

### MAIN APPLICATIONS

- Small fans control
- Control of auger motors
- Hopper control
- Control of conveyor belts
- Pumps
- Oil Mills
- Centrifugal Pumps
- Blowers
- Compressors



### MAIN FEATURES

- Motor control up to 500Vac - 7A - 3 kW (3 product versions)
- Single-phase and Three-phase motor control
- PL e and SIL 3 certified
- Start / stop function
- Reverse rotation function (optional and available only for three-phase motors)
- Motor overload protection
- Phase absence protection
- 4 digital controls 24Vdc alarm relay output
- 2 digital outputs for motor running signaling
- Automatic or manual alarm reset (settable)
- Selection of nominal motor current with frontselector
- Module coupling to DIN bar.

### GENERAL INFORMATION

Control device for motors up to 3KW, 7A at 500Vac, selection of the running rotation direction, overload protection

by measuring the current absorbed by the motor (configurable) phase absence, current/phase imbalance

protection, alarm reset (manual/automatic), relay alarm output, digital outputs for direction of travel indication

### PROFILE

The Gefran G-Start motor starter is a device compact (width 22.5mm) for DIN bar coupling, for the functional start / stop command and selection of the gear rotation of asynchronous motors up to 500Vac- with a power not exceeding 3kW - 7A.

Motor control is achieved through a combination of relays and power semiconductors (Triacs) that minimize thermal dissipation inside the electrical panel also guaranteeing great product reliability.

Integrates motor overload protection with automatic management of shutdown and relative engine cooling time. Advanced diagnostics with recognition of internal faults and lack of phase.

On the front there is a selector to set the nominal current of the motor (tripping threshold of the overload protection) and 4 status LEDs for easy immediate diagnostics.

The alarms can be reset manually via the front button or digital input or by selecting the automatic mode. PL e and SIL 3 certification guarantee the G-Start installation in applications where emergency stop is required.

## TECHNICAL DATA

### POWER SUPPLY

24 Vdc  $\pm$ 20% 50mA

Reverse voltage protection and overvoltage suppressor

### LOGICAL INPUTS

N.4 command input 24Vdc - 5mA input

Voltage range 5-30V (max 5 mA)  
Safe voltage reading status "0" < 7 V  
Safe voltage reading status "1" > 10 V  
Input impedance 15 K $\Omega$

Type\_1 Selection of:

- Forward run / engine stop
- Reverse run / motor stop (optional)
- Automatic / Manual alarm reset selection
- External reset command

### DIGITAL OUTPUT

N. 2 digital outputs PNP 24Vdc max 40mA

- Forward rotation motor signal
- Reverse rotation motor signal

### POWER INPUT

N.1 extractable connector for wiring to the power supply line max 500Vac / 50-60Hz

### ALARM RELAY

N.1 output relay with NO / NC connection.  
Switching capacity according to IEC 60947-5-1: 3A (230V, AC15), 2A (24V, DC13)

### MOTOR LOAD OUTPUT AC-3, AC53A, IEC60947-1

N.1 removable connector for wiring to the motor

### THREE PRODUCT VERSIONS AVAILABLE

- I nominal = 0.6A / 500Vac
- I nominal = 2.4A / 500Vac
- I nominal = 7.0A / 500Vac

### ENVIRONMENTAL CONDITIONS

Working temperature: -25...70°C, see derating curve

Storage temperature: -25 ...80°C

Humidity: 20 ... 90% UR non condensing

Degree of protection: IP 20

Degree of pollution: 2

### INSULATION FEATURES

Rated insulation voltage: 500V

Rated surge voltage: Uimp 6kV

**SAFETY FUNCTION (for models with Safety option only)**Safety Integrity Level (SIL, IEC 61508): up to **SIL 3**Performance Level (ISO 13849): up to **PLe**

Parameter	Value	Measuring Unit
Type (EN IEC 62061)	B	--
Architecture (EN IEC 62061)	1oo2(D)	--
HFT (EN IEC 62061)	1	--
Category (EN ISO 13849-1/2)	3	--
$\beta, \beta_D$ factor	2	%
CCF	>65	--
SFF (EN IEC 62061)	$\geq 99$	%
DC <sub>avg</sub> (EN ISO 13849-1/2)	99	%
MTTF <sub>D</sub> (of each channel) (EN ISO 13849-1/2)	15020	years
PFH	1,52E-12	1/h
SIL (EN IEC 62061)	3	--
PL (EN ISO 13849-1/2)	e	--
Useful lifetime	20	years

Response time of the safety functions: &lt;50 ms

NOTE: no fault exclusions applied.

**NUMBER OF STARTING OPERATIONS**

Permissible number of starting operations per hour 1/h				
Parameter: on-load factor = 50%				
Motor starter				
Max. rated operating current I	7A	2,4A	0,6A	
Motor				
Starting Current	Starting Time [ms]	N° comm [1/h]	N° comm [1/h]	N° comm [1/h]
250%	100	1000	3300	3600
430%	100	1000	1000	1000
	300	400	400	400
	500	220	220	220
520%	100	750	750	750
	300	250	250	250
	500	100	100	100
630%	100	500	500	500
	300	150	150	150
	500	100	100	100
730%	100	360	360	360
	300	100	100	100
	500	60	60	60

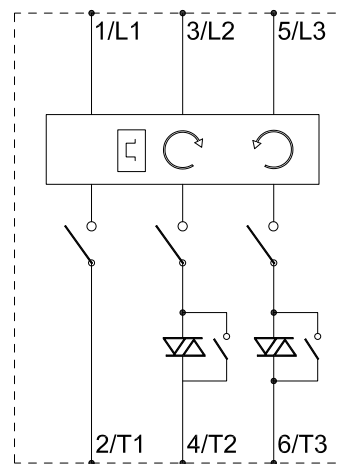
## INSTALLATION

DIN mounting by quick spring coupling

## FUNCTIONS / DIAGNOSTICS

- Engine start / stop
- Motor rotation selection
- Motor overload protection (settable current)
- Protection for the absence of a phase
- Current asymmetry / three-phase line unbalance protection
- Automatic engine shutdown and automatic management of the cooling time

### Scheme



## OPERATIONS TIME

Typical turn on time: 122ms  
Typical turn off time: 80ms  
Typical inversion time: 300ms

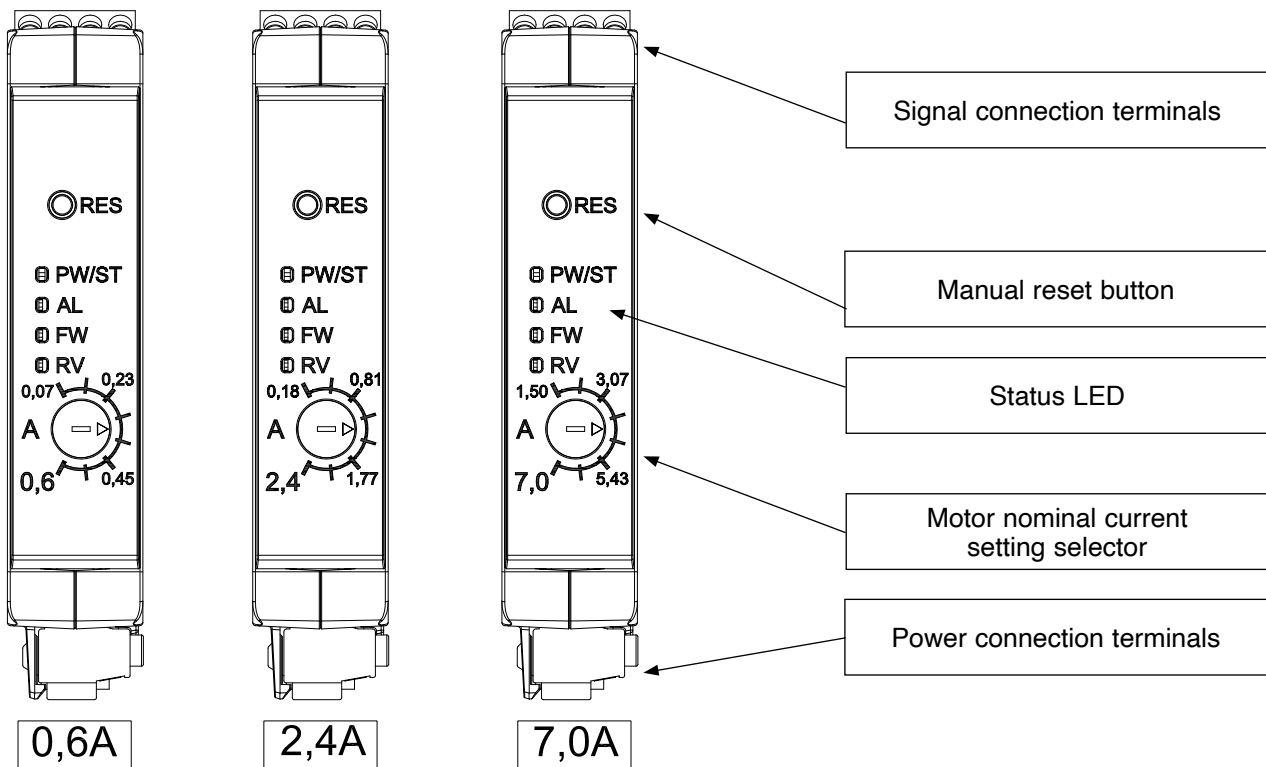
## DURABILITY

Mechanical durability: 15 million cycles

### CONNECTION DATA

Connection name	Control Circuits	Power Circuits
PINs	11 to 34	L1,L2,L3, T1,T2,T3
Conductor cross section, solid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section, flexible	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section [AWG]	24...14	24...14
Tightening torque	0.5 Nm ... 0.6 Nm	0.5 Nm ... 0.6 Nm
Stripping length	8mm	8mm

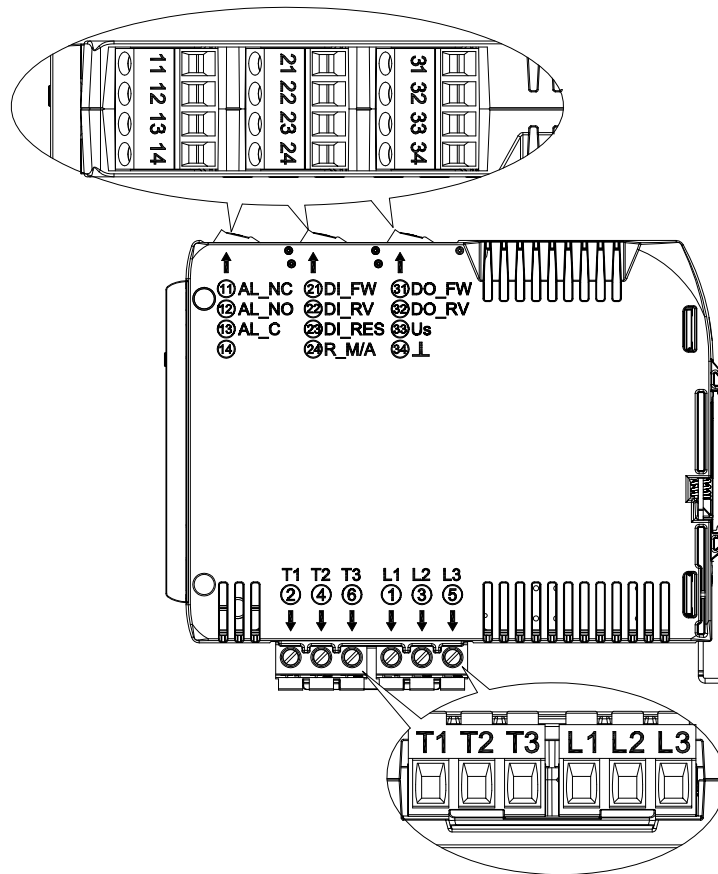
## FRONT DESCRIPTION



### 1.1.1. Status LED

Led	Color	Type of report	Meaning
PW/ST	-	turned off	Module not powered
PW/ST	Green	Steady on	Module correctly powered. Manual reset selected
PW/ST	Yellow	Steady on	Module correctly powered. Automatic reset selected
PW/ST	Blu	Flashing	Confirmation of motor size selection. Once the movement of the rotary selector is finished, the blue LED flashes a number of times equal to the number of the selected position
PW/ST	Yellow	Flashing alternately with the AL led	System failure. Contact Gefran.
AL	Red	Turned off	No alarm indication
AL	Red	Flashing alternately with the PW / ST led	System failure. Contact Gefran
AL	Red	Steady on	Motor overload alarm
AL	Red	Fast flashing (10Hz)	Phase failure alarm or no load alarm
AL	Red	Slow flashing (1Hz)	Phase imbalance alarm
FW	Yellow	Turned off	The engine is not turning forward
FW	Yellow	Steady on	The engine is running and is turning forward
RV	Yellow	Turned off	The engine is not turning back
RV	Yellow	Steady on	The engine is running and is turning backwards

## TERMINALS DESCRIPTION



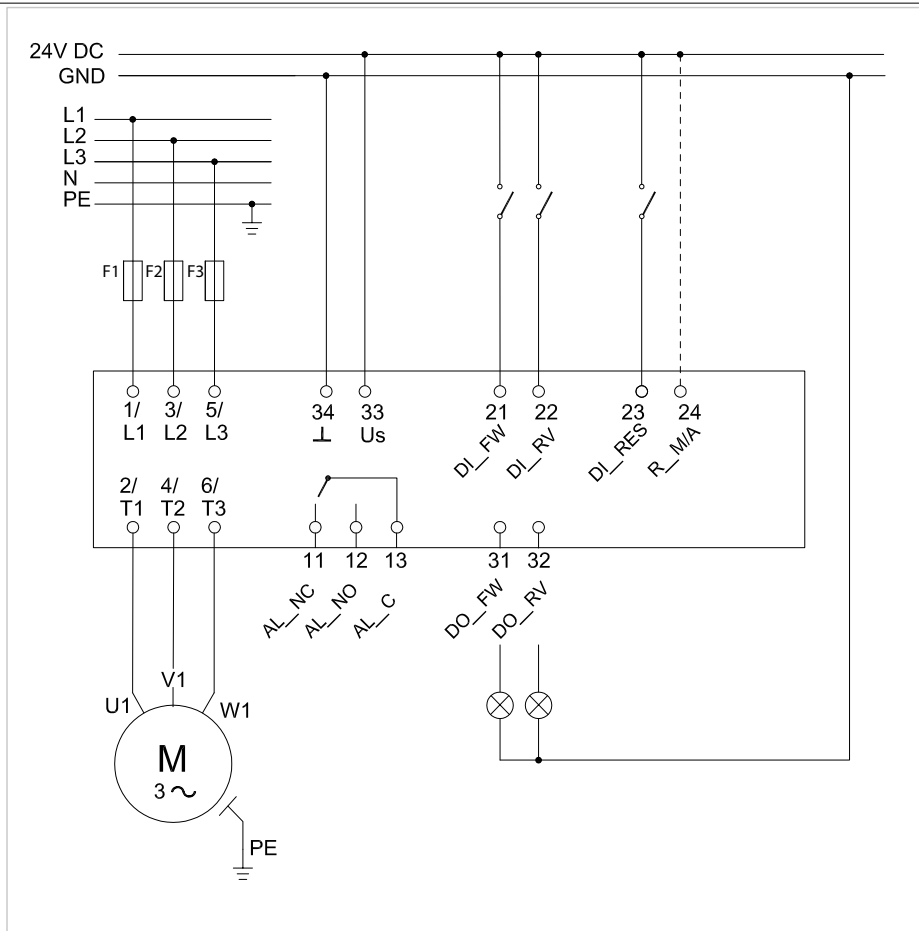
### Signal connection

Number	Label	
11	AL_NC	Changeover contact for alarm signaling: Normally Closed terminal
12	AL_NO	Changeover contact for alarm signaling: Normally Open terminal
13	AL_C	Changeover contact for alarm signaling: common terminal
14	-	Disconnect
21	DI_FW	Forward run command input
22	DI_RV	Reverse run command input
23	DI_RES	Reset command input
24	R_M/A	Manual/Automatic restart selection input
31	DO_FW	Forward running status signal output active
32	DI_RV	Reverse running status signal output active
33	Us	Device power supply + 24Vdc
34	L	Device power supply 0Vdc

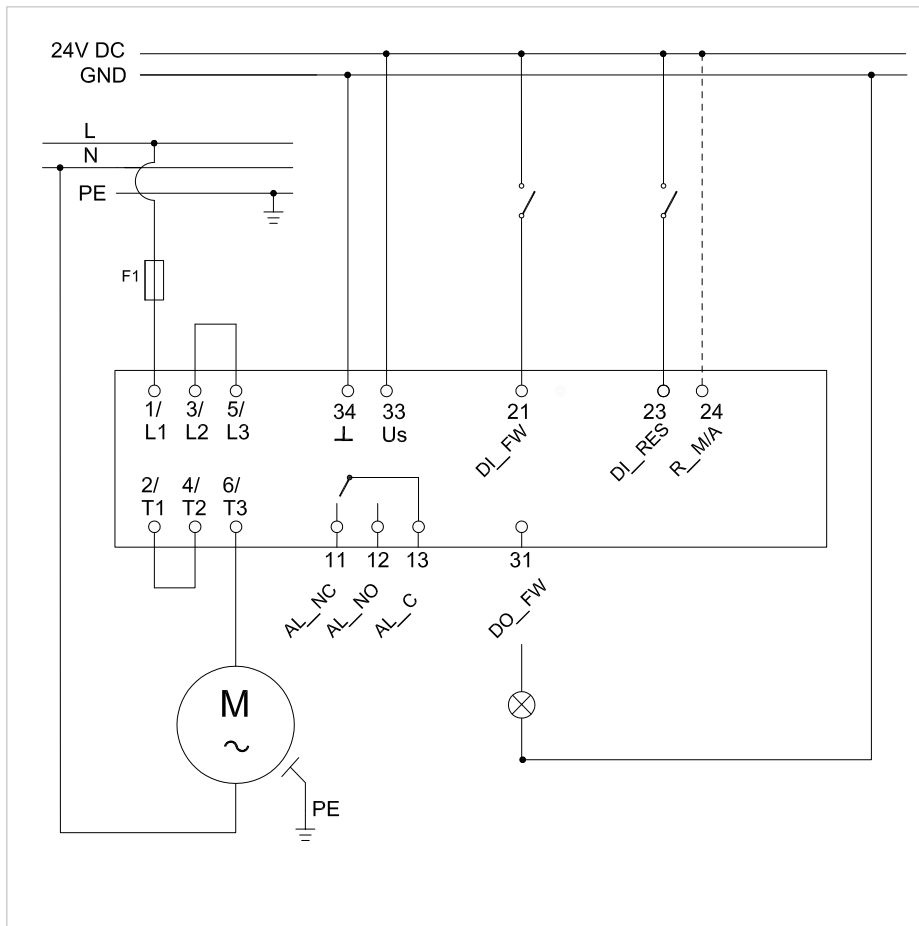
### Power connection

Number	Label	
2	T1	Phase motor connection 1
4	T2	Phase motor connection 2
6	T3	Phase motor connection 3
1	L1	Phase power line connection 1
3	L2	Phase power line connection 2
5	L3	Phase power line connection 3

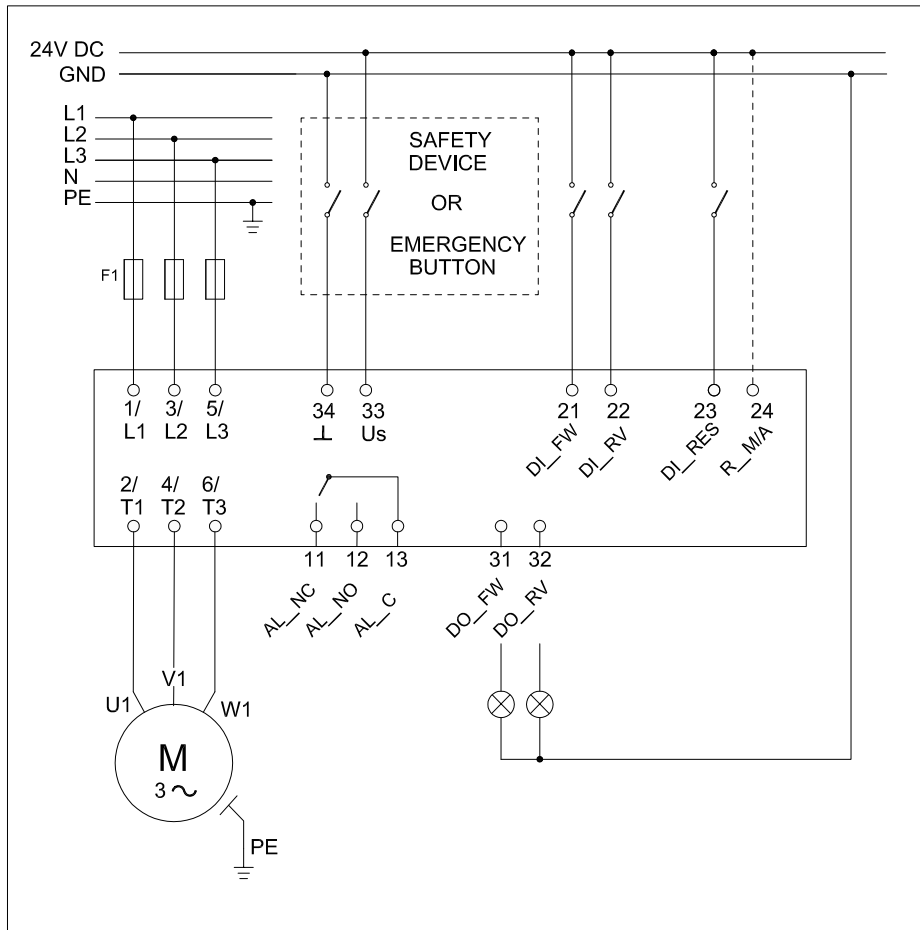
## WIRING SCHEME FOR THREE-PHASE MOTORS



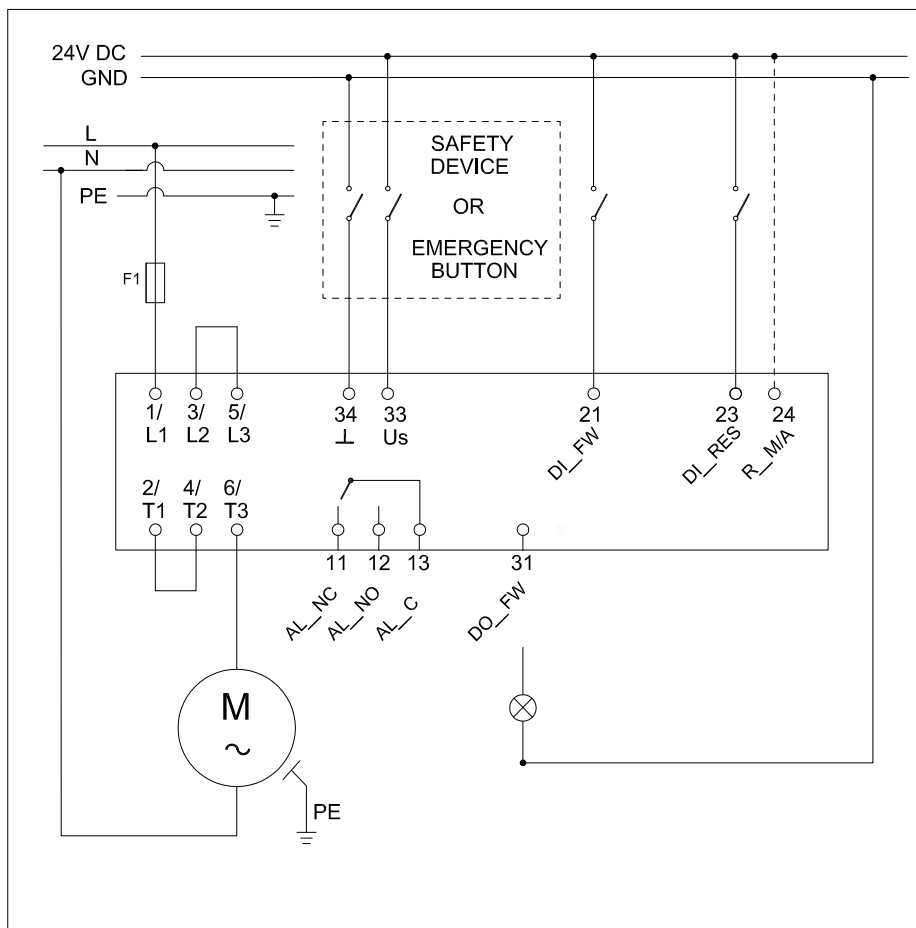
## WIRING SCHEME FOR SINGLE-PHASE MOTORS



## WIRING SCHEME FOR SAFETY APPLICATION THREE-PHASE MOTORS



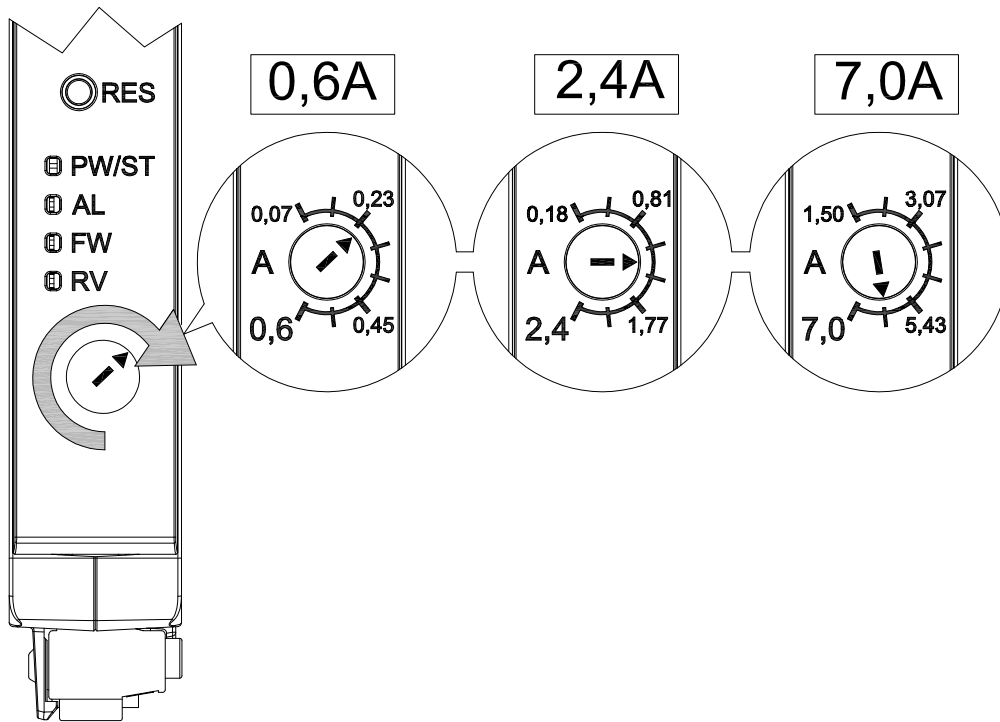
## WIRING SCHEME FOR SAFETY APPLICATION SINGLE-PHASE MOTORS





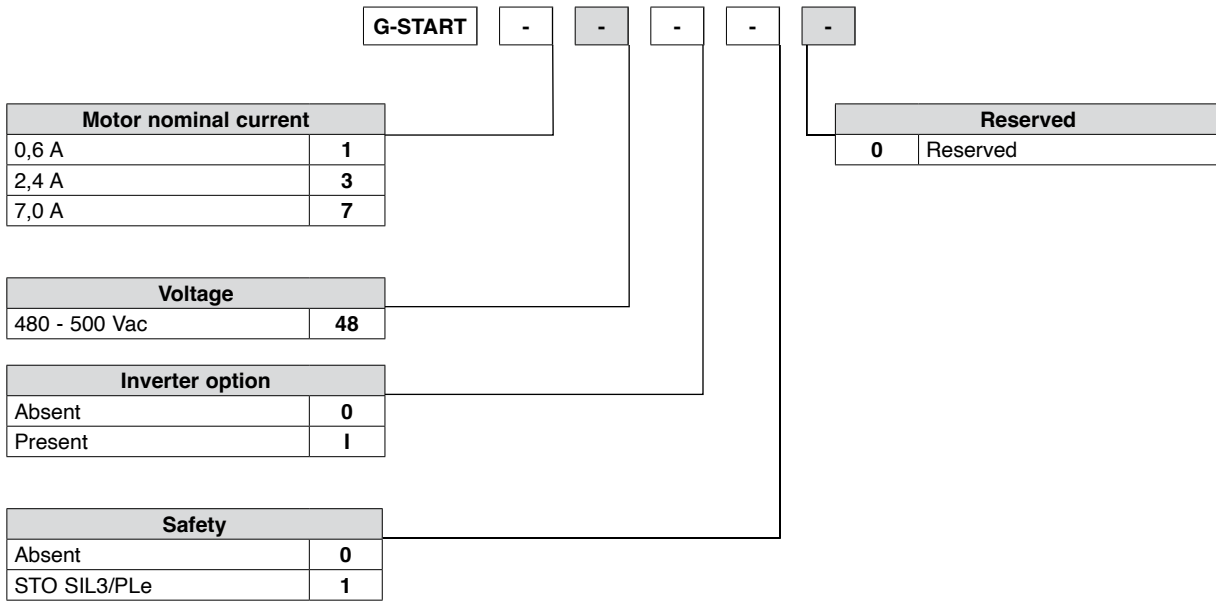
## NOMINAL CURRENT CALIBRATION

Rotate the selector by positioning it on one of the 8 preset positions according to the serigraphy indicated on the front.



Once the movement of the rotary selector is finished, the PW / ST LED will flash BLUE a number of times equal to the number of the selected position to confirm the selection of the motor size made. Calibration is also possible with the engine running. By pressing the RES button on the front for more than 3 seconds, it is possible to check the calibration by flashing the PW / ST LED.

## ORDER CODE



**Example:**

- Motor starter up to 7A - 500Vac with inverter options (Available only for three-phase motors)




### 1.1. Order codes

Codice F	Order Code	Description
F090435	G-START-1-48-0-0-0	Size 0,6A without inversion
F090432	G-START-1-48-I-0-0	Size 0,6A with inversion
F090434	G-START-3-48-0-0-0	Size 2,4A without inversion
F090431	G-START-3-48-I-0-0	Size 2,4A with inversion
F090433	G-START-7-48-0-0-0	Size 7,0A without inversion
F089099	G-START-7-48-I-0-0	Size 7,0A with inversion
F097743	G-START-1-48-0-1-0	Size 0,6A without inversion. STO SIL3
F097744	G-START-1-48-I-1-0	Size 0,6A with inversion. STO SIL3
F097745	G-START-3-48-0-1-0	Size 2,4A without inversion. STO SIL3
F097746	G-START-3-48-I-1-0	Size 2,4A with inversion. STO SIL3
F097747	G-START-7-48-0-1-0	Size 7,0A without inversion. STO SIL3
F097748	G-START-7-48-I-1-0	Size 7,0A with inversion. STO SIL3

GEFRAN spa reserves the right to make aesthetic or functional changes at any time and without notice.

### CERTIFICATIONS

The EC declaration of conformity is available on the website [www.gefran.com](http://www.gefran.com)

	cULus listed, Conformity UL 60947-4-2, file E175476
---	---