ENG

AUTOMATION

POWER CONTROL

SOLID STATE RELAYS, AND POWER CONTROLLERS

GEFRAN

COD. 81141G

Thanks to forty years of experience, Gefran is the world leader in the design and production of solutions for **measuring, controlling, and driving industrial production processes**.
We have branches in 14 countries and a network of over 80 worldwide distributors.
For 40 years, Gefran has been designing and producing technologically advanced actuators and solid state relays to control resistive/inductive loads and infrared lamps used in modern temperature control systems.
Our knowledge of the market transforms your needs into practical, high-quality answers.

QUALITY AND TECHNOLOGY

Gefran components are a **concentrate of technology**, the result of constant research and of **cooperation with major research centres**.
Thanks to its **complete line of controllers and actuators**, Gefran can be your sole provider of solutions for **electrical heating control**.
Gefran's know-how and experience guarantee **continuous** and practical solutions.

SERVICES

A team of Gefran experts works with the customer to select the ideal product for its application and to help install and configure devices (customercare@gefran.com).

Gefran offers a wide range of courses at different levels for the technical-commercial study of the Gefran product range as well as specific courses on *demand*

In addition to foreseeing the market's application needs, Gefran forms partnerships with its customers to find **the best way to optimise and boost the performance of various applications**.
Gefran products communicate with one another to provide integrated solutions, and can dialogue with devices by other companies thanks to compatibility with numerous fieldbuses.

CANopen EtherCAT EtherNet/IP DeviceNet Modbus TCP/RTU PROFIBUS PROFINET

PLASTICS

HEAT TREATMENT

GLASS

FOOD

PAPER

ENERGY

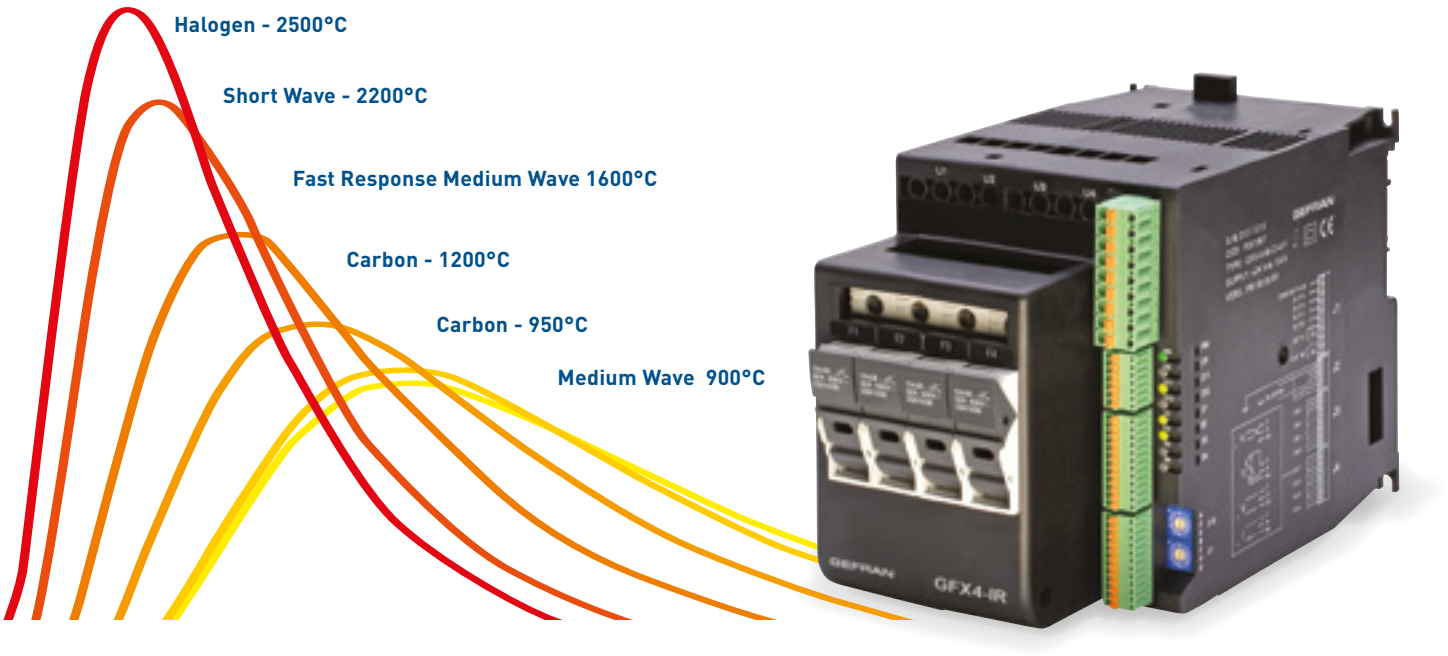
SOFTWARE

GF_eXpress

Configuration kit for Gefran instruments by means of PC (Windows environment).
Lets you read or write all of the parameters of a single instrument via serial connection.

- A single software for all models
- Easy configuration
- Copy/paste, save recipe, trend functions
- Rapid configuration of instruments
- Saving and management of parameter recipes
- On-line trend
- Recovery of factory settings
- Custom linearization
- On-line user manual
- Easy programming with custom messages
- Easy graphics programming with setpoint programmers

IR SOLUTION



IDEAL SOLUTIONS FOR IR LAMP APPLICATIONS

Gefran introduces its GFX4-IR, a new 4-zone PID power controller for infrared lamps, transformers, and inductive loads.
The GFX4-IR is extremely compact, saving you space and wiring time.
GFX4-IR runs full and continuous diagnostics of process current, temperature, and voltage.
Specific SOFT-START algorithms greatly extend average lamp life.
For high-density multi-zone applications, available models IR 24 and IR 12 that allow independent control of 24 zones or 12 zones with a single device.

GFX4-IR CHARACTERISTICS

- Up to 4 zones single-phase or 1 zone 3-phase +1 single-phase
- All connection types (star, delta, with/without neutral)
- Fast zero crossing operation with pulse train and half single cycle with minimized flickering.
- Phase-angle operation
- Soft start, soft stop, current limit, V, I, P feedback functions
- Reading in IAC rms and VAC rms, diagnostics for interrupted load, short circuit, blown fuse

PRINTING

PLASTICS – BLOWING

PHOTOVOLTAICS

TEXTILE

WOODWORKING MACHINES

AUTOMOTIVE

GTF - GFW

GTF

GTF is the new line of GEFRAN power controllers, designed to control all types of industrial electric heaters, for currents up to 250 Amperes.
Versatility, plus easy and guided configuration with GEFRAN **user friendly** software make the device ideal for all power control applications.

- Longer load life thanks to Soft Start and current limit control.
- Process accuracy and reliability via voltage, current, power feedback
- Powerful diagnostics of total and partial load interrupt
- Great flexibility with all types of control and load.
- SCCR (Short Circuit Current Rating) 100KA SCCR RMS SYM 100KA / 600V

GFW

GFW is the new modular line of GEFRAN power controllers, designed to control all types of industrial electric heaters with any connection mode (mono-phase, bi-phase and tri-phase) for currents up to 600 Amperes per phase.
Advanced control functions, feedback algorithms, phase synchronisation, and energy totalisers are the main advantages of the GFW's calculation functions.
Advanced Fieldbus performance and easy configuration with **user-friendly** software.

- Full integration in automation architectures thanks to Fieldbuses.
- Modularity for all mono/bi/ tri-phase applications.
- Integrated solution with incorporated temperature controller.
- Configurable retransmission analog outputs
- Possibility to read the current values by external current transformers
- Powerful diagnostics for total and partial load interrupt and for overtemperature, **with an exclusive function that measures power terminal temperature to avoid risks of wire overheating and sparks and a further temperature measure of the air at the fan output.**
- Great flexibility with all types of control and load.
- SCCR (Short Circuit Current Rating) 100KA SCCR RMS SYM 100KA / 600V

GTF-Xtra - GFW-Xtra

- Xtra series models include an **exclusive function** that completely protects the controllers against short circuits of the load.
- The Xtra overcurrent protection function immediately cuts power after dangerous current peaks due to temporary PV arc faults or permanent short circuits of the load, thereby drastically reducing machine downtimes and maintenance costs.
- Controller function is reset, in complete safety and without any spare parts, by a button, by remote control, or by automatic programmed reset.

PHOTOVOLTAIC, PLASTIC, FURNACES, WOOD, GLASS, PAPER, FOOD	Power Controller		**GFX-M1** **GFX-S1** (5,10,15A)	**GFX-M2** **GFX-S2** (25A...120A)	**GFX4** (16,32,40A) **[4 CHANNELS]** **FIELDBUS***
					
PLASTICS, PACKAGING, FURNACES	Solid State		**GTS** (15... 120A)	**GTZ** (25... 55A) **(3-PHASE)**	**GTD** (25,40A)
					
PLASTICS, PACKAGING	Solid State Relay	**GQ** (15... 90A)	**GS** (15... 120A)	**GZ** (10... 55A) **(3-PHASE)**	**GD** (40A)
					

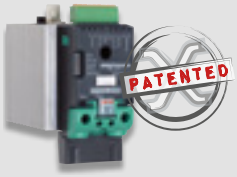
ZERO CROSSING

HB ALARM

ZERO CROSSING "BURST FIRING"

HALF SINGLE CYCLE, PHASE ANGLE, FEEDBACK

GTF-Xtra (Patented)
(25...60A)



Modbus RTU

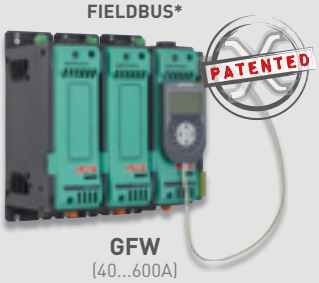
GTF
(25...250A

Modbus RTU

IR24/ IR12
(9A- 24/12 CHANNELS)

Modbus RTU PROFINET

GFW-Xtra (Patented)
(40...100A)
FIELDBUS*



GFW
(40...600A)
FIELDBUS*

GFX4-IR
(16, 32, 40A)
(4 CHANNELS)
FIELDBUS*

GTT
(25... 120A)

GT
(25... 120A)

FIELDBUS*

PROFINET
PROFIBUS
Modbus TCP/RTU
CANopen
DeviceNet
EtherCAT
EtherNet/IP

GEFRAN

GUIDE TO SELECTION BY FUNCTION

		SOLID STATE RELAY				
	SERIE	GQ	GS	GD	GT	GZ
RATINGS	*Nominal rated voltage (Vac)*	230Vac, 480Vac, 600Vac	230Vac, 480Vac, 600Vac	480Vac	480Vac	400Vac, 480Vac, 600Vac
	Nominal rated current (A)	15, 25, 50, 90	15, 25, 40, 50, 60, 75, 90, 120	40A	25, 40, 50, 60, 75, 90, 120	10, 25, 40, 55
INTEGRATED HEAT-SINK	*Integrated heat-sink with DIN bar attachment*	no	no	no	no	no
LOAD TYPE	*Heating elements with low thermal coefficient*	GQ	GS	GD	GT	GZ
	Long-wave IR lamps	GQ	GS	GD	GT	GZ
	Medium-wave IR lamps					
	Short-wave IR lamps					
	Heating elements with high thermal coefficient: (Kanthal, Super Kanthal, Silicon Carbide)					
	Single-phase Transformers					
	Three-phase Transformers					
INPUT CONTROL	*Digital ON/OFF Vdc*	GQ	GS	GD		GZ
	Digital ON/OFF Vac	GQ	GS			GZ
	Digital PWM					
	Analog 0-10V, 4-20mA				GT	
	Analog, potentiometer				GT	
	Modbus RTU serial					
	Fieldbus					
FIRING MODE	*Zero crossing, ON/OFF (ZC)*	GQ	GS	GD		GZ
	Rapid Zero crossing "Burst firing" (BF)				GT	
	Optimized rapid Zero crossing (HSC)					
	Phase angle (PA)					
	Delay triggering (DT)					
OPTIONS	*Soft Start*					
	Current limit					
	Load interrupt alarm		GS (≥ 50A)	GD	GT	GZ (in Vac)
	Short circuit alarm					
	Overtemperature alarm		GS (≥ 50A)	GD		GZ
	Integrated high-speed fuse					
	Overcurrent fault protection (Xtra) (*)					
	On-board temperature PID					
	Analog retransmission V, I, P					
FEEDBACK FUNCTIONS	*Voltage Feedback (V, V^2)*					
	Current Feedback (I, I^2)					
	Power Feedback					
FIELDBUS	*Profibus DP*					
	CanOpen					
	DeviceNet					
	Modbus TCP/RTU					
	Ethernet/ IP					
	EtherCAT					
	Profinet					
CONFIGURATION	*Configuration from PC*					
	Easy "Smart Configuration" configuration					
	Programming by hand-held keyboard					
CERTIFICATIONS	*CE*	GQ	GS	GD	GT	GZ
	UL	GQ	GS		GT	GZ
	TÜV					
	CSA	GQ				GZ
	EAC					
	SCCR (Short Circuit Current Rating)	25A/600V: 100KA by using a proper fuse	40A/480V: 100KA by using a proper fuse			

(*) European Patent N° 2660843

SOLID STATE CONTACTOR			
GTS	**GTD**	**GTT**	**GTZ**
230Vac, 480Vac 600Vac	480Vac	480Vac	400Vac, 480Vac, 600Vac
15, 25, 40, 50, 60, 75, 90, 120	25, 40	25, 40, 50, 60, 75, 90, 120	25, 40, 55
yes	yes	yes	yes
GTS	GTD	GTT	GTZ
GTS	GTD	GTT	GTZ
GTS	GTD		GTZ
GTS			GTZ
		GTT	
		GTT	
GTS	GTD		GTZ
		GTT	
GTS (≥ 50A)	GTD	GTT	GTZ (in Vac)
GTS (≥ 50A)	GTD		GTZ
GTS	GTD	GTT	GTZ
GTS		GTT	GTZ
GTS			GTZ
40A/480V: 100KA by using a proper fuse			

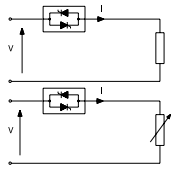
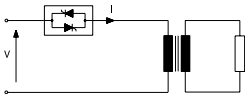
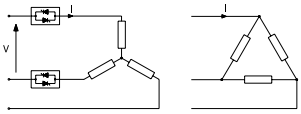
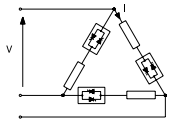
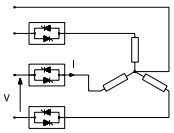
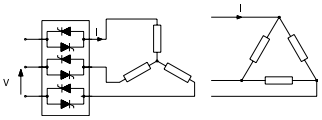
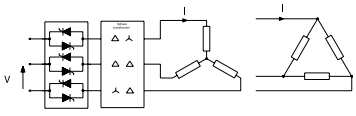
GUIDE TO SELECTION BY FUNCTION

		POWER CONTROLLERS			
	SERIE	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
RATINGS	*Nominal rated voltage (Vac)*	480V	480V	480Vac	480Vac
	Nominal rated current (A)	25,40,60,75,90,120	5,10,15	16, 32, 40	16, 32, 40
INTEGRATED HEAT-SINK	*Integrated heat-sink with DIN bar attachment*	yes	yes	yes	yes
LOAD TYPE	*Heating elements with low thermal coefficient*	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	Long-wave IR lamps	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	Medium-wave IR lamps				GFX4-IR
	Short-wave IR lamps				GFX4-IR
	Heating elements with high thermal coefficient: (Kanthal, Super Kanthal, silicon carbide)				GFX4-IR
	Single-phase Transformers				GFX4-IR
	Three-phase Transformers				GFX4-IR
INPUT CONTROL	*Digital ON/OFF Vdc*			GFX4	GFX4-IR
	Digital ON/OFF Vac				
	Digital PWM				
	Analog 0-10V, 4-20mA			GFX4 (4-20mA)	GFX4-IR (4-20mA)
	Analog, potentiometer				
	Seriale Modbus RTU	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	Fieldbus	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
FIRING MODE	*Zero crossing, ON/OFF (ZC)*	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	Rapid zero crossing "Burst firing" (BF)				GFX4-IR
	Optimized rapid Zero crossing (HSC)				GFX4-IR
	Phase angle (PA)				GFX4-IR
	Delay triggering (DT)				GFX4-IR
OPTIONS	*Soft Start*	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	Current limit				GFX4-IR
	Load interrupt alarm	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	Short circuit alarm			GFX4	GFX4-IR
	Overtemperature alarm	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	Integrated high-speed fuse		GFX-M/S-2	GFX4	GFX4-IR
	Overcurrent fault protection (Xtra) (*)				
	On-board temperature PID	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	Analog retransmission V, I, P				
FEED-BACK FUNCTIONS	*Voltage Feedback (V, V^2)*				GFX4-IR
	Current Feedback (I, I^2)				GFX4-IR
	Power Feedback				GFX4-IR
FIELDBUS	*Profibus DP*	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	CanOpen	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	DeviceNet	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	Modbus TCP/RTU	GFX-M/S/E-1	(Modbus RTU)	GFX4	GFX4-IR
	Ethernet/ IP			GFX4	GFX4-IR
	EtherCAT			GFX4	GFX4-IR
	Profinet			GFX4	GFX4-IR
CONFIGURATION	*Configuration from PC*	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	Easy "Smart Configuration" configuration				GFX4-IR
	Programming by hand-held keyboard	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
CERTIFICATIONS	*CE*	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	UL	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	TÜV				
	CSA			GFX4	GFX4-IR
	EAC	GFX-M/S/E-1	GFX-M/S-2	GFX4	GFX4-IR
	SCCR (Short Circuit Current Rating)			40A/480: 100KA by using a proper fuse	

(*) European Patent N° 2660843

POWER CONTROLLERS				
IR24/IR12	**GTF**	**GTF-XTRA**	**GFW**	**GFW-XTRA**
480Vac	480Vac, 600Vac, 690Vac	480Vac	480Vac, 600Vac, 690Vac	480Vac
9A/ch	25, 40, 50, 60, 75, 90, 120 150, 200, 250	25, 40, 50, 60	40, 60, 100, 150, 200, 250, 400, 500, 600	40, 60, 100
yes (panel attachment)	yes	yes	yes (panel attachment)	yes (panel attachment)
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
	GTF	GTF-Xtra	GFW	GFW-Xtra
	GTF	GTF-Xtra	GFW	GFW-Xtra
			GFW	GFW-Xtra
	GTF	GTF-Xtra	GFW	GFW-Xtra
	GTF	GTF-Xtra	GFW	GFW-Xtra
	GTF	GTF-Xtra	GFW	GFW-Xtra
	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12			GFW	GFW-Xtra
	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF (I >= 150A)		GFW	
		GTF-Xtra		GFW-Xtra
			GFW	GFW-Xtra
			GFW (400/600A)	
(V)	GTF	GTF-Xtra	GFW	GFW-Xtra
	GTF	GTF-Xtra	GFW	GFW-Xtra
	GTF	GTF-Xtra	GFW	GFW-Xtra
			GFW	GFW-Xtra
			GFW	GFW-Xtra
(Modbus RTU)	(Modbus RTU)	(Modbus RTU)	GFW	GFW-Xtra
			GFW	GFW-Xtra
			GFW	GFW-Xtra
IR24/12			GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
			GFW	GFW-Xtra
			GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
IR24/12	GTF	GTF-Xtra	GFW	GFW-Xtra
	GTF	GTF-Xtra		
	GTF	GTF-Xtra	GFW (Up to 250A)	GFW-Xtra
	UL 508 100KA (200A; 250A)		UL 508 100KA (100A; 200A; 250A)	

GUIDE TO SELECTION BY CONNECTION / LOAD TYPE

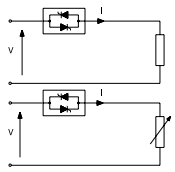
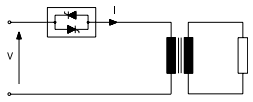
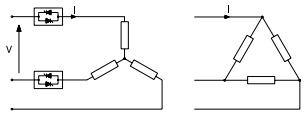
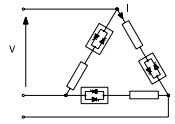
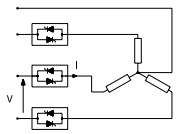
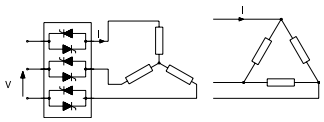
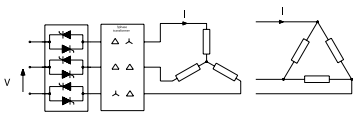
Wiring	Load Typology	Series					
		GQ	GS GTS	GD GTD	GT GTT	GZ GTZ	GFX-M/S/E-1
		15...90A	15...120A	25...40A	15...120A	10...55A	
SINGLE PHASE	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**						
	Wire resistance	1x	1x	1x	1x	*n.a.*	1x
	Infrared Long wave	1x	1x	1x	1x	*n.a.*	1x
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT						
	Infrared Lamps Medium Wave	*n.a.*					
	Infrared Lamps Short Wave	*n.a.*					
	Kanthal, Super Kanthal heaters	*n.a.*					
	Silicon Carbide heaters	*n.a.*					
SINGLE PHASE TRANSFORMER	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**						
	Wire resistance	*n.a.*					
	Infrared Long wave	*n.a.*					
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT						
	Infrared Lamps Medium Wave	*n.a.*					
	Infrared Lamps Short Wave	*n.a.*					
	Kanthal, Super Kanthal heaters	*n.a.*					
	Silicon Carbide heaters	*n.a.*					
BI-PHASE (Closed Delta/ star without neutral)	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**						
	Wire resistance	2x	2x		1M 1S	*n.a.*	
	Infrared Long wave	2x	2x		1M 1S	*n.a.*	
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT						
	Infrared Lamps Medium Wave	*n.a.*					
	Infrared Lamps Short Wave	*n.a.*					
	Kanthal, Super Kanthal heaters	*n.a.*					
	Silicon Carbide heaters	*n.a.*					
THREE-PHASE - OPEN DELTA	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**						
	Wire resistance	3x	3x	3x	3x	1x	*n.a.*
	Infrared Long wave	3x	3x	3x	3x	1x	*n.a.*
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT						
	Infrared Lamps Medium Wave	*n.a.*					
	Infrared Lamps Short Wave	*n.a.*					
	Kanthal, Super Kanthal heaters	*n.a.*					
	Silicon Carbide heaters	*n.a.*					
THREE-PHASE - STAR WITH NEUTRAL	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**						
	Wire resistance	3x	3x	3x	3x	1x	3X
	Infrared Long wave	3x	3x	3x	3x	1x	3X
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT						
	Infrared Lamps Medium Wave	*n.a.*					
	Infrared Lamps Short Wave	*n.a.*					
	Kanthal, Super Kanthal heaters	*n.a.*					
	Silicon Carbide heaters	*n.a.*					
TRI-PHASE (Closed delta/star without neutral)	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**						
	Wire resistance	3x	3x	n.a.	1M 2S	1x	n.a.
	Infrared Long wave	3x	3x	n.a.	1M 2S	1x	n.a.
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT						
	Infrared Lamps Medium Wave	*n.a.*					
	Infrared Lamps Short Wave	*n.a.*					
	Kanthal, Super Kanthal heaters	*n.a.*					
	Silicon Carbide heaters	*n.a.*					
THREE-PHASE TRANSFORMER (**)	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**						
	Wire resistance	*n.a.*					
	Infrared Long wave	*n.a.*					
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT						
	Infrared Lamps Medium Wave	*n.a.*					
	Infrared Lamps Short Wave	*n.a.*					
	Kanthal, Super Kanthal heaters	*n.a.*					
	Silicon Carbide heaters	*n.a.*					

x = (1pcs) *n.a. = not available*

Series				Firing Mode suggested					Function suggested					Nominal Current Dimensioning (*)	Notes
GFX-M/S-2	GFX4	GFX4-IR	IR24/IR12	ZC	BF	HSC	PA	DT	Soft Start	Current Limit	Feedback (I)	Feedback (V)	Feedback (P)	P= total max power I= current value to select the size of the product	pw= power % provided to the load
	16, 32, 40A	16, 32, 40A													
1x	1/4x	1/4x	1/24X-1/12X	x	x									I=P/Vline	
1x	1/4x	1/4x	1/24X-1/12X	x	x									I=P/Vline	
n.a.		1/4x	1/24X-1/12X			x	x		x	x				I=P/Vline	
n.a.		1/4x	1/24X-1/12X			x	x		x	x		x	x	I=P/Vline	
n.a.		1/4x					x		x		x			I=P/Vline	
n.a.		1/4x				x	x		x				x	I=P/Vline	
n.a.		1/4x		x	*n.a.*			x						I= 1,2 (P+10%)/ Vline	
n.a.		1/4x		x	*n.a.*			x						I= 1,2 (P+10%)/ Vline	
n.a.		1/4x			*n.a.*		x		x	x				I= 1,2 (P+10%)/ Vline	
n.a.		1/4x			*n.a.*		x		x	x		x	x	I= 1,2 (P+10%)/ Vline	
n.a.		1/4x			*n.a.*		x		x		x			I= 1,2 (P+10%)/ Vline	
n.a.		1/4x			*n.a.*		x		x				x	I= 1,2 (P+10%)/ Vline	
n.a.	2/4x	*n.a.*		x	x	*n.a.*								I= P/ (√3 Vline)	
n.a.	2/4x	*n.a.*		x	x	*n.a.*								I= P/ (√3 Vline)	
n.a.				*n.a.*					*n.a.*				*n.a.*	*n.a.*	
n.a.				*n.a.*					*n.a.*				*n.a.*	*n.a.*	
n.a.				*n.a.*					*n.a.*				*n.a.*	*n.a.*	
n.a.				*n.a.*					*n.a.*				*n.a.*	*n.a.*	
n.a.	3/4x	3/4x		x	x									I= P/ (3 Vline)	
n.a.	3/4x	3/4x		x	x									I= P/ (3 Vline)	
n.a.		3/4x				x	x		x	x				I= P/ (3 Vline)	
n.a.		3/4x				x	x		x	x		x	x	I= P/ (3 Vline)	
n.a.		3/4x					x		x		x			I= P/ (3 Vline)	
n.a.		3/4x				x	x		x				x	I= P/ (3 Vline)	
3X	3/4x	3/4x	1/8X-1/4X	x	x									I= P/ (√3 Vline)	
3X	3/4x	3/4x	1/8X-1/4X	x	x									I= P/ (√3 Vline)	
n.a.		3/4x	1/8X-1/4X			x	x		x	x				I= P/ (√3 Vline)	
n.a.		3/4x	1/8X-1/4X			x	x		x	x		x	x	I= P/ (√3 Vline)	
n.a.		3/4x					x		x		x			I= P/ (√3 Vline)	
n.a.		3/4x				x	x		x				x	I= P/ (√3 Vline)	
n.a.	3/4x	3/4x		x	x	*n.a.*								I= P/ (√3 Vline)	
n.a.	3/4x	3/4x		x	x	*n.a.*								I= P/ (√3 Vline)	
n.a.		3/4x				*n.a.*	x		x	x				I= P/ (√3 Vline)	pw>6%P
n.a.		3/4x				*n.a.*	x		x	x				I= P/ (√3 Vline)	pw>6%P
n.a.		*n.a.*	*n.a.*			*n.a.*				*n.a.*			*n.a.*	*n.a.*	*n.a.*
n.a.		3/4x				*n.a.*	x		x				x	I= P/ (√3 Vline)	pw>6%P
n.a.		3/4x		x	*n.a.*			x						I= 1,2 (P+10%)/ (√3 Vline) (**)	
n.a.		3/4x		x	*n.a.*			x						I= 1,2 (P+10%)/ (√3 Vline) (**)	
n.a.		3/4x			*n.a.*		x		x	x				I= 1,2 (P+10%)/ (√3 Vline) (**)	pw>6%P
n.a.		3/4x			*n.a.*		x		x	x				I= 1,2 (P+10%)/ (√3 Vline) (**)	pw>6%P
n.a.		*n.a.*	*n.a.*			*n.a.*				*n.a.*			*n.a.*	*n.a.*	*n.a.*
n.a.		3/4x				*n.a.*	x		x				x	I= 1,2 (P+10%)/ (√3 Vline) (**)	pw>6%P

(*) It is always suggested to add a margin of at least 10% to the calculation of the current value
Valid formulas for Vline=Vload
(**) For these applications it is recommanded to contact the Gefran specialists

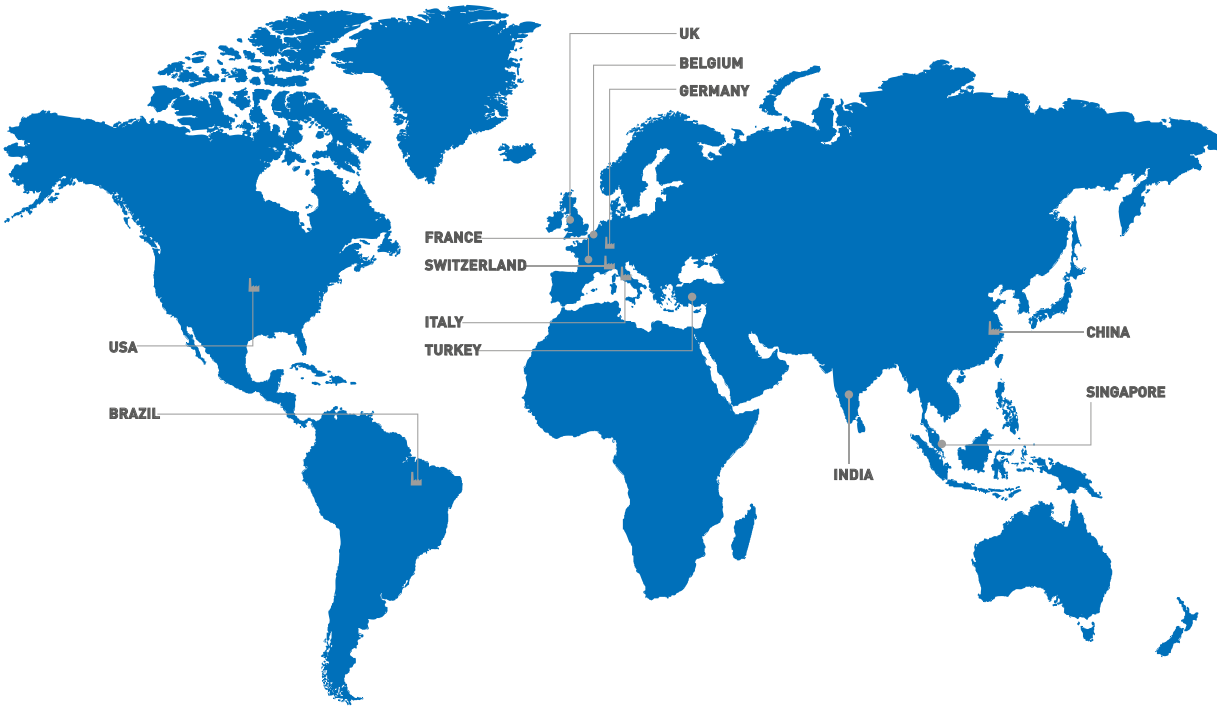
GUIDE TO SELECTION BY CONNECTION / LOAD TYPE

Wiring	Load Typology	Series			
		GTF	GTF-XTRA	GFW	GFW-XTRA
		25...250A	25...60A	40...600A	40...100A
SINGLE PHASE	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**				
	Wire resistance	1M	1M	1M	1M
	Infrared Long wave	1M	1M	1M	1M
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT				
	Infrared Lamps Medium Wave	1M	1M	1M	1M
	Infrared Lamps Short Wave	1M	1M	1M	1M
	Kanthal, Super Kanthal heaters	1M	1M	1M	1M
	Silicon Carbide heaters	1M	1M	1M	1M
SINGLE PHASE TRANSFORMER	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**				
	Wire resistance	1M	1M (**)	1M	1M (**)
	Infrared Long wave	1M	1M (**)	1M	1M (**)
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT				
	Infrared Lamps Medium Wave	1M	1M (**)	1M	1M (**)
	Infrared Lamps Short Wave	1M	1M (**)	1M	1M (**)
	Kanthal, Super Kanthal heaters	1M	1M (**)	1M	1M (**)
	Silicon Carbide heaters	1M	1M (**)	1M	1M (**)
BI-PHASE	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**				
(Closed Delta/ star without neutral)	Wire resistance	1M 1S	1M 1S	2PH	2PH
	Infrared Long wave	1M 1S	1M 1S	2PH	2PH
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT				
	Infrared Lamps Medium Wave	*n.a.*			
	Infrared Lamps Short Wave	*n.a.*			
	Kanthal, Super Kanthal heaters	*n.a.*			
	Silicon Carbide heaters	*n.a.*			
THREE-PHASE - OPEN DELTA	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**				
	Wire resistance	1M 2S	1M 2S	3PH	3PH
	Infrared Long wave	1M 2S	1M 2S	3PH	3PH
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT				
	Infrared Lamps Medium Wave	3M	3M	3PH	3PH
	Infrared Lamps Short Wave	3M	3M	3PH	3PH
	Kanthal, Super Kanthal heaters	3M	3M	3PH	3PH
	Silicon Carbide heaters	3M	3M	3PH	3PH
THREE-PHASE - STAR WITH NEUTRAL	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**				
	Wire resistance	1M 2S	1M 2S	3PH	3PH
	Infrared Long wave	1M 2S	1M 2S	3PH	3PH
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT				
	Infrared Lamps Medium Wave	3M	3M	3PH	3PH
	Infrared Lamps Short Wave	3M	3M	3PH	3PH
	Kanthal, Super Kanthal heaters	3M	3M	3PH	3PH
	Silicon Carbide heaters	3M	3M	3PH	3PH
TRI-PHASE	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**				
(Closed delta/star without neutral)	Wire resistance	1M 2S	1M 2S	3PH	3PH
	Infrared Long wave	1M 2S	1M 2S	3PH	3PH
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT				
	Infrared Lamps Medium Wave			3PH	3PH
	Infrared Lamps Short Wave			3PH	3PH
	Kanthal, Super Kanthal heaters	*n.a.*			
	Silicon Carbide heaters			3PH	3PH
THREE-PHASE TRANSFORMER	**HEATING ELEMENTS WITH LOW THERMAL COEFFICIENT**				
	Wire resistance			3PH (**)	3PH (**)
	Infrared Long wave			3PH (**)	3PH (**)
	HEATING ELEMENTS WITH HIGH THERMAL COEFFICIENT				
	Infrared Lamps Medium Wave			3PH (**)	3PH (**)
	Infrared Lamps Short Wave			3PH (**)	3PH (**)
	Kanthal, Super Kanthal heaters	*n.a.*			
	Silicon Carbide heaters			3PH (**)	3PH (**)

x = (1pcs) *n.a. = not available*

Firing Mode suggested					Function suggested					Nominal Current Dimensioning (*)	Notes
ZC	BF	HSC	PA	DT	Soft Start	Current Limit	Feedback (I)	Feedback (V)	Feedback (P)	P= total max power I= current value to select the size of the product	pw = power % provided to the load
x	x									I=P/Vline	
x	x									I=P/Vline	
		x	x		x	x				I=P/Vline	
		x	x		x	x				I=P/Vline	
			x		x		x			I=P/Vline	
		x	x		x				x	I=P/Vline	
x	*n.a.*		x							I= 1,2 (P+10%)/ Vline	
x	*n.a.*		x							I= 1,2 (P+10%)/ Vline	
	n.a.	x			x	x				I= 1,2 (P+10%)/ Vline	
	n.a.	x			x	x				I= 1,2 (P+10%)/ Vline	
	n.a.	x			x		x			I= 1,2 (P+10%)/ Vline	
	n.a.	x			x				x	I= 1,2 (P+10%)/ Vline	
x	x	*n.a.*								I= P/ (√3 Vline)	
x	x	*n.a.*								I= P/ (√3 Vline)	
n.a.					*n.a.*				*n.a.*	*n.a.*	
n.a.					*n.a.*				*n.a.*	*n.a.*	
n.a.					*n.a.*				*n.a.*	*n.a.*	
n.a.					*n.a.*				*n.a.*	*n.a.*	
x	x									I= P/ (3 Vline)	
x	x									I= P/ (3 Vline)	
		x	x		x	x				I= P/ (3 Vline)	
		x	x		x	x				I= P/ (3 Vline)	
			x		x		x			I= P/ (3 Vline)	
		x	x		x				x	I= P/ (3 Vline)	
x	x									I= P/ (√3 Vline)	
x	x									I= P/ (√3 Vline)	
		x	x		x	x				I= P/ (√3 Vline)	
		x	x		x	x				I= P/ (√3 Vline)	
			x		x		x			I= P/ (√3 Vline)	
		x	x		x				x	I= P/ (√3 Vline)	
x	x	*n.a.*								I= P/ (√3 Vline)	
x	x	*n.a.*								I= P/ (√3 Vline)	
		n.a.	x		x	x				I= P/ (√3 Vline)	pw>6%P
		n.a.	x		x	x				I= P/ (√3 Vline)	pw>6%P
n.a.					*n.a.*				*n.a.*	*n.a.*	*n.a.*
		n.a.	x		x				x	I= P/ (√3 Vline)	pw>6%P
x	*n.a.*		x							I= 1,2 (P+10%)/ (√3 Vline) (**)	
x	*n.a.*		x							I= 1,2 (P+10%)/ (√3 Vline) (**)	
	n.a.	x			x	x				I= 1,2 (P+10%)/ (√3 Vline) (**)	pw>6%P
	n.a.	x			x	x				I= 1,2 (P+10%)/ (√3 Vline) (**)	pw>6%P
n.a.					*n.a.*				*n.a.*	*n.a.*	*n.a.*
	n.a.	x			x				x	I= 1,2 (P+10%)/ (√3 Vline) (**)	pw>6%P

(*) It is always suggested to add a margin of at least 10% to the calculation of the current value
Valid formulas for Vline=Vload
(**) For these applications it is recommanded to contact the Gefran specialists



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