

### MAIN APPLICATIONS

- Extrusion, injection, blow moulding,
- thermoforming of plastics
- Synthetic fibre production and polymerisation
- Packing and packaging
- Chemical and pharmaceutical industry
- Industrial furnaces for heat treatments, metallurgy
- Fusion, sinterization, nitration furnaces
- Furnaces for ceramics and precious metals
- Dryers
- Heating systems with infrared lamps (long-, medium-, short-wave)
- Wood edge banding Machines
- Plastic-blowing Machines
- Welding applications on Packaging Machinery
- Thermoforming Machines
- Furnaces with Super Kanthal™ Silicon carbide heating elements



### MAIN FEATURES

- Ultra-compact dimensions from 10A to 120A
- Load voltage 480V, 600V AC
- DIN rail and panel mounting
- IO-Link and Modbus RTU digital communication
- Current limiting
- Feedback  $V, I, V^2, I^2, P, Z$
- Control output for Slave (2PH, 3PH)
- Opzione ad elevata accuratezza di controllo
- Zero voltage crossing (ZeroCrossing) or Phase angle control
- On/Off control, optimised/fixed cycle time, HalfSingleCycle, PhaseAngle, softstart ramps
- Input command, Analogue signal (0..5V, 0..10V, 0..20mA, 4..20mA, potentiometer), PWM or IO-Link logic
- Signal LED
- Configuration and diagnostics via smartphone app with NFC technology
- Calibration and alarm reset commands via DI
- 2 outputs : PNP and dry contact, completely configurable
- Cage clamps for power cables
- Advanced load diagnostics
- Internal over voltage protection
- Integrated cooling fan power option

### PROFILE

Power control of complex loads needs special precautions. This is for example the case with infrared lamps, or Silicon Carbide heating elements. These kind of electrical loads have not to a constant current absorption during the work phases. This means that at startup when cold, you could have currents up to 15 times higher than the rated current of the load. To avoid that these phenomena cause breakdowns or downtime, the GRM continuously monitors the absorption current and with special algorithms it limits it up to achievement of optimal conditions. The GRM is able to guarantee a stable supply of the energy to the load by compensating for fluctuations of the voltage on the electricity grid, due to variations in the temperature of the loads and the aging of the heating elements. Thanks to the feedback algorithms (feedback in  $V^2, I^2$  and  $P$ ) is always delivered same amount of energy. The range of ultra-compact power controllers GRM-H meets all these needs, with sizes of current from 10 to 120 Ampere, voltages up to 600Vac.

The range of solid state contactors with heatsink GRM-H meets all these needs, with current ratings from 10 to 120 Ampere, voltages up to 600Vac, in extremely compact dimensions in every single size. The thermal design of all models guarantees the continuous supply of the rated current at an ambient temperature of 40°C / 104°F through high efficiency heat sinks, assisted by fans for the 90A and 120A models. The derating curves show how higher current values can also be obtained for lower temperatures as well as the possibility of mounting various devices stacked on the DIN rail.

### CONFIGURATION AND DIAGNOSTICS

For the configuration of the GRM-H series devices, an App is available for smartphones with Android and iOS operating systems, which can be downloaded free of charge from the relative stores. The App interfaces to the device via contactless NFC (Near Field Communication) technology via a small NFC Dongle (which can be ordered as part of the device or as an accessory). It is also possible to read diagnostic data on the operation of the load and the device (energy meters, current peaks or over-temperatures), duplicate or share the configurations of multiple devices through this interface.

**The IO-Link interface guarantees efficient communication, capable of powering, configuring, monitoring and controlling the device, via only 3 wires,** complete and simple device configuration is possible with IODD files.

The devices can also be configured using a special cable via PC and the GF\_eXpress configuration tool.

Alternatively, basic device configuration is made available by means of a button and LED on the front.

The current thresholds for partial load break alarms can be adjusted by means of a front key or digital input, so that multiple objects can be configured at the same time with the electrical panel closed.

## CONTROL

The GRM-H series can be controlled in different ways based on the options chosen:

- Command signal configurable as 0..5V, 0..10V, 0..20mA, 4..20mA, potentiometer and PWM, for proportional commands (Burstfiring, FixedCycleTime, HalfSingleCycle, PhaseAngle).

- Control via the IO-Link point-to-point communication protocol for comprehensive process diagnostics.

- Control and diagnostics via the Modbus RTU RS485 communication protocol, with MR option (compatible with analog input model).

All commands are managed via push-in connectors, for faster and easier connection, even without tools.

The device status is always displayed by a multi-colour LED on the front panel, for an immediate view of its operation. In the event of an error in the command signal, a fault power can be programmed which the device will maintain until the signal is restored.

## POWER CONNECTIONS

Both the line voltage terminal available on the upper part of the device and the load terminal on the lower part are of the "cage" type, which offers the best and safest seal even for cables of different cross-sections, whether mounted with a cable lug or simply stripped.

## DIAGNOSTICS AND ALARMS

It is increasingly vital for operators and maintainers to recognize possible anomalies in the system immediately and solve them quickly in order to ensure the efficiency and profitability of machinery and plants. The GRM-H series offers complete availability of load information.

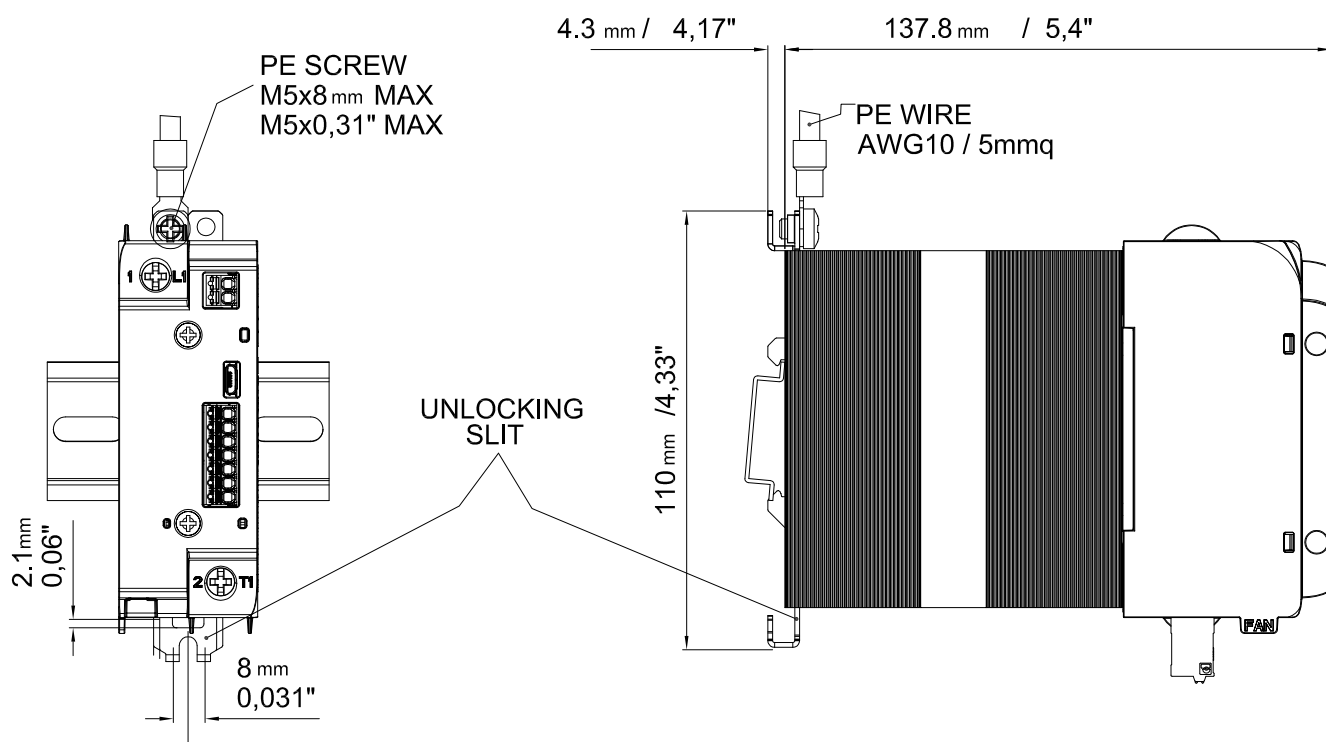
There are 3 physical outputs, two are PNP type and one voltage-free normally open contact.

The outputs can be configured and associated with different alarm states: partial or total breakages of the load, lack of voltage on the load, faults on the line, over temperature.

The thermal alarm is triggered if heat dissipation exceeds a critical threshold, signalling it with a red led on the front panel, interrupting the power supply and triggering the alarm output.

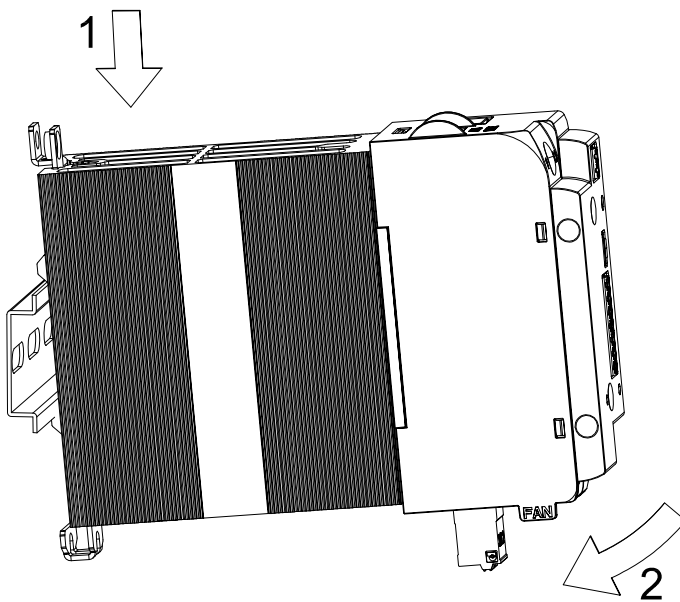
This function is always present, on all current sizes.

## DIN RAIL FIXING

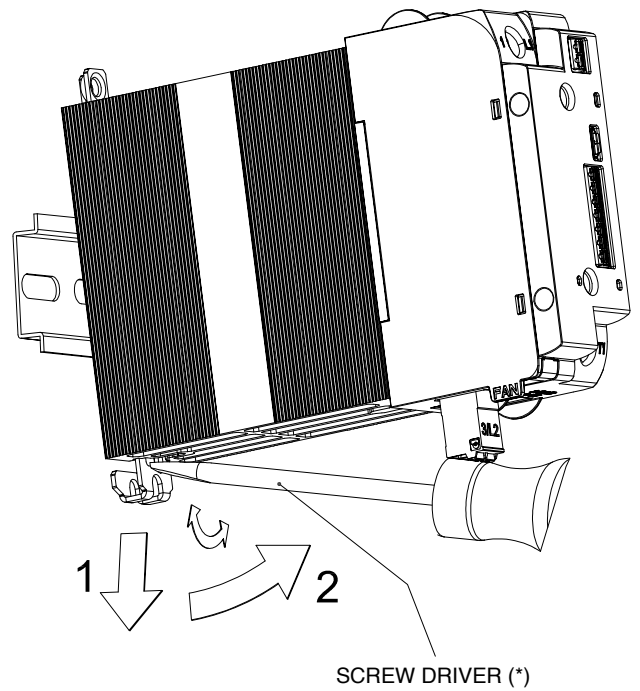


## DIN RAIL FIXING

DIN rail coupling sequence

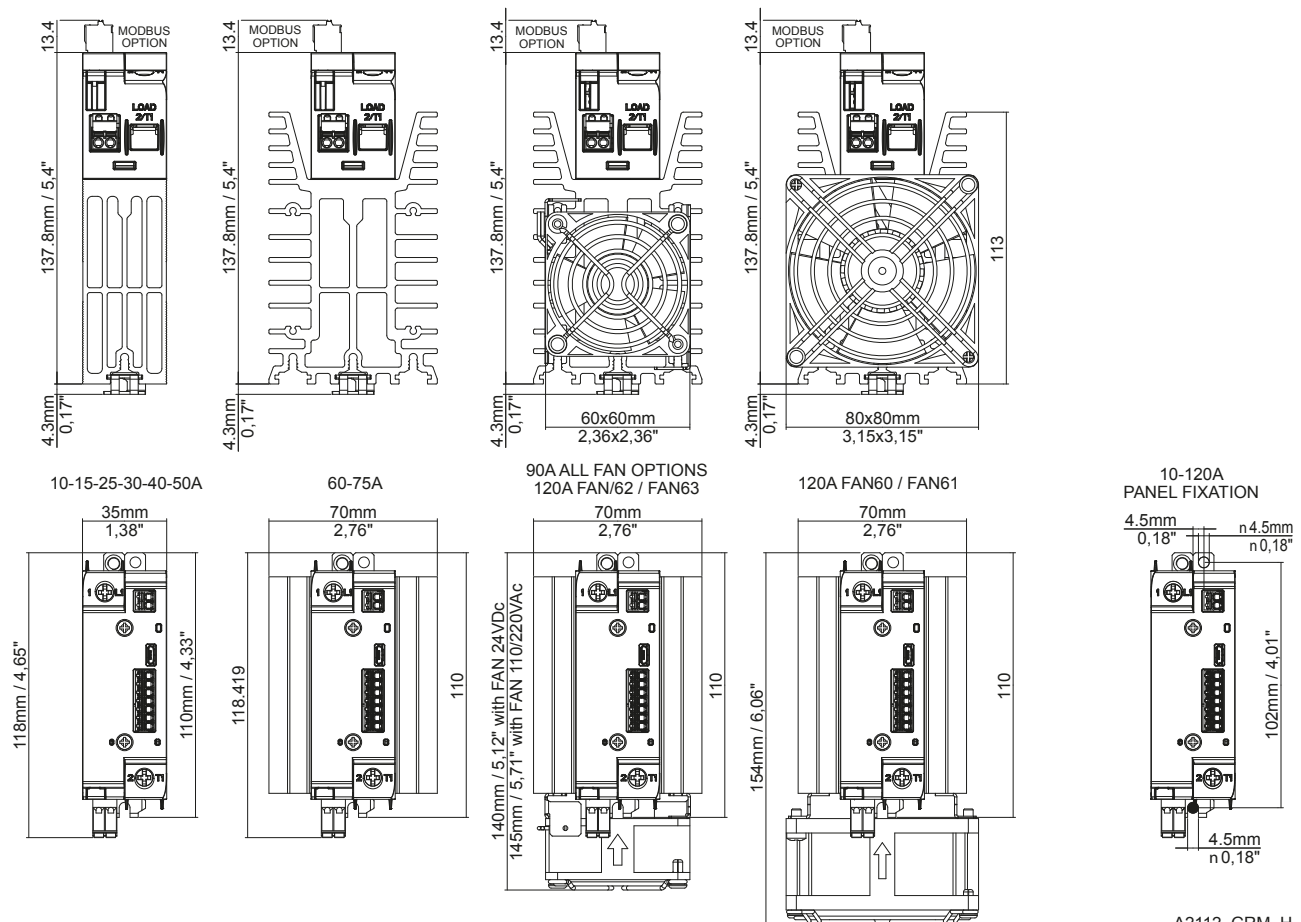


DIN rail release sequence



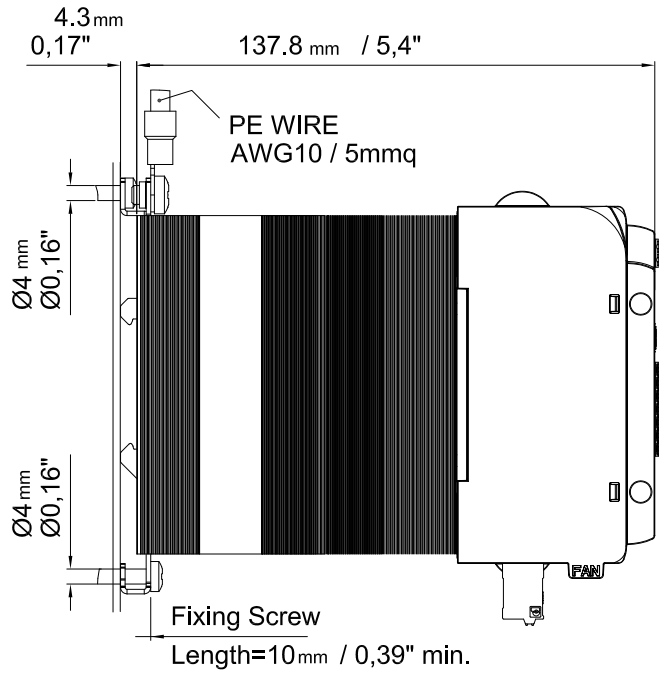
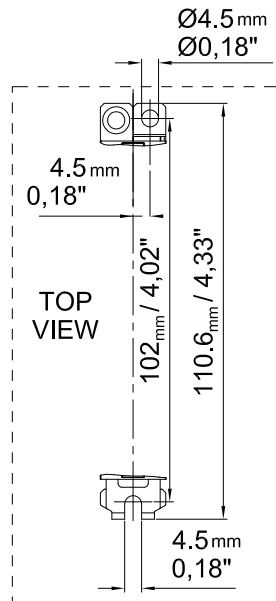
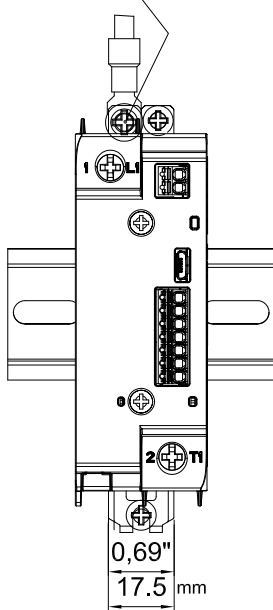
(\*) Use of a slotted screwdriver with a max. diameter of 6mm is recommended

## DIMENSIONS AND MOUNTING MEASUREMENTS



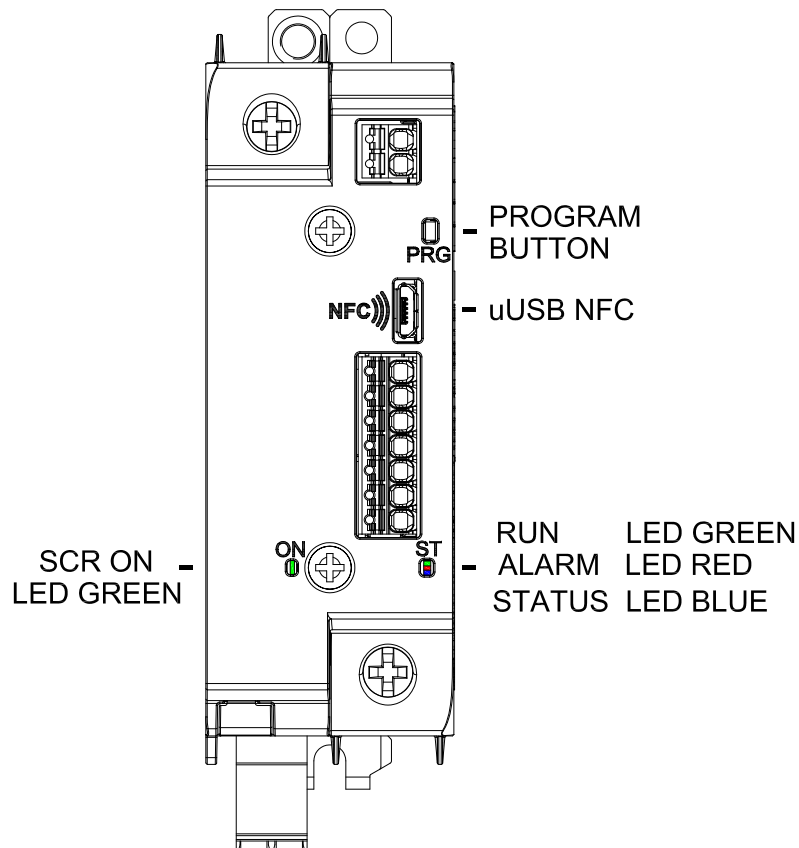
## PANEL FIXING

PE SCREW  
M5x8 mm MAX  
M5x0,31" MAX



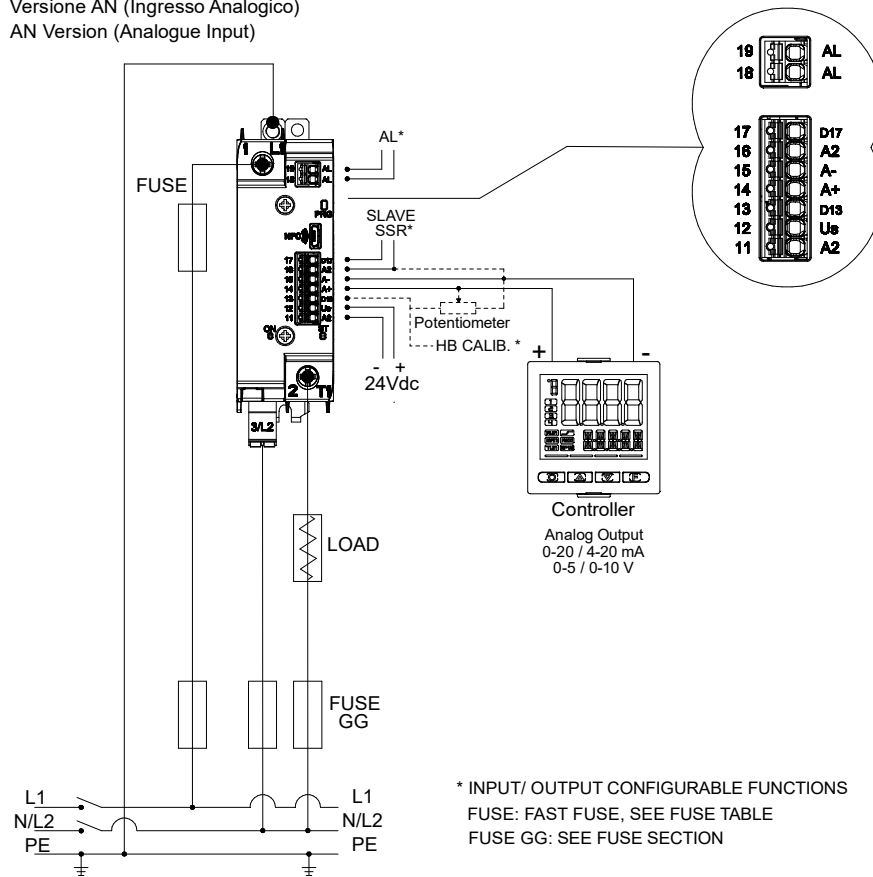
## FRONT VIEW

### GRM-H 10-120A



## VERSION WITH ANALOGUE INPUT

Versione AN (Ingresso Analogico)  
AN Version (Analogue Input)

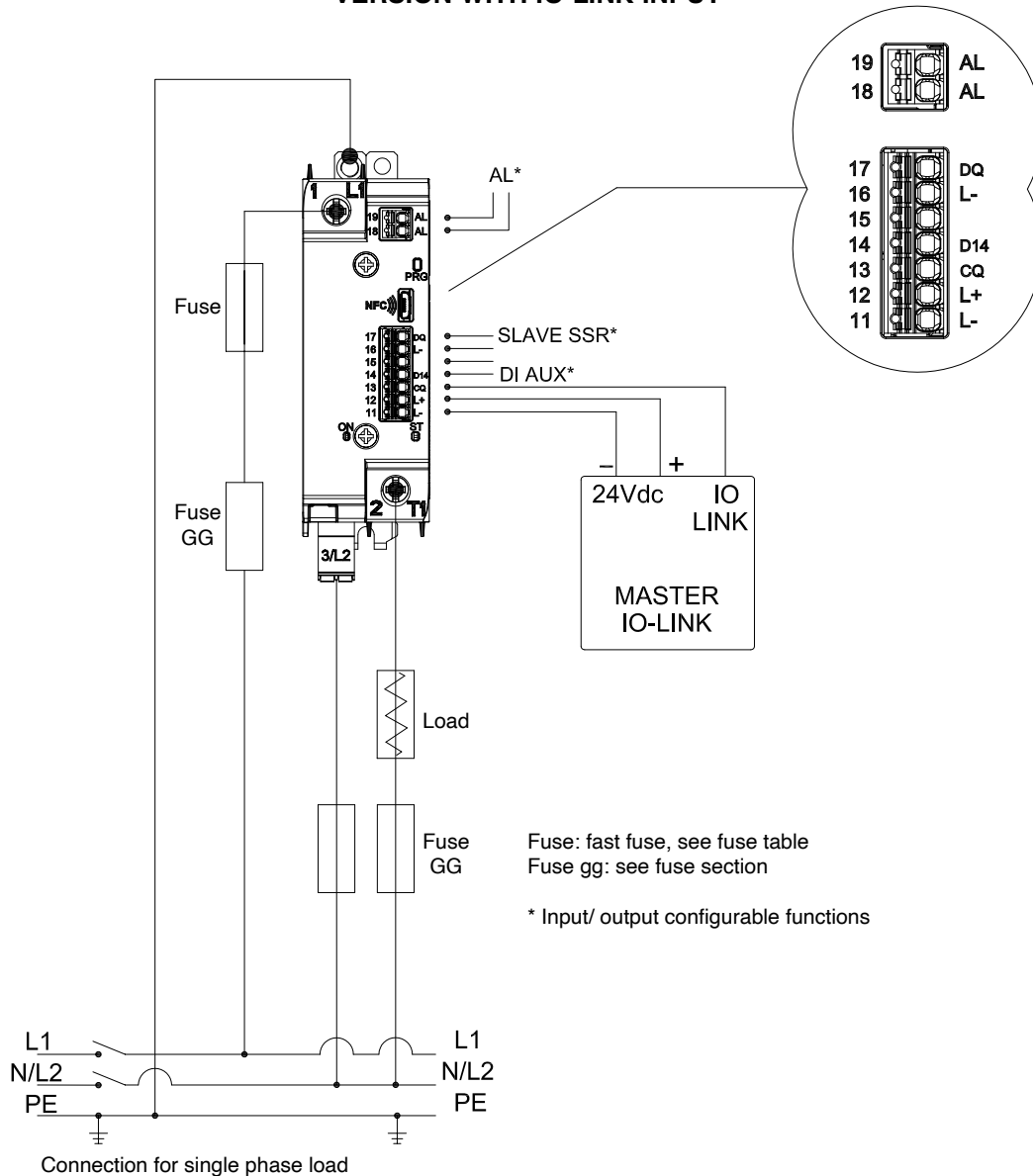


\* INPUT/ OUTPUT CONFIGURABLE FUNCTIONS  
FUSE: FAST FUSE, SEE FUSE TABLE  
FUSE GG: SEE FUSE SECTION

COLLEGAMENTO PER CARICO MONOFASE  
CONNECTION FOR SINGLE PHASE LOAD

| Power terminals                                               |                                                                                            |                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rif.                                                          | Description                                                                                | Note                                                                                                                                                                                                                                                                  |
| 1/L1                                                          | Line Connection                                                                            |                                                                                                                                                                                                                                                                       |
| 2/T1                                                          | Load Connection                                                                            |                                                                                                                                                                                                                                                                       |
| 3/L2                                                          | Line voltage reference connection                                                          |                                                                                                                                                                                                                                                                       |
| Power supply and AN version signal connector (analogue input) |                                                                                            |                                                                                                                                                                                                                                                                       |
| 11/A2-                                                        | GND (-) with 24Vdc power supply                                                            |                                                                                                                                                                                                                                                                       |
| 12/Us                                                         | Signal (+) with 24Vdc power supply                                                         | GRM-H power supply:<br>Range 12 - 30 Vdc, I <sub>max</sub> 20mA @ 24Vdc<br>With option FAN63 (Only 90/120A):<br>Range 20 - 27 Vdc, I <sub>max</sub> <150 mA a 24V with running fan                                                                                    |
| 13/D13                                                        | Potentiometer power supply output (+ 5Vdc) / Auxiliary digital input 1 / PWM control input | Potentiometer output voltage: 5V DC, I <sub>out</sub> max = 10mA<br>Digital input: 5-30V max 3 mA<br>PWM control input: 5-30V max 3 mA, Frequency range: (1, ..., 100 Hz), Resolution max 1% (0.1ms)                                                                  |
| 14/A+                                                         | Analogue differential command input                                                        |                                                                                                                                                                                                                                                                       |
| 15/A-                                                         |                                                                                            |                                                                                                                                                                                                                                                                       |
| 16/A2-                                                        | GND alarm output                                                                           | Same as 11/A2- connection                                                                                                                                                                                                                                             |
| 17/D17                                                        | Master-Slave output / Alarm output / Digital input auxiliary 2                             | Master-Slave output:<br>Output voltage: Us - 0.7Vdc, I <sub>out</sub> max = 15mA<br>Alarm output:<br>PNP output normally not active (Configurable as normally active)<br>(Us*1,14) - 0.7Vdc (ver. AA), I <sub>out</sub> max =15mA<br>Digital input:<br>5-30V, max 3mA |
| 18/AL                                                         |                                                                                            | Dry contact N.O.<br>Maximum current: 150mA<br>Maximum voltage = 30 Vdc<br>Closed contact impedance <1 Ω<br>Open contact impedance > 1 MΩ                                                                                                                              |
| 19/AL                                                         | Alarm output                                                                               |                                                                                                                                                                                                                                                                       |

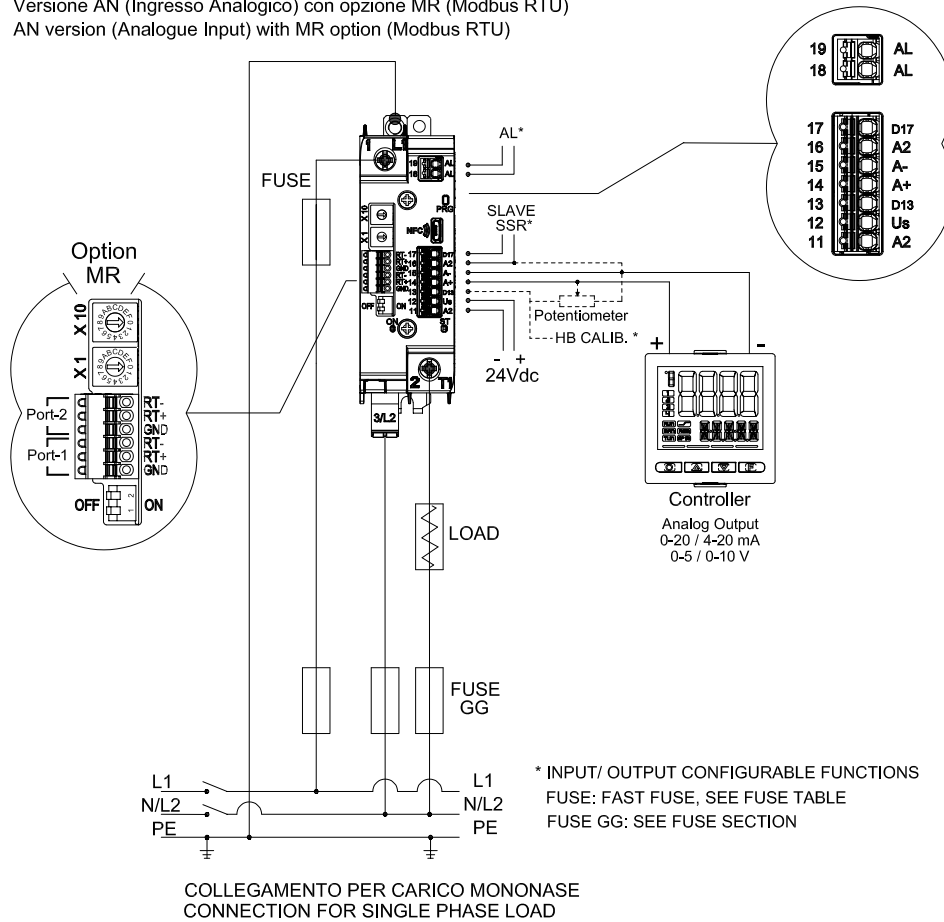
## VERSION WITH IO-LINK INPUT



| Power terminals                      |                                                               |                                                                                                                                                                                                                                                                                        |
|--------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ref.                                 | Description                                                   | Notes                                                                                                                                                                                                                                                                                  |
| 1/L1                                 | Line Connection                                               |                                                                                                                                                                                                                                                                                        |
| 2/T1                                 | Load Connection                                               |                                                                                                                                                                                                                                                                                        |
| 3/L2                                 | Line voltage reference connection                             |                                                                                                                                                                                                                                                                                        |
| I version signal connector (IO-LINK) |                                                               |                                                                                                                                                                                                                                                                                        |
| 11/L-                                | Power GND                                                     |                                                                                                                                                                                                                                                                                        |
| 12/L+                                | + V DC power supply                                           | GRM-H power supply (Range from 10 to 30 V DC, I <sub>max</sub> = 20 mA at 24V)                                                                                                                                                                                                         |
|                                      |                                                               | GRM-H-90/120A-..FAN63: GRM-H + Fan power supply (Range from 20 to 27 V DC, I <sub>max</sub> <150 mA at 24V with Fan active)                                                                                                                                                            |
| 13/CQ                                | IO-LINK communication line                                    |                                                                                                                                                                                                                                                                                        |
| 14/D14                               | Auxiliary digital input 1                                     | Digital input: 5-30Vdc, max 3mA                                                                                                                                                                                                                                                        |
| 16/L-                                | GND alarm output (common to terminal 11/L-)                   |                                                                                                                                                                                                                                                                                        |
| 17/DQ                                | Master-Slave output /Alarm output / Digital input auxiliary 2 | Master-Slave output: Output voltage: U <sub>s</sub> - 0.7Vdc, I <sub>out</sub> max = 15mA<br>Alarm output: PNP output normally not active (Configurable as normally active), output voltage: U <sub>s</sub> – 0.7V DC , I <sub>out</sub> max =15mA<br>Digital input: 18-30Vdc, max 3mA |
| 18/AL                                | Alarm output                                                  | Dry contact N.O.<br>Maximum current: 150mA<br>Maximum voltage = 30 Vdc<br>Closed contact impedance <1 Ω<br>Open contact impedance> 1 MΩ                                                                                                                                                |
| 19/AL                                |                                                               |                                                                                                                                                                                                                                                                                        |

## ANALOG CONTROL WITH MR OPTION (MODBUS RTU)

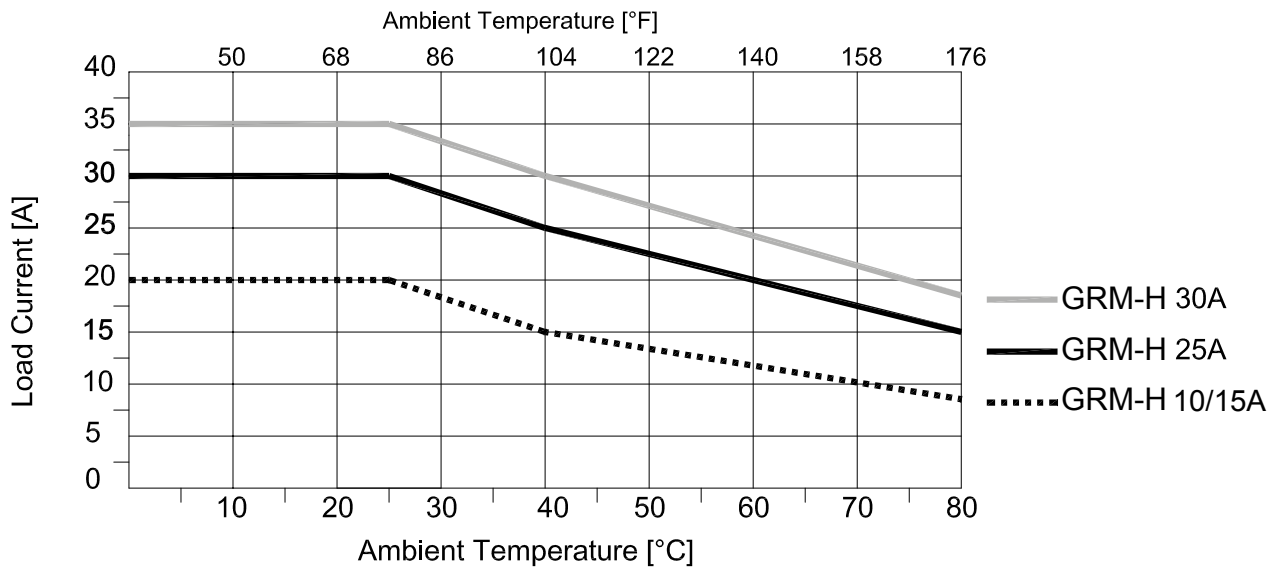
Versione AN (Ingresso Analogico) con opzione MR (Modbus RTU)  
AN version (Analogue Input) with MR option (Modbus RTU)



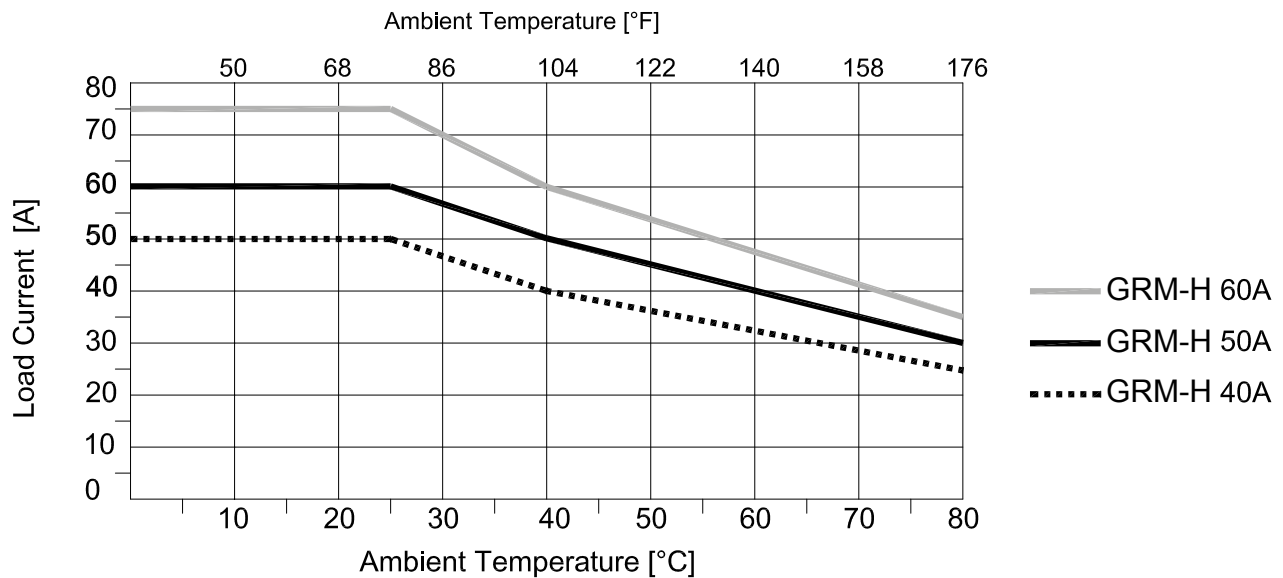
| Power terminals                                                       |                                                                                               |                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ref.                                                                  | Description                                                                                   | Notes                                                                                                                                                                                                                                                                     |
| 1/L1                                                                  | Line Connection                                                                               |                                                                                                                                                                                                                                                                           |
| 2/T1                                                                  | Load Connection                                                                               |                                                                                                                                                                                                                                                                           |
| 3/L2                                                                  | Line voltage reference connection                                                             |                                                                                                                                                                                                                                                                           |
| Power supply and AN version signal connector (Analog Input)           |                                                                                               |                                                                                                                                                                                                                                                                           |
| 11/A2-                                                                | GND (-) with 24Vdc power supply                                                               |                                                                                                                                                                                                                                                                           |
| 12/Us                                                                 | Signal (+) 24Vdc power supply                                                                 | GRM-H power supply with MR option:<br>Range 18 -30 Vdc, I <sub>max</sub> 35mA @ 24Vdc                                                                                                                                                                                     |
| 13/D13                                                                | Potentiometer power supply output (+ 5Vdc) /<br>Auxiliary digital input 1 / PWM control input | Potentiometer output voltage: 5V DC, I <sub>out</sub> max = 10mA<br>Digital input: 5-30V max 3 mA<br>PWM control input: 5-30V max 3 mA, Frequency range: (1, ..., 100 Hz),<br>Resolution max 1% (0.1ms)                                                                   |
| 14/A+<br>15/A-                                                        | Analogue differential command input                                                           |                                                                                                                                                                                                                                                                           |
| 16/A2-                                                                | GND alarm output                                                                              | Same as 11/A2 connection                                                                                                                                                                                                                                                  |
| 17/D17                                                                | Master-Slave output / Alarm output /<br>Digital input auxiliary 2                             | Master-Slave output:<br>Output voltage: Us - 0.7Vdc, I <sub>out</sub> max = 15mA<br>Alarm output:<br>PNP output normally not active (Configurable as normally active)<br>Output voltage:<br>Us – 0.7V DC , I <sub>out</sub> max =15mA<br>Digital input:<br>5-30V, max 3mA |
| 18/AL<br>19/AL                                                        | Alarm output                                                                                  | Dry contact N.O.<br>Maximum current: 150mA<br>Maximum voltage = 30 Vdc<br>Closed contact impedance <1 Ω<br>Open contact impedance> 1 MΩ                                                                                                                                   |
| RS-485 fieldbus signal connector (only with MR option)                |                                                                                               |                                                                                                                                                                                                                                                                           |
| RT-                                                                   | Tx/Rx- (Data transmission B-)                                                                 | Port-1 and Port-2 interconnected for multislave chain connections<br>* GND signal connection between slaves is recommended                                                                                                                                                |
| RT+                                                                   | Tx/Rx+ (Data transmission A+)                                                                 |                                                                                                                                                                                                                                                                           |
| GND *                                                                 | Serial line GND reference signal                                                              |                                                                                                                                                                                                                                                                           |
| Rotary switch Modbus node address configuration (only with MR option) |                                                                                               |                                                                                                                                                                                                                                                                           |
| X10                                                                   | Tens                                                                                          | Node address between 01 to 99                                                                                                                                                                                                                                             |
| X1                                                                    | Unit                                                                                          |                                                                                                                                                                                                                                                                           |
| RS485 termination line configuration (only with MR option)            |                                                                                               |                                                                                                                                                                                                                                                                           |
| OFF                                                                   | Serial line termination not active                                                            | It is recommended to enable the termination for the last device connected to the serial line.<br>ATTENTION: Both switch must be configured in the same position                                                                                                           |
| ON                                                                    | Serial line termination active                                                                |                                                                                                                                                                                                                                                                           |

Rated current curves as a function of ambient temperature (minimum distance between GRM-H of 20mm).

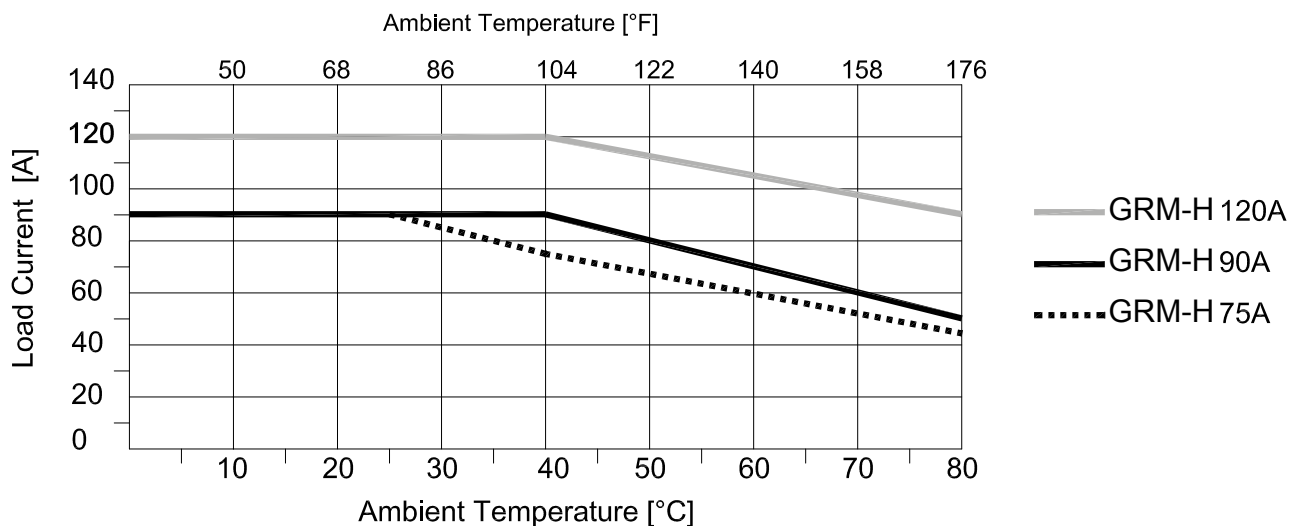
**GRM-H 10 ÷ 30A DERATING CURVES**



**GRM-H 40 ÷ 60A DERATING CURVES**



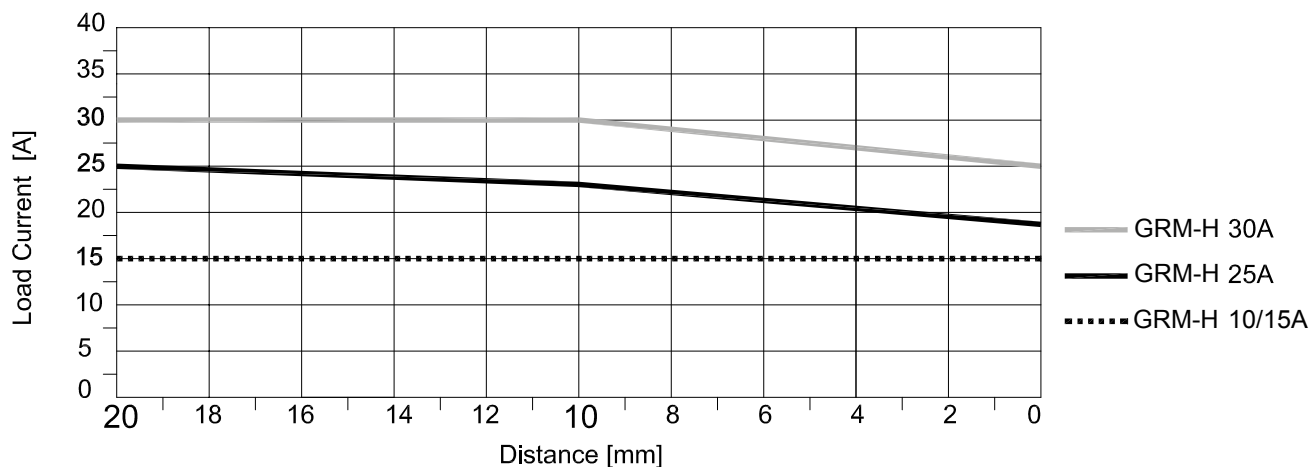
**GRM-H 75 ÷ 120A DERATING CURVES**



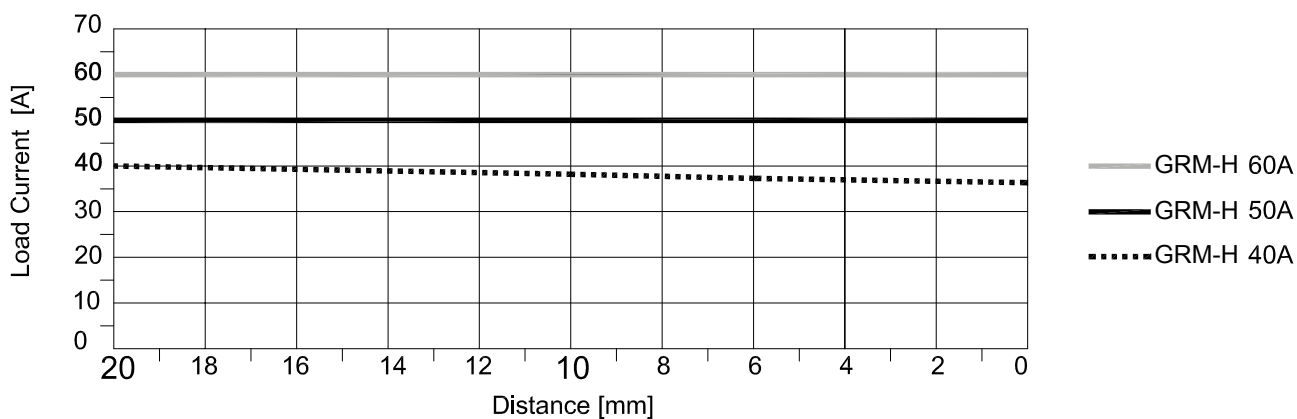
Note: The curves of GRM-H 90/120A refer to the device complete with a working specified fan

Rated current curves as a function of the horizontal distance between the GRM-Hs (ambient temperature 40°C / 104°F).

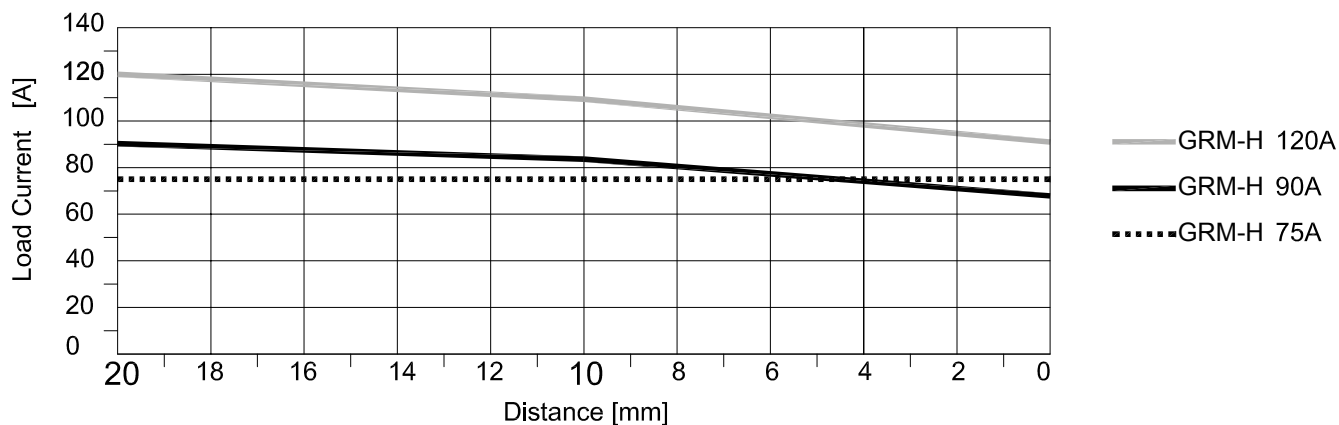
**GRM-H 15 ÷ 30A DERATING CURVES**



**GRM-H 40 ÷ 60A DERATING CURVES**



**GRM-H 75 ÷ 120A DERATING CURVES**



Note: The curves of GRM-H 90/120A refer to the device complete with a working specified fan

## TECHNICAL SPECIFICATIONS

### INPUTS

#### Analogue command input (Versions with AN input type)

|                            |                                                                                                                         |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Function                   | Proportional power control signal                                                                                       |
| Maximum Error              | 1% f.s. $\pm$ 1 scale point at an ambient temperature of 25°C / 77°F                                                    |
| Thermal shift              | <100 ppm/° C on f.s.                                                                                                    |
| Sampling time              | 10 ms                                                                                                                   |
| 0-10V scale                | Input impedance > 500 K $\Omega$                                                                                        |
| 0-5V scales                | Input impedance > 500 K $\Omega$                                                                                        |
| 0-20mA or 4-20mA scale     | Internal Shunt Resistance: 250 $\Omega$                                                                                 |
| Potentiometer input        | Potentiometer resistance: 1 K $\Omega$ at 47 K $\Omega$<br>Potentiometer power supply: + 5V (provided by GRM, max 10mA) |
| Linear input reading scale | 0 ... 100.0 %                                                                                                           |
| Common mode immunity       | -60V, +60V                                                                                                              |

#### IO-LINK input (Versions with input type I)

|          |                                                                                                                                                                          |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function | IO-LINK fieldbus communication line                                                                                                                                      |
| Protocol | IO-LINK<br>Type of transmission: COM2 (38.4 kBaud)<br>IO-Link version: 1.1.2<br>SIO mode: Yes<br>Auxiliary output: Pin 17/ 18-19 Alarm output<br>Auxiliary input: Pin 14 |

#### Line voltage and load current measurement

|                                   |                                                                             |
|-----------------------------------|-----------------------------------------------------------------------------|
| Load current measurement function | Measurement range (full-scale f.s.): 0 ... 1.5 * I <sub>rated_product</sub> |
| RMS current measurement accuracy  | 2% f.s. at room temperature of 25°C / 77°F<br>Thermal shift: <200 ppm/° C   |
| Line voltage measurement function | Working voltage range (full-scale f.s.): 60...660Vac                        |
| RMS voltage measurement accuracy  | 2% f.s. at room temperature of 25°C / 77°F<br>Thermal shift: <100 ppm/° C   |
| Current and voltage sampling time | 10 ms                                                                       |
| Line frequency                    | 50/60 Hz                                                                    |

### Configurable I/O

#### I/O pin 13 configurable (only with Analog version)

|                            |                                                                                                                                                                                 |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function                   | Configurable as digital output or input                                                                                                                                         |
| Output Function            | Configurable alarm output functions (partial / total load break, line fault, thermal alarm)<br>Potentiometer power supply 5V (max 10mA)                                         |
| Output type                | Output Type Digital output normally off (configurable as normally active).<br>PNP type, output voltage: 5Vdc, I <sub>out</sub> max = 10mA (not protected against short circuit) |
| Function Input (default)   | Teach In HB partial breakage alarm threshold calibration (default), SCR logic control, Proportional control via PWM, On / Off Software, Reset alarms                            |
| Input voltage range        | 5-30V (max 3 mA)                                                                                                                                                                |
| Voltage reading status "0" | < 2 V                                                                                                                                                                           |
| Voltage reading status "1" | > 5 V                                                                                                                                                                           |
| Input impedance            | 17 K $\Omega$                                                                                                                                                                   |
| PWM input                  | Max frequency: (1, ..., 100 Hz) Max resolution 1% (0.1ms)                                                                                                                       |

#### Configurable pin 14 input (only with IO-Link version)

|                            |                                                                                                                                                               |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function                   | Configurable digital input                                                                                                                                    |
| Function Input             | Teach In HB partial breakage alarm threshold calibration, Feedback Calibration, On / Off Software, Reset alarms, Dry out start / restart, disabled (default). |
| Input voltage range        | 5-30V (max 3 mA)                                                                                                                                              |
| Voltage reading status "0" | < 2 V                                                                                                                                                         |
| Voltage reading status "1" | > 5 V                                                                                                                                                         |
| Input impedance            | 17 K $\Omega$                                                                                                                                                 |

#### I/O pin 17 (D17 / DQ)

|                           |                                                                                                                                                                                                          |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function                  | Configurable as digital output or input                                                                                                                                                                  |
| Function Output (default) | SSR output retransmission (default, for two-phase / three-phase slave control)<br>Configurable alarm (partial / total load break, line fault, thermal alarm)                                             |
| Output type               | Output Type Digital output normally off (configurable as normally active).<br>PNP type, output voltage: U <sub>s</sub> (24Vdc)-0.7Vdc, I <sub>out</sub> max = 30mA (not protected against short circuit) |
| Function Input            | Teach In HB partial breakage alarm threshold calibration, SCR logic command, Software On / Off, Alarm reset                                                                                              |
| Input voltage range       | 5-30V (max 3 mA)                                                                                                                                                                                         |

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |      |       |      |       |       |           |       |       |  |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-------|------|-------|------|-------|-------|-----------|-------|-------|--|
| Voltage reading status "0"                         | < 2 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |       |      |       |      |       |       |           |       |       |  |
| Voltage reading status "1"                         | > 5 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |       |      |       |      |       |       |           |       |       |  |
| Input impedance                                    | 17 KΩ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |       |      |       |      |       |       |           |       |       |  |
| OUTPUTS                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |      |       |      |       |       |           |       |       |  |
| Alarm output (pin 18 19)                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |      |       |      |       |       |           |       |       |  |
| Function                                           | Configurable alarm output (default): Partial load break, line fault, thermal alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |      |       |      |       |      |       |       |           |       |       |  |
| Type                                               | Voltage free contact (solid state N.O.) max characteristics: 30V-150mA<br>conduction resistance: ≤ 1Ω                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |       |      |       |      |       |       |           |       |       |  |
| COMMUNICATIONS                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |      |       |      |       |       |           |       |       |  |
| Porta microUSB di servizio                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |      |       |      |       |       |           |       |       |  |
| Functions with TTL serial cable                    | Only for initial product configuration, via PC.<br>Use a PC connected to the GRM, ONLY via the Gefran adapter cable. The adapter powers the GRM.<br>Cod. F060800 (PC with USB).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |      |       |      |       |       |           |       |       |  |
| Type                                               | Micro USB type B connector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |      |       |      |       |      |       |       |           |       |       |  |
| Insulation                                         | TTL serial NOT isolated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |       |      |       |      |       |       |           |       |       |  |
| Funzione Dongle NFC:                               | Available for configuration, reading Product Information and diagnostic data.<br>Use App downloadable from PlayStore and AppleStore and NFC Dongle (see accessories table)<br><b>NOTE:</b> From FW 1.06 GRM-H and GRM products with IO-Link communication do not support NFC function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |      |       |      |       |      |       |       |           |       |       |  |
| Modbus RS485 (Option)                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |      |       |      |       |       |           |       |       |  |
| Function                                           | Serial line communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |       |      |       |      |       |       |           |       |       |  |
| Protocol                                           | ModBus RTU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |      |       |      |       |      |       |       |           |       |       |  |
| Type                                               | RS485                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |       |      |       |      |       |       |           |       |       |  |
| Baudrate                                           | Configurable 1200 ...115200bit/s (default 115,2Kbit/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |      |       |      |       |      |       |       |           |       |       |  |
| Node address                                       | Configurable by two rotary switch (rotary-switches)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |       |      |       |      |       |       |           |       |       |  |
| Insulation                                         | 500V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |      |       |      |       |      |       |       |           |       |       |  |
| Parity                                             | None/Odd/Even (default "none")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |       |      |       |      |       |       |           |       |       |  |
| StopBits                                           | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |      |       |      |       |      |       |       |           |       |       |  |
| DataBits                                           | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |      |       |      |       |      |       |       |           |       |       |  |
| POWER (STATIC GROUP)                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |      |       |      |       |       |           |       |       |  |
| CATEGORY OF USE<br>(Tab. 2 EN60947-4-3)            | AC 51: resistive or low-inductance loads<br>AC 55b: infrared lamps<br>AC56a transformers, resistive loads with high temperature coefficient                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |       |      |       |      |       |       |           |       |       |  |
| Trigger modes                                      | <b>OnOff</b> - Zero crossing firing.<br><b>FCT- Fixed Cycle Time</b> - Zero Crossing with constant cycle time (settable in the range 1...200 sec).<br><b>BF</b> - Burst Firing with optimised minimum variable cycle time (Zero crossing firing).<br><b>HSC</b> - Half Single Cycle, corresponds to a Burst Firing which handles half on/off cycles (Zero crossing firing).<br><b>PA</b> - load management by adjusting the power-on phase angle.<br>It is useful for reducing flicker with short-wave infrared loads.<br><b>Softstart</b> ramp in Phase Angle configurable with any configured Firing mode<br><b>Delay triggering:</b> First cycle start-up delay (only for ZC, BF, single phase control mode) Can be set from 0 ° to 90 °.<br>It is useful for inductive loads (primary transformer) to avoid the current peak that could in some cases trigger the ultra-rapid fuses for the protection of SCRs. |      |      |       |      |       |      |       |       |           |       |       |  |
| Feedback and Limit functions (optional)            | Peak current or RMS limiting algorithms available. Feedback in <b>current</b> (I, I <sup>2</sup> ), <b>voltage</b> (V, V <sup>2</sup> ) or power.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |      |       |      |       |      |       |       |           |       |       |  |
| Max. rated voltage                                 | 480 V AC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |       |      |       |      |       |       | 600 V AC  |       |       |  |
| Working voltage range                              | 60-530Vac                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |       |      |       |      |       |       | 60-660Vac |       |       |  |
| Non-repetitive voltage<br>(Surge protection level) | 1200 Vp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |       |      |       |      |       |       | 1400 Vp   |       |       |  |
| Rated frequency                                    | 50/60Hz with auto-determination                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |       |      |       |      |       |       |           |       |       |  |
| Rated current                                      | GRM Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |       |      |       |      |       |       |           |       |       |  |
|                                                    | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 15   | 25   | 25I   | 30   | 30I   | 40   | 50    | 60    | 75        | 90    | 120   |  |
|                                                    | 10A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 15A  | 25A  | 25A   | 30A  | 30A   | 40A  | 50A   | 60A   | 75A       | 90A   | 120A  |  |
| Non-repetitive over-current,<br>(t=20 msec)        | 620A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 620A | 620A | 1600A | 620A | 1600A | 620A | 1600A | 1600A | 1600A     | 1500A | 1500A |  |
| I <sub>2t</sub> for melting (t = 1... 10msec) A²s  | 1800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1800 | 1800 | 12800 | 1800 | 12800 | 1800 | 12800 | 12800 | 12800     | 11250 | 11250 |  |

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| critical dv/dt with output disabled             | 1000 V/ $\mu$ s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Rated impulse withstand voltage                 | 4kV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Rated current in short circuit condition        | 5kA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Minimum Load Current:                           | 150 mA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Voltage drop over rated current:                | = < 1,2Vrms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Presence of leakage current:                    | < 3mA<br>(Maximum value with nominal Voltage and Junction temperature of 125°C / 257°F)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Dissipated power                                | Calculation of power dissipated by the solid state relay<br>$P_d [W] = 1,2 \cdot I_{rms}$<br>$I_{rms}$ = single-phase load current<br><br>Example: load current = 20Arms,<br>Dissipated thermal power: $P_d = 20 \cdot 1.2 = 24W$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Heatsink Thermal Resistance Calculation         | $R_{th}[^{\circ}C/W] = (90^{\circ}C - \text{max amb. T}) / P_d$ where $P_d$ = dissipated power<br>Max. amb. T = max air temperature inside the electrical cabinet.<br>Use a heatsink with thermal resistance inferior to the calculated one ( $R_{th}$ ).<br>Maximum surrounding air temperature 40°C "Open Type Equipment" suitable for use in pollution degree 2 or better.<br>Example:<br><br>Thermal power dissipated:<br>$P_d = 20 \cdot 1,2 = 24 W$<br>$T_{amb.max} = 40^{\circ}C$<br>$R_{th} = (90-40)/24 = 2,08[^{\circ}C/W]$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>INTEGRATED DIAGNOSTICS</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Advanced Diagnostics                            | <ul style="list-style-type: none"> <li>- Power failure for: SCR open / Load interrupted / No line voltage</li> <li>- Overheating alarm</li> <li>SCR short circuit (current presence with OFF command).</li> </ul><br>HB (Heat Break) Alarm:<br><ul style="list-style-type: none"> <li>- HB alarm load interrupted or partially interrupted, up to 8 loads in parallel.</li> <li>- Automatic calibration of the HB alarm threshold based on the current load level default, alarm threshold equal to 90% of the current read during calibration, recommended value for diagnosing a maximum of 5 equal loads in parallel).</li> </ul> So, if the device is left at factory settings, it can manage 2, 3, 4 or 5 loads in parallel without reconfiguration.<br><b>Note 1:</b> with Digital command turn ON minimum time = 50 ms to detect broken load.<br><b>Note 2:</b> For the proper operation of the partial load break alarm even in the most critical conditions (8 equal loads in parallel), it is necessary that the total current of the load (not faulty) is at least 30% of the rated current of the GRM (on a GRM from 15A -> 4.5A)<br>Example: a nominal size 15A GRM commands 8 equal resistors in parallel. To have an alarm of failure of only one of the 8 loads in parallel, the single load must have absorption of at least 0.56A, the total load must absorb at least 4.5A (0.56A * 8 loads). |
| <b>GENERAL CHARACTERISTICS</b>                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Power supply                                    | 12 - 30 Vdc $I_{max}$ 20mA @ 24Vdc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Power supply with GRM-H-90/120A-.. FAN63 option | Power supply GRM-H + Fan<br>(Range from 20 to 27 Vdc, $I_{max}$ <150 mA to 24V with fan running)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Indications                                     | 2 leds:<br>ON (Green LED): Control status SCR<br>STATUS (RGB LED): State of operation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Protection rating                               | IP20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Working temperature                             | 0...80°C (32 ... 176°F) (see derating curves)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Storage temperature             | -20°C - +85°C (-4 ... 185°F)<br>average temperature in a period of 24H not higher than 35°C (95°F)<br>(according to EN 60947-4-3 § 7.1.1)                                                                                                                                                                                                                                                                                                                                                                                            |                  |
| Maximum relative humidity       | 90% non-condensing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |
| Environmental conditions of use | Indoor use, maximum altitude 2000m<br>For higher altitudes consider:<br>-Decreasing 1% of rated current for every 100m (328ft) above elevation 2000m (6562ft).<br>-Decreasing of maximum voltage by correction factor:<br>0.88 from 2000 (6562ft) to 3000m (9842ft)<br>0.77 from 3001 (9846ft) to 4000m (13123ft)<br>0.68 from 4001 (13127ft) to 5000m (16404ft)<br>Example for GRM-...25-60.. at 2800 mslm (9186ft)<br>- 25A nominal derated by 1%*8-->23A<br>- 600Vac nominal, maximum voltage 660Vac derated to 660*0.88=580.8Vac |                  |
| Installation                    | DIN EN50022 bar or panel mount by screws                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |
| Installation requirements       | Installation category II, pollution degree 2<br><br>Maximum air temperature around the device 40°C / 104°F<br>(for Temperature > 40°C / 104°F see derating curves)                                                                                                                                                                                                                                                                                                                                                                   |                  |
| Weight                          | GRM-H 10, 15, 25A, 25I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 388 g / 16.69 Oz |
|                                 | GRM-H 30A, 30I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 388 g / 16.69 Oz |
|                                 | GRM-H 40, 50A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 388 g / 16.69 Oz |
|                                 | GRM-H 60, 75A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 688 g / 24.27 Oz |
|                                 | GRM-H 90A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 796 g / 28.09    |
|                                 | GRM-H 120A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 796 g / 28.09    |
|                                 | GRM 10A ...120A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 156 g / 5,50 Oz  |

## EXTRARAPID FUSES

| Model              | Fuse manufacturer               | Fuse Model size    |
|--------------------|---------------------------------|--------------------|
| GRM-H 10           | Bussmann Div Cooper (UK) Ltd    | FWC10A10F 10x38    |
| GRM-H 15           | Bussmann Div Cooper (UK) Ltd    | FWC16A10F 10x38    |
| GRM-H 25/25I       | Bussmann Div Cooper (UK) Ltd    | FWC25A10F 10x38    |
| GRM-H 30/30I       | Bussmann Div Cooper (UK) Ltd    | FWP40A14F 14x51    |
| GRM-H 40           | Bussmann Div Cooper (UK) Ltd    | FWP40A14F 14x51    |
| GRM-H 50           | Bussmann Div Cooper (UK) Ltd    | FWP63A22F 22x58    |
| GRM-H 60, GRM-H 75 | Bussmann Div Cooper (UK) Ltd    | FWP80A22F 22x58    |
| GRM-H 90           | Bussmann Div Cooper (UK) Ltd    | FWP100A22F 22x58   |
| GRM-H 120          | Bussmann International Inc. USA | 170M1418 000-TN/80 |

## GG FUSES

An electrical protection device known as a GG FUSE must be used to ensure protection against short-circuit of the electrical cable (see EN 60439-1, paragraph 7.5 Short-circuit protection and short-circuit withstand strength” and 7.6 “Switching devices and components installed in ASSEMBLIES”, or the equivalent paragraphs of standard EN 61439-1).

## ACCESSOIRES

| Code           | Description                                                                             |
|----------------|-----------------------------------------------------------------------------------------|
| <b>F089025</b> | 1 NFC dongle for configuration via App + 1 Gefran keychain lanyard                      |
| <b>F089026</b> | 5 NFC dongles for configuration via App + 5 Gefran keychain lanyards                    |
| <b>F089027</b> | 10 NFC dongles for configuration via App                                                |
| <b>F060800</b> | Cable for programming with PC, USB-TTL 3 V with USB - microUSB connectors, length 1,8 m |

## FANS (for 90A/120A models only)

| Model      | Code    | Type                                       | Supply                      |
|------------|---------|--------------------------------------------|-----------------------------|
| 90A FAN60  | F083747 | 230 Vac 60mm x 60mm x 30mm for 90A models  | Separate power supply       |
| 120A FAN60 | F083750 | 230Vac 80mm x 80mm x 38 mm for 120A models | Separate power supply       |
| 90A FAN61  | F083751 | 115Vac 60mm x 60mm x 30 mm for 90A models  | Separate power supply       |
| 120A FAN61 | F083752 | 115Vac 80mm x 80mm x 38 mm for 120A models | Separate power supply       |
| FAN62      | F083753 | 24 Vdc 60mm x 60mm x 25mm                  | Separate power supply       |
| FAN63      | F083754 | 24 Vdc 60mm x 60mm x 25mm                  | Internally powered by GRM-H |



### PERIODIC CLEANING

Every 6-12 months (depending on dust in the place where it is installed), blow a jet of compressed air downward through the cooling heatsink (on the opposite side of the fan).

In this way both the heat sink and the cooling fan are cleaned.



### IN THE EVENT OF OVERTEMPERATURE ALARM

If periodic cleaning does not eliminate the problem, perform the following operations:

1. Disconnect the fan cables from the terminal block (if present) or disconnect the fan connector from the GRM-H (FAN63).
2. Unscrew the screws securing the fan to the support brackets
3. Check the condition of the fan, clean it or replace it
4. Reassemble the fan

# PROTEZIONE CON MCB

Protection co-ordination (Type 2) with Siemens Miniature Circuit Breaker (MCB / Thermal-Magnetic) 5SY4 series, curve A, 1P and 2P

| Current size model<br>(I²t)                                                                           | 1P MCB model<br>(MCB Nominal<br>current in A) at<br>230Vac * | Wire cross<br>sectional<br>area (mm²) | Minimum<br>length ***of<br>copper wire<br>conductor (m) | 2P MCB model<br>(MCB Nominal<br>current in A) at<br>400Vac ** | Wire cross<br>sectional area<br>(mm²) | Minimum<br>length*** of cop-<br>per wire<br>conductor (m) |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------|---------------------------------------------------------|---------------------------------------------------------------|---------------------------------------|-----------------------------------------------------------|
| GRM(-H)-<br>10,15, 25, 30, 40<br>(1800 A2s)                                                           | 5SY4110-5 (10)                                               | 1,0                                   | 6,0                                                     | 5SY4210-5 (10)                                                | 1,0                                   | 6,0                                                       |
|                                                                                                       |                                                              | 1,5                                   | 9,0                                                     |                                                               | 1,5                                   | 10,0                                                      |
|                                                                                                       |                                                              | 2,5                                   | 14,0                                                    |                                                               | 2,5                                   | 14,0                                                      |
|                                                                                                       | 5SY4116-5 (16)                                               | 1,0                                   | 6,0                                                     | 5SY4216-5 (16)                                                | 1,0                                   | 6,0                                                       |
|                                                                                                       |                                                              | 1,5                                   | 9,0                                                     |                                                               | 1,5                                   | 10,0                                                      |
|                                                                                                       |                                                              | 2,5                                   | 14,0                                                    |                                                               | 2,5                                   | 14,0                                                      |
|                                                                                                       |                                                              | 4,0                                   | 15,0                                                    |                                                               | 4,0                                   | 25,0                                                      |
|                                                                                                       | 5SY4120-5 (20)                                               | 1,5                                   | 9,0                                                     | 5SY4220-5 (20)                                                | 1,5                                   | 10,0                                                      |
|                                                                                                       |                                                              | 2,5                                   | 15,0                                                    |                                                               | 2,5                                   | 21,0                                                      |
|                                                                                                       |                                                              | 4,0                                   | 30,0                                                    |                                                               | 4,0                                   | 30,0                                                      |
|                                                                                                       | 5SY4125-5 (25)                                               | 2,5                                   | 18,0                                                    | 5SY4225-5 (25)                                                | 2,5                                   | 18,0                                                      |
|                                                                                                       |                                                              | 4,0                                   | 30,0                                                    |                                                               | 4,0                                   | 30,0                                                      |
|                                                                                                       | 5SY4132-5 (32)                                               | 2,5                                   | 21,0                                                    | 5SY4232-5 (32)                                                | 2,5                                   | 36,0                                                      |
|                                                                                                       |                                                              | 4,0                                   | 35,0                                                    |                                                               | -                                     | -                                                         |
| For MCBs smaller than those indicated in the lines below, there are no section and length constraints |                                                              |                                       |                                                         |                                                               |                                       |                                                           |
| GRM(-H)-<br>25I, 30I, 50,<br>60, 75<br>(12800 A2s)                                                    | 5SY4132-5 (32)                                               | 2,5                                   | 2,0                                                     | 5SY4232-5 (32)                                                | 2,5                                   | 2,0                                                       |
|                                                                                                       |                                                              | 4,0                                   | 4,0                                                     |                                                               | 4,0                                   | 4,0                                                       |
|                                                                                                       |                                                              | 6,0                                   | 7,0                                                     |                                                               | 6,0                                   | 7,0                                                       |
|                                                                                                       | 5SY4140-5 (40)                                               | 4,0                                   | 4,0                                                     | 5SY4240-5 (40)                                                | 4,0                                   | 4,0                                                       |
|                                                                                                       |                                                              | 6,0                                   | 7,0                                                     |                                                               | 6,0                                   | 7,0                                                       |
|                                                                                                       |                                                              | 10,0                                  | 10,0                                                    |                                                               | 10,0                                  | 10,0                                                      |
|                                                                                                       | 5SY4150-5 (50)                                               | 6,0                                   | 7,0                                                     | 5SY4250-5 (50)                                                | 6,0                                   | 7,0                                                       |
|                                                                                                       |                                                              | 10,0                                  | 10,0                                                    |                                                               | 10,0                                  | 10,0                                                      |
|                                                                                                       |                                                              | 16,0                                  | 18,0                                                    |                                                               | 16,0                                  | 18,0                                                      |
|                                                                                                       | 5SY4163-5 (63)                                               | 6,0                                   | 7,0                                                     | 5SY4263-5 (63)                                                | 6,0                                   | 7,0                                                       |
|                                                                                                       |                                                              | 10,0                                  | 10,0                                                    |                                                               | 10,0                                  | 10,0                                                      |
|                                                                                                       |                                                              | 16,0                                  | 18,0                                                    |                                                               | 16,0                                  | 18,0                                                      |
| For MCBs smaller than those indicated in the lines below, there are no section and length constraints |                                                              |                                       |                                                         |                                                               |                                       |                                                           |
| GRM(-H)-90,120<br>(11250 A2s)                                                                         | 5SY4132-5 (32)                                               | 2,5                                   | 2,0                                                     | 5SY4232-5 (32)                                                | 2,5                                   | 2,0                                                       |
|                                                                                                       |                                                              | 4,0                                   | 4,0                                                     |                                                               | 4,0                                   | 4,0                                                       |
|                                                                                                       |                                                              | 6,0                                   | 7,0                                                     |                                                               | 6,0                                   | 7,0                                                       |
|                                                                                                       | 5SY4140-5 (40)                                               | 4,0                                   | 4,0                                                     | 5SY4240-5 (40)                                                | 4,0                                   | 4,0                                                       |
|                                                                                                       |                                                              | 6,0                                   | 7,0                                                     |                                                               | 6,0                                   | 7,0                                                       |
|                                                                                                       |                                                              | 10,0                                  | 10,0                                                    |                                                               | 10,0                                  | 10,0                                                      |
|                                                                                                       | 5SY4150-5 (50)                                               | 6,0                                   | 7,0                                                     | 5SY4250-5 (50)                                                | 6,0                                   | 7,0                                                       |
|                                                                                                       |                                                              | 10,0                                  | 10,0                                                    |                                                               | 10,0                                  | 10,0                                                      |
|                                                                                                       |                                                              | 16,0                                  | 18,0                                                    |                                                               | 16,0                                  | 18,0                                                      |
|                                                                                                       | 5SY4163-5 (63)                                               | 6,0                                   | 7,0                                                     | 5SY4263-5 (63)                                                | 6,0                                   | 7,0                                                       |
|                                                                                                       |                                                              | 10,0                                  | 10,0                                                    |                                                               | 10,0                                  | 10,0                                                      |
|                                                                                                       |                                                              | 16,0                                  | 18,0                                                    |                                                               | 16,0                                  | 18,0                                                      |

\* The sizing is valid for a 230Vac phase-neutral line with an assumed short-circuit current of 2,5KA

\*\* The sizing is valid for a 400Vac phase-to-phase line with an assumed short-circuit current of 5KA

\*\*\* Between MCB and Load plus return path which goes back to the lines/neutral

The use of MCBs with a **nominal size smaller** than the smallest ones associated with a specific GRM in the table, is allowed without restrictions on the length and section of the cables.

For example, a 25I size GRM can be coupled to a 5SY4116-5 (16) MCB with any cable length or section.

Example, for a GRM-H-50- ..., with line voltage of 230Vac, controlled load of 45 A nominal, with a section of 6mm<sup>2</sup> of cable, an MCB 5SY4150-5 (50 A) the minimum length of the cables is 7m (cable length is intended between MCB and load, including return).

## EMC STANDARDS

### EMC emissions

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

### EMC Immunity

|                                                                  |                                                                                                                 |                                                                                                  |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Generic standards, immunity standard for industrial environments | EN 60947-4-3                                                                                                    |                                                                                                  |
| ESD immunity                                                     | EN 61000-4-2                                                                                                    | 4 kV contact discharge<br>8 kV air discharge                                                     |
| RF interference immunity                                         | EN 61000-4-3 /A1                                                                                                | 10 V/m amplitude modulated 80 MHz-1 GHz<br>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<br>2 kV I/O signal line                                                          |
| Surge immunity                                                   | EN 61000-4-4/5                                                                                                  | Power line-line 1 kV<br>Power line-earth 2 kV<br>Signal line-earth 2 kV<br>Signal line-line 1 kV |
| Magnetic fields immunity                                         | Test are not required. Immunity is demonstrated 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                                                                                |

### LVD safety

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

### CAUTION

This product has been designed for class A equipment. Its use in a domestic environment may cause radio interference, in which case the user may be required to use additional attenuation methods.

**EMC filters** are required in PA operating mode (Phase Angle, i.e., SCR triggering with a modulated phase angle). The filter model and current size depend on the configuration and the load used. It is important that the power filter is connected as close as possible to the GRM-H. A filter connected between the power supply line and the GRM-H or an LC unit connected between the GRM-H output and the load may be used.

## ORDER CODE

GRM-H - A - B - C - D - E - F - G - H - I

| Rated current       |     |
|---------------------|-----|
| 10Aac High Accuracy | 10  |
| 15Aac               | 15  |
| 25Aac               | 25  |
| 25Aac I2t++         | 25I |
| 30Aac               | 30  |
| 30Aac I2t++         | 30I |
| 40Aac               | 40  |
| 50Aac               | 50  |
| 60Aac               | 60  |
| 75Aac               | 75  |
| 90Aac (Fan needed)  | 90  |
| 120Aac (Fan needed) | 120 |

| Rated voltage           |    |
|-------------------------|----|
| 480Vac (60Vac...530Vac) | 48 |
| 600Vac (60Vac...660vac) | 60 |

| Control type                                   |    |
|------------------------------------------------|----|
| Analogue<br>(0..10V,4..20mA, PWM, Logic OnOff) | AN |
| IO-Link (***)                                  | I  |

| Control Options                                         |    |
|---------------------------------------------------------|----|
| Open Loop                                               | OL |
| Advanced Control (Current limit/ DryOut)                | AC |
| AC + Feedback (V,I,V <sup>2</sup> ,I <sup>2</sup> ,P,Z) | FB |

(\*) Not available with IO-link control type option

(\*\*) Not available with MR option

(\*\*\*) NFC function not available with Control type I (IO-Link communication)

### NOTE:

Advanced Diagnostic always included: Thermal protection, Thermal Alarm, Total and Partial heater break, No-line, Current reading.

|   |  |
|---|--|
| 0 |  |
|---|--|

| NFC Dongle accessory |                                            |
|----------------------|--------------------------------------------|
| 0                    | Absent                                     |
| 1                    | NFC Dongle included in the packaging (***) |

| Options |                      |
|---------|----------------------|
| 0       | None                 |
| MR      | Modbus RTU RS485 (*) |

|   |  |
|---|--|
| 0 |  |
|---|--|

| Fan   |                                                                         |
|-------|-------------------------------------------------------------------------|
|       | for nominal current from 15A to 75A                                     |
| 0     | No needed                                                               |
|       | for 90/120A nominal current models                                      |
| FAN60 | 230V AC 60x60x30mm for 90A models<br>230V AC 80x80x38mm for 120A models |
| FAN61 | 115V AC 60x60x30mm for 90A models<br>115V AC 80x80x38mm for 120A models |
| FAN62 | 24Vdc 60x60x25mm                                                        |
| FAN63 | 24V DC 60x60x25mm integrated power supply                               |

CE Conformity Declaration is available on web site [www.gefran.com](http://www.gefran.com)

|                                                                                     |                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | This device conforms to European Union Directive 2014/30/EU and 2014/35/EU as amended with reference to generic standards: <b>EN 61000-6-2</b> (immunity in industrial environment) <b>EN 61000-6-4</b> (emission in industrial environment) - <b>EN 61010-1</b> (safety regulations). |
|  | cULus listed, Conformity UL508 - File: E243386                                                                                                                                                                                                                                         |



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