

LOVATO ELECTRIC S.P.A.

24020 GORLE (BERGAMO) ITALIA  
VIA DON E. MAZZA, 12  
TEL. 035 4282111  
E-mail info@LovatoElectric.com  
Web www.LovatoElectric.com



## GB ELECTRONIC MOTOR STARTERS

### Instruction manual

ME...



#### WARNING!

- Carefully read the manual before the installation or use.
- This equipment is to be installed by qualified personnel, complying to current standards, to avoid damages or safety hazards.
- Before any maintenance operation on the device, remove all the voltages from measuring and supply inputs and short-circuit the CT input terminals.
- The manufacturer cannot be held responsible for electrical safety in case of improper use of the equipment.
- Products illustrated herein are subject to alteration and changes without prior notice. Technical data and descriptions in the documentation are accurate, to the best of our knowledge, but no liabilities for errors, omissions or contingencies arising there from are accepted.
- A circuit breaker must be included in the electrical installation of the building. It must be installed close by the equipment and within easy reach of the operator. It must be marked as the disconnecting device of the equipment: IEC/EN 61010-1 § 6.11.3.1.
- Clean the device with a soft dry cloth; do not use abrasives, liquid detergents or solvents.



#### ATTENTION !

- Lire attentivement le manuel avant toute utilisation et installation.
- Ces appareils doivent être installés par un personnel qualifié, conformément aux normes en vigueur en matière d'installations, afin d'éviter de causer des dommages à des personnes ou choses.
- Avant toute intervention sur l'instrument, mettre les entrées de mesure et d'alimentation hors tension et court-circuiter les transformateurs de courant.
- Le constructeur n'assume aucune responsabilité quant à la sécurité électrique en cas d'utilisation impropre du dispositif.
- Les produits décrits dans ce document sont susceptibles d'évoluer ou de subir des modifications à n'importe quel moment. Les descriptions et caractéristiques techniques du catalogue ne peuvent donc avoir aucune valeur contractuelle.
- Un interrupteur ou disjoncteur doit être inclus dans l'installation électrique du bâtiment. Celui-ci doit se trouver tout près de l'appareil et l'opérateur doit pouvoir y accéder facilement. Il doit être marqué comme le dispositif d'interruption de l'appareil : IEC/EN 61010-1 § 6.11.3.1.
- Nettoyer l'appareil avec un chiffon doux, ne pas utiliser de produits abrasifs, détergents liquides ou solvants.



#### ACHTUNG!

- Dieses Handbuch vor Gebrauch und Installation aufmerksam lesen.
- Zur Vermeidung von Personen- und Sachschäden dürfen diese Geräte nur von qualifiziertem Fachpersonal und unter Befolgung der einschlägigen Vorschriften installiert werden.
- Vor jedem Eingriff am Instrument die Spannungszufuhr zu den Messeingängen trennen und die Stromwandler kurzschließen.
- Bei zweckwidrigem Gebrauch der Vorrichtung übernimmt der Hersteller keine Haftung für die elektrische Sicherheit.
- Die in dieser Broschüre beschriebenen Produkte können jederzeit weiterentwickelt und geändert werden. Die im Katalog enthaltenen Beschreibungen und Daten sind daher unverbindlich und ohne Gewähr.
- In die elektrische Anlage des Gebäudes ist ein Ausschalter oder Trennschalter einzubauen. Dieser muss sich in unmittelbarer Nähe des Geräts befinden und vom Bediener leicht zugänglich sein. Er muss als Trennvorrichtung für das Gerät gekennzeichnet sein: IEC/EN 61010-1 § 6.11.3.1.
- Das Gerät mit einem weichen Tuch reinigen, keine Scheuermittel, Flüssigreinerer oder Lösungsmittel verwenden.



#### ADVERTENCIA

- Leer atentamente el manual antes de instalar y utilizar el regulador.
- Este dispositivo debe ser instalado por personal cualificado conforme a la normativa de instalación vigente a la fin de evitar daños personales o materiales.
- Antes de realizar cualquier operación en el dispositivo, desconectar la corriente de las entradas de alimentación y medida, y cortocircuitar los transformadores de corriente.
- El fabricante no se responsabilizará de la seguridad eléctrica en caso de que el dispositivo no se utilice de forma adecuada.
- Los productos descritos en este documento se pueden actualizar o modificar en cualquier momento. Por consiguiente, las descripciones y los datos técnicos aquí contenidos no tienen valor contractual.
- La instalación eléctrica del edificio debe disponer de un interruptor o disyuntor. Este debe encontrarse cerca del dispositivo, en un lugar al que el usuario pueda acceder con facilidad. Además, debe llevar el mismo marcado que el interruptor del dispositivo (IEC/EN 61010-1 § 6.11.3.1).
- Limpiar el dispositivo con un trapo suave; no utilizar productos abrasivos, detergentes líquidos ni disolventes.



#### UPOZORNĚNÍ

- Návod se pozorně pročtěte, než začnete regulátor instalovat a používat.
- Tato zařízení smí instalovat kvalifikovaní pracovníci v souladu s platnými předpisy a normami pro předcházení úrazů osob či poškození věcí.
- Před jakýmkoli zásahem do přístroje odpojte měřící a napájecí vstupy od napětí a zkratujte transformátory proudu.
- Výrobce nenese odpovědnost za elektrickou bezpečnost v případě nevhodného používání regulátoru.
- Výrobky popsané v tomto dokumentu mohou kdykoli projít úpravami či dalším vývojem. Popisy a údaje uvedené v katalogu nemají proto žádnou smluvní hodnotu.
- Spínač či odpojovač je nutno zabudovat do elektrického rozvodu v budově. Musí být nainstalován v těsné blízkosti přístroje a snadno dostupné pracovníku obsluhy. Je nutno ho označit jako vypínač zařízení přístroje: IEC/EN 61010-1 § 6.11.3.1.
- Přístroj čistěte měkkou utěrkou, nepoužívejte abrazivní produkty, tekutá čistidla či rozpouštědla.



#### AVERTIZARE!

- Cititi cu atenție manualul înainte de a instala sau utiliza.
- Acest echipament va fi instalat de personal calificat, în conformitate cu standardele actuale, pentru a evita deteriorări sau pericole.
- Înainte de efectuarea oricărei operațiuni de întreținere asupra dispozitivului, îndeplățiți toate tensiunile de la intrările de măsurare și de alimentare și scurtcircuitați bornele de intrare CT.
- Producătorul nu poate fi considerat responsabil pentru siguranța electrică în caz de utilizare incorectă a echipamentului.
- Produsele ilustrate în prezentul sunt supuse modificărilor și schimbărilor fără notificare anterioară. Datele tehnice și descrierile din documentație sunt precise, în măsura cunoștințelor noastre, dar nu se acceptă nicio răspundere pentru erorile, omisiunile sau evenimentele neprevăzute care apar ca urmare a acestora.
- Trebuie inclus un disjunctiv în instalația electrică a clădirii. Acesta trebuie instalat aproape de echipament și într-o zonă ușor accesibilă operatorului. Acesta trebuie marcat ca fiind dispozitivul de deconectare al echipamentului: IEC/EN 61010-1 § 6.11.3.1.
- Curățați instrumentul cu un material textil moale și uscat; nu utilizați substanțe abrazive, detergenți lichizi sau solvenți.



#### ATTENZIONE!

- Leggere attentamente il manuale prima dell'utilizzo e l'installazione.
- Questi apparecchi devono essere installati da personale qualificato, nel rispetto delle vigenti normative impiantistiche, allo scopo di evitare danni a persone o cose.
- Prima di qualsiasi intervento sullo strumento, togliere tensione dagli ingressi di misura e di alimentazione e cortocircuitare i trasformatori di corrente.
- Il costruttore non si assume responsabilità in merito alla sicurezza elettrica in caso di utilizzo improprio del dispositivo.
- I prodotti descritti in questo documento sono suscettibili in qualsiasi momento di evoluzioni o di modifiche. Le descrizioni ed i dati a catalogo non possono pertanto avere alcun valore contrattuale.
- Un interruttore o disgiuntore va compreso nell'impianto elettrico dell'edificio. Esso deve trovarsi in stretta vicinanza dell'apparecchio ed essere facilmente raggiungibile da parte dell'operatore. Deve essere marchiato come il dispositivo di interruzione dell'apparecchio: IEC/EN 61010-1 § 6.11.3.1.
- Pulire l'apparecchio con panno morbido, non usare prodotti abrasivi, detergenti liquidi o solventi.



#### UWAGA!

- Przed użyciem i instalacją urządzenia należy uważnie przeczytać niniejszą instrukcję.
- W celu uniknięcia obrażeń osób lub uszkodzenia mienia tego typu urządzenia muszą być instalowane przez wykwalifikowany personel, zgodnie z obowiązującymi przepisami.
- Przed rozpoczęciem jakichkolwiek prac na urządzeniu należy odłączyć napięcie od wejść pomiarowych i zasilania oraz zewrzeć zaciski przekładnika prądowego.
- Producent nie przyjmuje na siebie odpowiedzialności za bezpieczeństwo elektryczne w przypadku niewłaściwego użytkowania urządzenia.
- Produkty opisane w niniejszym dokumencie mogą być w każdej chwili udoskonalone lub zmodyfikowane. Opisy oraz dane katalogowe nie mogą mieć w związku z tym żadnej wartości umownej.
- W instalacji elektrycznej budynku należy uwzględnić przełącznik lub wyłącznik automatyczny. Powinien on znajdować się w bliskim sąsiedztwie urządzenia i być łatwo osiągalny przez operatora. Musi być oznaczony jako urządzenie służące do wyłączania urządzenia: IEC/EN 61010-1 § 6.11.3.1.
- Urządzenie należy czyścić miękką szmatką, nie stosować środków ściernych, płynnych detergentów lub rozpuszczalników.



#### 警告!

- 安装或使用前，请仔细阅读本手册。
- 本设备只能由合格人员根据现行标准进行安装，以避免造成损坏或安全危害。
- 对设备进行任何维护操作前，请移除测量输入端和电源输入端的所有电压，并短接 CT 输入端。
- 制造商不负责因设备使用不当导致的电气安全问题。
- 此处说明的产品可能会有变更，恕不提前通知。我们竭力确保本文件中技术数据和说明的准确性，但对于错误、遗漏或由此产生的意外事件概不负责。
- 建筑电气系统中必须装有断路器。断路器必须安装在靠近设备且方便操作人员触及的地方。必须将断路器标记为设备的断开装置：IEC/EN 61010-1 § 6.11.3.1
- 请使用柔软的干布清洁设备；切勿使用研磨剂、洗涤剂或溶剂。



#### ПРЕДУПРЕЖДЕНИЕ!

- Прежде чем приступать к монтажу или эксплуатации устройства, внимательно ознакомьтесь с содержанием настоящего руководства.
- Во избежание травм или материального ущерба монтаж должен осуществляться только квалифицированным персоналом в соответствии с действующими нормативами.
- Перед проведением любых работ по техническому обслуживанию устройства необходимо обеспечить все измерительные и питающие входные контакты, а также замкнуть накоротко входные контакты трансформатора тока (ТТ).
- Производитель не несет ответственность за обеспечение электробезопасности в случае ненадлежащего использования устройства.
- Изделия, описанные в настоящем документе, в любой момент могут подвергнуться изменениям или усовершенствованиям. Поэтому каталожные данные и описания не могут рассматриваться как действительные с точки зрения контрактов.
- Электрическая сеть здания должна быть оснащена автоматическим выключателем, который должен быть расположен вблизи оборудования в пределах доступа оператора. Автоматический выключатель должен быть промаркирован как отключающее устройство оборудования: IEC/EN 61010-1 § 6.11.3.1.
- Очистку устройства производить с помощью мягкой сухой ткани, без применения абразивных материалов, жидких мощных средств или растворителей.



#### DIKKATI!

- Montaj ve kullanımdan önce bu el kitabını dikkatlice okuyunuz.
- Bu aparatlar kişilere veya nesnelere zarar verme ihtimaline karşı yürürlükte olan sistem kurma normlarına göre kalifiye personel tarafından monte edilmelidir.
- Aparatları (çihaz) herhangi bir müdahalede bulunmadan önce ölçüm girişlerindeki genilimi kesip akım transformatorlerinede kısa devre yaptırınız.
- Üretici aparatın hatalı kullanımından kaynaklanan elektriksel güvenliğe ait sorumluluk kabul etmez.
- Bu dokümanda tarif edilen ürünler her an evrimlere veya değişimlere açıktır. Bu sebeple katalogdaki tarif ve değerler herhangi bir bağlayıcı değeri haiz değildir.
- Binanın elektrik sisteminde bir anahtar veya şalter bulunmalıdır. Bu anahtar veya şalter operatörün kolaylıkla ulaşabileceği yakın bir yerde olmalıdır. Aparatı (çihaz) devreden çıkartma görevi yapan anahtar veya şalterin markası: IEC/EN 61010-1 § 6.11.3.1.
- Aparatı (çihaz) sıvı deterjan veya solvent kullanılarak yumuşak bir bez ile siliniz aşındırıcı temizlik ürünleri kullanmayınız.

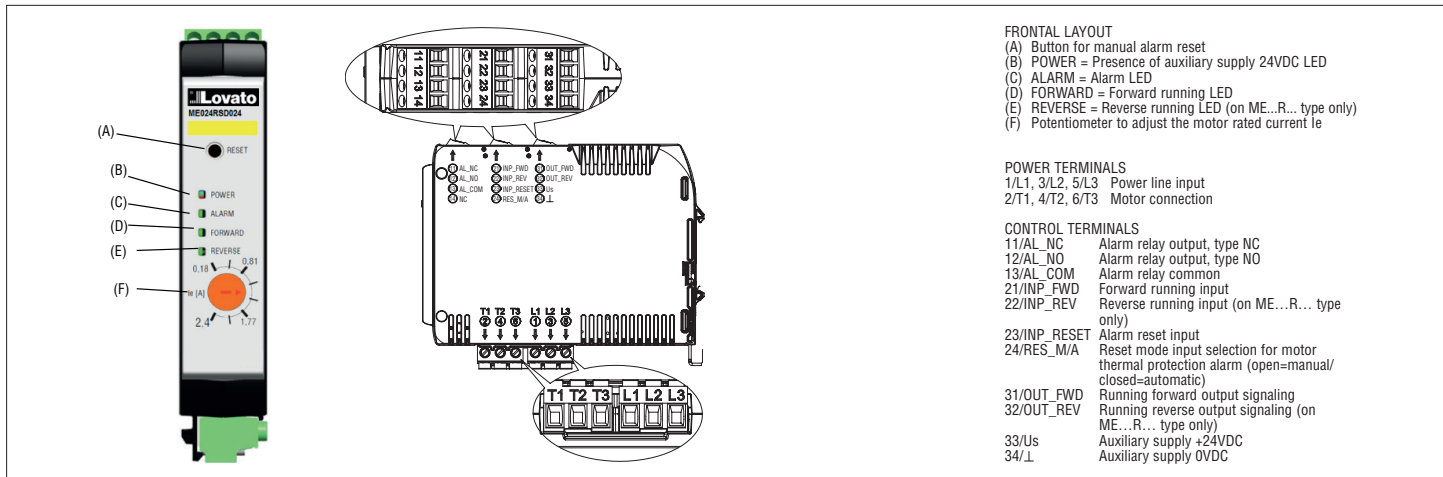


#### UPOZORENJE!

- Prije instalacije ili korištenja uređaja, pažljivo pročitate upute.
- Ovaj uređaj mora instalirati, u skladu s važećim normama, obučena osoba kako bi se izbjegle štete ili sigurnosne opasnosti.
- Prije bilo kakvog zahvata na uređaju otpojite napajanje s mjernih i napajajućih ulaza i kratko spojite ulazne stezaljke strujnog transformatora.
- Produđač ne snosi odgovornost za električnu sigurnost u slučaju nepravilnog korištenja opreme.
- Ovdje prikazan uređaj predmet je stalnog usavršavanja i promjena bez prethodne najave. Tehnički podaci i opisi u ovim uputama su točni, ali ne preuzimamo odgovornost za možebitne nenamjerne greške.
- U električnu instalaciju zgrade mora biti instaliran prekidač. On mora biti instaliran blizu uređaja i na dohvata ruke operatera, te označen kao rastavljač u skladu s normom IEC/EN/BS 61010-1 § 6.11.3.1.
- Uređaj čistite s mekom, suhom krpom bez primjene abraziva, tekućina, otapala ili deterdženta.



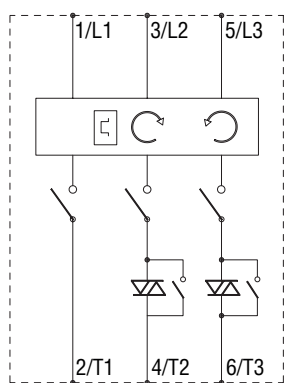
## 1. FRONTAL LAYOUT AND TERMINALS



## 2. STATUS LEDs

LED	Color	Type of signalling	Meaning
POWER	-	Off	Motor starter not powered (missing of 24VDC supply)
POWER	Green	On	Motor starter powered.
POWER	Yellow	On	Motor starter powered. Manual reset selected.
POWER	Blue	Flashing	Confirmation of motor current 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.
POWER	Yellow	Flashing alternately with the ALARM LED	System error. Contact the supplier.
ALARM	Red	Off	No alarms.
ALARM	Red	Flashing alternately with the POWER LED	System error. Contact the supplier.
ALARM	Red	On	Motor overload alarm (thermal protection)
ALARM	Red	Fast flashing (10Hz)	Phase failure alarm
ALARM	Red	Slow flashing (1Hz)	Phase imbalance alarm
FORWARD	Yellow	Off	The motor is not running in forward direction
FORWARD	Yellow	On	The motor is running in forward direction
REVERSE	Yellow	Off	The motor is not running in reverse direction
REVERSE	Yellow	On	The motor is running in reverse direction

## 3. SCHEME

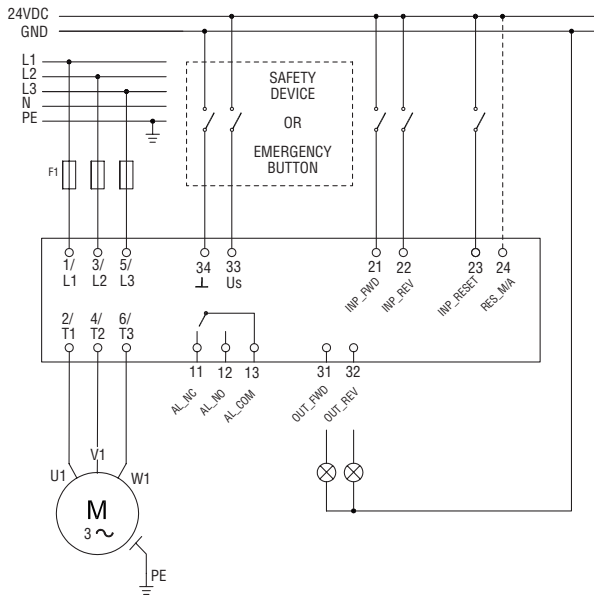


4. WIRING DIAGRAMS

ME...F/RSD024

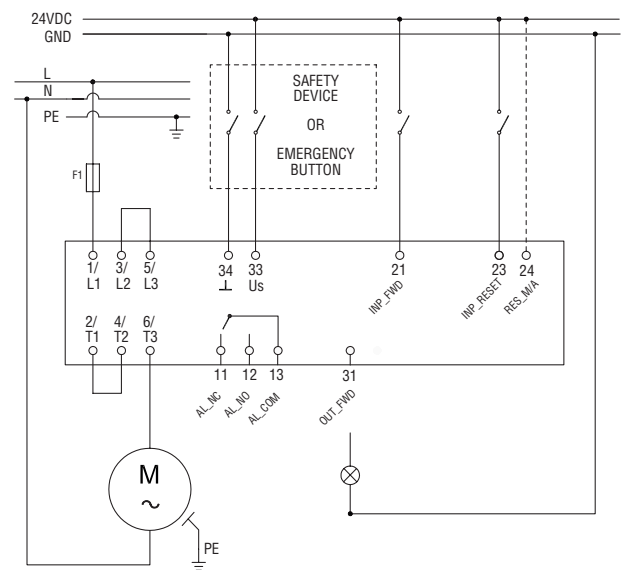
Safety applications, connection of three phase motor

1725 GB 07 24



ME...F/RSD024

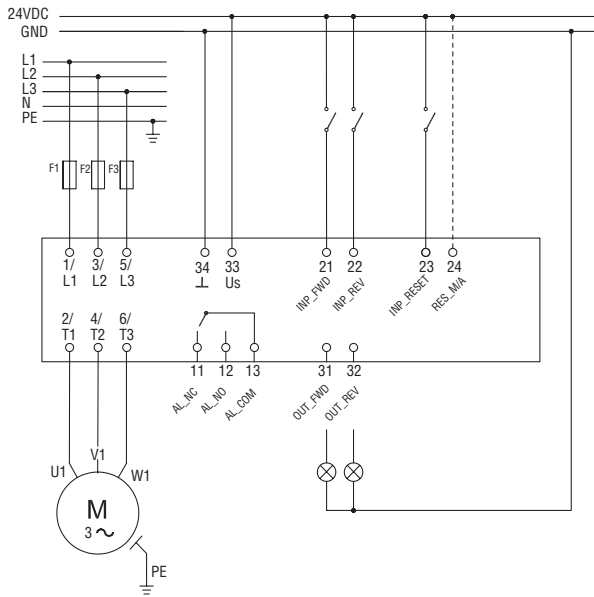
Safety applications, collegamento motore monofase



Note! The reverse running function cannot be used for single-phase motors

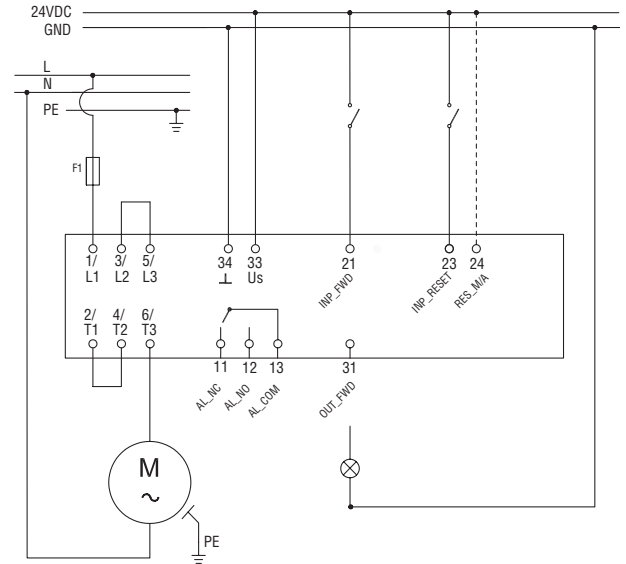
ME...F/RD024

Connection of three phase motor



ME...F/RD024

Connection of single phase motor

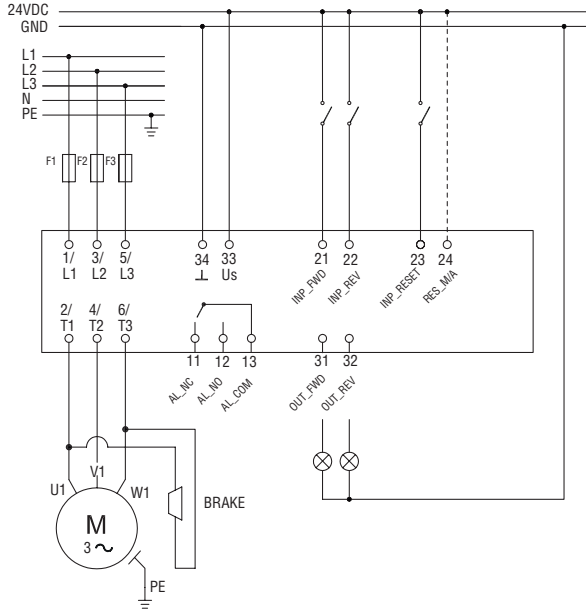


Note! The reverse running function cannot be used for single-phase motors.

**MOTOR WITH BRAKE 400VAC**

If a motor with brake (connection in the motor terminal block) is connected, the 400VAC brake must be linked to the 2/T1 and 6/T3 terminals.

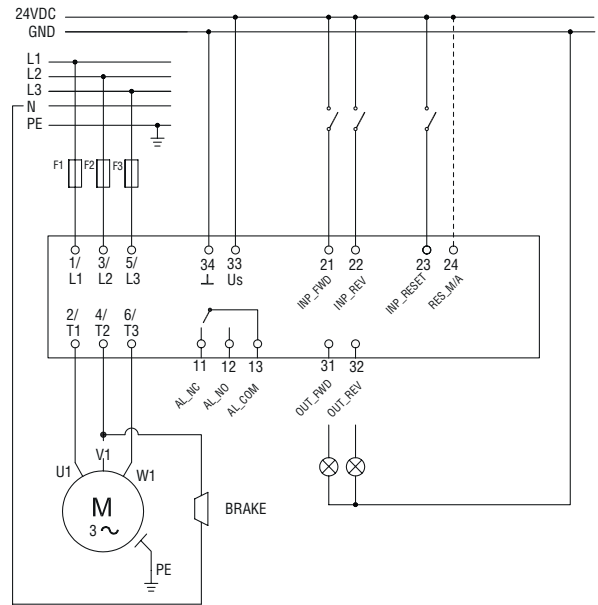
1725 GB 07 24



Note! increase motor current to the sum of the nominal currents (motor + brake).

**MOTOR WITH BRAKE 230VAC**

If a motor with brake (connection in the motor terminal block) is connected, the 230VAC brake must be linked to the 4/T2 and the star point of the motor.



Note! increase motor current to the sum of the nominal currents (motor + brake).

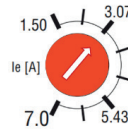
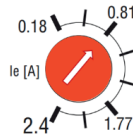
**5. NOMINAL CURRENT CALIBRATION**

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 POWER 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 RESET button on the front for more than 3 seconds, it is possible to check the calibration by flashing the POWER LED



## 6. MOTOR PROTECTION AND DIAGNOSTIC FUNCTION

### 6.1. REVERSE PROTECTION FUNCTIONS

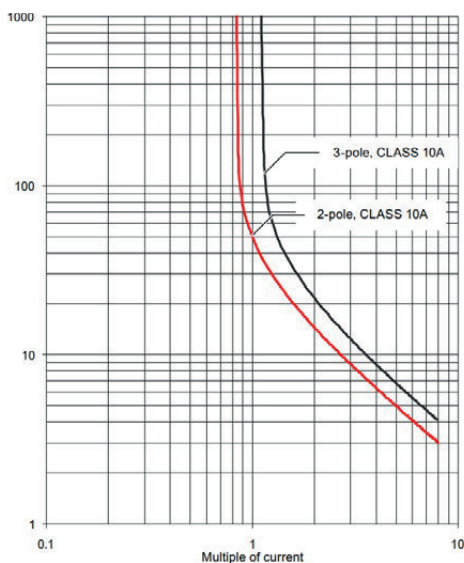
If both INP\_FWD and INP\_REV inputs are activated at the same time (simultaneous window of 50ms) the device does not activate the ignition sequence.

If, on the other hand, a gear is already in operation and the second gear is also activated, then the device ignores the second gear and keeps active the first gear that was already selected.

### 6.2. MOTOR THERMAL PROTECTION

During motor operation (forward or reverse running), if the motor exceeds the nominal absorption set with the front selector for a time that is a function of the percentage of over-current measured, the motor switches off and the red ALARM LED lights up.

The release time is defined by the Class10 curve shown below (e.g. with overload factor x8 it switches off after approx.2.5 s, with overload factor x2 it switches off after approx.18s).



Reactivation of the motor is not allowed for at least 3 minutes (cooling time). If manual reset has been configured, the command from the button or from the digital input is performed only if it occurs after this cooling time.

If the Automatic reset has been configured after the cooling time of 20 minutes, the controller automatically exits the alarm condition and returns to normal operation. Therefore, if the run command is still active, the motor restarts.

### 6.3. PHASE FAILURE OR NO LOAD PROTECTION

During motor operation (forward or reverse running), if the absorption value of a phase falls below 6% of the nominal value for more than 2 seconds, the motor shutdown sequence is activated and the alarm ALARM LED lights up with a 10Hz flashing frequency.

In this case the cooling time is not considered.

In the case of manual reset, the motor restarts but if the fault persists it will be repeated as soon as it is detected.

In case of automatic reset, the motor does not restart.

### 6.4. PHASE IMBALANCE PROTECTION

During motor operation (forward or reverse running) if the absorption value of one of the three phases differs by more than +/- 20% with respect to the average value of the 3 currents, the device detects the current imbalance alarm and activates the shutdown sequence after 60s.

In this case the cooling time is not considered.

In the case of manual reset, the motor restarts but if the fault persists it will be repeated as soon as it is detected.

In case of automatic reset, the motor does not restart.

### 6.5. DIAGNOSTIC TEST

Through a series of internal tests during the ignition, shutdown and running phases, the device can detect a malfunction and activate the engine shutdown sequence. The fault will be signaled by the alternating flashing of the POWER and ALARM LEDs.

## 7. RESET MODE

The Reset mode can be automatic or manual.

The Automatic mode is selected by bringing the 24VDC to terminal RES\_M/A.

#### – Manual alarm reset:

In the event of an active alarm (engine off and red AL led on) by pressing the front button for at least 3 seconds or bringing the 24VDC to terminal 23 INP\_RESET, the device resets the alarm condition and returns to normal operation.

#### – Automatic alarm reset:

In the event of an active alarm (engine off and red ALARM LED on), an alarm reset is performed after 20 minutes and is only available for the overload alarm.

However, the front manual reset button remains active (see paragraph "Warnings").

## 8. MAINTENANCE AND PERIODIC INSPECTIONS

Periodic maintenance to carry-out in order to guarantee the justified exclusion of failures are:

#### – Visual inspection of the status of the electrical and mechanical connections.

The maintenance is designed to evaluate possible problems due to situations of incorrect mounting.

Frequency: every two years

#### – Check the functionality of the safety function.

The maintenance has the purpose to verify periodically the correct execution of the safety function and perform the output diagnostic test at least once per year.

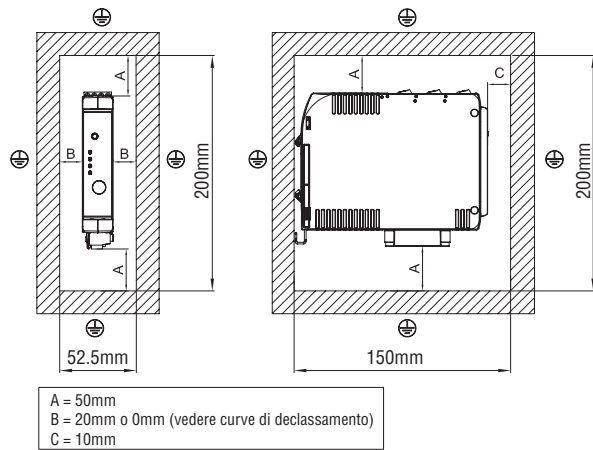
Frequency: every year.

## 9. FAILURES AND TROUBLESHOOTING

In case of failures or malfunctions, in the following table you can find the most common failures and the means of appropriate search.

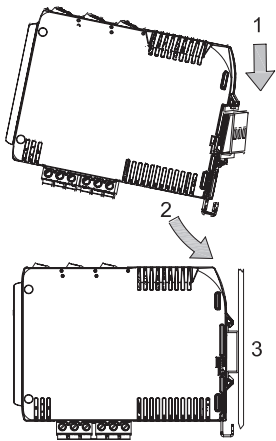
Failure	Possible cause	Troubleshooting
LED ALARM (red): Fast flashing (10Hz) - Alarm relay: energized	- One of the phases of motor power supply is missing (L1, L2, L3) - One motor current is equal to zero	1- Power-off the motor starter 2- Check the stability of motor power supply 3- Turn-off the motor power supply 4 - Check the connections on L1, L2, L3 and T1, T2, T3 5 - Check possible motor damages.
LED ALARM (red): Slow flashing (1Hz) - Alarm relay: energized	- Motor's power supply is unbalanced - The motor's currents are unbalanced	1- Power-off the motor starter 2- Check the stability of motor power supply 3- Turn-off the motor power supply 4- Check the connections on L1, L2, L3 and T1, T2, T3 5- Check possible Motor damages.
- LED ALARM (red): ON - Alarm relay: energized	- Motor overload	1- Power-off the motor starter 2- Check and remove the cause of motor overload/overheat Note: If the Automatic reset has been configured, after the cooling time of 20 minutes the controller automatically exits the alarm condition and returns to normal operation. Therefore, if the run command is still active, the motor restarts. <b>Power off the motor stater before checking for the cause of the motor over-load!</b>
- LED ALARM (red): Flashing - LED POWER (yellow): Flashing - Alarm relay: energized	- 24VDC power supply over/undervoltage - Overtemperature - Program sequence error - System failure	1- Power-off the motor starter 2- Turn-off the motor power supply 3- Check the correct connection of the power supply 4- Check if the power supply level is within specification 5- Check voltage supply stability 6- Check possible housing overtem-peratures. Remove the reasons, wait till cooling down and switch on the motor start 7- If the problem persists, send the device to factory for repair.
Power Supply (24VDC) present - No LEDs on	- System failure	1- Power-off the motor starter 2- Turn-off the motor power supply 3- Check the correct connection of the power supply 4- Check if the power supply level is within specification 5- Check voltage supply stability 6- If the problem persists, send the device to factory for repair.

## 10. INSTALLATION

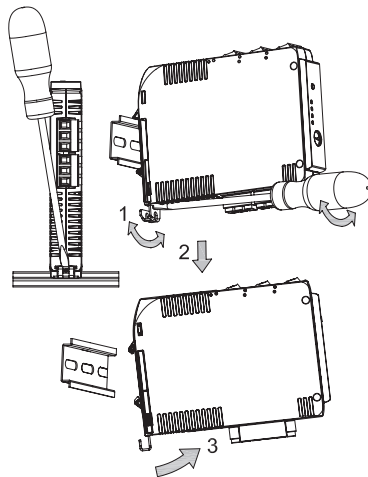


## 11. DIN RAIL MOUNTING

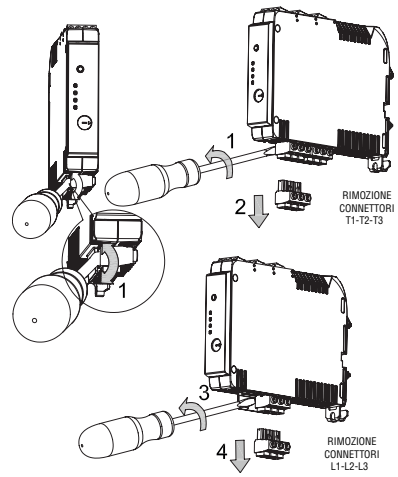
Connection to 35mm DIN rail



Disconnection from 35mm DIN rail

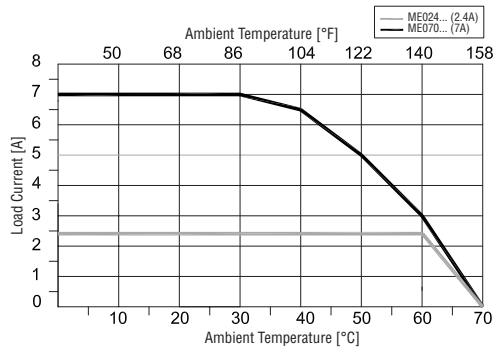


Power and motor terminals disconnection

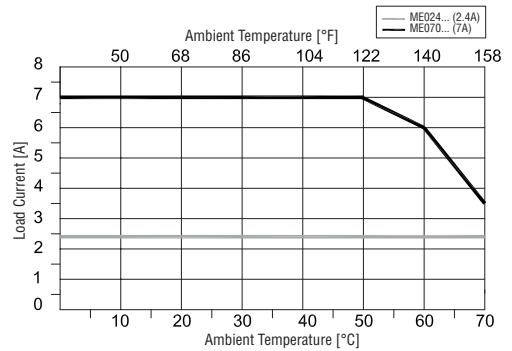


## 12. DERATING CURVE

Continuative use, without space between the devices (B=0mm)



Continuative use, with 20mm space between the devices (B=20mm)



## 13. SAFETY FUNCTION (ONLY FOR ME...S... VERSIONS)

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.

## 14. NUMBER OF STARTING OPERATIONS

Permissible number of starting operations per hour [1/h].

On-load factor: 50%.

Electronic motor starter		ME024...	ME070...	
Max. rated operating current I <sub>e</sub>		2,4A	7A	
Motor				
Starting current	Starting time [ms]	Operations per hour	Operations per hour	
250%	100	3300	1000	
	430%	100	1000	1000
		300	400	400
520%	500	220	220	
	630%	100	750	750
		300	250	250
500		100	100	
730%	100	500	500	
	300	150	150	
	500	100	100	
730%	100	500	360	
	300	150	100	
	500	100	60	

## 15. FUSES

Coordination type 1:

- 25 A gG / 10 kA / 500 V
- 30 A CC / 30 kA / 500 V

Coordination type 2:

- FA 16 A (6,3 x 32 mm) / 1,5 kA / 500 V
- 16 A FF / gR (10 x 38 mm) / 10 kA / 500 V

## Note

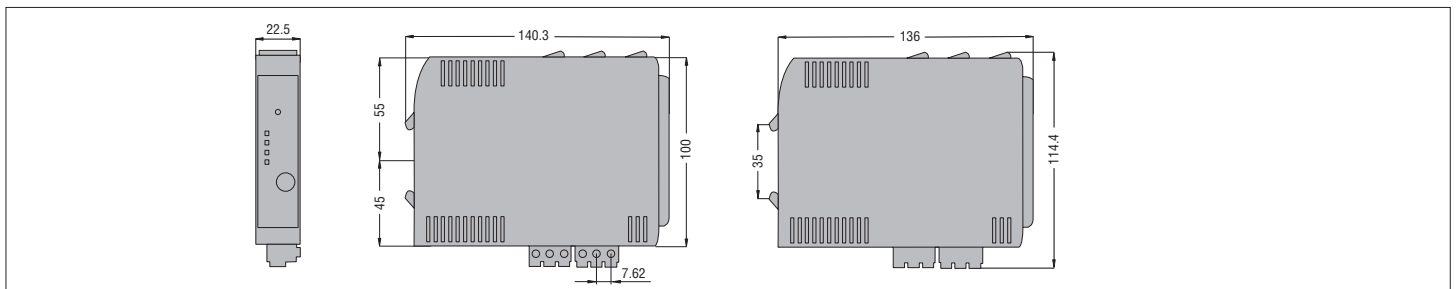
Type 1 and Type 2 coordination is a definition that applies to motor starters, set out in the IEC standard 60947-4-1. The coordination level relates to the level of resilience and protection in the event of a high current short-circuit fault. The differences between the two types can be summarised as follows.

- TYPE 1: A motor starter incorporating type 1 protection will protect persons and surrounding equipment from harm in the event of a short circuit fault, but may not be suitable for further service. For example, the contactor may have welded contacts, or the overload may be destroyed. Replacement parts or repairs will generally be required to get the motor starter back into service.
- TYPE 2: A motor starter incorporating type 2 coordination will again protect personnel and equipment from harm, but will also be suitable for further service without extensive repairs or replacements (though the standard does permit light welding of the contacts that can be separated easily with a screwdriver or similar). This allows the motor starter to continue use without the need for extensive maintenance or downtime.

## 16. WARNINGS

- Commissioning, assembly and configurations must only be carried out by experienced and qualified personnel.
- The motor connected to the circuit can start automatically if in the automatic restart position. In case of emergency stops it is necessary to prevent automatic restart of the machine by a higher level controller. Failure to follow these instructions can result in death, serious injury, or equipment damage.
- When working on the device, observe the national safety and accident prevention regulations.
- Startup, mounting, modifications, should only be carried out after disconnecting the power to the module.
- During operation, parts of electrical switching devices carry hazardous voltages. The device is an associated item of equipment.
- Do not install the device in potentially explosive areas.
- When installing and operating associated equipment, the applicable safety directives must be observed.
- If you use the "Automatic RESET" mode, the drive is switched on again after the cooling time has expired - if a control signal is still present. The cooling time is 20 minutes. For applications in the Ex-protection area, automatic restart is not permitted.
- The device may not be exposed to mechanical or thermal influences that exceed the limits as described in the operating instructions.
- The operating equipment cannot be repaired by the user and must be replaced by an equivalent device. Repairs may only be carried out by the manufacturer. Observe the safety information, conditions, and limits of use specified in the product documentation. Comply with them.
- Secure the device during safety-related applications with an access protection.
- Observe the minimum permissible load current in safety-related applications:
  - ME024...:  $\geq 180$  mA
  - ME070...:  $\geq 1.5$  A
- This is a product for environment A (industry). The device can cause unwanted radio interference if used in Class B environments (household). In this case, the user may be obligated to take the necessary pre-cautionary measures.
- Risk of electric shock and fire, the opening of the branch-circuit protective device may be an indication that a fault current has been interrupted.
- To reduce the risk of fire or electric shock, current carrying parts and the other components of the controller should be examined and replaced if damaged. Failure to follow instructions can result in death, serious injury, or equipment damage.

## 17. DIMENSIONS





## 18. TECHNICAL DATA

Three phase input (L1-L2-L3)	Value
Rated operational voltage U <sub>e</sub>	40...500VAC
Rated frequency	50/60Hz
<b>Auxiliary and command supply voltage (Us)</b>	
Auxiliary and command supply voltage	24VDC ±20% 50mA
<b>Rated current</b>	
Rated current I <sub>e</sub> (AC-3, AC-53a)	2.4 A (ME024...) 7.0 A (ME070...)
Motor thermal protection	Integrated, class 10A
Adjustment range	0.18-2.4 A (ME024...) 1.50-7A (ME070...)
<b>Alarm relay output (AL_NC, AL_NO, AL_COM)</b>	
Output type	1 relay output with changeover contact NO/NC
Output rating	3A 230V AC15, 2A 24V DC13
<b>Digital outputs (OUT_FWD, OUT_REV)</b>	
Outputs type	ME...F...: 1 PNP digital output ME...R...: 2 PNP digital outputs
Output ratings (IEC/EN 60947-5-1)	40mA max
<b>Environmental conditions</b>	
Operating temperature	-25...+70°C (see derating curves)
Storage temperature	-25...+80°C
Relative humidity (non-condensing)	20...90%
Pollution degree	2
<b>Durability</b>	
Mechanical life	15 million cycles
Electrical life	50 million cycles
<b>Insulation</b>	
Rated insulation voltage	500V
Rated surge voltage	6kV
<b>Installation</b>	
Fixing	35mm DIN rail (IEC/EN/BS 607015)
Protection degree	IP20
<b>Connection data</b>	
Conductor cross section	0.2...2.5mm <sup>2</sup> (24...14AWG)
Tightening torque	0.5...0.6Nm
Stripping length	8mm
<b>Safe Torque Off (STO), for type ME...S...</b>	
Safety Integrity Level (SIL, IEC 61508)	SIL3
Performance Level (ISO 13849)	PL e
Response time of the safety functions	<50ms
<b>Certifications and compliance</b>	
Certifications	cULus
Compliant with standards	IEC/EN/BS 60947-4-2, UL 60947-4-2, CSA C22.2 N°60947-4-2. STO function (for ME...S... only): Safety Integrity Level SIL3 (IEC/EN/BS 61508), Performance Level PL e (ISO 13849).

## 19. DATA FOR UL

## Electrical characteristic

Type	Three phase HP ratings Break all line 500V	
	FLA [A]	LRA [A]
ME024...	2,4	19,2
ME070...	7,0	56

- Control circuit power supply: 24 VDC, 50mA
- No.4 digital inputs: 5-30 VDC, 5mA
- No.2 digital outputs: 24 VDC, 40mA
- N.1 output relay with NO / NC connection. Switching capacity according to IEC 60947-5-1: 3A (230V, AC15), 2A (24V, DC13)

## Wiring

"Use copper cables (CU) 60/75°C".

## Power Circuit Connections(L1,L2,L3,T1,T2,T3):

- AWG range: 30-12, stranded or solid
- Tightening torque: 5-7 lb-in.

## Input, output, and auxiliary circuit connections (terminals from 11 to 34):

- AWG range: 14-22, stranded or solid
- Tightening torque: 3.46 lb-in.

## SCCR

Suitable for use in a circuit capable of delivering no more than 5kA symmetrical rms, maximum 500 Volts, when protected by a 20A Class RK5 fuse (coordination type 1).

## Environmental ratings

- Ambient temperature: 50°C.
- Rated surge voltage U<sub>imp</sub>: 6kV
- Pollution degree: 2