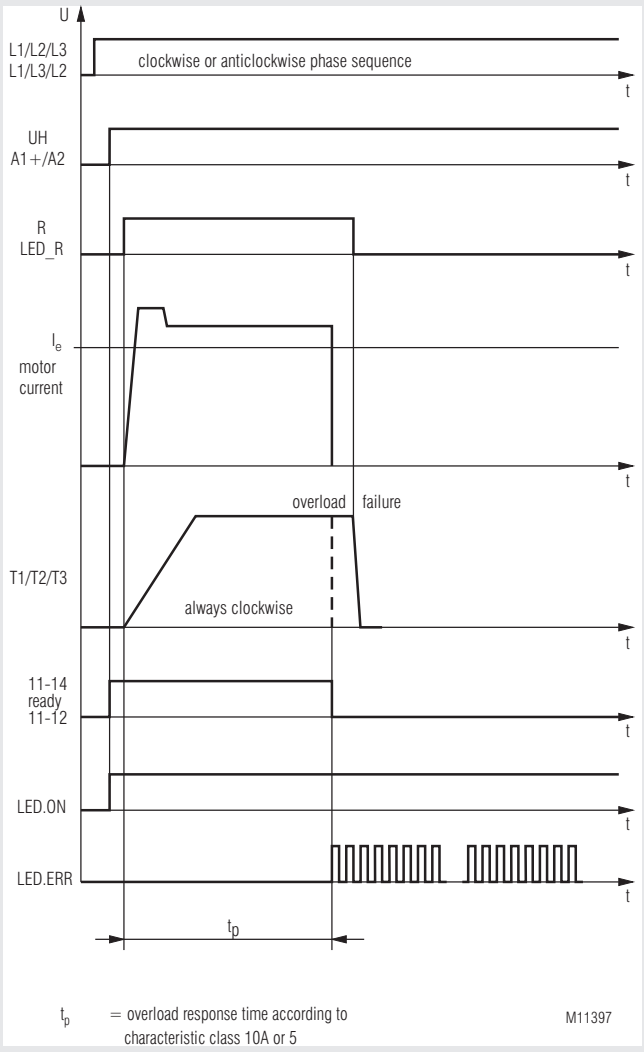
MINISTART
Smart Motorstarter with autom. phase sequence correction
UG 9256/804, UG 9256/807

0273199

Product Description

The smart motorstarter UG 9256/804 and UG 9256/807 is used to provide always a clockwise phase sequence and to start asynchronous motors. Independent of the the pase sequence on the input it will always provide clockwise sequence on the output to the motor. The unit also protects the motor against phase failure and motor overload. The relays of the reversing circuit switch without current. This provides a long electrical life.

Function diagram



Your Advantages

- Up to 3 functions in one unit
  - Providing clockwise phase sequence at the motor connection terminals
  - Phase failure detection
  - Motorprotection Class 10 A, Class 5
- Galvanic mains separation by forcibly guided contacts contact opening min. 0.5 mm (UG 9256/807)
- 66 % less space
- Simple and time-saving commissioning as well as user-friendly operation through setting via potentiometer on absolute scale
- Hybrid relay combines benefits of relay technology with non-wearing semiconductor technology
- High availablility by
  - Temperature monitoring of semiconductors
  - High withstand voltage up to 1500 V
  - Load free relay reversing function

Features

- According to UL 60 947-4-2
- To reverse the rotary field
- For 3-phase motors with rated motor current from I_e 1,5 A ... 9,0 A
- 1 potentiometer für setting of rated motor current
- 3 LEDs for status indication
- Reversing with relays without current, switching with thyristor
- Galvanic separated 24V-inputs for clockwise
- Reset button on front
- Connection facility for external reset button
- Relay indicator output for operation
- Galvanic separation between control circuit and power circuit
- Galvanic separation of motor terminals from mains voltage in off state or fault condition (UG 9256/807)
- Width 22.5 mm

Approvals and Markings

CE | c UL us LISTED * Canada / USA

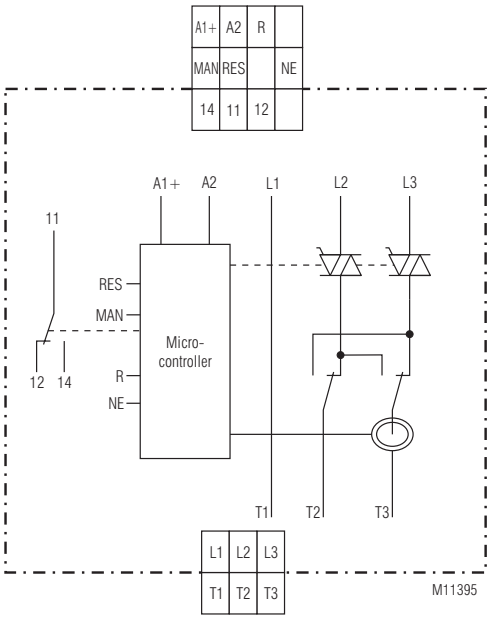
* in preparation

Application

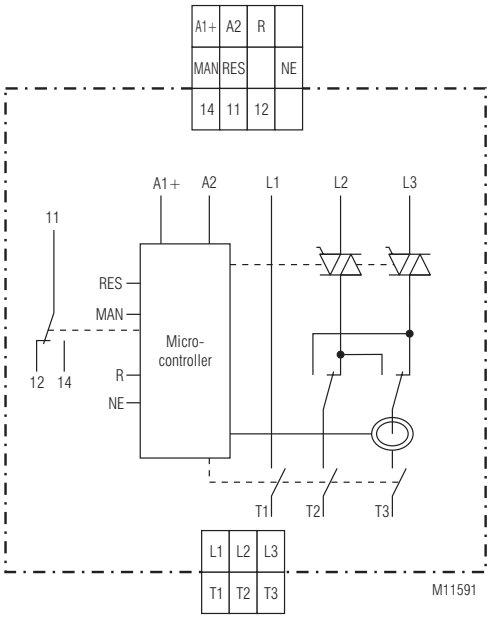
- Conveyor systems with preferred direction of rotation
- Actuating drives in process controls with preferred direction of rotation

All technical data in this list relate to the state at the moment of edition. We reserve the right for technical improvements and changes at any time.

Circuit Diagrams



UG 9256/804



UG 9256/807

Connection Terminals

Terminal designation	Signal description
A1 (+)	Auxiliary voltage + DC 24 V
A2	Auxiliary voltage 0 V
R+	Control input clockwise
L+	Control input anti-clockwise
NE	Earth connection control input
MAN	Output for remote reset
RES	Input for remote reset
11, 12, 14	Indicator relay for operation
L1	Phase voltage L1
L2	Phase voltage L2
L3	Phase voltage L3
T1	Motor connection T1
T2	Motor connection T2
T3	Motor connection T3

Functions

Motor protection (variant / 1_ _)
The thermal load of the motor is calculated using a thermal model. To calculate the thermal load the current is measured in phase T3.
A symmetric current load of all 3 phases of the motor is assumed for flawless functioning. When the trigger value – stored in the trigger characteristics -, is reached, the motor is switched off and the device switches to fault 8. The fault can be acknowledged via the reset button or reset input.

Attention: The data of the thermal model is cleared through reset or voltage failure. In this case, the user must provide adequate cooling time of the motor.

Phase failure
To make sure the motor is not loaded with asymmetric currents, a check takes place during motor start whether phases L1, L2 and L3 are present. If one or several phases are absent, the device switches to fault 4. The fault can be acknowledged via the reset button or reset input.
Phase failure is detected when he phase is missing for at least 1 second.

Motor connection (UG 9256/807)
In off state or fault condition the motor terminals are isolated from the mains voltage by a 4 pole. forcibly guided contact relay. The contact opening is min. 0.5 mm

Control inputs
Clockwise rotation can be selected via one control input. The reference connection for the control input is the terminal NE. The control input is galvanically separated from the rest of the unit.

Signalling output "Ready"
Contact 11/14 is closed if no device fault is present.

Indication

green LED "ON":	permanent on	- auxiliary supply connected
yellow LED "R":	permanent on	- clockwise, power semiconductors bridged
red LED "ERR":	short impulse	- Phase reversal detected
red LED "ERR":	flashing	- Error
	1*)	- Overtemperature on semiconductors
	2*)	- Wrong mains freqency
	4*)	- Icorrect synchronisation signal
	6*)	- mains isolating energized
	7*)	- Incorrect temperature measurement circuit
	8*)	- Motor protection has responded

1*) - 8*) = Number of flashing pulses in sequence

Reset Function

2 options are available to acknowledge the fault

Manual (reset button):
Acknowledgement is performed by operating the reset button at the front of the device. If the button is still actuated after 2 seconds, the device resumes the fault state.

Manual (remote acknowledgement):
Remote acknowledgement can be realised by connecting a button (N/O contact) between the terminals MAN and RES. Acknowledgement is triggered as soon as the contact of the button closes. If the button is still actuated after 2 seconds, the device resumes the fault state since a defect in the acknowledgement circuit cannot be ruled out.

Setting Facilities

Rotary switch I_e: - Nom. motor current 1.5 A_{eff} ... 9.0 A_{eff}

Set-up Procedure

1. Connect motor and device according to application example.
   The unit works with clockwise or anticlockwise phase sequence.
2. Adjust the nominal current of the connected motor with potentiometer Ie
3. Connect devive to power and start motor via control input R.

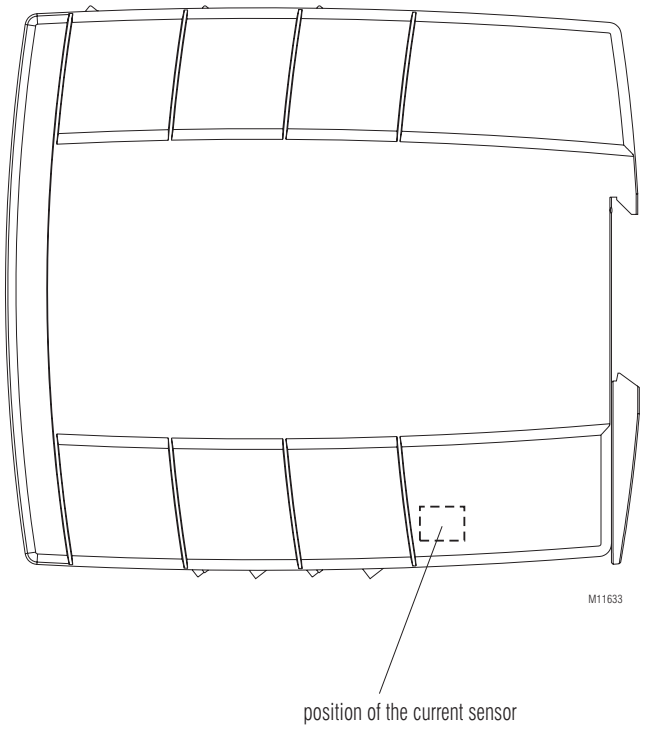
Safety Notes

- Never clear a fault when the device is switched on
- The user must ensure that the device and the necessary component are mounted and connected according to the locally applicable regulations and technical standards (VDE, TÜV,BG).
- Adjustments may only be carried out by qualified specialist staff and the applicable safety rules must be observed.
- After a short circuit the motor starter is defective and has to be replaced (Assignment type 1).
- Group supply:
  If several motor starters are protected together, the sum of the motor currents must not exceed 25 A.

Mounting Notes

When operated with rated continuous current the devices must not be placed closer than 10 mm side-by-side.

The phase current in the device is measured with a hall effect sensor. Due to this principle also magnetic fields next to the sensor may have an influence. When designing circuits with this motorstarter components that generate magnetic fields like contactors, transformers, high current wires should not be placed close to the sensor.



Technical Data

Nominal voltage L1/L2/L3:	3 AC 200 ... 480 V ± 10%	
Nominal frequency:	50 / 60 Hz , automatic detection	
Auxiliary voltage:	DC 24 V ± 10%	
Motor power:	4 kW at AC 400 V	
Min. motor power:	25 W	
Operating mode:	9.0 A:	
	AC 53a: 6-2: 100-30	IEC/EN 60947-4-2
Rated continuous current [1]:	9.0 A	
Measured nominal current:	9.0 A	

[1] The rated continuous current is the arithmetic mean value of starting and rated operating current of the motor in a cycle.

Surge current:	200 A (tp = 20 ms)	
Load limit integral:	200 A²s (tp = 10 ms)	
Peak reverse voltage:	1500 V	
Overvoltage limiting:	AC 550 V	
Leakage current in off state:	< 3 x 0.5 mA	
Consumption:	2 W	
Start up delay for master tick:	min. 100 ms	
Release delay for master tick:	min. 50 ms	
Overcurrent measuring device:	AC 0.5 ... 50 A	
Measuring accuracy:	± 5% of end of scale value	
Measured value update time		
at 50 Hz:	100 ms	
at 60 Hz:	83 ms	
Motor protection		
I_e 1.5 A to 6.9 A:	Class 10 A	
I_e 6.9 A to 9.0 A:	Class 5	
Short circuit strength:		
max. fuse rating:	25 A gL	IEC/EN 60 947-5-1

Inputs

Control input right:	DC 24V	
Rated current:	4 mA	
Response value ON:	DC 10 V ... 30 V	
Response value OFF:	DC 0 V ... 8 V	
Connection:	polarity protected diode	
Manuel:	DC 24 V (connect button on terminals "MAN" and "RES")	

Indicator Outputs

RES:	DC 24 V, semiconductor, short circuit proof, rated continuous current 0.2 A	
Ready:	Changeover contact 250 V / 5 A	
Contact:	1 Changeover contact	
Switching capacity		
to AC 15		
NO contact:	3 A / AC 230 V	IEC/EN 60 947-5-1
NC contact:	1 A / AC 230 V	IEC/EN 60 947-5-1
Electrical life		
to AC 15 at 3 A, AC 230 V:	2 x 10^5 switch. cycles	IEC/EN 60 947-5-1
Mechanical life:	15 x 10^6 switching cycles	
Permissible switching frequency:	1800 switching cycles/h	
Short circuit strength		
max. fuse rating:	4 A gG / gL	IEC/EN 60 947-5-1

Technical Data

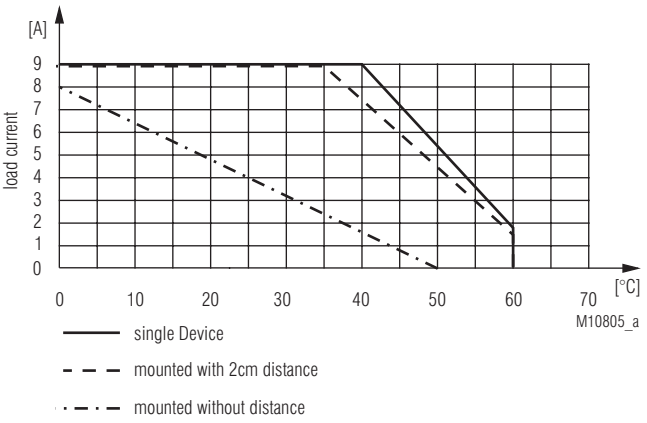
General Data

Operating mode:	Continuous operation	
Temperature range:	0 ... + 60 °C (see derating curve)	
Clearance and creepage distances		
overvoltage category / contamination level between control input- , auxiliary voltage and Motor voltage respectively		
indicator contact:	4 kV / 2	IEC/EN 60 664-1
EMC		
Electrostatic discharge (ESD):	8 kV (air)	IEC/EN 61 000-4-2
HF irradiation:	10 V / m	IEC/EN 61 000-4-3
Fast transients:	2 kV	IEC/EN 61 000-4-4
Surge voltage between		
wires for power supply:	1 kV	IEC/EN 61 000-4-5
between wire and ground:	2 kV	IEC/EN 61 000-4-5
HF-wire guided:	10 V	IEC/EN 61 000-4-6
Voltage dips:		IEC/EN 61 000-4-11
RF interference emission:	Limit Class value B	IEC/EN 60947-4-2
Radio interference,	Measurement procedures	EN 55 011
Radio interference voltage,	Measurement procedures	EN 55 011
Harmonics:		EN 61 000-3-2
Degree of protection:		
Housing:	IP 40	IEC/EN 60 529
Terminals:	IP 20	IEC/EN 60 529
Vibration resistance:	Amplitude 0.35 mm frequency 10 ... 55 Hz,	IEC/EN 60 068-2-6
Climate resistance:	0 / 055 / 04	IEC/EN 60 068-1
Wire connection:		DIN 46 228-1/-2/-3/-4
Screw terminal (fixed):		
Cross section:	1 x 0.34 ... 2.5 mm² solid or stranded ferruled (isolated)	
Insulation of wires or sleeve length:	8 mm	
Fixing torque:	0.5 Nm	
Wire fixing:	captive slotted screw	
Mounting:	DIN rail	IEC/EN 60 715
Weight:	220 g	

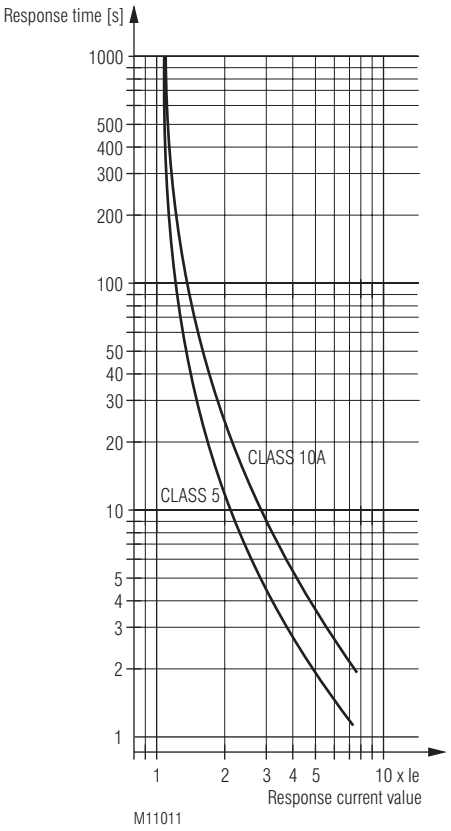
Dimensions

Width x height x depth:	22.5 x 105 x 120.3 mm

Characteristics



Derating curve:
Rated continuous current depending on ambient temperature and distance
Enclosure without ventilation slots



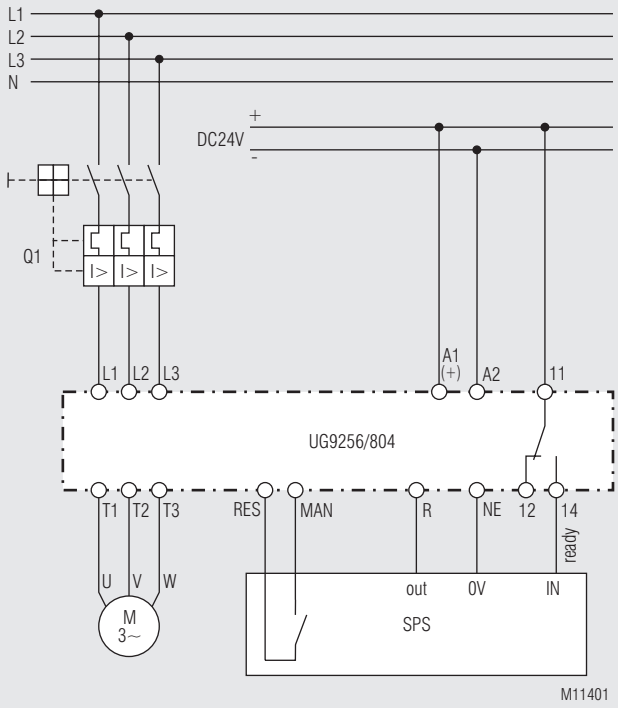
Trigger characteristics
Motor overload protection

Standard Types

UG 9256.11/804/61 3 AC 200 ... 480 V 9.0 A
Article number: 0066450
- Nominal voltage: 3 AC 200 ... 480 V
- Nominal current: 9.0 A
- Control input R
- Width: 22.5 mm

UG 9256.11/807/61 3 AC 200 ... 480 V 9.0 A
Article number: 0067133
- Nominal voltage: 3 AC 200 ... 480 V
- Nominal current: 9.0 A
- Main isolating
- Control input R
- Width: 22.5 mm

Application Example



Motor control with UG 9256/804 and PLC