTF 25-120A: 24 Vac 50-60Hz / Vdc ± 25%, max 3VA GTF 150-250A: 24 Vac 50-60Hz / Vdc ± 25%, max 11VA	
Power supply external fan	(only for GTF120A model) 24 Vdc ± 10%, max 200mA	
Signals	5 leds: RUN: run state of CPU STATUS: operating state ALARM: state of alarm output DIGITAL INPUT: state of digital inputs ON / OVER-TEMP.: state control triynstr / Alarm for overheating	
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-fase control	
Protection	IP20	
Work/storage temperature	0...40°C (refer to dissipation curves) / -20 °C - +70 °C average temperature over a period of 24hour not exceeding 35° C(to EN 60947-4-3 § 7.1.1)	
Relative humidity	20...85% RH 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 >120A models) - maximum surrounding air temperature 40°C ; for temperature >40°C refer at derating curves. - Device type: "UL Open Type"	
Weight	GTF 25, 40A	0,81 Kg
	GTF 50, 60A	0,79 Kg
	GTF 75, 90A	1,3 Kg
	GTF 120A	1,5 Kg
	GTF 150, 200, 250A	2,5 Kg Max
<b>EMC filters</b> are required in PA mode (Phase Angle, i.e., SSR trigger with phase angle modulation). The filter model and current level depend on the configuration and load used. The power filter MUST be connected as close as possible to the GTF. You can use a filter connected between the power line and GTF or an LC group connected between the GTF output and the load.		
<b>Graphic symbols</b>		
	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.	
	I Indicates a risk to the user's safety due to high voltage at the points indicated.	

## TEMPLATE / INSTALLATION



Models	EXTRARAPID FUSES				FUSEHOLDERS
	Size I <sup>2</sup> t	Sign Format	Model Codc	Power dissipation@ In	
GTF 25	25A 390A <sup>2</sup> s	FUS-025 10x38	FWC25A10F 338474	6W	PFI-10X38 337134 R/C30A@690V
GTF 40... GTF 50...	50A 1600A <sup>2</sup> s	FUS-050 22x58	FWP50A22F 338127	9W	PFI-22X58 337223 R/C80A@600V
GTF 60...	63A 3090A <sup>2</sup> s	FUS-063 22x58	FWP63A22F 338191	11W	PFI-22X58 337223 R/C80A@600V
GTF 75...	80A 6600A <sup>2</sup> s	FUS-080 22x58	FWP80A22F 338199	14W	PFI-22X58 337223 R/C80A@600V
GTF 90...	125A 6950A <sup>2</sup> s	FUS-125N	660RF00AT125 338106	25W	PF-DIN 337092 R/C400A@1000V
GTF 120...	125A 6950A <sup>2</sup> s	FUS-125N	660RF00AT125 338106	25W	PF-DIN 337092 R/C400A@1000V
GTF 150...	200A 31500A <sup>2</sup> s	FUS-200S	DN000UB69V200 338930	19W	
GTF 200/250 480V/600V	450A 196000A <sup>2</sup> s	FUS-450S	DN000UB60V450L 338932	17W	
GTF 200/250 690V	400A 150000A <sup>2</sup> s	FUS-400S	DN000UB69V400L 338936	20W	

Model	UL508 SCCR FUSES TABLE			
	"Short circuit current [Arms]"	"Max fuse size [A]"	Fuse Class	"Max Voltage [VAC]"
GTF 200	100.000	400	J	600
GTF 250	100.000	400	J	600

The fuses on the above table are representative of all the fuses of the same class with lower current ratings

Model	SCCR CO-ORDINATION FUSES TABLE			
	Short circuit current [Arms]	Max fuse size [A]	Bussmann Model Number	Max Voltage [VAC]
GTF 25	100.000	25	DFJ-25	600
GTF 40	100.000	50	DFJ-50	600
GTF 50	100.000	50	DFJ-50	600
GTF 60	100.000	100	DFJ-100	600
GTF 75	100.000	100	DFJ-100	600
GTF 90	100.000	100	DFJ-100	600
GTF 120	100.000	125	DFJ-125	600

The fuses on the above table are representative of all the Bussmann DFJ fuses with lower current ratings.  
The devices protected with the fuses reported above, still be functional after the short circuit.

## DERATING CURVES

