INSTALLATION AND CONNECTION

This section contains the instructions needed for correct installation of GFX4-IR modular power controller 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 product 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 GFX4-IR 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).

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.

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 GFX4-IR 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.
- To connect the control outputs and alarm outputs (contactors, solenoids, motors, fans, etc.), install RC (series of capacitors and resistors) groups parallel to inductive loads that work in AC.
  (Note: all condensers must conform to VDE standards (class X2) and support voltage of at least 220Vac.
  Resistances must be at least 2W).
- Install a 1N4007 diode anti-parallel to the coil of inductive loads that work in DC.
- Suitable for use on a circuit capable of delivering not more than 100,000A RMS Symmetrical Amperes, 480 Volts maximum when protected by class J fuses or RK5 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.

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.

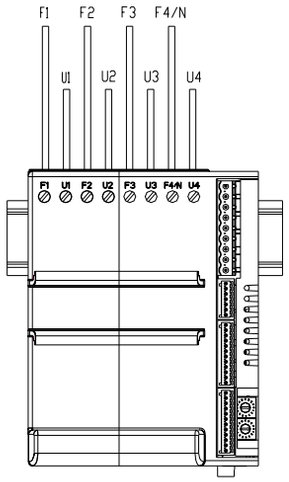
EAC	*Conformity TC N° RU-IT.A32.b.01762*
UL	*Conformità C/UL/US File no. E243386*
CE	The device conforms to European Directives **2011/65/EU, 2014/30/EU (EMC)** and **2014/35/EU (LVD)** with reference to the harmonized standards **EN 50581:2012, EN 60947-4-3:2000/A2:2011** and **EN 61010-1:2010**.
SCCR RMS SYM 100KA / 480V	Short Circuit Current Rating 100KA / 480V according to UL 508
EtherNet/IP ODVA	ODVA Conformant (only E8 opt)

Graphic simbol

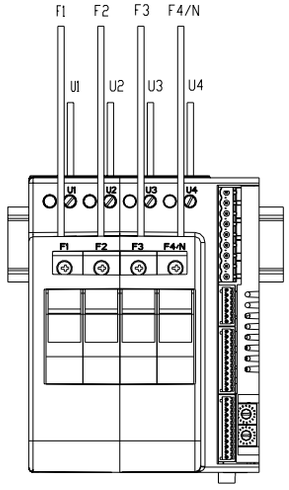
☞	Indicates contents of sections, general instructions, notes, and other points to which the reader's attention needs to be called.
⚠	Indicates a particularly delicate situation that could affect the safety or correct operation of the controller, or an instruction that MUST be followed to prevent hazards.
⚠	Indicates a risk to the user's safety due to high voltage at the points indicated.

ELECTRICAL CONNECTIONS

POWER CONNECTIONS



Model without fuse holder

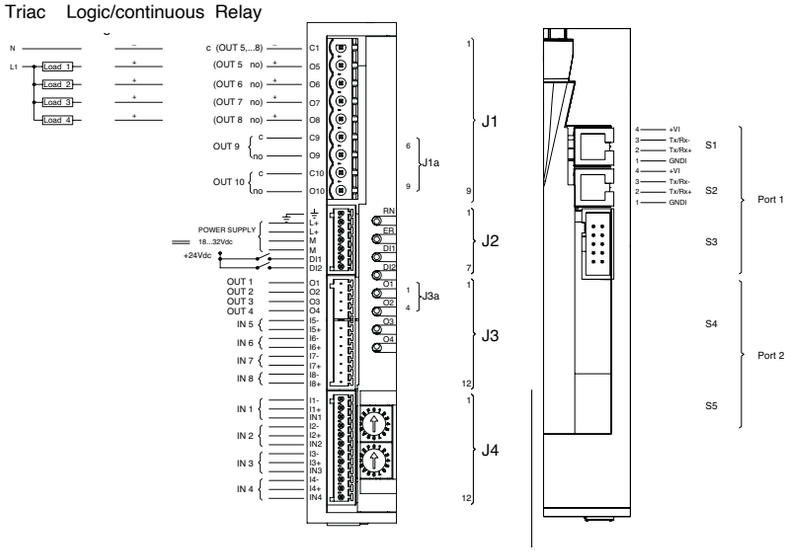


Model with fuse holder

F1,F2,F3,F4/N	Line connection terminals
U1,U2,U3,U4	Load connection terminals

CONNECTIONS

Triac Logic/continuous Relay



GEFRAN

GFX4-IR

4-ZONE MODULAR POWER CONTROLLER FOR IR LAMPS AND INDUCTIVE LOADS

code **80418E - 03/2023 - ENG**

INSTALLATION AND OPERATION MANUAL

Side 1	Installation and Connection Electrical connections
Side 2	Technical-Commercial information General Information Dimensions Fixing/Installation Derating curves

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

SECTION CABLE

Model	30kW / 60kW		80kW	
max current	16A / 32A (30A)*		57A (40A)*	
rigid	**0,2 - 6mm²**	**24-10AWG**	**0,5 - 16mm²**	**20-6AWG**
flexible	**0,2 - 4mm²**	**24-10AWG**	**0,5 - 10mm²**	**20-7AWG**
	0,25 - 4mm²	**23-10AWG**	**0,5 - 10mm²**	**20-7AWG**
	0,25 - 4mm²	**23-10AWG**	**0,5 - 10mm²**	**20-7AWG**
	0,5 - 0,6Nm		**1,2 - 1,5Nm**	

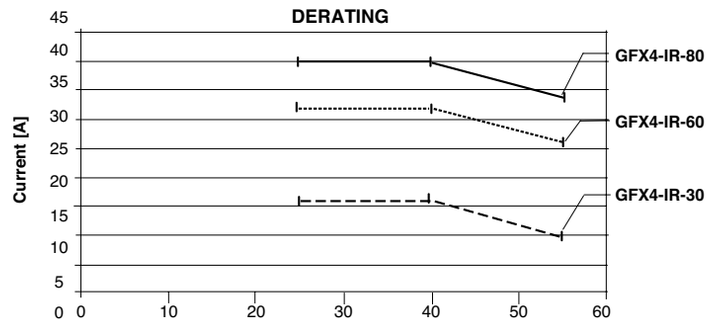
* UL certification

TECHNICAL CHARACTERISTICS / GENERAL DATA

POWER (SOLID-STATE RELAY)			
Load type	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 1-200sec) **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:** Voltage feedback: proportional to RMS voltage value on load to compensate possible variations in line voltage. **I:** 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		
Work voltage range	90…530Vac		
Non-repetitive voltage	1200Vp		
Rated frequency	50/60Hz auto-determination		
Rated current AC51 non-inductive or slightly inductive loads, resistance furnaces	30KW 4x16A	60KW 4x32A (4x30)*	80KW 4x40A (4x40)* (single channel 57A ∑I= 160A)
Nominal current AC55b short wave infrared lamps	30KW 4x8A	60KW 4x16A	80KW 4x20A
	for applications in which you can set a minimum power output limit (ex: Lo.P = 10%) by also limiting the lamp power variation speed with gradient limit (ex: G.out = 20%, PS.TM = 20s). Under these conditions, the nominal currents shown on the table can be raised up to the values indicated for AC51 type loads.		
Rated current AC56A load transformar permitted trigger modes: ZC, BF with DT (Delay Triggering), PA with sofstart	30KW 4x12A	60KW 4x25A	80KW 4x32A
Non-repetitive overcurrent (t=20msec)	400A	600A	1150A
I^2t for melting (t=1…10msec)	645A^{2}s	1010A^{2}s	6600A^{2}s
Critical Dv/dt with output deactivated	10,000V/µs High static dv/dt		
Rated isolation voltage	4000V		

GENERAL DATA		
Power supply	24Vdc ±25%, Class II, max 8VA	
Fan power supply	24Vdc ±10%, 500mA @ 25Vdc	
Signals	Eight LEDs: **RN** run state of CPU **ER** error signal **DI1, DI2**, state of digital inputs **O1...O4** state of SCR control	
Protection	IP20	
Work/storage temperature	0…50°C (refer to dissipation curves) / -20 °C - +70 °C	
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 Max. temperature of air surrounding device 50°C Device type: “UL Open Type”	
Weight Models 30KW, 60KW, 80KW	1200 g.	
Models 30KW, 60KW with fuses	1600 g.	

DERATING CURVES



* UL Certification**External EMC filters**

The need to use a filter to obtain emissions conducted on the line during power-on of SCRs with phase angle trigger depends on the applications.
It is important to connect the power filter as close as possible to the solid-state power unit.
We recommend a filter with the following characteristics:

Voltage	Load voltage	
Current	Max. current on load	
Rated frequency	50/60Hz	
Common mode attenuation	>35dB@100KHz	>60dB from 150KHz to 1.5MHz
Differential mode attenuation	>50dB@100KHz	>60dB from 150KHz to 1.5MHz

The following are two commercial filters tested in single-phase applications:

Model	Load 230V	Load 400V
GFX4-IR 30KW	ICAR FL140.30.00	ICAR FL140.30.00 H
GFX4-IR 60-80KW	ICAR FL140.50.00	ICAR FL140.50.00 H

The CE declaration of conformity is available on request.

Model	EXTRARAPID FUSES				FUSES-HOLDER ISOLATORS
	Size I^2t	Code Format	Model Code	Power Dissipated @ In	Approval Code
GFX4-IR 30 kw	16A 150 A²s	FUS-016 10x38	FWC16A10F 338470	3,5 W	PFI-10x38 337134 UR30A@690V
GFX4-IR 60 kw	30A 675 A²s	FUS-030 10x38	FR10GR69V30 338481	4,8 W	PFI-10x38 337134 UR30A@690V
GFX4-IR 80 kw	63A 3080 A²s	FUS-063 22x58	FWP63A22F 338191	11 W	PFI-22x88 337223 UR80A@600V

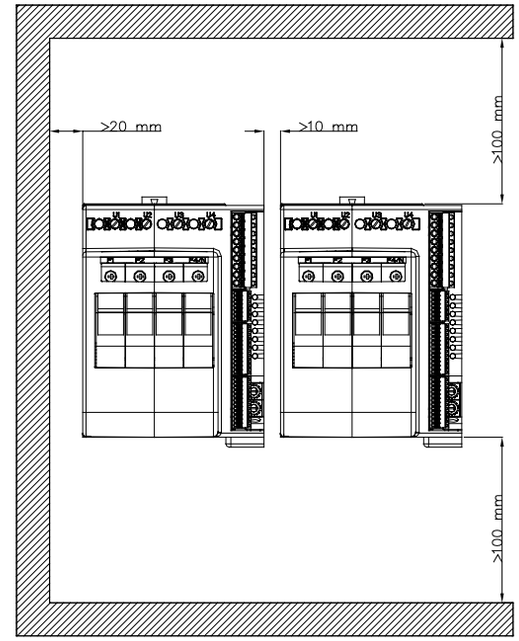
UL508 SCCR FUSES TABLE				
Model	"Short circuit current [Arms]"	"Max fuse size [A]"	Fuse Class	"Max Voltage [VAC]"
GFX4-IR 30	**100.000**	**30**	**RK5**	**600**
GFX4-IR 60	**100.000**	**30**	**RK5**	**600**
GFX4-IR 80	**100.000**	**100**	**J**	**600**

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

FIXING / INSTALLATION

- Panel mounting and cut-out dimensions

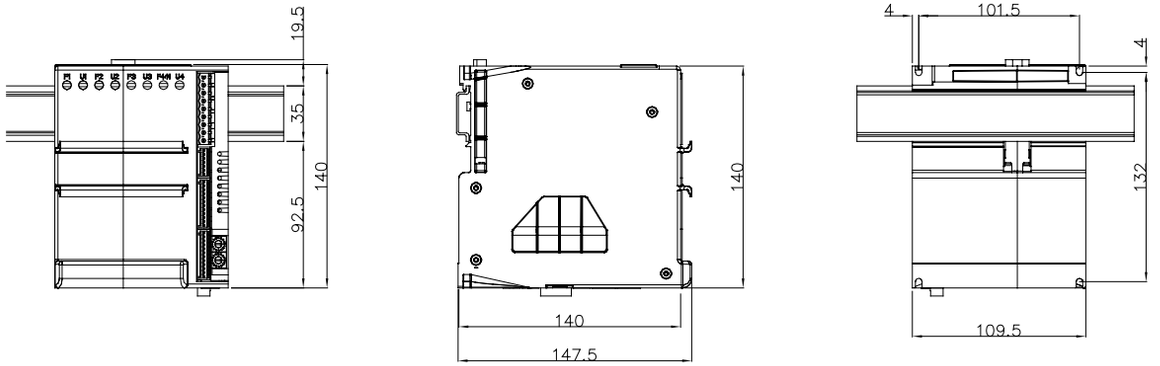
- Installation



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

DIMENSIONS

Model without fuse holder



Model with fuse holder