TeSys Giga Series China

TeSys Control-Giga Contactors

TeSys Protect-Giga Electronic Overload Relays

Installation Guide

TeSys offers innovative and connected solutions for motor starters.

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09/2023

Legal Information

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Safety Information

Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

About the Book

Document Scope

Use this guide to:

- Familiarize yourself with the mechanical and electrical characteristics of the components of TeSys Giga Series:
  - TeSys™ Control-Giga Contactors
  - TeSys™ Protect-Giga Electronic Overload Relays
- Assemble and wire the contactors and overload relays.

Validity Note

This installation guide is valid for TeSys Control-Giga Contactors and TeSys Protect-Giga Electronic Overload Relays with configurations as mentioned below:

- 3-pole contactors:
  - 6 AC-3 ratings in 3 sizes:
    - 205–245 A
    - 300–410–475 A
    - 620 A
- Overload relays: 4 current rating ranges in 3 sizes:
  - 28–115 A and 57–225 A
  - 125–500 A
  - 160–630 A

The availability of some functions described in this guide depends on physical modules installed on the contactors and overload relays.

Online Information

The information contained in this document is likely to be updated at any time. Schneider Electric strongly recommends that you have the most recent and up-to-date version available on www.se.com/ww/en/download.

The technical characteristics of the devices described in the present document also appear online. To access the information online, go to the Schneider Electric home page www.se.com.

The technical characteristics presented in this guide should be the same as those that appear online. If you see a difference between the information contained in this guide and online information, use the online information.

For product compliance with environmental directives such as RoHS, REACH, PEP, and EOLI, go to *www.se.com/green-premium*.

Related Documentation

Document title	Description	Document number
TeSys Giga 电动机控制与保护产品中国版产品目录	Describes about the contactors and overload relays	ECATA1135
TeSys Control Giga Series China – Contactors – Instruction Sheet	Describes how to install the contactors	NNZ9700201
TeSys Control Giga Series China – Contactors for Wind Turbines – Instruction Sheet	Describes how to install the contactors	JYT9883101

Document title	Description	Document number
TeSys Protect Giga Series China – Electronic Thermal Overload Relays – Instruction Sheet	Describes how to install the overload relays	NNZ9700301
TeSys Control Giga Series China – Auxiliary Contacts with Screw Terminals – Instruction Sheet	Describes how to install the auxiliary contacts with screwterminals	NNZ9700401
TeSys Control Giga Series – Retrofit Kit for Contactors – Instruction Sheet	Describes how to mount the contactors on plate using the retrofit kit	NNZ4443401
TeSys Control Giga Series – Power Connection Accessories – Instruction Sheet	Describes how to mount the power connection accessories	NNZ4793901
Tesys Control Giga Series - Flexible Terminal Extensions - Instruction Sheet	Describes how to connect a moulded case circuit breaker to a LC1G contactor	NNZ9700101
TeSys Control Giga Series – Cable Memory – Instruction Sheet	Describes how to mount the cable memory	NNZ5141101
TeSys Control Giga Series China – Control Module – Instruction Sheet	Describes how to mount the control module	NNZ9699301
TeSys Control Giga Series – Switching Module – Instruction Sheet	Describes how to mount the switching module	NNZ5266601
TeSys Control Giga Series – IP20 Terminal Shrouds for LC1G205-475C Contactors – Instruction Sheet	Describes how to mount IP20 terminal shrouds on LC1G205-475C contactors	NNZ4804701
Tesys Control Giga Series - IP20 Terminal Shrouds for LC1G620C Contactors - Instruction Sheet	Describes how to mount IP20 terminal shrouds on LC1G620C contactors	JYT9976501
TeSys Control Giga Series – Combination Accessories – Instruction Sheet	Describes how to mount the mechanical interlock and coupling bars	NNZ4813501
TeSys Control Giga Series – Phase Separator – Instruction Sheet	Describes how to mount the phase separator	JYT2250601
TeSys Protect Giga Series – Mounting Base – Instruction Sheet	Describes how to mount the stand alone overload relay on the mounting base	NNZ4806801

Trademarks

QR Code is a registered trademark of DENSO WAVE INCORPORATED in Japan and other countries.

Precautions

Read and understand the following precautions before performing any procedures in this guide.

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462,NOM 029-STPS or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on this equipment.
- Use only the specified voltage when operating this equipment and any associated products.
- Power line circuits must be wired and protected in compliance with local and national regulatory requirements.
- Beware of potential hazards, and carefully inspect the work area for tools and objects that may have been left inside the equipment.

Failure to follow these instructions will result in death or serious injury.

Intended Use

The products described in this guide are low voltage switchgears intended for industrial use within industrial or commercial applications.

The product may only be used in compliance with all applicable safety regulations and directives, the specified requirements, and the technical data.

Before using the product, you must perform a hazard analysis and risk assessment of the planned application. Based on the results, appropriate safety related measures must be implemented.

Since the product is used as a component of a machine or process, you must ensure the safety of persons by means of the overall system design.

Operate the product only with the specified cables and accessories. Use only genuine accessories and spare parts. Any use other than the use explicitly permitted is prohibited and can result in unanticipated hazards.

Introduction to TeSys Giga Series

What's in This Chapter

TeSys Master Range

TeSys is an innovative motor control and management solution from the global market leader. TeSys offers connected, efficient products and solutions for switching and protection of motors and electrical loads in compliance with all major global electrical standards.

TeSys Control-Giga Contactors

Overview

TeSys Control-Giga contactors are high power contactors (up to 620 A AC-3 or 1050 A AC-1) for AC/DC motor applications and AC/DC load applications. They can be used up to 1000 Vac power voltage and up to 460 Vdc power voltage.

They are available with 3 main poles that have the same width and the same pole pitch as the associated Schneider Electric circuit breaker.

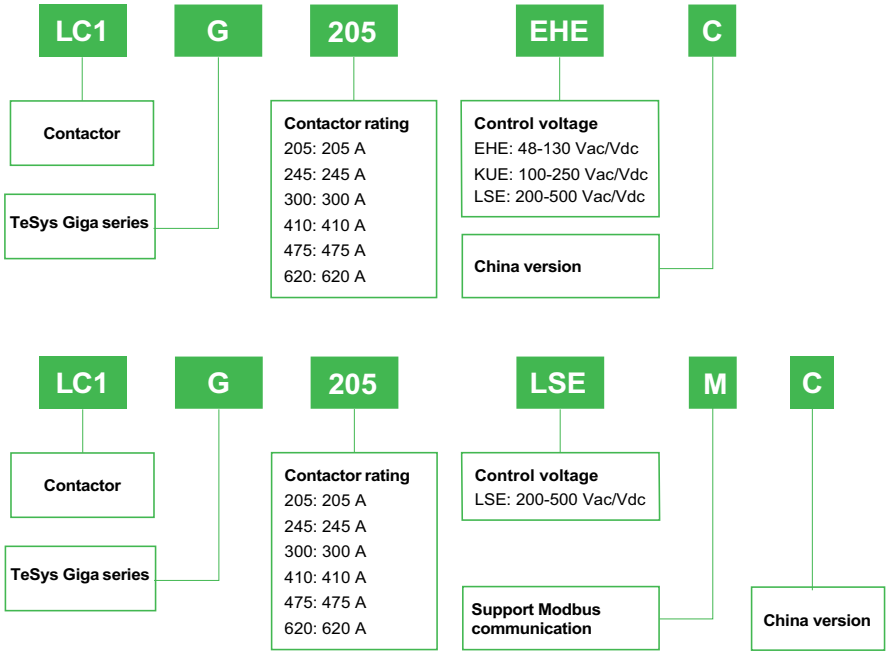
They can be supplied either by AC or DC control voltage and has the built-in surge suppressors. They can operate with a wide control voltage band. If they are supplied by DC control voltage, there is no need to respect the polarity.

They embed diagnosis functions as contact wear diagnosis or control voltage diagnosis. They are delivered with one auxiliary contact module of two auxiliary contacts (1 NO + 1 NC) with screw terminals. The auxiliary NC contact mirrors the state of the main poles and the auxiliary NO contact is mechanically linked to the NC auxiliary contact.

The control module controls the contactor by A1-A2 terminals. They can operate with 48-130, 100–250 or 200–500 Vac/Vdc control voltage ranges. The A1-A2 terminals are removable and use screw technology.

Coding Principle

The commercial reference of Tesys Giga contactors is coded with significant features to explain the type of contactor, current ratings at 440 Vac for AC-3 utilization category and control voltage.



Utilization Categories

The contactors are designed to switch AC or DC loads. The IEC 60947-4-1 standard defines the utilization categories for a contactor.

The table below provides the definition of the AC utilization categories:

Term	Definition
AC–1	Non–inductive or slightly inductive loads, resistance furnaces
AC–2	Slip–ring motors: starting, switching off
AC–3	Squirrel–cage motors: starting, switching off motors during running, reversing
AC–3e	Squirrel-cage motors with higher locked rotor current: starting, switching off motors during running, reversing
AC–4	Squirrel–cage motors: starting, plugging, inching
AC–5a	Switching of electric discharge lamp controls
AC–5b	Switching of incandescent lamps
AC–6a	Switching of transformers
AC–6b	Switching of capacitor banks
AC–7a	Slightly inductive loads in household appliances and similar applications
AC–7b	Motor–loads for household applications
AC–8a	Hermetic refrigerant compressor motor control with manual resetting of overload releases
AC–8b	Hermetic refrigerant compressor motor control with automatic resetting of overload releases

The table below provides the definition of the DC utilization categories:

Term	Definition
DC-1	Non-inductive or slightly inductive loads
DC-3	Shunt-motors: starting, plugging, inching, dynamic breaking of DC motors
DC-5	Series-motors: starting, plugging, inching, dynamic breaking of DC motors

Motor Ratings per IEC Utilization Categories

The table below indicates the motor ratings compatible with the 3–pole contactors for AC–3, AC–3e, and AC-4 utilization categories.

3P contactors	Category	230 Vac	400 Vac	415 Vac	440 Vac	500 Vac	690 Vac	1000 Vac
LC1G205●●●C LC1G205LSEMC	AC-3	63 kW	110 kW	110 kW	110 kW	129 kW	129 kW	100 kW
	AC-3e	63 kW	110 kW	110 kW	110 kW	129 kW	129 kW	100 kW
	AC-4	55 kW	90 kW	90 kW	100 kW	110 kW	110 kW	75 kW
LC1G245●●●C LC1G245LSEMC	AC-3	75 kW	132 kW	132 kW	132 kW	160 kW	160 kW	147 kW
	AC-3e	75 kW	132 kW	132 kW	132 kW	160 kW	160 kW	147 kW
	AC-4	55 kW	110 kW	110 kW	129 kW	132 kW	132 kW	110 kW
LC1G300●●●C LC1G300LSEMC	AC-3	100 kW	160 kW	180 kW	195 kW	200kW	220 kW	160 kW
	AC-3e	100 kW	160 kW	180 kW	185 kW	200kW	220 kW	160 kW
	AC-4	90 kW	160 kW	160 kW	185 kW	200 kW	220 kW	185 kW
LC1G410●●●C LC1G410LSEMC	AC-3	110 kW	220 kW	220 kW	250 kW	250 kW	280 kW	185 kW
	AC-3e	110 kW	220 kW	220 kW	250 kW	250 kW	280 kW	185 kW
	AC-4	110 kW	200 kW	200 kW	220 kW	250 kW	315 kW	220 kW
LC1G475●●●C	AC-3	147 kW	265 kW	280 kW	280 kW	355 kW	335 kW	335kW

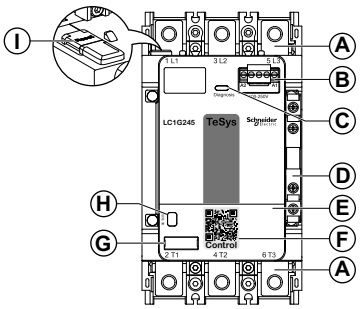
LC1G475LSEMC	AC-3e	147 kW	265 kW	265 kW	280 kW	315 kW	335 kW	335kW
	AC-4	150 kW	250 kW	250 kW	295 kW	295 kW	355 kW	280 kW
LC1G620●●●C LC1G620LSEMC	AC-3	200 kW	335 kW	375 kW	400 kW	400 kW	450 kW	450 kW
	AC-3e	180 kW	335 kW	335 kW	355 kW	400 kW	450 kW	450 kW
	AC-4	180 kW	315 kW	335 kW	355 kW	375 kW	450 kW	355 kW

Loads per IEC Utilization Category

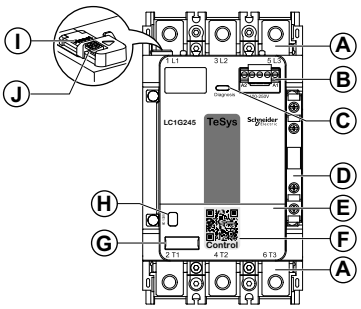
The table below indicates the loads compatible with the 3–pole contactors for IEC AC–1 utilization category .

3P contactors	**IEC AC-1 utilization category** **Maximum current** **(θ ≤ 40 °C)**	**IEC AC-1 utilization category** **Maximum current** **(θ ≤ 60 °C)**
LC1G205●●●C LC1G205LSEMC	305 A	275 A
LC1G245●●●C LC1G245LSEMC	330 A	300 A
LC1G300●●●C LC1G300LSEMC	440 A	400 A
LC1G410●●●C LC1G410LSEMC	550 A	500 A
LC1G475●●●C LC1G475LSEMC	700 A	600 A
LC1G620●●●C LC1G620LSEMC	1050 A	800 A

Hardware Description



LC1G205-620C

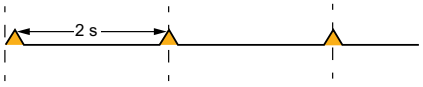
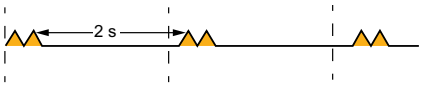
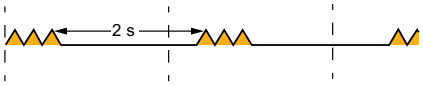
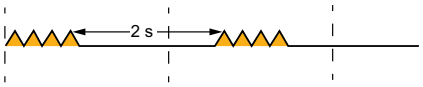
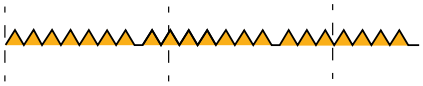
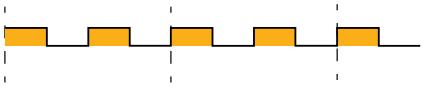


LC1G205-620LSEMC

Labels	Description
A	Power connections
B	A1–A2 control module terminal
C	Diagnosis orange LED
D	1 NO + 1 NC auxiliary contacts
E	Marking flap cover
F	QR code
G	Clip-on marker holder
H	ON/OFF status indicator
I	Diagnosis reset switch
J	Remote diagnosis Modbus module plug

Diagnosis LED

The below table provides the different LED indication functions:

LED indication	Diagnosis indication	Diagnosis function
	The contacts are worn, see Diagnosis Functions, page 17	Diagnosis contact wear
	The control voltage is lower than 80 % of Ucmin, see Diagnosis Functions, page 17	Under voltage
	The control voltage is higher than 110 % of Ucmax, see Diagnosis Functions, page 17	Over voltage
	The remote wear diagnosis module is not synchronized with the contactor, see Diagnosis Functions, page 17	Remote wear diagnosis module synchronization
	The wear diagnosis reset is in progress, see Switching Module Replacement, page 144	Reset of remote wear diagnosis
	A control module internal malfunction is detected, see Troubleshooting, page 151	Internal functioning

QR Code

When the QR code on the front face of a TeSys Giga series device is scanned with a smartphone having a QR code reader and connected to the internet, Go2SE Landing Page, page 33 is displayed. The landing page displays some information about the device and a list of menus.

Diagnosis Functions

Contact Wear Diagnosis

The contact wear increases every time the contactor breaks the current in the power circuit.

The contact wear algorithm embedded in the control module calculates the remaining service life of the contacts. When the remaining service life of the contacts is below 15%, it is indicated:

- locally by the Diagnosis LED on the front face of the contactor.
- remotely by the optional remote diagnosis Modbus module (LA9GRDMD) when a control module with commercial references ending with LSEMC is installed. See Remote Diagnostic Modbus Module, page 105

With this diagnosis indication, predictive maintenance can be planned for replacing the complete set of switching modules and avoiding breakdown maintenance.

For replacement of the switching modules and resetting the contact wear diagnosis, see Switching Module Replacement, page 144.

Control Voltage Diagnosis

The control voltage supplying the control module at A1-A2 is monitored.

With a control module with commercial references ending with LSEMC, the diagnosis indication is available remotely with the optional RDM module. See Remote Diagnostic Modbus Module, page 105

Under Voltage

If the control voltage supplying the control module at A1-A2 is lower than 80 % of Ucmin, it is indicated by the Diagnosis LED flashing 2 times at repeated intervals.

Ucmin is the minimum value of rated control voltage range (Uc) of the control module.

Example: for a control module with Uc = 48-130 Vac/Vdc, Ucmin = 48 Vac/Vdc.

If under voltage is detected, see Troubleshooting, page 151.

Over Voltage

If the control voltage supplying the control module at A1-A2 is higher than 110 % of Ucmax, it is indicated by the Diagnosis LED flashing 3 times at repeated intervals.

Ucmax is the maximum value of rated control voltage range (Uc) of the control module.

Example: for a control module with Uc = 48-130 Vac/Vdc, Ucmax = 130 Vac/Vdc.

If over voltage is detected, see Troubleshooting, page 151.

Internal Functioning Diagnosis

The control module checks its correct internal functioning. If an internal malfunction is detected, it is indicated by the Diagnosis LED blinking. See Troubleshooting, page 151

With a control module with commercial references ending with LSEMC, the diagnosis indication is available remotely with the optional RDM module. See Remote Diagnostic Modbus Module, page 105.

Control Module Temperature Diagnosis

Temperature of the control module with commercial references ending with LSEMC is monitored. If the temperature exceeds its operation limit, it can be indicated locally or remotely through the optional RDM module. See Remote Diagnostic Modbus Module, page 105.

Contactor Operating Times Diagnosis

The control module with commercial references ending with LSEMC can count operating cycles of the contactor and communicates the number of operating cycles remotely through the optional RDM module. See Remote Diagnostic Modbus Module, page 105.

Control Mode

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

Size the command components according to the control circuit characteristics.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Coil voltage supply and control signal are the same signal and use just one channel connected to A1-A2 control module terminals.

The poles are closed as soon as the control voltage is supplied to A1-A2 control module terminals.

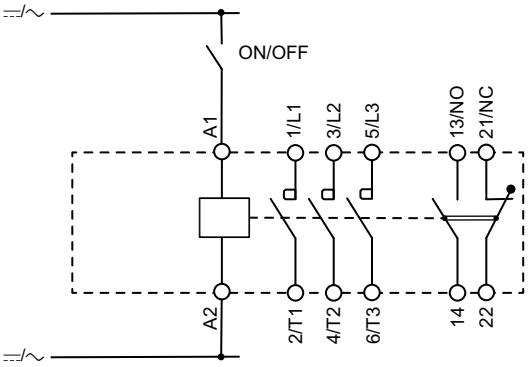
The poles are open as soon as the control voltage is removed from A1-A2 control module terminals.

Depending on the control circuit wiring diagram, the control mode has two types:

- Maintained type (two-wire mode)
- Pulse type (three-wire mode)

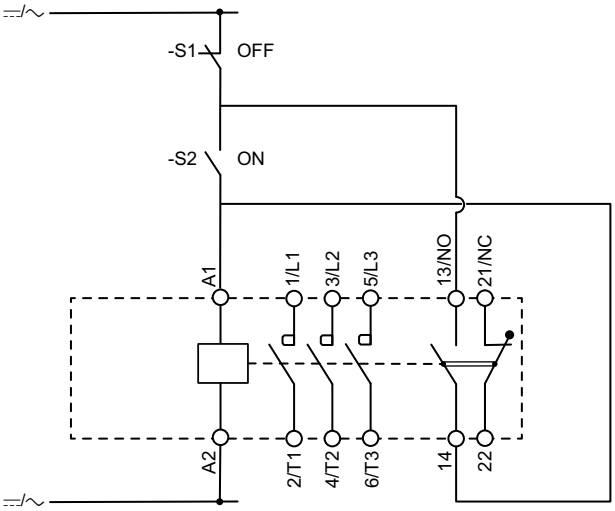
Two-wire mode: The command is maintained type. The poles close and stay closed as soon as the command is ON.

The poles open and stay opened as soon as the command is OFF.



Three-wire mode: The commands are pulse type. The use of one NO auxiliary contact and two command components are necessary.

The poles close as soon as there is a pulse command ON. The poles stay closed up to a pulse command OFF.



TeSys Protect-Giga Electronic Overload Relays

Overview

TeSys Protect-Giga electronic overload relays are self–powered electronic thermal overload relays with thermal memory. They are designed to protect 50/60 Hz three-phase or single-phase asynchronous motors.

The TeSys Giga overload relays can be mounted directly on TeSys Giga contactors of the same size, or mounted standalone.

The overload relays provide the below current-based protection functions:

- Thermal overload protection
- Ground-fault protection
- Phase imbalance protection
- Phase loss protection

The overload relays are not compatible for the DC motor protection.

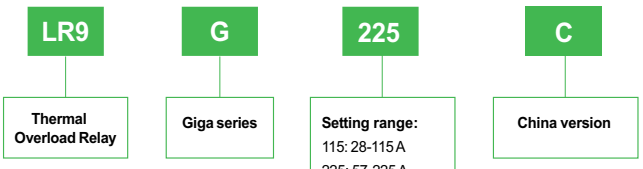
Range

The table below describes the range of the TeSys Giga electronic overload relays:

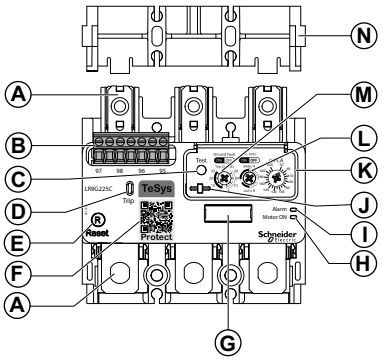
Commercial reference	Ir/FLA setting range	Direct mounting on contactor
LR9G115C	28–115 A	LC1G205-245C
LR9G225C	57–225 A	LC1G205-245C
LR9G500C	125–500 A	LC1G300-475C
LR9G630C	160–630 A	LC1G620C

Coding Principle

The commercial reference of TeSys Giga overload relays is coded with significant features to explain the type and the ratings of the overload relay.



Hardware Description



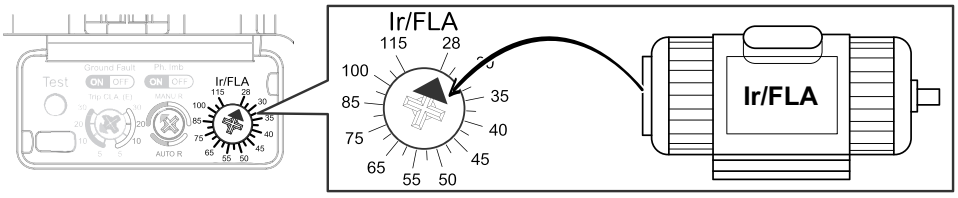
Label	Description
A	Power connections
B	Control terminal
C	Test button
D	Trip indicator
E	Reset button
F	QR code
G	Clip–on marker holder
H	Motor ON green LED
I	Alarm orange LED
J	Sealable cover
K	Ir/FLA setting
L	Overload reset mode setting and phase imbalance activation
M	Trip class setting and ground fault activation
N	Phase separator adaptor

Motor ON and Alarm LEDs

LED	LED status	Indication
Motor ON	Green steady	The motor is supplied: • On LR9G115C or LR9G225C relays: the current measured is higher than 25 A • On LR9G500C or LR9G630C relays: the current measured is higher than 50 A
	Green blinking	An overload relay internal malfunction is detected, see Troubleshooting, page 151
	OFF	The motor is not supplied: • On LR9G115 or LR9G225 relays: the current measured is lower than 25 A • On LR9G500 or LR9G630 relays: the current measured is lower than 50 A
Alarm	Orange steady	Overload alarm: 90% of the motor thermal capacity is reached

Ir/FLA Setting

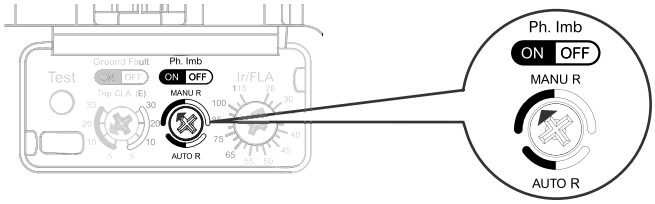
The Ir/FLA setting corresponds to the rated current of the motor or full load amp and can be adjusted with a 56-position rotary switch.



Overload Reset Mode Setting and Phase Imbalance Activation

The same rotary switch is used:

- to enable or disable the automatic reset of the thermal overload protection.
- to enable or disable the phase imbalance protection.



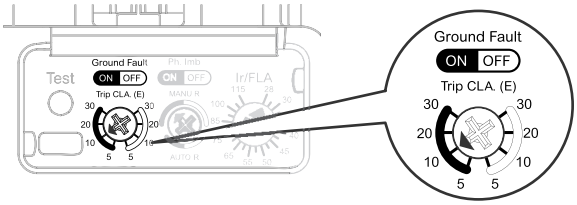
	The thermal overload protection automatic reset is disabled and the phase imbalance protection is enabled.
	The thermal overload protection automatic reset is disabled and the phase imbalance protection is disabled.

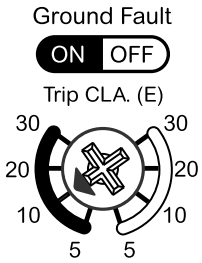
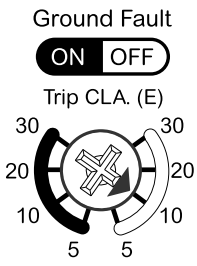
	The thermal overload protection automatic reset is enabled and the phase imbalance protection is enabled.
	The thermal overload protection automatic reset is enabled and the phase imbalance protection is disabled.

Trip Class Setting and Ground Fault Activation

The same rotary switch is used:

- to set the trip class of the thermal overload protection.
- to enable or disable the ground fault protection.

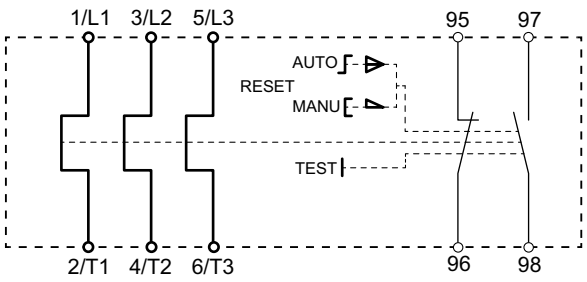


	The ground fault protection is enabled and the thermal overload trip class is set to 10E.
	The ground fault protection is disabled and the thermal overload trip class is set to 10E.

QR Code

When the QR code on the front face of a TeSys Giga series device is scanned with a smartphone having a QR code reader and connected to the internet, Go2SE Landing Page, page 33 is displayed. The landing page displays some information about the device and a list of menus.

Wiring Diagram



Current–Based Protection Functions

There are four current–based protection functions provided by the overload relay:

- Thermal overload protection
- Phase loss protection
- Phase imbalance protection
- Ground–fault protection

Operation

The state of the auxiliary contacts of the overload relay changes, when a protection function triggers a tripping:

- NC 95/96 contact state changes from closed to open.
- NO 97/98 contact state changes from open to closed.

The trip state is latched and is indicated by the trip indicator on the front face of the overload relay. A reset action is required to acknowledge the trip condition and to release the auxiliary contacts.

The auxiliary contacts of the overload relay can be used as follows:

- the NC contact can be used to switch off the contactor and then stop the motor.
- the NO contact can be used to signal remotely the state of the overload relay.

Trip Reset

The trip state of the overload relay is latched and must be reset. The reset action releases the trip indicator and the auxiliary contacts:

- NC 95/96 contact changes from open to closed.
- NO 97/98 contact changes from closed to open.

Once tripped, the overload relay can always be reset manually. Only trip due to thermal overload protection can be reset automatically. For more information, refer to Thermal Overload Protection, page 26.

To reset the overload relay manually:

- Push the reset button mechanically on the overload relay :
  - On the front face or
  - Using the flexible cable LAD7305
- Or send an electrical remote reset order by using the electrical remote reset accessory LAD703●.

  NOTE: A trip order always takes priority over a reset action.

Factory Settings

The overload relays are delivered with the factory settings as follows:

- Thermal overload protection: enabled.
- Ir/FLA threshold: Ir/FLA minimum value.
- Reset mode: Manual.
- Trip class: 10E.
- Phase loss protection: enabled.
- Phase imbalance protection: enabled.
- Ground-fault protection: enabled.

Thermal Overload Protection

Overview

The thermal overload protection is used to protect asynchronous motors against thermal overload conforming to the IEC 60947-4-1 standard.

The thermal overload protection can be used to protect:

- Three-phase IE1, IE2, IE3, and IE4 asynchronous motors.
- Single-phase asynchronous motors.

The thermal overload condition causes the overheating of the motor. Thermal overload conditions occur:

- During the starting phase when the starting time is too long, or if there is stalling conditions.
- During operation if there is jam condition or any condition that results to increase abnormally the currents flowing in the motor.

For more information on protection of single-phase motors, see Single-Phase Motor Application, page 115.

Operation

The overload relay calculates the thermal state and thermal capacity of the motor continuously.

- When the motor thermal capacity used exceeds 90%: the Alarm LED on the overload relay turns on steady orange to signal an alarm, indicating that the motor is approaching a thermal overload. The motor will stop shortly, if no action is performed to solve the thermal overload. The thermal overload alarm is cleared by the overload relay when the thermal capacity used falls below 80%.
- When the motor thermal capacity used exceeds 100%: the thermal overload protection triggers a trip and the state of the auxiliary contacts changes.

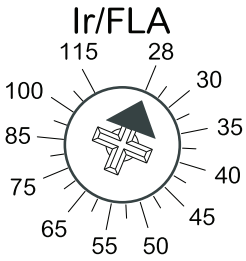
  NOTE: The thermal overload protection cannot be disabled.

Settings

The settings of the thermal overload protection are Ir/FLA threshold and trip class.

- **Ir/FLA threshold**

  The Ir/FLA threshold corresponds to the rated current of the motor or full load amp and can be adjusted with a 56-position rotary switch.

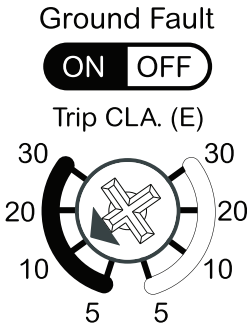


  The table below provides the setting range of the Ir/FLA threshold:

Commercial reference	Ir/FLA setting range
LR9G115C	28–115 A
LR9G225C	57–225 A
LR9G500C	125–500 A
LR9G630C	160–630 A

- **Trip class**

  The trip class allows to adapt the tripping time of the thermal overload protection to the application. Trip classes are defined by the IEC 60947-4-1 standard. The trip class can be selected with a rotary switch.



  The following table indicates the tripping time (Tp) depending on the trip class selected:

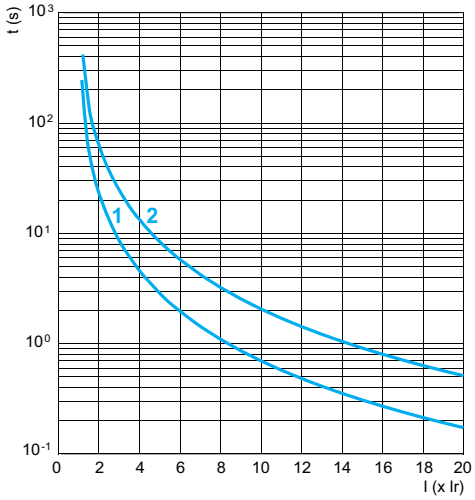
Current in the load	Class 5E	Class 10E	Class 20E	Class 30E
7.2 x Ir	3 s < Tp ≤ 5 s	5 s < Tp ≤ 10 s	10 s < Tp ≤ 20 s	20 s < Tp ≤ 30 s

Tripping Curves

The tripping curves of the thermal overload protection indicates the tripping time (Tp) for each trip class depending on the current load and the thermal state of the overload relay. The two states are the cold state and the hot state:

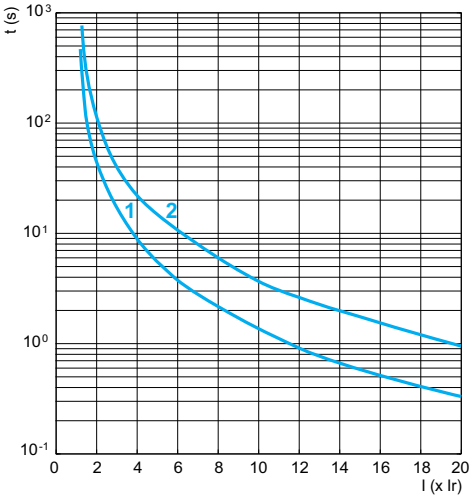
- **Cold state:** Thermal state of the overload relay when it was not loaded previously and the thermal capacity used is 0%.
- **Hot state:** Thermal state of the overload relay when it was loaded at setting current and the thermal capacity used is 75%.

Class 5E



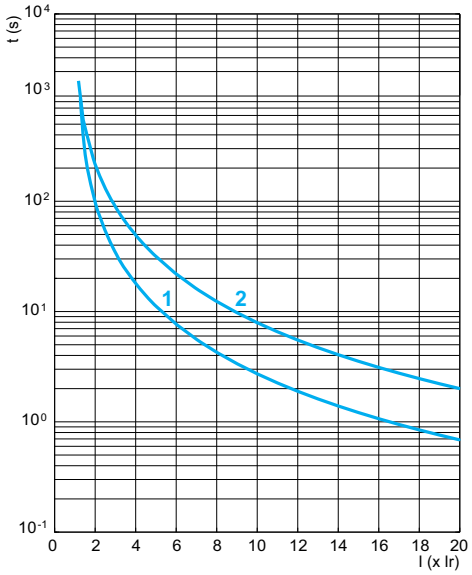
1 Hot State
2 Cold State

Class 10E



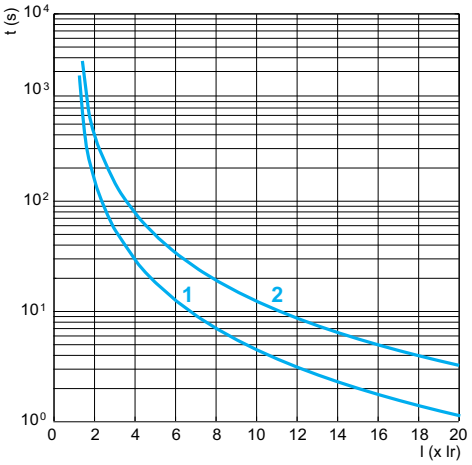
1 Hot State
2 Cold State

Class 20E



1 Hot State
2 Cold State

Class 30E



1 Hot State
2 Cold State

Manual Reset

The thermal overload protection can be reset manually. For more information, refer to Trip Reset, page 25.

Automatic Reset

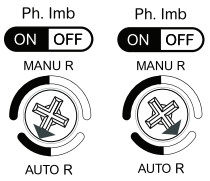
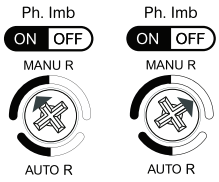
⚠WARNING

UNINTENDED EQUIPMENT OPERATION

Before setting to **AUTO R**, ensure that automatic restart of the motor will not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The automatic reset of the thermal overload protection can be enabled or disabled by using a rotary switch.

	The thermal overload protection automatic reset is enabled.
	The thermal overload protection automatic reset is disabled.

When the automatic reset is enabled, the thermal overload trip is reset automatically in 2±1 minutes.

Phase Loss Protection

Overview

The phase loss protection is used to protect three-phase asynchronous motors against phase loss conforming to the IEC 60947-4-1 standard.

The phase loss protection can be used to protect three-phase IE1, IE2, IE3, and IE4 asynchronous motors.

Phase loss causes the overheating of the motor. It occurs in case of blown fuses or loose power connection.

Operation

The overload relay calculates the rms current value in each phase continuously. When the rms current value in one of the three phases is lower than 0.1 Ir and the rms current value in another phase is greater than 0.8 Ir, the overload relay triggers a tripping in 4 +/- 1 s.

NOTE: The phase loss protection cannot be disabled.

Manual Reset

The phase loss protection can be reset manually only. For more information, refer to Trip Reset, page 25.

Phase Imbalance Protection

Overview

The phase imbalance protection is used to protect asynchronous motors against current phase imbalance conforming to the IEC 60947-4-1 standard.

The phase imbalance protection can be used to protect three-phase IE1, IE2, IE3, and IE4 asynchronous motors.

Phase imbalance causes the overheating of the motor. It can occur in case of:

- Long main supply lines.
- Defective contact on the incomer switch.
- Imbalanced network.

Operation

The overload relay calculates the imbalance current ratio in each phase as given below:

- Ii1 = (| I1 - Iavg | x 100) / Iavg
- Ii2 = (| I2 - Iavg | x 100) / Iavg
- Ii3 = (| I3 - Iavg | x 100) / Iavg

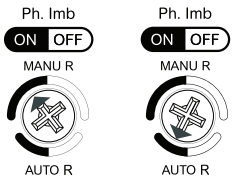
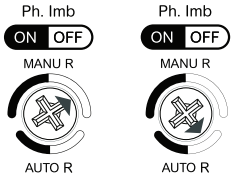
Where Iavg = (I1 + I2 + I3) / 3, and I1, I2 ,I3 are the current values in L1, L2, L3 phases.

The network imbalance ratio Iimb is the maximum imbalance current ratio calculated: Iimb = Max (Ii1, Ii2, Ii3).

When the imbalance ratio Iimb exceeds 40%, the overload relay triggers a trip in 5 +/- 1 s.

Settings

The table below indicates the position of the rotary switch used to enable or disable the phase imbalance protection.

	The phase imbalance protection is enabled.
	The phase imbalance protection is disabled.

Manual Reset

The phase imbalance protection can be reset manually only. For more information, refer to Trip Reset, page 25.

Ground Fault Protection

Overview

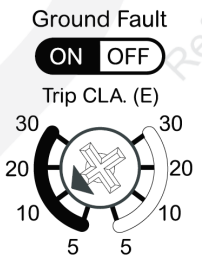
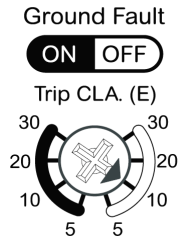
The ground-fault protection is used to protect asynchronous motors against ground fault conforming to the IEC 60947-4-1 standard.

The ground-fault protection can be used to protect three-phase IE1, IE2, IE3, and IE4 asynchronous motors.

Ground fault occurs when the insulation drops on the load circuit due to vibration or moisture.

Settings

The table below shows the position of the rotary switch used to enable or disable the ground-fault protection.

	The ground fault protection is enabled. Ig = 0.75 Ir.
	The ground fault protection is disabled.

Operation

The overload relay calculates the ground current Ig continuously. When the ground current Ig exceeds more than 10%, the relay trips in 1±20% s.

Manual Reset

The ground fault protection can be reset manually only. For more information, refer to Trip Reset, page 25.

Go2SE Landing Page

Presentation

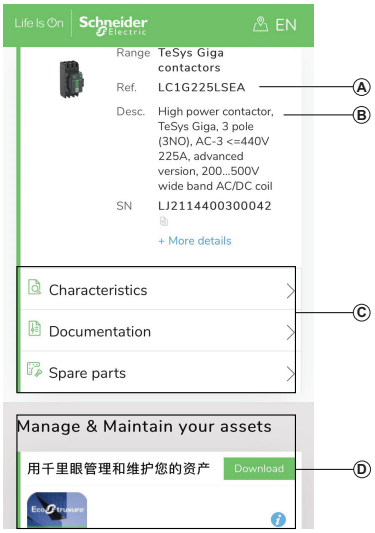
When the QR code on the front face of a TeSys Giga series device is scanned with a smartphone having a QR code reader and connected to the internet, the Go2SE landing page is displayed.

The landing page displays information about the device and a list of menus.

Landing Page Description

The landing page is accessible from Android and iOS smartphones. It displays the same list of menus with slight differences in presentation.

The following example shows the landing page displayed on an android smartphone:



A Commercial reference of TeSys Giga series device

B Type of TeSys Giga series device

C Landing page menus. See the following menu descriptions for details.

D Downloadable applications

Characteristics

Selecting this menu gives access to the product datasheet with detailed information about the TeSys Giga series device.

Documentation

Selecting this menu gives access to the technical documentation related to the product.

用千里眼管理和维护您的资产

Selecting this application gives access to the 千里眼 mobile application that can be downloaded on Android and iOS smartphones. For smartphone compatibility, check on your application store.

千里眼 mobile application optimizes operations and maintenance, helping to ensure business continuity, and provides insights to service providers or facility managers.

千里眼 is a real-time collaborative technology available on mobile devices and PCs that enables managers and maintenance personnel to be connected with facilities and equipment. Information exchange between users is simple and fast.

The QR code on TeSys Giga series device enables managers and maintenance personnel to access the following automatic downloads:

- TeSys Giga series device identifier.
- Technical documentation.
- The maintenance plan for the TeSys Giga series device.

千里眼 enables managers and maintenance personnel to access the maintenance plan for TeSys Giga series devices.

千里眼 helps maintenance personnel to diagnose issues remotely and manage maintenance efficiently by:

- Providing relevant information on critical assets.
- Sending immediate state of the equipment and detailed information helping for diagnostics.

mySchneider App

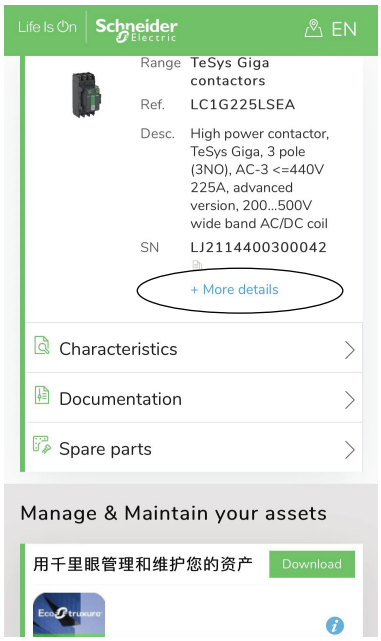
Selecting this application gives access to the Schneider Electric customer care mobile application **mySchneider** app that can be downloaded on Android and iOS smartphones. For smartphone compatibility, check on your application store. The customer care application offers self-service instructions and easy access to expert support and information.

Schneider Electric Anti-Fake Query

Perform the following procedure to check anti-fake code:

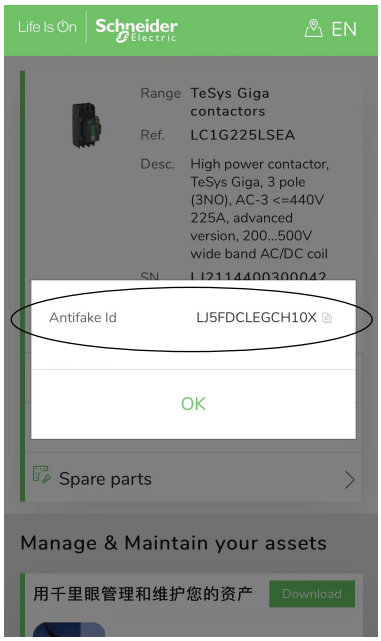
1. Scan the QR code.

   The following landing page of the contactor is displayed with the following information.

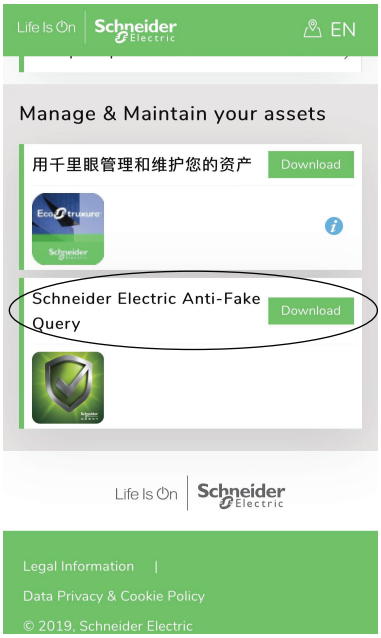


2. Click **More details**.

   The following page is displayed.

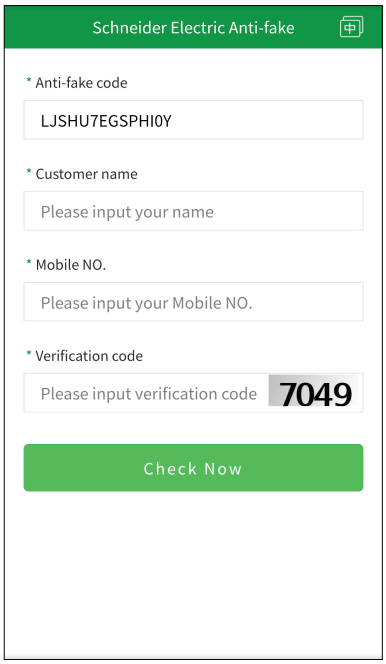


3. Click copy icon to copy the anti-fake code and click **OK** to return to the previous page.



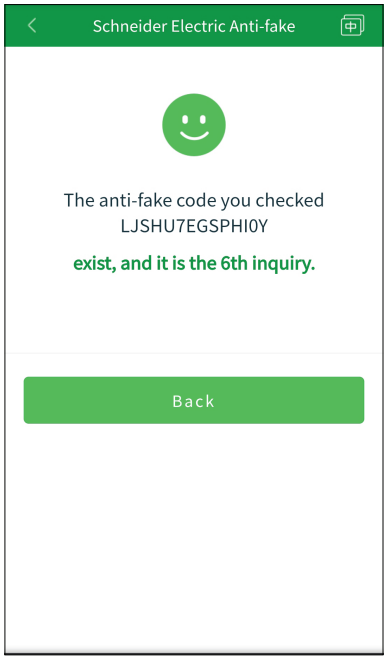
4. Click **Schneider Electric Anti-Fake Query**.

   The following page is displayed.



5. Paste the anti-fake code in the **Anti-fake code** field.
6. Enter your Customer Name and Mobile Number.
7. Type the displayed verification code in the **Verification code** field.
8. Click **Check Now**.

   The following page is displayed if the device is a genuine TeSys Giga device.



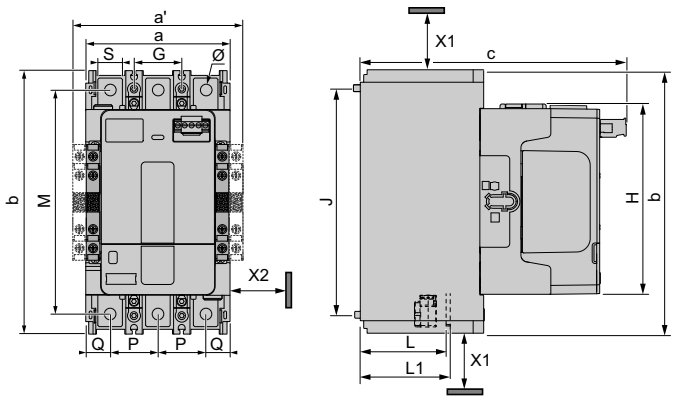
Technical Characteristics

What's in This Chapter

Dimensions

This section describes the dimensions of the TeSys Control-Giga contactors and TeSys Protect-Giga electronic overload relays. The dimensions are provided in millimeters and inches.

3–Pole Contactors



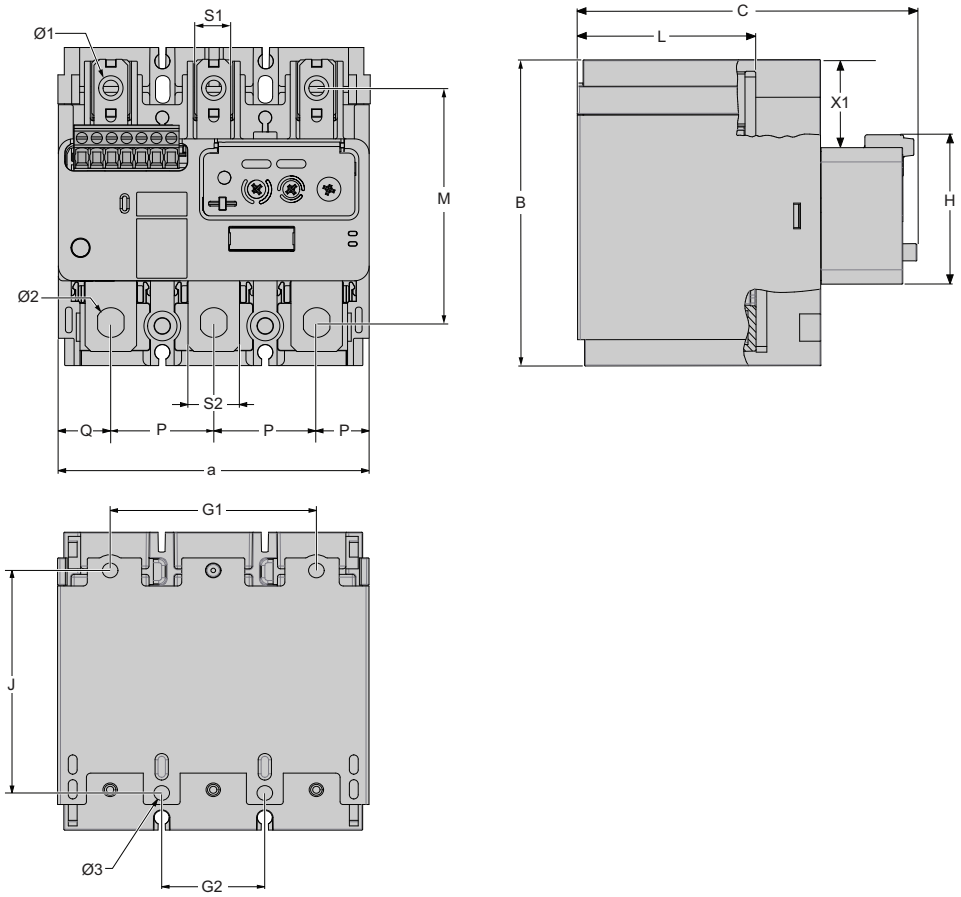
Labels	LC1G205–245C	LC1G300C	LC1G410C	LC1G475C	LC1G620C
a	108 mm	140 mm	140 mm	140 mm	210 mm
a’	128 mm	160 mm	160 mm	160 mm	210 mm
b	193 mm	225 mm	225 mm	225 mm	284 mm
c	193 mm	226 mm	226 mm	226 mm	266 mm
G	35 mm	45 mm	45 mm	45 mm	70 mm
J	166 mm	187 mm	187 mm	187 mm	242 mm
M	164 mm	197 mm	197 mm	197 mm	244 mm
H	139 mm	162 mm	162 mm	162 mm	187 mm
L	67 mm	79 mm	79 mm	79 mm	107 mm
L1	70 mm	82 mm	83 mm	84 mm	113 mm
P	35 mm	45 mm	45 mm	45 mm	70 mm
Q	19 mm	25 mm	25 mm	25 mm	35.3 mm
S	18 mm	30 mm	30 mm	30 mm	48 mm
Ø	8.5 mm	10.6 mm	10.6 mm	10.6 mm	13 mm

NOTE: a’ is the dimension with 2 auxiliary contact modules on both sides. a’ = a for LC1G630–800.

Clearance Distances

Labels	Definition	Value
X1	Arc flash clearance distance up to 1000 V operating voltage.	40 mm
X2	Minimum electrical clearance according to operating voltage inside metallic cabinets and for adjacent installation of contactors.	5 mm

Overload Relays



Labels	LR9G115–225C	LR9G500C	LR9G630C
a	106 mm	140 mm	210 mm
b	109 mm	116 mm	149 mm
c	126 mm	139 mm	186 mm
G1	70 mm	119 mm	186 mm
G2	35 mm	45 mm	70 mm
J	80 mm	68 mm	86 mm
M	78 mm	83 mm	100 mm
H	52 mm	47 mm	47 mm
L	66 mm	79 mm	107 mm
P	35 mm	45 mm	70 mm
Q	18 mm	25 mm	35 mm
S1	11.5 mm	22.5 mm	22.5 mm
S2	17.5 mm	30.5 mm	50 mm
Ø1	8.3 mm	10.6 mm	13 mm
Ø2	9 mm	10.6 mm	13 mm
Ø3	5.3 mm	5.3 mm	8.5 mm

Weights

This section describes the weights for the TeSys Control-Giga contactors and TeSys Protect-Giga electronic overload relays.

Device	Commercial references	Weight
Contactor	LC1G205–245C	3.6 kg
	LC1G300–475C	7.5 kg
	LC1G620C	14 kg
Overload relay	LR9G115-225C	0.80 kg
	LR9G500C	1.33 kg
	LR9G630C	2.23 kg

Thermal Dissipation

This section describes the thermal dissipation characteristics for the contactors and control modules, and thermal overload relays.

Main Power Lines of Contactors

Contactor	Power dissipation per pole at maximum current with AC–1 load	Power dissipation per pole at maximum current with AC–3/AC–3e load
LC1G205C	20 W	6 W
LC1G245C	20 W	8 W
LC1G300C	30 W	16 W
LC1G410C	30 W	16 W
LC1G475C	40 W	20 W
LC1G620C	70 W	26 W

Contactors Control Modules

Contactor	Heat dissipation for control module
LC1G205–245C	5–6 W
LC1G300C	6–7 W
LC1G410–475C	6–7 W
LC1G620C	6–7 W

Overload Relays

Overload relay	Maximum heat dissipation at Ir Max
LR9G115C	1 W
LR9G225C	3 W
LR9G500C	5 W
LR9G630C	8 W

Contactors Technical Characteristics

The contactors are electrically isolated between the internal electronic circuit and the input/output channels. These limits are described by the environmental characteristics, pole characteristics, and the control module characteristics given below. This equipment meets CE requirements as indicated in the tables.

Environmental Characteristics

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

Install and operate the contactors according to the conditions described in the environmental characteristics table.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Environmental Characteristics		LC1G205–245C	LC1G300–475C	LC1G620C
Rated insulation voltage (Ui)		1000 V		
Over–voltage category		III		
Degree of pollution		3		
Rated impulse withstand power circuit		8 kV		
Conforming to standards		• IEC 60947–4–1 • GB/T 14048.4 • IEC 60721-3-3 3C3		
Product certifications		CB certification, CCC, CCS, CE Marking		
Degree of protection (Conforming to IEC 60529 and VDE 0106)		IP20 with TeSys Giga terminal shrouds.		
Climatic withstand		According to IACS E10		
Ambient air temperature around the Giga contactor	Storage	-60 to +80 °C		
	Operation	-25 to +60 °C		
	Permissible at Uc	-40 to +70 °C		
Maximum operating altitude (Without derating)		3000 m (9850 ft)		
Shock resistance 1/2 sine wave = 11 ms (Conforming to IEC 60068-2-27)	contactor open	10 gn		
	contactor close	15 gn		
Vibration resistance 5–300 Hz (Conforming to IEC 60068-2-6)	contactor open	2 gn		
	contactor close	4 gn		

LC1G205–620C Pole Characteristics

Poles Characteristics		LC1G205C	LC1G245C	LC1G300C	LC1G410C	LC1G470C	LC1G620C
Rated operational current (Ie) (≤ 440 V)	In AC–3, ≤ 60 °C	205 A	245 A	300 A	410 A	475 A	620 A
	In AC–1, ≤ 40 °C	300 A	330 A	440 A	550 A	700 A	1050 A
Rated operational voltage(1) (Ue)		Up to 1000 V (1)					
Rated frequency(1)		50 Hz					
Frequency operating limits with derating		16 2/3 – 400 Hz Consult your technical support team for application with frequencies other than 50-60 Hz.					
Conventional thermal current (Ith) ≤ 40 °C (104 °F)		300 A	330 A	440 A	550 A	700 A	1050 A
Rated making capacity	I rms conforming to IEC 60947–4–1	Making current: 10 x I in AC–3 or 12 x I in AC–4 Making current: 13 x I in AC-3e					
Rated breaking capacity	I rms conforming to IEC 60947–4–1	Making and breaking current: 8 x I in AC–3 or 10 x I in AC–4 Making and breaking current: 8.5 x I in AC-3e					
Maximum permissible current No current flowing for previous 60 minutes, at ≤ 40 °C	For 10 s	1500 A	1800 A	2650 A	3600 A	4000 A	5050 A
	For 30 s	920 A	1000 A	1800 A	2400 A	2800 A	4400 A
	For 1 min	740 A	850 A	1300 A	1700 A	2200 A	3400 A
	For 3 min	500 A	560 A	900 A	1200 A	1500 A	2200 A
	For 10 min	400 A	440 A	750 A	1000 A	1200 A	1600 A
Short-circuit protection by fuses	Fuses for motor application type aM- Ue ≤ 440V	200 A	200 A	400 A	500 A	500 A	630 A
	Fuses for motor application type aM- Ue ≤ 690V	1605 A	160 A	250 A	315 A	400 A	500 A
	Fuses for general application:type gG- Ue ≤ 690V	315 A	400 A	500 A	630 A	800 A	1250 A
Average impedance per pole at Ith and 50 Hz		0.17 mΩ	0.15 mΩ	0.144 mΩ	0.1 mΩ	0.08 mΩ	0.065 mΩ
(1)Ue = 1000 V simple insulation / Ue = 690 V SELV							

Control Module Characteristics

Contactor type				**LC1G205-245C**	**LC1G300C**	**LC1G410-475C**	**LC1G620C**
Rated control circuit voltage Uc (Ucmin-Ucmax)				• 48–130 Vac/Vdc • 100–250 Vac/Vdc • 200–500 Vac/Vdc			
Control voltage (≤ 60 °C)			Operation	0.8 Uc min-1.1 Uc max			
			Drop–out	≤ 0.45 Ucmin			
Average consumption at 20 °C and at Uc	48-130 V control module (EHE)	Inrush	50/60 Hz coil circuit	640 VA	778 VA	963 VA	990 VA
			DC	445 W	695 W	760 W	850 W
		Sealed	50/60 Hz coil circuit	18.7 VA	17.6 VA	17.6 VA	21.6
			DC	7.8 W	7.8 W	7.8 W	9.5 W
	100-250 V control module (KUE)	Inrush	50/60 Hz coil circuit	540 VA	698 VA	750 VA	798 VA
			DC	380 W	645 W	690 W	710 W
		Sealed	50/60 Hz coil circuit	12.4 VA	15 VA	15.5 VA	16.9 VA
			DC	7.8 W	9.1 W	9.3 W	9.5 W
	200-500 V control module (LSE)	Inrush	50/60 Hz coil circuit	295 W	531 W	533 W	672 W
			DC	216 W	303 W	300 W	392 W
		Sealed	50/60 Hz coil circuit	13 W	16.1 W	15.4 W	18.4 W
			DC	8 W	9 W	8.6 W	11 W
Heat dissipation				5–6 W	6–7 W	6–7 W	6–7 W
Operating time			Closing "C"	40-70 ms			
			Opening "O"	15-50 ms			
Mechanical durability at Uc (millions of operating cycles)				8	8	8	5
Maximum operating rate at ambient temperature ≤ 60 °C (operating cycles per hour)			AC-1	300	300	300	300
			AC-3	500	500	500	500
			AC-4	150	150	60	60

Overload Relays Technical Characteristics

Environmental Characteristics

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

Install and operate overload relays according to the conditions described in the environmental characteristics table.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Environmental Characteristics		**LR9G115–630C**
Conforming to standards		• IEC 60947–4–1 • IEC 60947–5–1 • GB/T 14048.4
Product certifications		• CCC, CE Marking, UKCA Marking, CCS • ATEX
Degree of protection	Conforming to IEC 60529 and VDE 0106	IP20 with TeSys Giga terminal shrouds.
Climatic withstand		According to IACS E10
Ambient air temperature around the device (conforming to IEC 60255-149)	Storage	–60 to +80 °C
	Normal operation	–25 to +60 °C
Maximum operating altitude	Without derating	3000 m (9850 ft)
Shock resistance 1/2 sine wave = 11 ms	Permissible acceleration conforming to IEC 60068–2-27	15 gn
Vibration resistance 5 to 300 Hz	Permissible acceleration conforming to IEC 60068–2–6	6 gn

Overload Relay Electrical Characteristics

Electrical Characteristics		**LR9G115–630C**
Rated insulation voltage (Ui)	Conforming to IEC 60947–4–1	1000 V
Rated impulse withstand voltage (Uimp)	Conforming to IEC 60947–4–1	8 kV
Rated operational current (Ie)		28–630 A
Rated frequency		50 – 60 Hz
Frequency operating limits with derating		16 2/3 – 400 Hz Consult your technical support team for application with frequencies other than 50-60 Hz.

Overload Relay Contacts Electrical Characteristics

Electrical Characteristics					**LR9G115–630C**				
Conventional thermal current					5 A				
Short–circuit protection		By gG or BS fuses or by circuit breaker GB2CD10			6 A				
Maximum sealed power and inrush power consumption of the contactors (occasional operating cycles of contact 95–96)		AC supply			24–480 Vac				
		Sealed			17 VA				
		Inrush			800 VA				
		DC supply			24–250 Vdc				
		Sealed			10 W				
		Inrush			600 W				
Rated operational contact power	AC supply AC-15	**V**	**24**	**48**	**120**	**240**	**380**	**480**	**500**
		A	4	4	3	1.5	0.95	0.75	0.72
		VA	96	192	360	360	361	360	360
	DC supply DC-13	**V**	**24**	**48**	**125**	**250**	**-**	**-**	**-**
		A	2	0.7	0.22	0.11	**-**	**-**	**-**
		W	48	33.6	27.5	27.5	**-**	**-**	**-**
Maximum operational voltage	AC category AC-15	**V**	690						
	DC category DC-13	**V**	250						

Contactor Accessory Technical Characteristics

Auxiliary Contacts Electrical Characteristics

Auxiliary contacts electrical characteristics		**LAG8N11 / LAG8N20 / LAG8N11P / LAG8N20P**
Conventional thermal current		10 A
Short-circuit protection	By gG or BS fuses or by circuit breaker GB2CD16	10 A
Maximum sealed and inrush power consumption of the contactors (occasional operating cycles of contact 95–96)	AC supply	24–600 Vac
	Sealed	17 VA
	Inrush	800 VA
	DC supply	24–500 Vdc
	Sealed	10 W
	Inrush	600 W

Category AC-15

Operating cycles	**V**	**24**	**48**	**115**	**230**	**400**	**500**
1 million	VA	60	120	280	560	800	500
2 million	VA	24	48	115	230	400	250
3 million	VA	16	32	80	160	280	150

Category DC-13

Operating cycles	**V**	**24**	**48**	**125**	**250**	**440**
1 million	W	36	72	54	54	55
2 million	W	24	48	38	38	39
3 million	W	16	24	31	31	32

Electromagnetic Compatibility

The table below describes the electromagnetic compatibility of the TeSys Control-Giga contactors and TeSys Protect-Giga electronic overload relays:

Phenomenon	Basic standard	Product compliance
Electrostatic discharge	IEC 61000–4–2	Air Discharge: 8 kV + 10% Contact discharge: 6 kV +10%
Radiated electromagnetic field	IEC 61000–4–3	Field strength: 20 V/m +5 V/m Frequency: 80 MHz or 6 GHz
		Field strength: 20 V/m +5 V/m Frequency: 1.0 GHz or 1.4 GHz
		Field strength: 20 V/m +5 V/m Frequency: 1.4 GHz or 2.0 GHz
		Field strength: 20 V/m +5 V/m Frequency: 2.0 GHz or 2.7GHz
		Field strength: 20 V/m +5 V/m Frequency: 2.7 GHz ; 3.0 GHz
		Field strength: 20 V/m +5 V/m Frequency: 3.0 GHz ; 5.9 GHz
		Field strength: 20 V/m +5 V/m Frequency: ISM–GSM
Fast transient burst	IEC 61000–4–4	Power AC and DC > 50 V–4 kV + 0.5 kV / 1 min and 2 kV +0.25 kV / 5 min
		Power DC < 50 V–2 kV +0.5 kV / 5 min
Surge immunity	IEC 61000–4–5	Power AC and DC > 50 V (A1 A2)–4 kV +10% CM 12 Ω and 2 kV +10% DM 2 Ω
		Power AC and DC > 50 V (A1 A2)–2 kV +10% CM 12 Ω and 1 kV +10% DM 2 Ω
Conducted electromagnetic field	IEC 61000–4–6	Conducted Disturbance [0,15MHz ; 80MHz] ISM frequencies–20 V rms +5 V
Magnetic field	IEC 61000–4–8	300 A/m permanent (1 min) 1000 A/m impulse (3 s)
Conducted emission	EN 55011	Class A
Radiated emission	EN 55011	Class A

Installation

What's in This Chapter

Contactor Customization

Overview

Cable memory connection blocks enable contactor replacement without disconnection of the power connections.

Cable memory connection blocks can be installed as an option on 3-pole contactors.

Description	Compatible with contactors	Cable memory reference
Cable memory for 3-pole contactors - for holding cables in place when replacing contactor	LC1G205–245C	LA9G3101
	LC1G300–475C	LA9G3102
	LC1G620C	LA9G3103

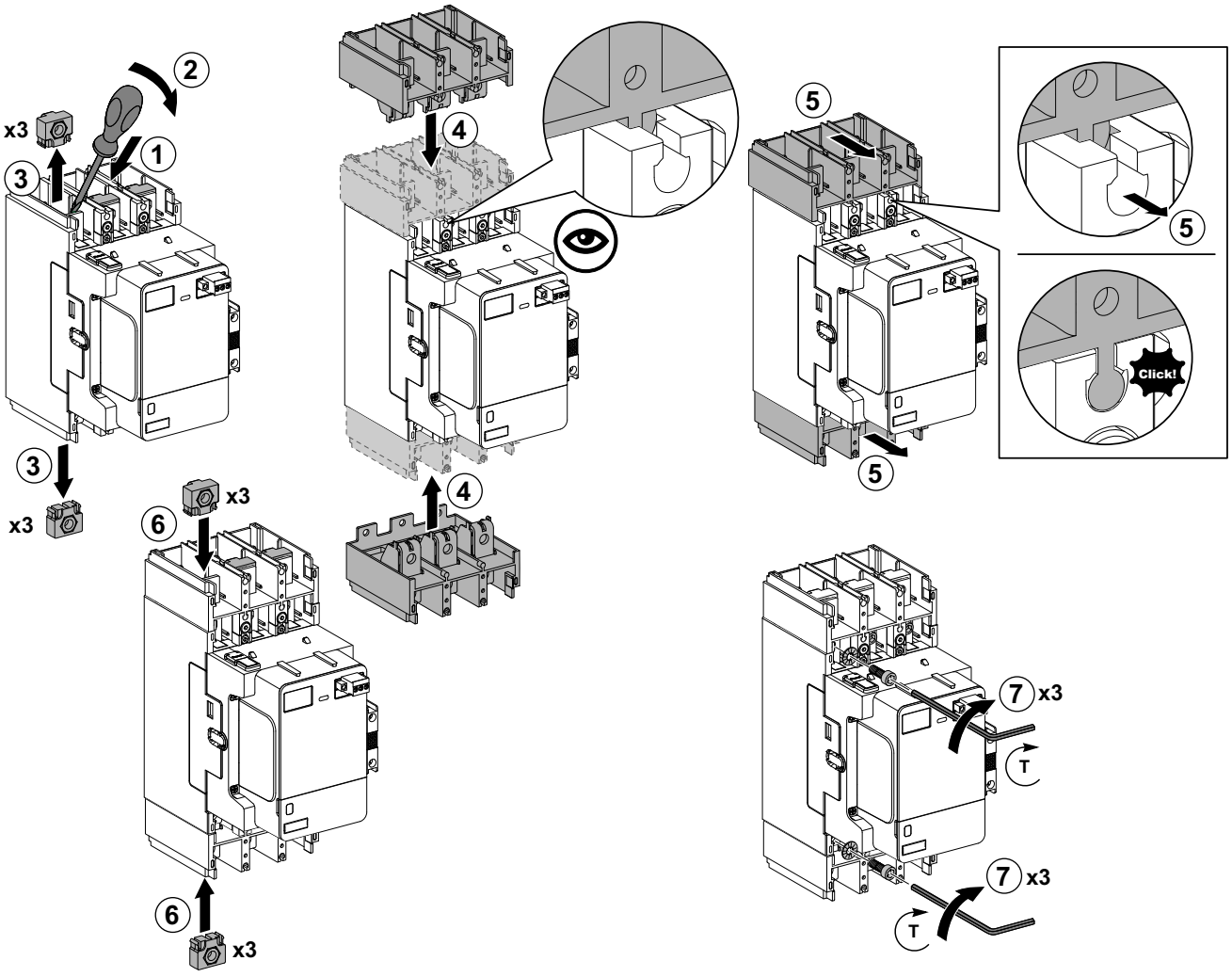
This section describes the cable memory connection blocks installation on the contactor.

Cable Memory Connection Blocks Installation on Contactor

1. Place the screwdriver on the contactor power terminals to remove the snap-in nut.
2. Twist the screwdriver clockwise.
3. Pull the snap-in nut outwards to remove it.

   NOTE: Remove all the six nuts in similar way. Keep the lock nuts aside for further use.
4. Place the cable memory connection blocks on the contactor power terminals.
5. Push inwards to lock it automatically with a click.
6. Place the lock nut back on the power terminals of the cable memory.
7. Tighten the screws at the right torque.

Contactor	Torque	Tool	Screws
LC1G205–245C	18±1.8 N•m	Allen key	M8
LC1G300–475C	35±3.5 N•m	Inner hexagon	M10
LC1G620C	58±5.8 N•m	Inner hexagon	M12



TeSys Giga Contactor Mounting on Plate

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Install the contactor so that the minimum clearance to grounded metal is maintained.

Failure to follow these instructions will result in death or serious injury.

The contactor can be mounted

- either on a plate drilled with simple holes, using the screws, washers and nuts delivered with the contactors
- or on a plate drilled with threaded holes, using only screws adapted to the threaded holes.

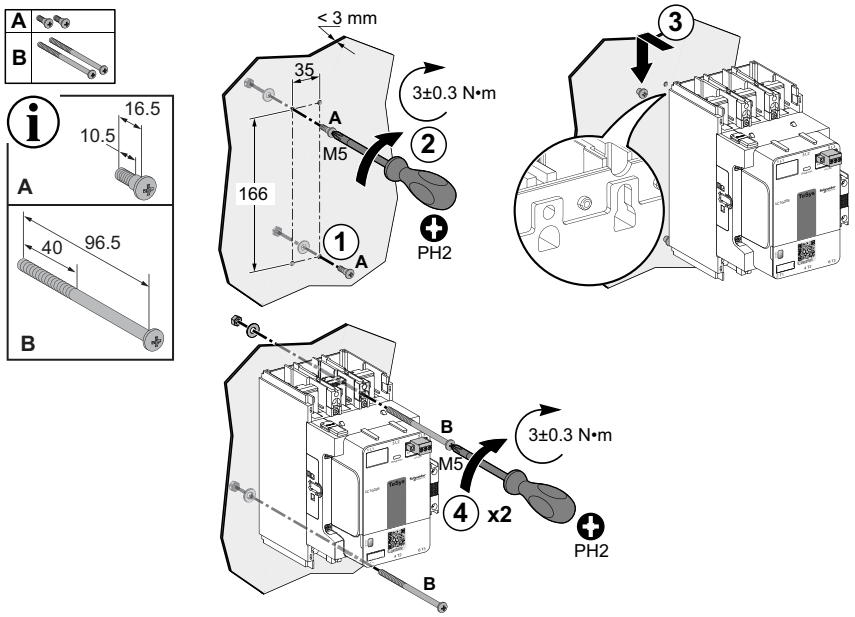
  NOTE: It is recommended to use a steel plate with minimum thickness of 2 mm.

Mounting LC1G205-245C Contactors on Plate

Perform the following procedure to mount the LC1G205-245C contactors on the plate.

1. Drill 4 holes in the plate. Hole diameter: 4.5 to 6 mm .
2. Insert the two short screws (A) diagonally on the plate and tighten the screws with PH2 screwdriver at the right torque.
3. Place the contactor on the short screw heads.
4. Insert the two long screws (B) diagonally through the contactor and tighten them at the right torque.

mm

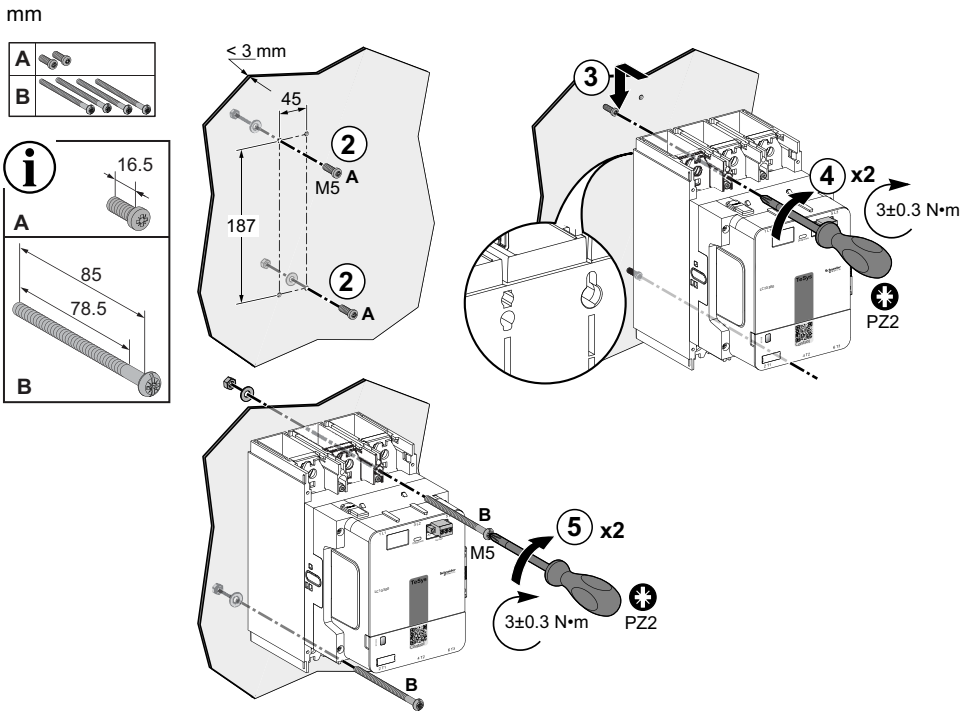


NOTE: The four screws with nuts and washers are delivered with contactors.

Mounting LC1G300-475C Contactors on Plate

Perform the following procedure to mount the LC1G300-475C contactors on the plate.

1. Drill 4 holes in the plate. Maximum hole diameter: 6 mm.
2. Insert the two short screws (A) diagonally on the plate. The distance between the panel and screw head flat surface shall be between 6 and 14 mm.
3. Place the contactor on the screw heads.
4. Tighten the two screws (A) with PZ2 screwdriver at the right torque.
5. Insert the two long screws (B) diagonally through the contactor and tighten them at the right torque.



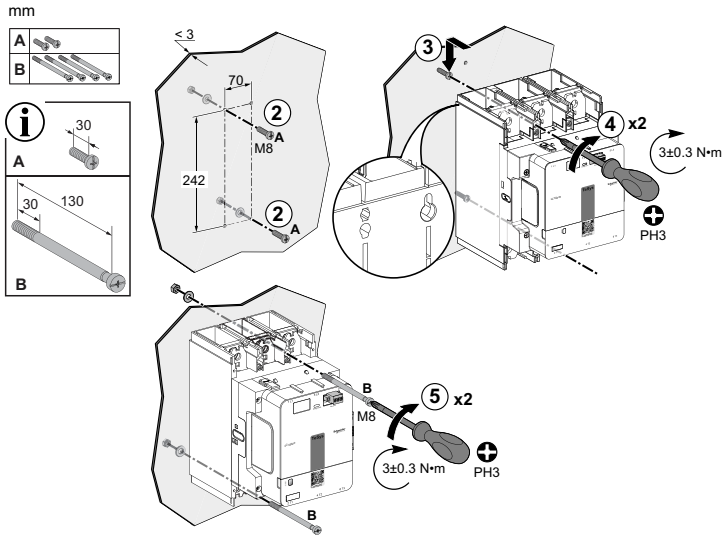
NOTE: The screws with nuts and washers are delivered with contactors.

NOTE: Contactor can also be mounted using four long screws instead of two short screws and two long screws.

Mounting LC1G620C Contactors on Plate

Perform the following procedure to mount the LC1G620C contactors on the plate.

1. Drill 4 holes in the plate. Maximum hole diameter: 9 mm .
2. Insert the two short screws (A) diagonally on the plate. The distance between the panel and screw head flat surface shall be between 16 and 24 mm .
3. Place the contactor on the screw heads.
4. Tighten the two screws (A) with PH3 screwdriver at the right torque.
5. Insert the two long screws (B) diagonally through the contactor and tighten them at the right torque.



NOTE: The screws with nuts and washers are delivered with contactors.

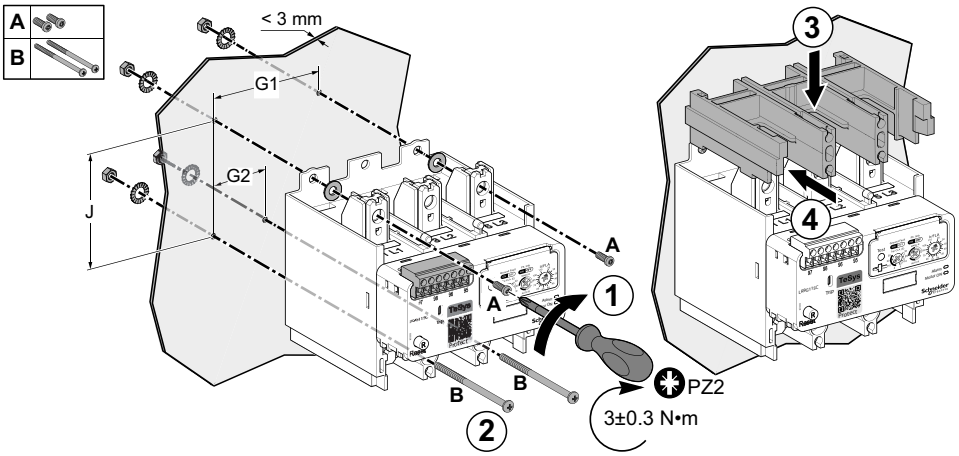
NOTE: Contactor can also be mounted using four long screws instead of two short screws and two long screws.

TeSys Giga Electronic Overload Relay Mounting on Plate

Perform the following procedure to mount the overload relays on the plate.

1. Drill 4 holes in the plate, with respect of the dimensions given.
   - LR9G115-500C - Maximum hole diameter: 6 mm
   - LR9G630C - Maximum hole diameter: 9 mm
2. Use the two short screws (A) to fix the top side of the overload relay and tighten the screws with PZ2 screwdriver at the right torque.

   NOTE: For short screws, the screwdriver should be inserted through the power terminal holes to tighten the screws.
3. Use the two long screws (B) to fix the bottom side of the overload relay and tighten them at the right torque
4. Place the phase separator adaptor on the overload relay from the top.
5. Push the adaptor inwards to lock it with a click.



Overload relay	A			B		
	X	Y		X	Y	
LR9G115–225	16 mm	16 mm	PZ2	96.5 mm	40 mm	PH2
LR9G500	16 mm	16 mm	PZ2	85 mm	78.5 mm	PZ2
LR9G630	20 mm	20 mm	PH3	130 mm	30 mm	PH3

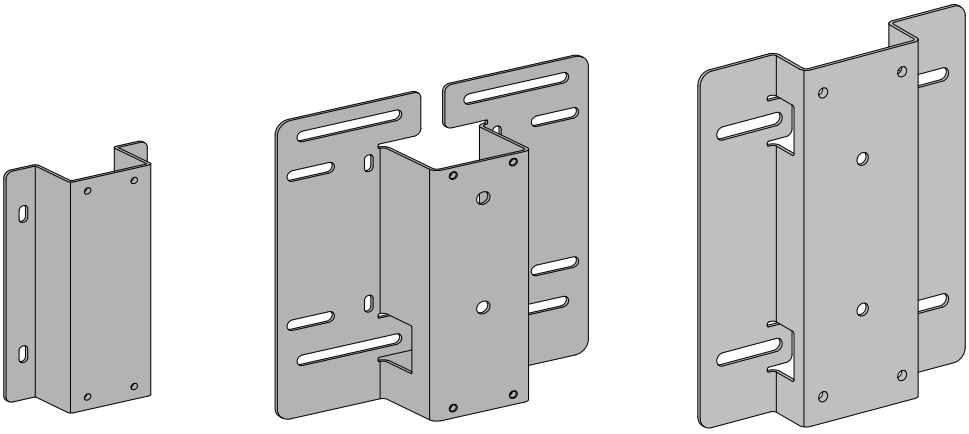
Overload relay	G1	G2	J	Screws
LR9G115–225C	70 mm	35 mm	80.10 mm	M5
LR9G500C	119 mm	45 mm	68.25 mm	M5
LR9G630C	186 mm	70 mm	96.10 mm)	M8

NOTE: The four screws with nuts and washers are delivered with overload relay.

TeSys Giga Contactor Mounting on Retrofit Base

Overview

Retrofit bases are designed for integrating TeSys Giga contactors into installations using TeSys D contactors. The retrofit bases help reduce replacement and reinstallation time when you upgrade your system with the new range of TeSys Giga contactors. The bases come in three frame sizes.

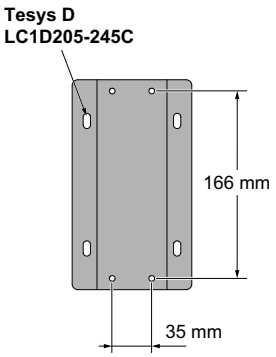


LA9GRFB1 LA9GRFB2 LA9GRFB3

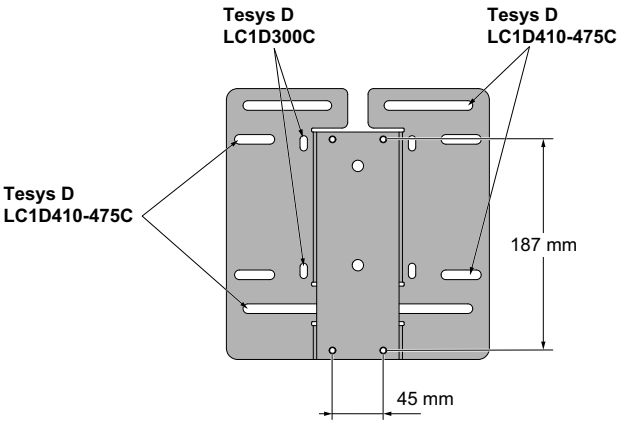
Contactor	Retrofit base
LC1G205–245C	LA9GRFB1
LC1G300-475C	LA9GRFB2
LC1G620C	LA9GRFB3

Mounting Dimensions

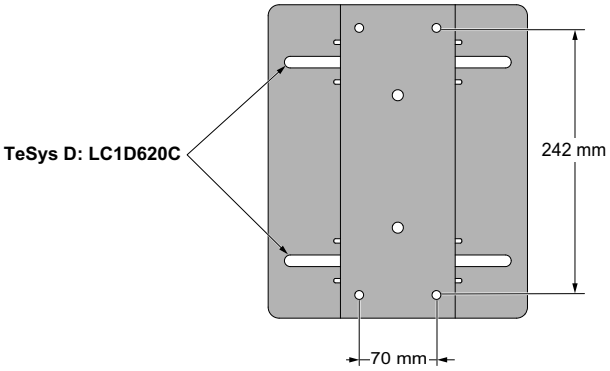
LA9GRFB1: LC1G205-245C



LA9GRFB2: LC1G300-475C



LA9GRFB3: LC1G620C



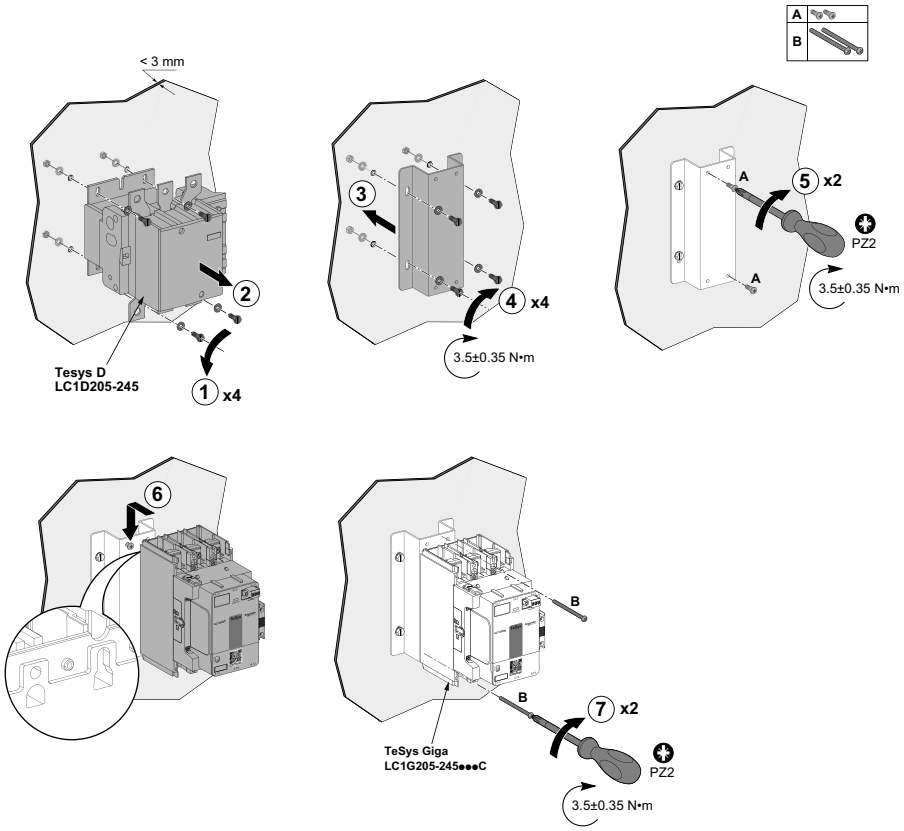
Installation Procedure

Perform the following procedure to install a TeSys Giga contactor on the retrofit base.

1. Remove the four mounting screws from the fixing holes of the TeSys F contactor.
2. Remove the TeSys F contactor.
3. Place the retrofit base on the fixing holes of the TeSys F contactor. Use the holes on the retrofit base corresponding to the TeSys F contactor to replace, as indicated on TeSys Giga Contactor Mounting on Retrofit Base, page 57.
4. Insert and tighten the four mounting screws with PZ2 screwdriver at the right torque.

   NOTE: Use the screws of the TeSys F contactor to install the retrofit base.
5. Insert and tighten the two short screws (A) half way diagonally on the retrofit base.
6. Place the TeSys F contactor on the short screws head.

7. Insert and tighten the long screws (B) with PZ2 screwdriver at the right torque.



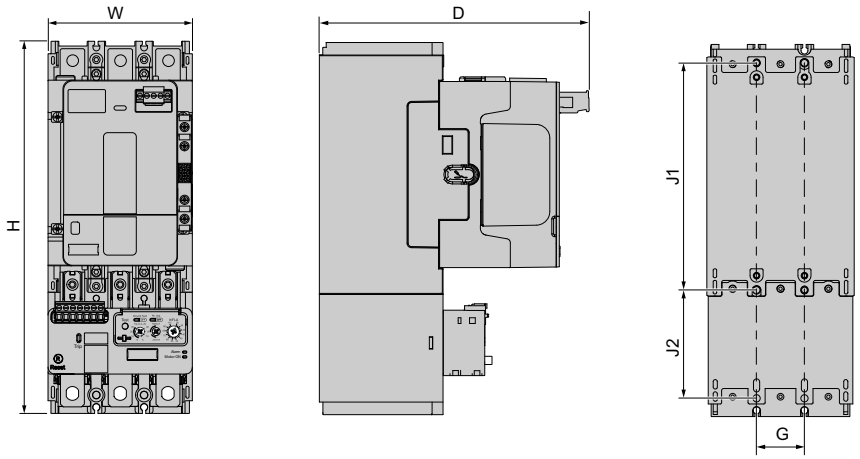
TeSys Giga Contactor and TeSys Giga Overload Relay Direct Mounting

Overview

This section describes the assembly of the overload relays directly on the 3-pole contactors. The overload relays are mounted downstream of the contactors.

- LR9G115C and LR9G225C overload relays can be assembled with LC1G205–245C contactors.
- LR9G500C overload relay can be assembled with LC1G300–475C contactors.
- LR9G630C overload relay can be assembled with LC1G620C contactors.

Contactors Assembled with Overload Relay



The table below provides the dimension detail for mounting:

Contactor	Overload relay	W	D	H	G	J1	J2
LC1G205–245C	LR9G115–225C	108 mm	193 mm	272 mm	35 mm	166 mm	79.15 mm
LC1G300–475C	LR9G500C	140 mm	225 mm	308.5 mm	45 mm	187 mm	92.85 mm
LC1G620C	LR9G630C	210 mm	265 mm	384 mm	70 mm	242 mm	102.18 mm

Assembly Procedure

⚠CAUTION

HAZARD OF FALLING

Always use the screws to secure the overload relay to the contactor.

Failure to follow these instructions can result in injury or equipment damage.

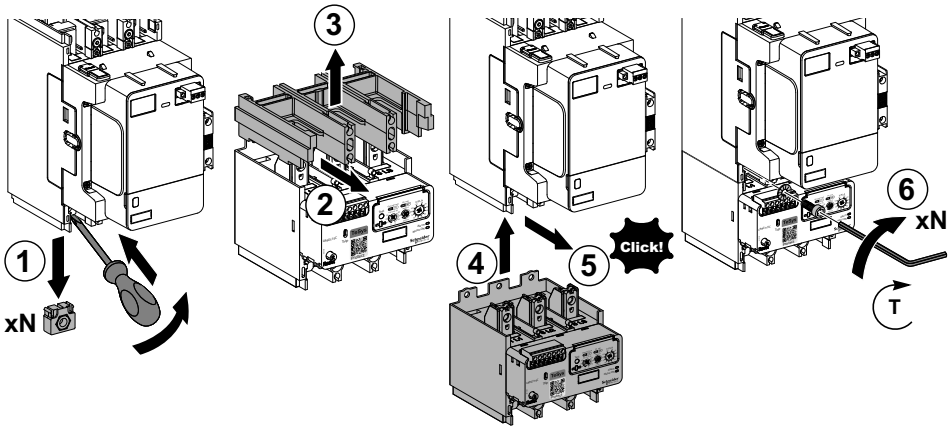
Perform the following procedure to mount the overload relay on the contactor:

NOTE: Mount the overload relay together with the contactor before installing the assembly on the plate.

1. Remove the 3 nut holders using a screwdriver from the downstream power terminals of the contactor.

2. Push the phase adaptor outwards.
3. Remove the phase adaptor from the overload relay.
4. Place the overload relay downstream of the contactor .
5. Push the overload relay inwards to lock it automatically with a click.
6. Place the screws at the power terminals of the contactor and tighten them at the right torque.

Contactor	Overload relay	Tool	Torque	Screws
LC1G205-245C	LR9G115–225C	Allen key	18±1.8 N•m	M8
LC1G300-475C	LR9G500C	Inner hexagon	35±3.5 N•m	M10
LC1G62C	LR9G630C	Inner hexagon	58±5.8 N•m	M12

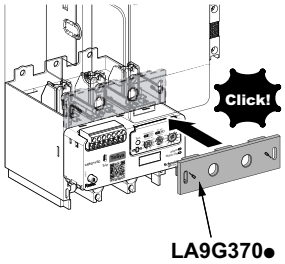


IP20 Optional Protection Cover

The IP20 protection cover is an optional protection cover which is used to cover the main power terminals between contactor and overload relay when mounted together.

The table below shows the compatibility of the protection cover with contactors and overload relays:

Contactor	Overload relay	IP20 cover reference
LC1G205-245C	LR9G115–225C	LA9G3704
LC1G300-475C	LR9G500C	LA9G3705
LC1G620C	LR9G630C	LA9G3706



Assembly Installation of LC1G205–245C Contactor and Overload Relay on Plate

After assembling LC1G205–245C contactor and LR9G115–225C overload relay (see Assembly Procedure, page 60), perform the following procedure to mount the assembly on the plate:

1. Drill 6 holes in the plate. Maximum hole diameter: 6 mm

   NOTE: To ease the mounting, drilling stencils JYT1902701 can be downloaded from the www.se.com website.
2. Insert the two short screws (A) half way diagonally on the plate and tighten the screws with PH2 screwdriver at the right torque.
3. Place the contactor and overload relay on the short screw heads.
4. Insert the two long screws (B) diagonally through the contactor and another two screws to fix the overload relay and then tighten them at the right torque.

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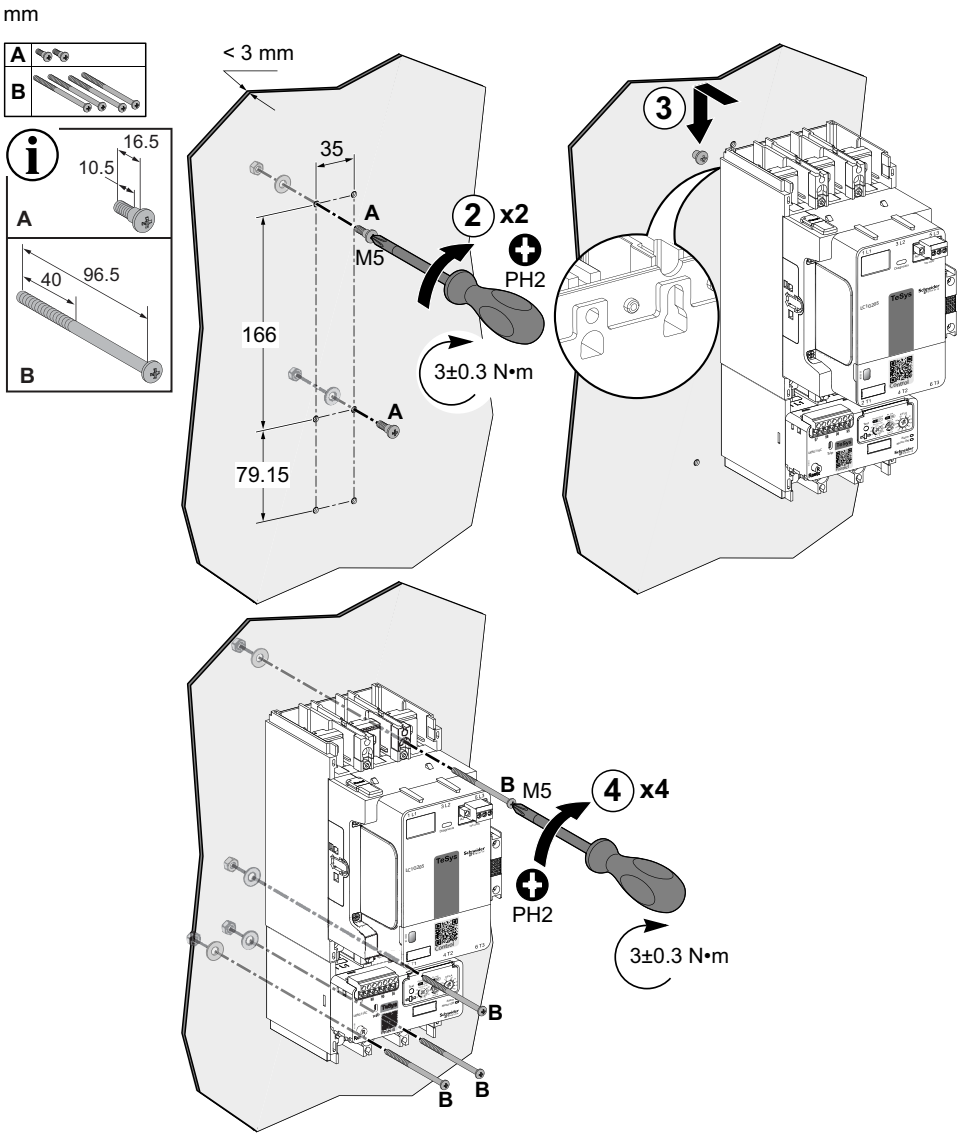

Assembly Installation of LC1G300–475C Contactor and Overload Relay on Plate

After assembling LC1G300–475C contactor and LR9G500C overload relay (see Assembly Procedure, page 60), perform the following procedure to mount the assembly on the plate:

1. Drill 6 holes in the plate. Maximum hole diameter: 6 mm

   NOTE: To ease the mounting, drilling stencils JYT1902701 can be downloaded from the www.se.com website.
2. Insert the two short screws (A) half way diagonally on the plate.
3. Place the contactor and overload relay on the short screw heads.
4. Tighten the two short screws with PZ2 screwdriver at the right torque.

5. Insert the two long screws (B) diagonally through the contactor and another two screws to fix the overload relay and then tighten them at the right torque.

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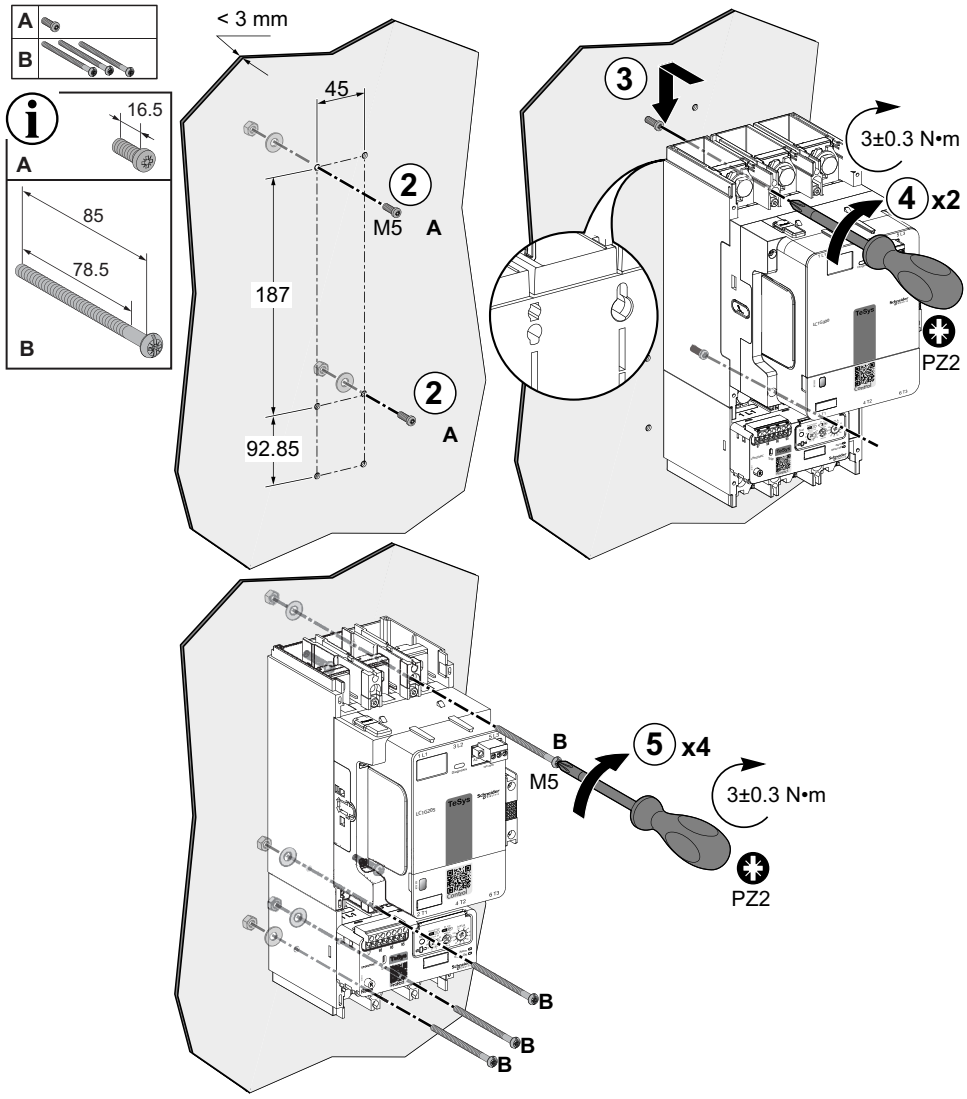


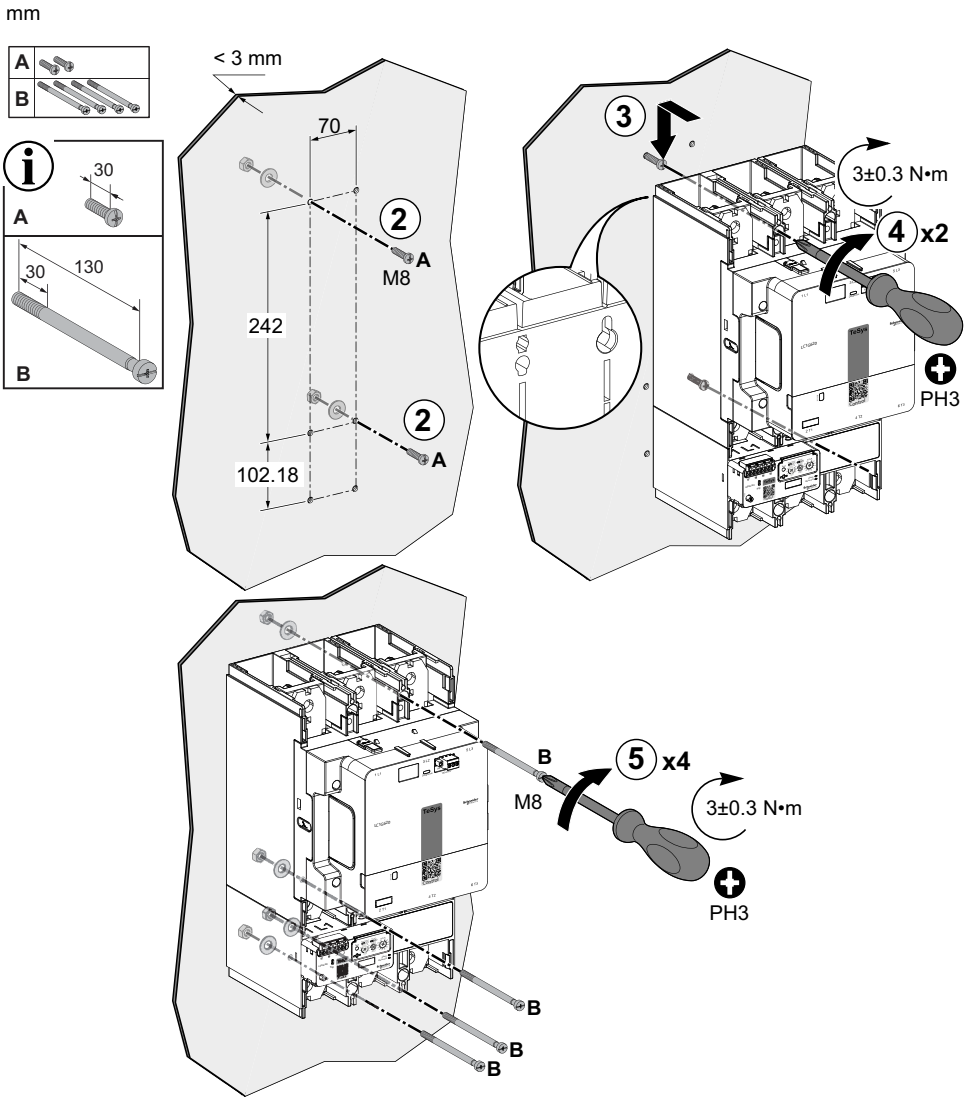
Assembly Installation of LC1G620C Contactor and Overload Relay on Plate

After assembling LC1G620C contactor and LR9G630C overload relay (see Assembly Procedure, page 60), perform the following procedure to mount the assembly on the plate:

1. Drill 6 holes in the plate. Maximum hole diameter: 9 mm

   NOTE: To ease the mounting, drilling stencils JYT1902701 can be downloaded from the www.se.com website.

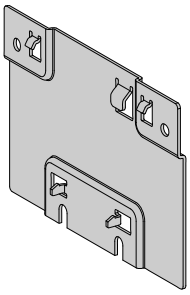
2. Insert the two short screws (A) half way diagonally on the plate.
3. Place the contactor and overload relay on the short screw heads.
4. Tighten the two short screws with PH3 screwdriver at the right torque.
5. Insert the two long screws (B) diagonally through the contactor and another two screws to fix the overload relay and then tighten them at the right torque.


mm
A
B
30
A
30
130
B
< 3 mm
70
2
A
M8
242
2
A
102.18
3
3±0.3 N•m
4 x2
PH3
B
5 x4
M8
3±0.3 N•m
PH3
B
B
B

TeSys Giga Contactor Assembly with TeSys Giga Overload Relay Separately Mounted

Overview

The mounting base is used for separately mounting of overload relay beneath contactor to align the main power pole connections of the contactor and the overload relay, to allow connection between the contactor and the overload relay with straight bars.

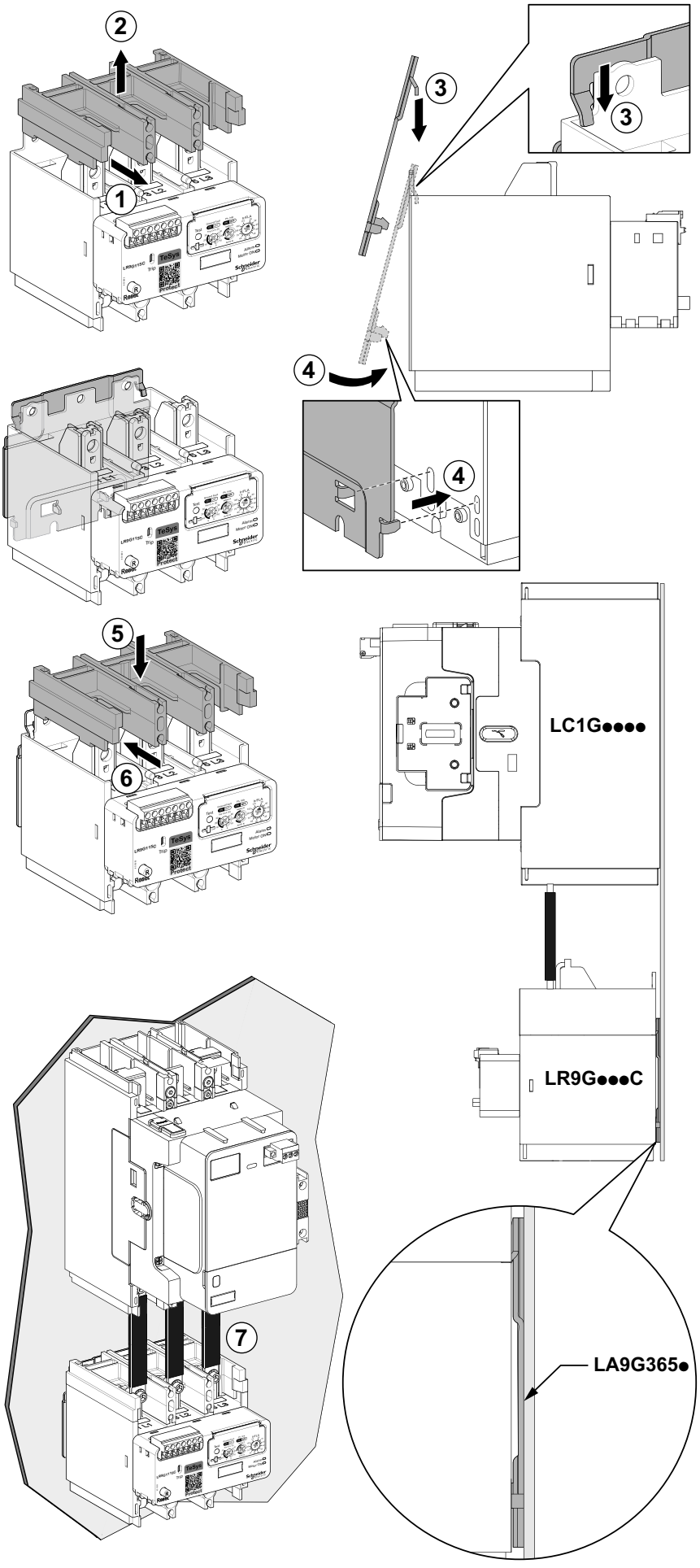


Description	Mounting base reference
Mounting base for alignment of LR9G115-225C with LC1G205-245C	LA9G3650
Mounting base for alignment of LR9G500C with LC1G300C	LA9G3651
Mounting base for alignment of LR9G500C with LC1G410–475C	LA9G3652
Mounting base for alignment of LR9G630C with LC1G620C	LA9G3653

Installation Procedure

Perform the following procedure to install the mounting base on the overload relay.

1. Push outwards the phase separator adaptor from the overload relay.
2. Remove the phase separator adaptor and keep aside for further use
3. Place the mounting base on the top hooks at the back of the overload relay.
4. Push it inwards to lock the mounting base automatically with the bottom hooks of the overload relay.
5. Place the phase separator adaptor back on the overload relay.
6. Push it inwards to lock it automatically with a click.
7. Connect the overload relay downstream of the contactor using the straight bars.


2
1
3
3
4
4
5
6
LC1G●●●●
LR9G●●●C
7
LA9G365●

Identification with Clip-On Marker Holder

There is a clip-on marker holder on the front face of each contactor and overload relay. The dimension of the marker holder is 8 x 18 mm .

NOTE: Spare marker holder can be ordered with the commercial reference LA7D903 (set of 100 marker holders).

Perform the following procedure to identify an equipment with a marker holder.

1. Unclip and remove the marker holder from contactor or overload relay.
2. Write the identification code of the contactor or overload relay on the marker holder.
3. Clip the marker holder back on contactor or overload relay.

Wiring

What's in This Chapter

Wiring Precautions

Read and understand the following precautions before wiring the devices.

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462,NOM 029-STPS or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on this equipment.
- Use only the specified voltage when operating this equipment and any associated products.
- Power line circuits must be wired and protected in compliance with local and national regulatory requirements.
- Beware of potential hazards, and carefully inspect the work area for tools and objects that may have been left inside the equipment.

Failure to follow these instructions will result in death or serious injury.

⚠WARNING

FIRE HAZARD

- Use only specified wiring cross-section with the equipment and comply with the specified wiring requirements.
- Tighten the connections to the specified torque values.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

Always route low level control wiring and power wiring separately.

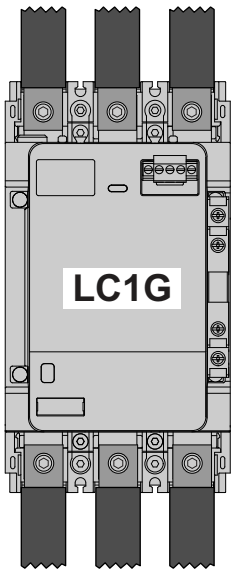
Failure to follow these instructions can result in death, serious injury, or equipment damage.

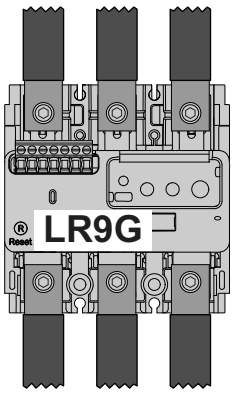
Power Connections

Connection with Bars

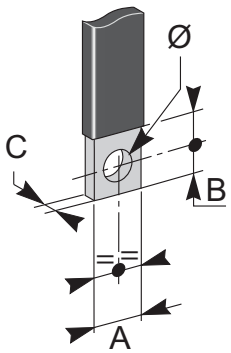
Overview

Bars can be used to connect contactors and overload relays. These are provided by the installer. The bars can be installed both upstream and downstream of contactors and overload relays.





Dimensions



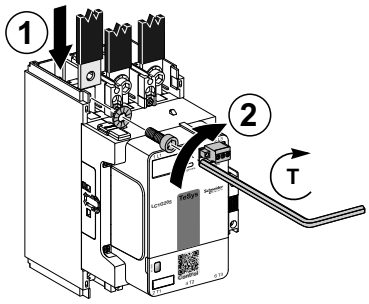
Contactor	Overload relay	A	B	C	Ø
LC1G205-245C	LR9G115-225C	≤ 25 mm	≤ 10 mm	≤ 6 mm	9 mm
LC1G300-475C	LR9G500C	≤ 32 mm	≤ 15 mm	3 mm ≤...≤ 10 mm	10.6 mm
LC1G620C	LR9G630C	≤ 50 mm	≤ 15 mm	3 mm ≤...≤ 10 mm	13 mm

Bar Installation

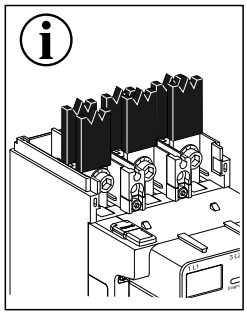
Perform the following procedure to install the bars on the power terminals of the contactor or overload relay.

1. Place the bars on the power terminals of the contactor or overload relay.
2. Insert the screws through the bars and the power terminals and tighten the screws at the right torque.

Contactor	Overload Relay	Type of screws	Torque
LC1G205-245C	LR9G115-225C	Allen key	18±1.8 N•m
LC1G300-475C	LR9G500C	Inner hexagon	35±3.5 N•m
LC1G620C	LR9G630C	Inner hexagon	58±5.8 N•m



NOTE: You can also install two bars for the power connections.



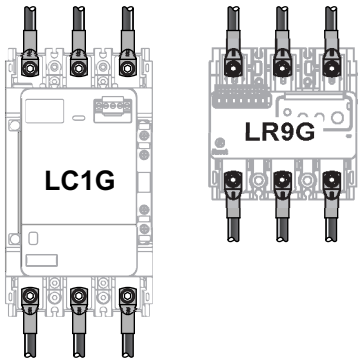
Connection with Lugs

Overview

Lugs can be used to connect contactors and overload relays:

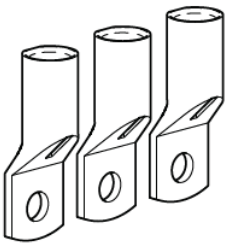
- IEC lugs
- Third party lugs

The lugs can be installed both upstream and downstream of contactors and overload relays.



IEC Lugs

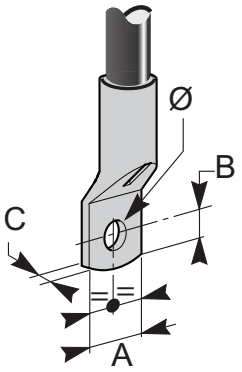
The table below provides the list of the IEC lugs used with the contactors and overload relays:



3P

Contactors	Overload relay	IEC lugs	Cable section
LC1G205-245C	LR9G115-225C	LV429252	120 mm²
LC1G205-245C	LR9G115-225C	LV429253	150 mm²
LC1G205-245C	LR9G115-225C	LV429254	185 mm²
LC1G300-475C	LR9G500C	LV432500	240 mm²
LC1G300-475C	LR9G500C	LV432502	300 mm²

Third Party Lugs



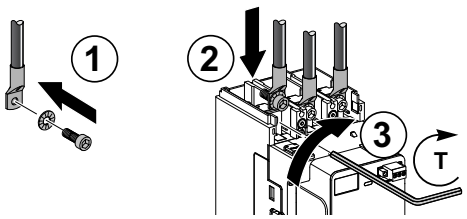
Contactor	Overload relay	A	B	C	Ø
LC1G205-245C	LR9G115-225C	≤ 25 mm	≤ 10 mm	≤ 6 mm	9 mm
LC1G300-475C	LR9G500C	≤ 32 mm	≤ 15 mm	3 mm ≤...≤ 10 mm	10.6 mm
LC1G620C	LR9G630C	≤ 50 mm	≤ 15 mm	3 mm ≤...≤ 10 mm	13 mm

Lug Installation

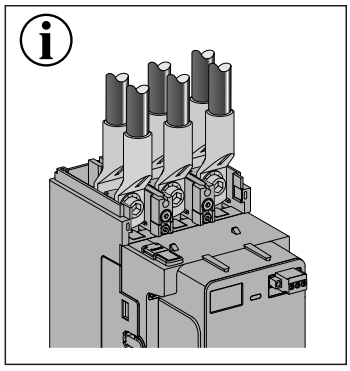
Perform the following procedure to install the lugs on the power terminals of the contactor or overload relay.

1. Insert the washer and the screw through the lug hole.
2. Place the lugs on the power terminals of the contactor or overload relay.
3. Insert and tighten the screws at the right torque.

Contactor	Overload relay	Type of screws	Torque
LC1G205-245C	LR9G115-225C	Allen key	18±1.8 N•m
LC1G300-475C	LR9G500C	Inner hexagon	35±3.5 N•m
LC1G620C	LR9G630C	Inner hexagon	58±5.8 N•m



NOTE: Two lugs for the power connections can also be installed.



Power Connection Accessories

The contactors can be connected by using the below power connection accessories:

- Straight terminal extensions
- Edgewise terminal extensions
- L side terminal extensions 3P
- L large terminal extensions 3P
- L rear terminal extensions 3P
- Spreaders
- Large spreaders
- Flexible terminal extensions

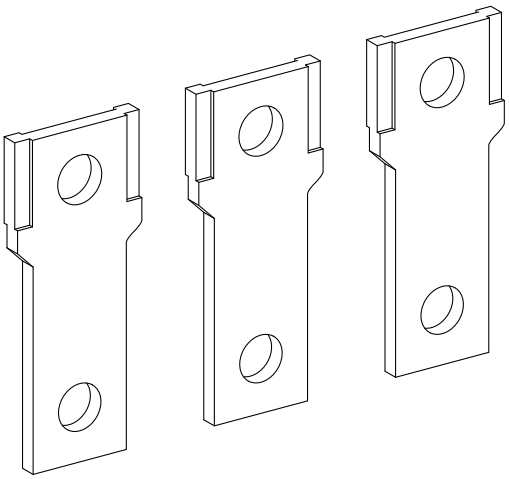
Straight Terminal Extensions

Overview

The straight terminal extensions are used to extend the connexion possibilities of the contactor.

The terminal extensions are screwed on the contactor using the screws delivered with the contactor.

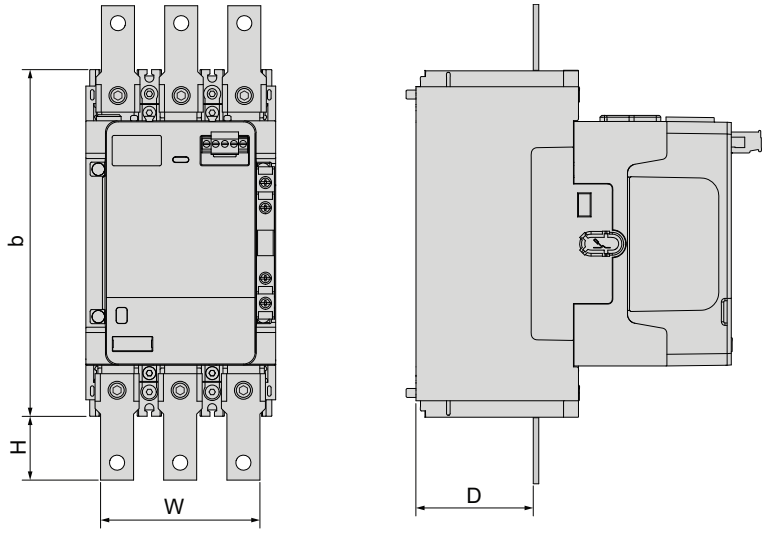
The screws delivered with the terminal extensions are used to screw bars or lugs on the terminal extensions.



The table below provides the list of the straight terminal extensions:

Contactor	Straight terminal extension
LC1G205-245C	LA9G3601
LC1G300-475C	LA9G3602
LC1G620C	LA9G3603

Dimension



Contactor	W	H	D
LC1G205-245C	88 mm	34.5 mm	69.5 mm
LC1G300-475C	120 mm	36 mm	84 mm
LC1G620C	188 mm	49.7 mm	113 mm

For installation instructions of power connection accessories, see Installation of the Power Connection Accessories, page 86

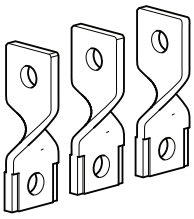
Edgewise Terminal Extensions

Overview

The edgewise terminal extensions are used to extend the connexion possibilities of the contactor.

The terminal extensions are screwed on the contactor using the screws delivered with the contactor.

The screws delivered with the terminal extensions are used to screw bars or lugs on the terminal extensions.

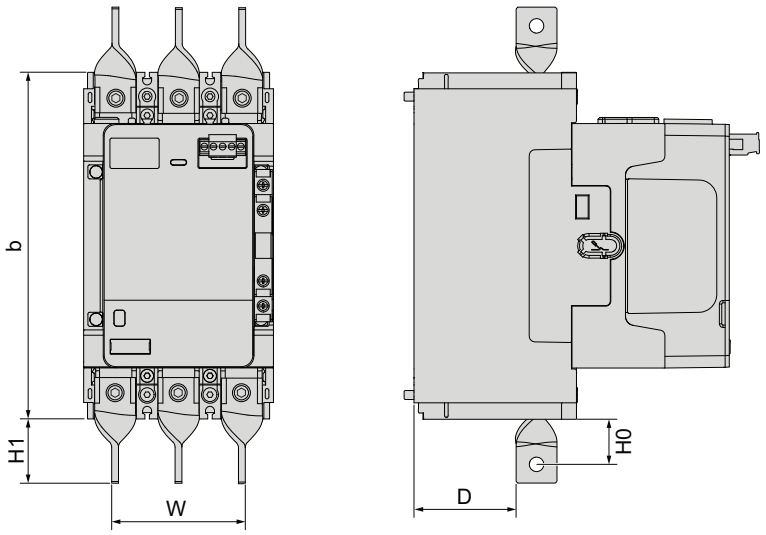


3P

The table below provides the list of the edgewise terminal extensions:

Contactor	Edgewise terminal extensions
LC1G205-245C	LA9G3631
LC1G300-475C	LA9G3632
LC1G620C	LA9G3633

Dimension



Contactor	W	H0	H1	D
LC1G205-245C	94 mm	27.5 mm	38.5 mm	59.5 mm
LC1G300-475C	120 mm	64.5 mm	78.5 mm	70 mm
LC1G620C	148 mm	93 mm	111 mm	93 mm

For installation instructions of power connection accessories, see Installation of the Power Connection Accessories, page 86.

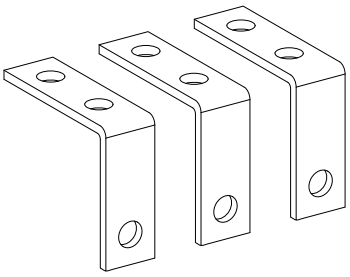
L Side Terminal Extensions

Overview

The L side terminal extensions are used to extend the connection possibilities of 3-pole contactors.

The terminal extensions are screwed on the contactor using the screws delivered with the contactor.

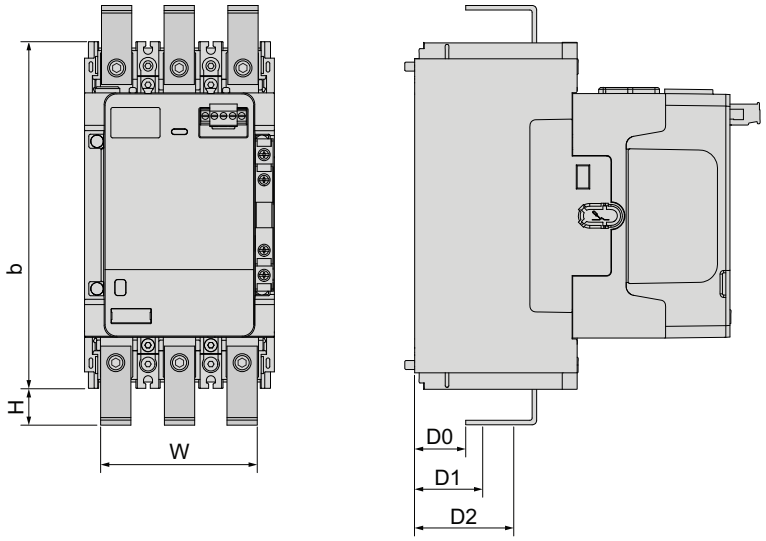
The screws delivered with the terminal extensions are used to screw bars or lugs on the terminal extensions.



The table below provides the list of L side terminal extensions:

Contactor	L side terminal extensions
LC1G205-245C	LA9G3661
LC1G300-475C	LA9G3662
LC1G620C	LA9G3663

Dimension



Contactor	W	H	D0	D1	D2
LC1G205-245C	88 mm	22.5 mm	17.5 mm	29.5 mm	55.5 mm
LC1G300-475C	120 mm	26.5 mm	17 mm	31 mm	63 mm
LC1G620C	188 mm	34 mm	42 mm	60 mm	96 mm

For installation instructions of power connection accessories, see Installation of the Power Connection Accessories, page 86.

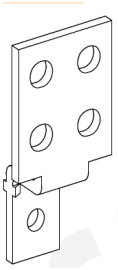
L Large Terminal Extension

Overview

The L large terminal extensions are used to extend the connection possibilities of 3-pole contactors.

The terminal extensions are screwed on the contactor using the screws delivered with the contactor.

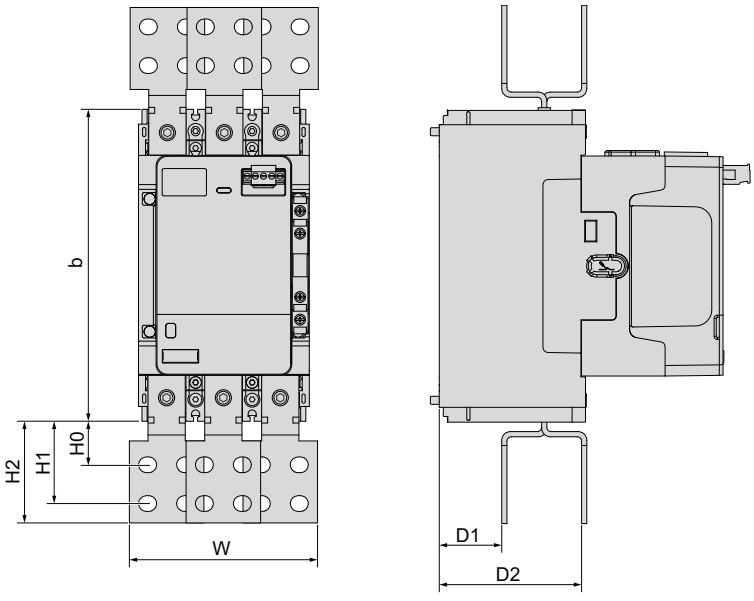
The screws delivered with the terminal extensions are used to screw bars or lugs on the terminal extensions.



The table below provides the list of L large terminal extensions:

Contactor	L large terminal extensions
LC1G205-245C	LA9G3671
LC1G300-475C	LA9G3672
LC1G620C	LA9G3673

Dimension



Contactor	W	H0	H1	H2	D1	D2
LC1G205-245C	110 mm	28.5 mm	50.5 mm	60.5 mm	46.5 mm	92.5 mm
LC1G300-475C	150 mm	38.5 mm	68.5 mm	84.5 mm	55 mm	111 mm
LC1G620C	240 mm	55 mm	90 mm	113 mm	80 mm	146 mm

For installation instructions of power connection accessories, see Installation of the Power Connection Accessories, page 86.

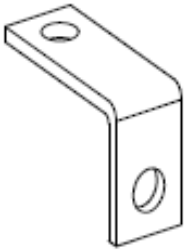
L Rear Terminal Extension

Overview

The L side terminal extensions are used to extend the connection possibilities of contactors.

The terminal extensions are screwed on the contactor using the screws delivered with the contactor.

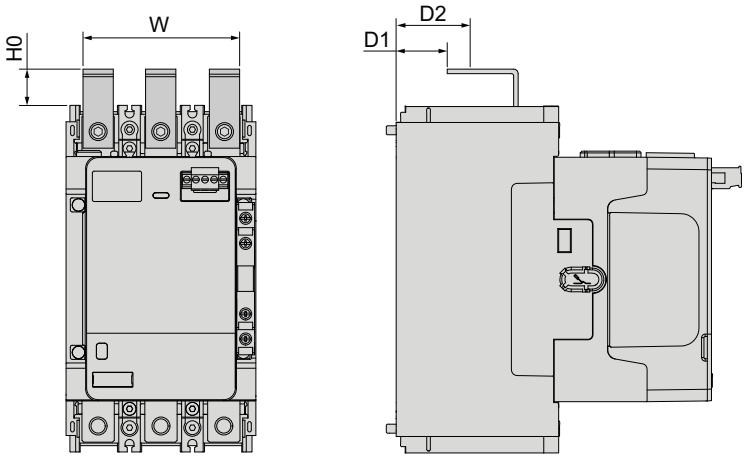
The screws delivered with the terminal extensions are used to screw bars or lugs on the terminal extensions.



The table below provides the list of L rear terminal extensions:

Contactor	L rear terminal extensions
LC1G205-245C	LA9G3681
LC1G300-475C	LA9G3682
LC1G620C	LA9G3683

Dimension



Contactor	W	H0	D1	D2
LC1G205-245C	88 mm	22.5 mm	44.5 mm	53.5 mm
LC1G300-475C	150 mm	38.5 mm	68.5 mm	84.5 mm
LC1G620C	188 mm	34 mm	73 mm	91 mm

For installation instructions of power connection accessories, see Installation of the Power Connection Accessories, page 86.

Spreaders

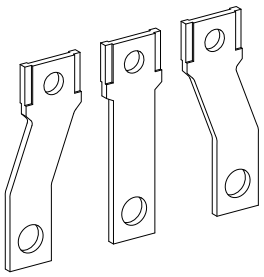
Overview

The spreaders are used on contactors:

- to increase the pole pitch of the contactor and align the contactor poles with circuit breaker poles or
- to increase the clearance distance between phases or
- to connect larger bars or lugs.

The spreaders are screwed on the contactor using the screws delivered with the contactor.

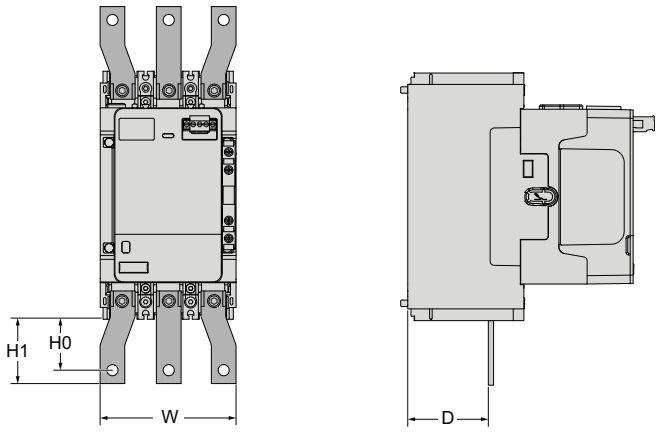
The screws delivered with the spreaders are used to screw bars or lugs on the spreaders.



The table below provides the list of spreaders used with contactors:

Contactor	Spreaders
LC1G205-245C	LA9G3611
LC1G300-475C	LA9G3612

Dimension



Contactor	W	H0	H1	D
LC1G205-245C	108 mm	44 mm	54.5 mm	69.5 mm
LC1G300-475C	170 mm	61 mm	73 mm	84 mm

For installation instructions of power connection accessories, see Installation of the Power Connection Accessories, page 86.

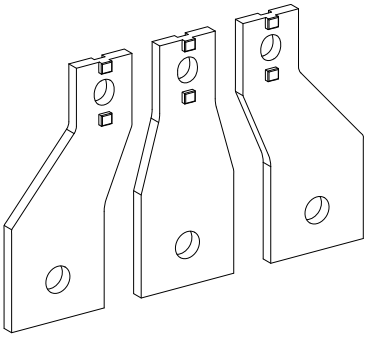
Large Spreaders

Overview

The large spreaders are used on LC1G475–620C contactors to connect larger bars. They are delivered with phase separators.

The large spreaders are screwed on the contactor using the screws delivered with the contactor.

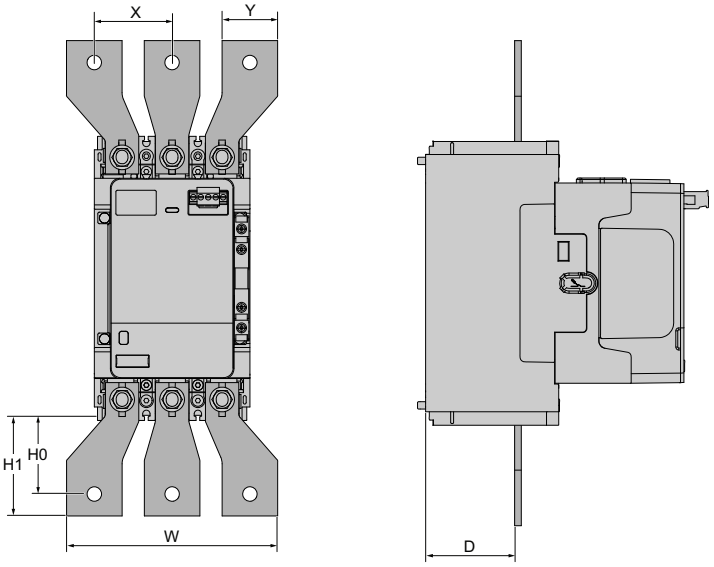
The screws delivered with the large spreaders are used to screw bars or lugs on the large spreaders.



The table below provides the list of large spreaders used with contactors:

Contactor	Spreaders
LC1G475C	LA9G3613
LC1G620C	LA9G3614

Dimension

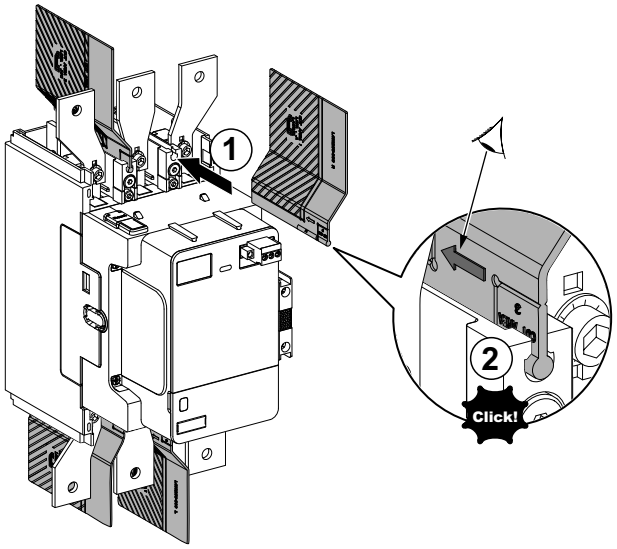


Contactor	X	Y	W	H0	H1	D
LC1G475C	70 mm	55 mm	190 mm	71 mm	91 mm	84 mm
LC1G620C	95 mm	80 mm	270 mm)	75 mm	90 mm	107 mm

For installation instructions of power connection accessories, see Installation of the Power Connection Accessories, page 86.

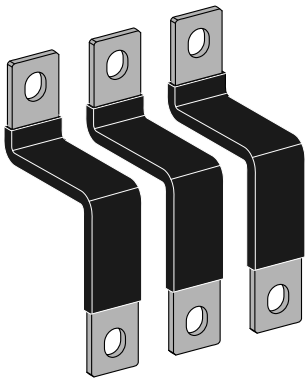
Installation of Phase Separators

1. Place the phase separator on the power terminals of the contactor.
2. Push the phase separator inwards to lock it automatically with a click.



Flexible Terminal Extensions

Flexible connecting bars can be used to connect TeSys Giga contactors with moulded case circuit breakers mounted in the same plane and orientation.



The table below provides the list of flexible terminal extensions used to connect contactors with moulded case circuit breakers:

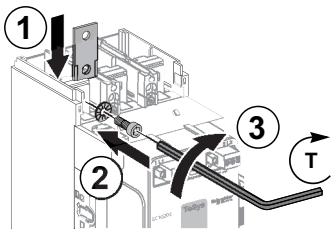
Contactor	Moulded case circuit breaker	Flexible terminal extensions
LC1G205-245C	TeSys Power – Giga Motor Protection Frame 5	LA9G3111
	ComPacT NSX100-250	
	PowerPacT H- / J-Frame	
LC1G300-475C	TeSys Power – Giga Motor Protection Frame 6	LA9G3112
	ComPacT NSX400-630	
	PowerPacT L-Frame	
LC1G620C	ComPacT NS630b-1600	LA9G3113
	PowerPacT P-Frame	

NOTE: To ease the mounting, drilling stencils JYT1902701 can be downloaded from the www.se.com website.

Installation of the Power Connection Accessories

This section describes the installation procedure of straight terminal extensions on the power terminals. The installation procedure is same for all other power connection accessories.

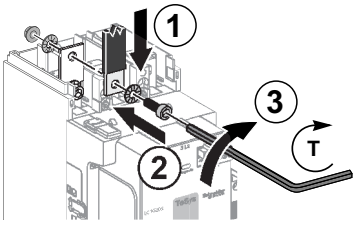
1. Place the terminal extension on the power terminals.
2. Insert the screw and washer through the hole at the top of the terminal extension.
3. Tighten the screws at the right torque.



Contactor	Type of screws	Torque
LC1G205-245C	Allen key	18±1.8 N•m
LC1G300-475C	Inner hexagon	35±3.5 N•m
LC1G620C	Inner hexagon	58±5.8 N•m

Bar or Lug Connection

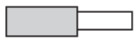
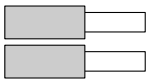
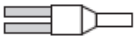
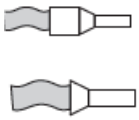
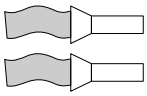
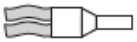
1. Place the bar or lug of the power circuit on the terminal extension.
2. Connect the terminal extensions to the power circuit using the screws delivered with the terminal extensions.
3. Tighten the screws at the right torque. The torques are the same as the torques to connect the terminal extensions on the contactor.



Control Connections

Contactor Wiring Characteristics

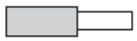
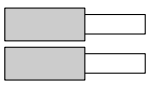
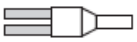
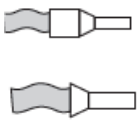
The table below provides wiring characteristics of the screw terminals blocks of contactors:

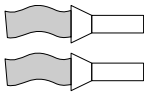
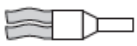
Cable type	Stripping length	Number of conductors		Section
Solid Cable	10 mm	1 conductor without cable end		0.2–2.5 mm²
		2 conductors without cable end		0.2–1.5 mm²
		2 conductors with suitable dual sleeve		0.5-1.0 mm²
Flexible cable		1 conductor with suitable cable end or sleeve		0.25-2.5 mm²
		2 conductors with suitable cable end		0.25-0.75 mm²
		2 conductors with suitable dual sleeve		0.5-1.0 mm²
Do not use flexible cable without cable end or sleeve.				

For the contactor wiring diagrams, see Control Mode, page 19

Overload Relay Wiring Characteristics

The table below provides wiring characteristics of the screw terminals blocks of overload relays:

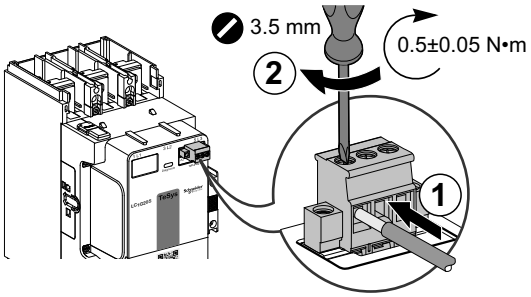
Cable type	Stripping length	Number of conductors		Section
Solid Cable	10 mm	1 conductor without cable end		0.2–2.5 mm²
		2 conductors without cable end		0.2–1 mm²
		2 conductors with suitable dual sleeve		0.5-1.5 mm²
Flexible cable		1 conductor with suitable cable end or sleeve		0.25-2.5 mm²

Cable type	Stripping length	Number of conductors		Section
		2 conductors with suitable cable end		0.25-1 mm²
		2 conductors with suitable dual sleeve		0.5-1.5 mm²
Do not use flexible cable without cable end or sleeve.				

For the overload relay wiring diagram, see Wiring Diagram, page 24.

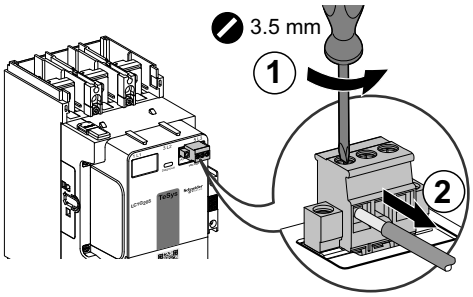
Conductor Connection

1. Insert the conductor in the terminal.
2. Tighten the screws at the right torque.



Removing the Conductor from the Terminal

1. Loosen the screws to release the conductor from the terminal.
2. Pull the conductor out from the terminal.



Installation of Accessories

What's in This Chapter

Insulation Accessories

Terminal Shrouds

⚠WARNING

HAZARD OF FLASH OVER BETWEEN POLARITIES

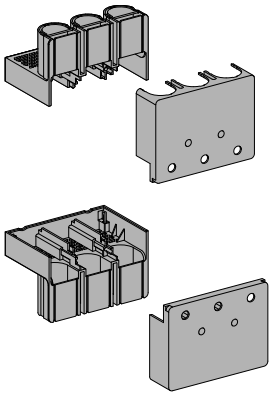
Terminal shrouds must be installed if the network voltage is greater than or equal to 690 Vac.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Overview

The terminal shrouds can be installed on the top and bottom of the power terminals of contactors and overload relays to provide IP20 protection. One terminal shroud is made up of two covers:

- Front cover
- Back cover.



The terminal shrouds must be ordered separately. The table below provides the commercial references of the terminal shrouds. For each commercial reference, one terminal shroud is delivered, for installing either on top and bottom power terminals:

Contactor	Overload relay	Terminal shroud
LC1G205-245C	LR9G115-225C	LA9G3701
LC1G300-475C	LR9G500C	LA9G3702
LC1G620C	LR9G630C	LA9G3703

NOTE: Either phase separators or terminal shrouds can only be mounted. Phase separators or terminal shrouds are mandatory for operational voltage, Ue ≥ 690 V.

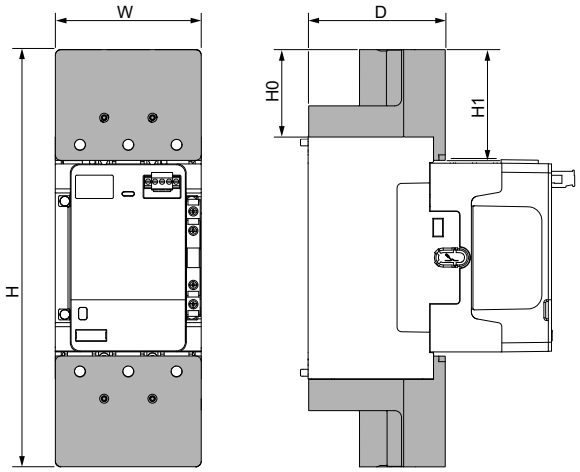
Compatibility

The terminal shrouds can be installed :

- on contactors
- on overload relays
- on top and bottom power connections connected with:
  - bars or lugs
  - coupling bars

NOTE: The terminal shrouds cannot be installed on contactors with power connection accessories and spreaders, or with phase separators.

Overall Dimension



The table below provides the dimension detail and other technical characteristics of the terminal shroud:

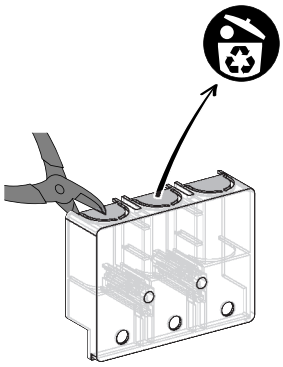
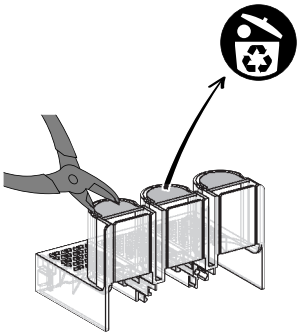
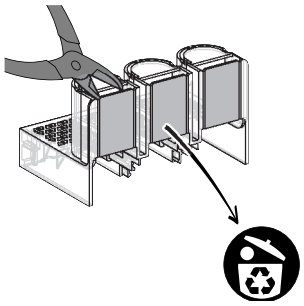
Contactor	W	D	H	H0	H1
LC1G205-245C	105.1 mm	98.5 mm	302 mm	63.5 mm	80.5 mm
LC1G300-475C	140 mm	121.5 mm	359 mm	79.5 mm	96.5 mm
LC1G620C	210.6 mm	163.5 mm	422.3 mm	81.75 mm	115 mm

Terminal Shroud Preparation

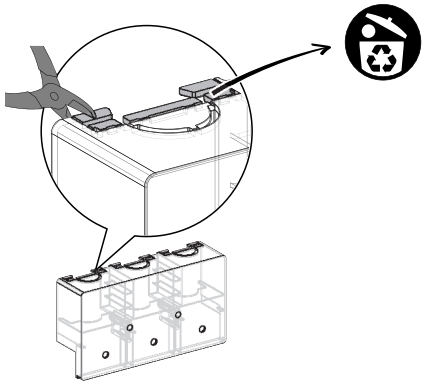
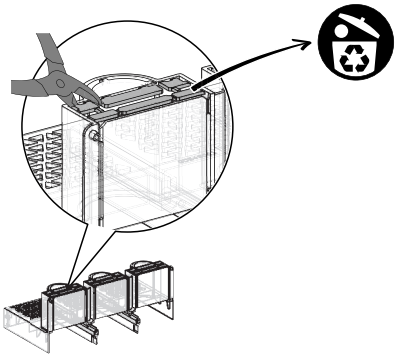
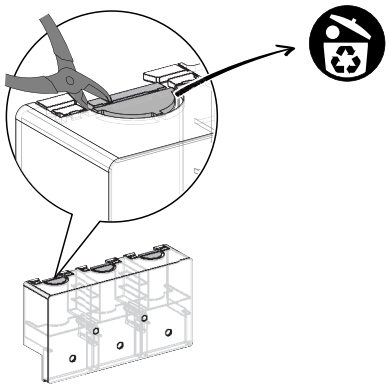
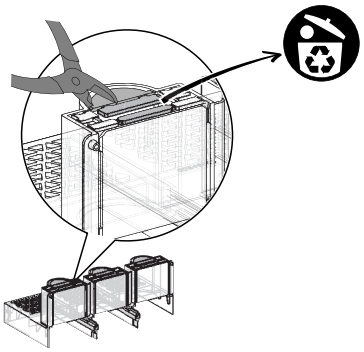
Prepare the terminal shrouds for installation by cutting the unnecessary parts on the front cover and the back cover with a tool. The following tables provide information about the preparation required before installation of the terminal shrouds according to the contactor rating.

NOTE: When the terminal shrouds are installed on contactor with coupling bars, only the front cover must be prepared. The back cover is not necessary.

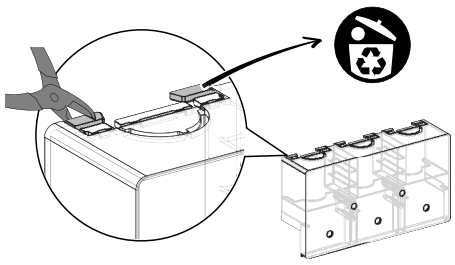
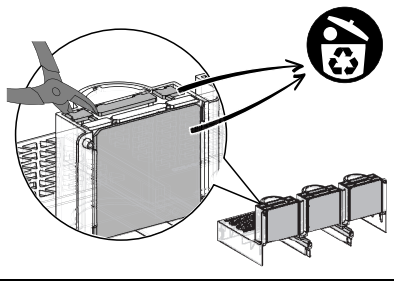
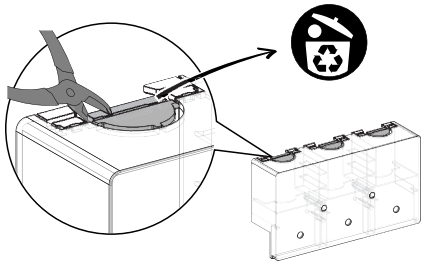
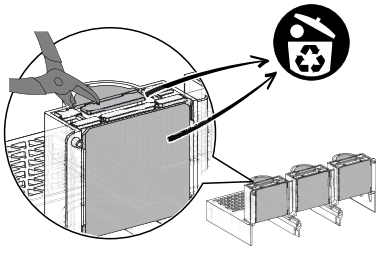
LC1G205-475C contactors

Power connection accessory	Front cover	Back cover
Bars	Nothing to cut	Nothing to cut.
Lugs	If lugs are connected at the front of the contactor terminals, cut the part from top. 	If lugs are connected at the back of the contactor terminals, cut the part from bottom. 
Contactor with cable memory connection blocks	Nothing to cut	Cut the part from middle. 

LC1G620C contactors without cable memory

Power connection accessory	Front cover	Back cover
Bars	If lugs are connected at the front of the contactor terminals, cut the part from top. 	If lugs are connected at the back of the contactor terminals, cut the part from bottom. 
Lugs	If lugs are connected at the front of the contactor terminals, cut the part from top. 	If lugs are connected at the back of the contactor terminals, cut the part from bottom. 

LC1G620C contactors with cable memory

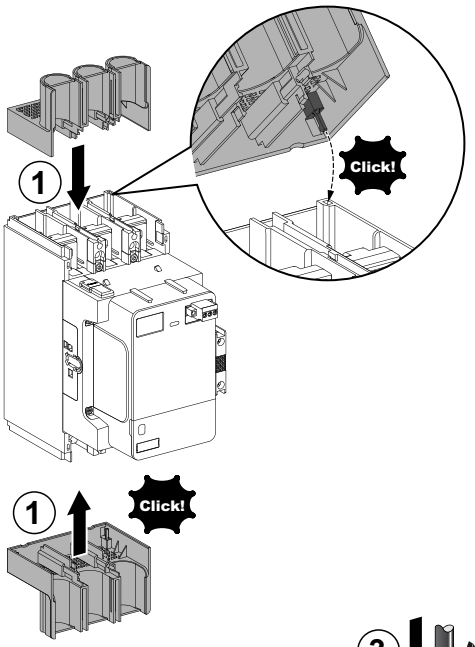
Power connection accessory	Front cover	Back cover
Bars		
Lugs		

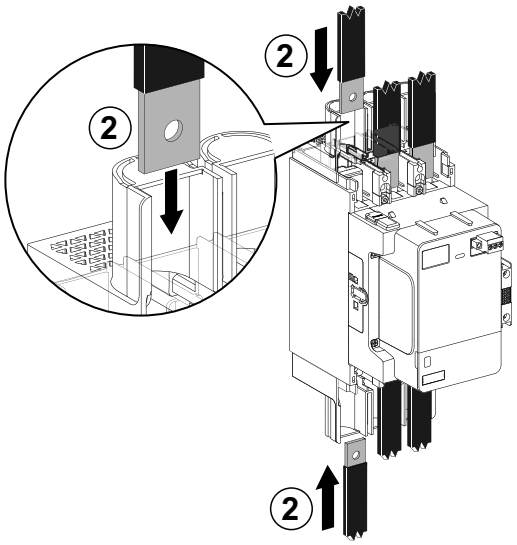
Installation of Terminal Shroud with Bars, Lugs or Terminal Extensions

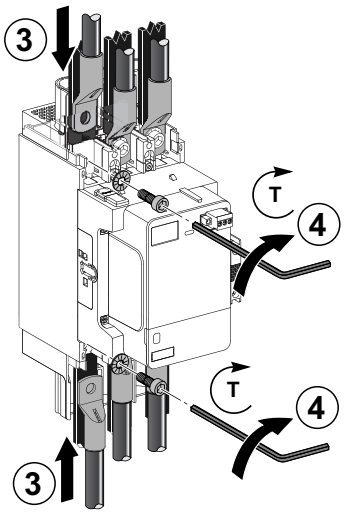
1. Install the back cover of the terminal shroud on the contactor to lock it automatically with a click.
2. Place and insert the bars inwards through the back cover of the terminal shroud.
3. Place and insert the lugs on the power terminals of the contactor.
4. Insert and tighten the screws at the right torque.

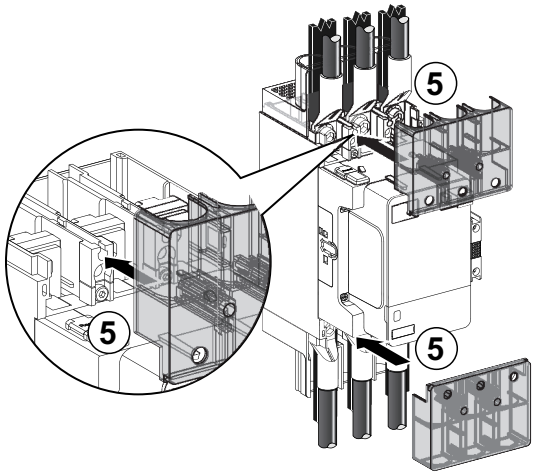
Contactor	Type of screws	Torque
LC1G205-245C	Allen key	18±1.8 N•m
LC1G300-475C	Inner hexagon	35±3.5 N•m
LC1G620C	Inner hexagon	58±5.8 N•m

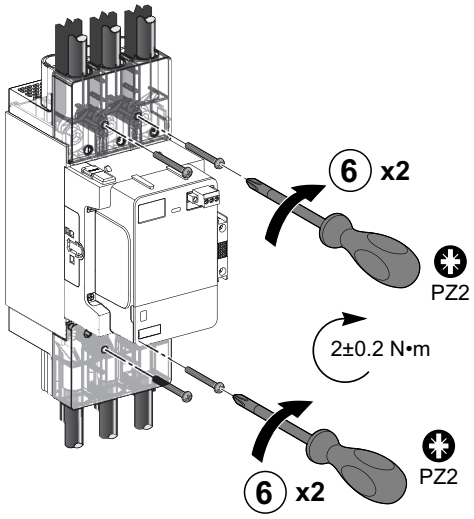
5. Install the front cover of the terminal shroud.
6. Insert and tighten the screws at the right torque to lock the front cover.


1
Click!
1
Click!


2
2
2


3
T
4
T
4
3


5
5
5


6 x2
PZ2
2±0.2 N•m
PZ2
6 x2

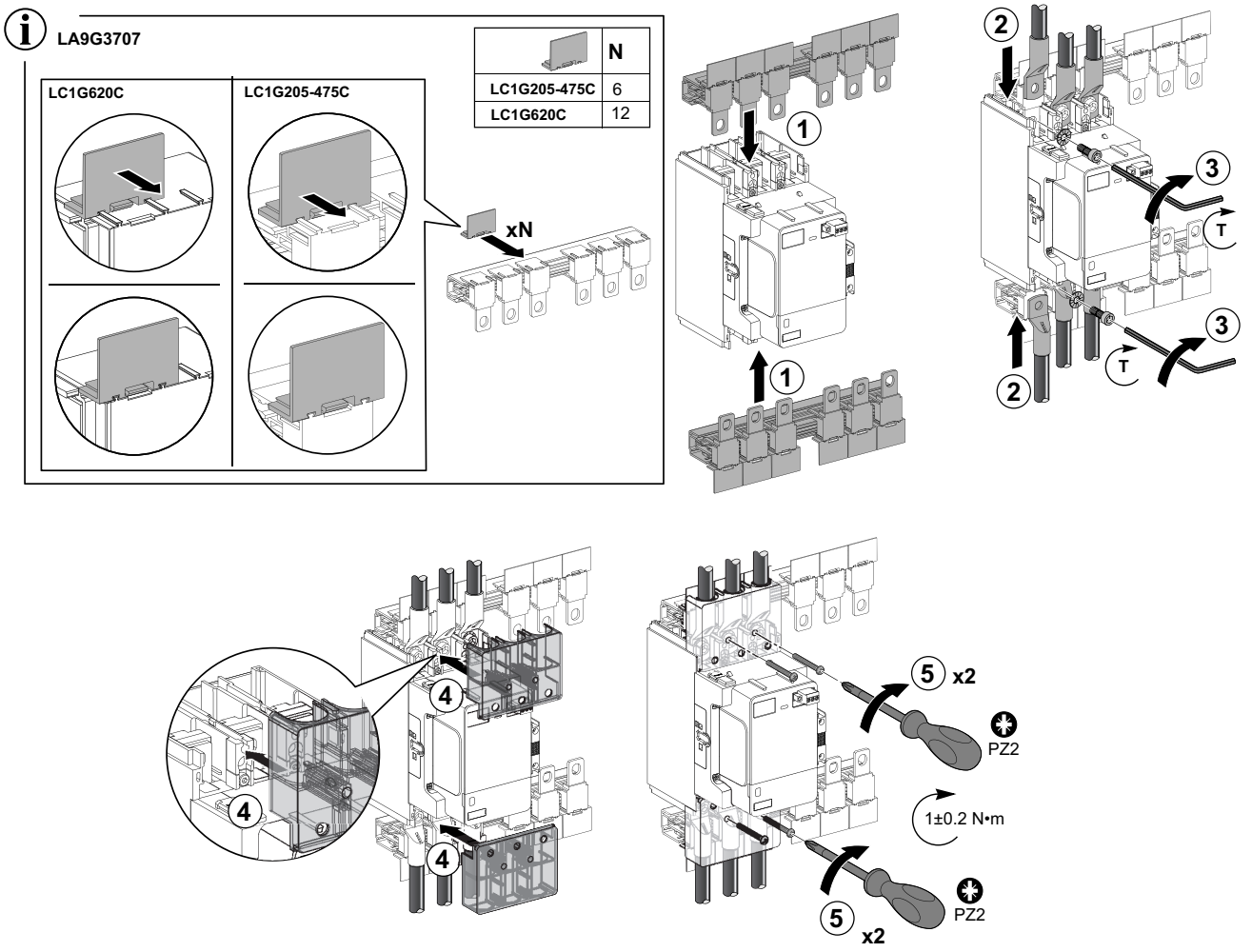
Installation of Terminal Shroud with Coupling Bars

With coupling bars, the back cover of the terminal shroud cannot be installed. You can use optional lug covers LA9G3707 to improve insulation of the coupling bars.

1. Place and insert the coupling bars on the power terminals of the contactor.
2. Place and insert the lugs inwards on the power terminals of the contactor.
3. Insert and tighten the screws at the right torque.

Contactor	Type of screws	Torque
LC1G205-245C	Allen key	18±1.8 N•m
LC1G300-475C	Inner hexagon	35±3.5 N•m
LC1G620C	Inner hexagon	58±5.8 N•m

4. Install the front cover of the terminal shroud.
5. Insert and tighten the screws at the right torque to lock the front cover.



Phase Separator

⚠WARNING

HAZARD OF FLASH OVER BETWEEN POLARITIES

Interphase barriers must be installed if the network voltage is greater than or equal to 690 Vac.

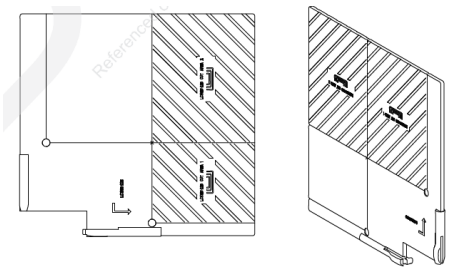
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Overview

The phase separators are installed between the power terminals of the contactor or the overload relay to provide 1000 Vac insulation between phases. They can be installed on the upstream or downstream side of the contactor or overload relay:

- LA9G3801: 2 phase separators.

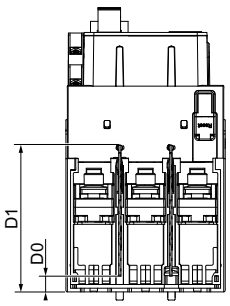
The phase separators are compatible with the power connection accessories, except the large spreaders. Phase separators LA9G3803 are delivered with the large spreaders, see Large Spreaders, page 83.

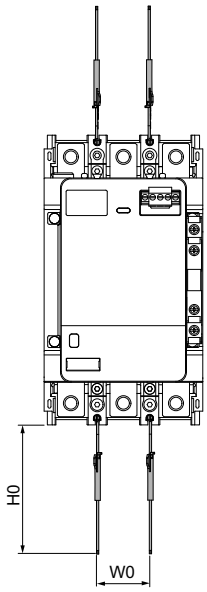


Contactor	Number of poles	Phase separator
LC1G205-620C	3P	LA9G3801

NOTE: Either phase separators or terminal shrouds can only be mounted. Phase separators or terminal shrouds are mandatory for operational voltage, Ue ≥ 690 V.

Overall Dimension





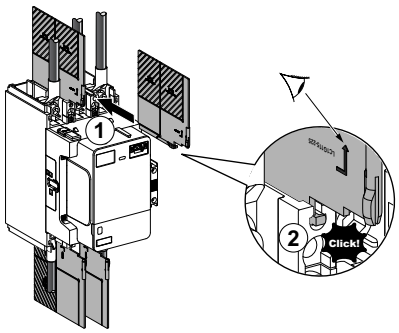
The table below provides the dimension detail and other technical characteristics of the phase separator:

Contactor	W0	H0	D0	D1
LC1G205-245C	35 mm	110 mm	0 mm	116.2 mm
LC1G300-475C	35 mm	110 mm	32 mm	113 mm
LC1G620C	35 mm	110 mm	32 mm	113 mm

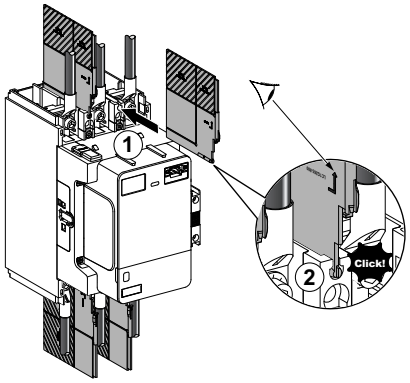
Installation of Phase Separator on Contactors

1. See the direction shown on the phase separator according to the contactor rating to insert it on contactor power terminals.
2. Insert the phase separator in the right direction on the power terminals of the contactor.
3. Push the phase separator inwards to lock it automatically with a click.

LC1G205-245C



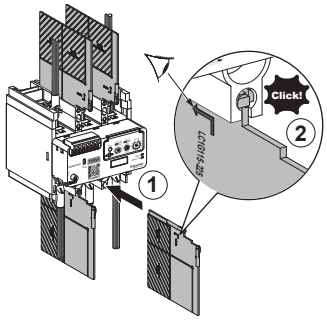
LC1G300-620C



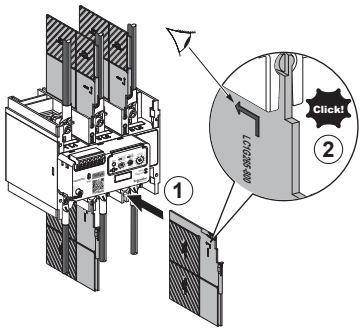
Installation of Phase Separator on Overload Relays

1. See the direction shown on the phase separator according to the contactor rating corresponding to the rating of the overlad relay to insert it on the overload relay power terminals.
2. Insert the phase separator in the right direction on the power terminals of the overload relay.
3. Push the phase separator inwards to lock it automatically with a click.

LR9G115-225C

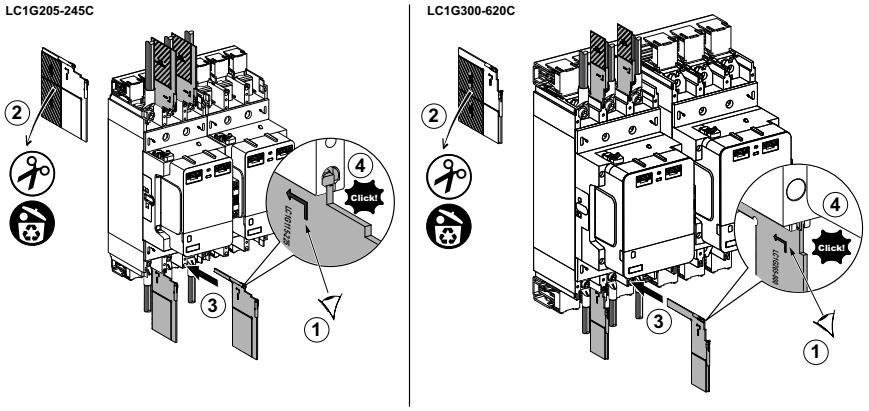


LR9G500-630C



Installation of Phase Separator with Coupling Bars

1. See the direction shown on the phase separator to cut it according to the contactor rating.
2. Cut the extra part of the phase separator.
3. Insert the phase separator in the right direction on the power terminals of the contactor.
4. Push the phase separator inwards to lock it automatically with a click.



Functional Accessories

Auxiliary Contact Modules

Overview

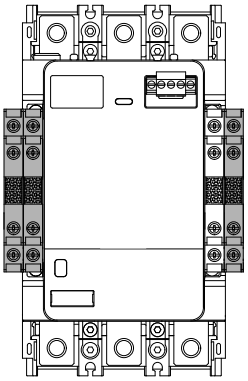
Auxiliary contact modules give an indication of the contactor status. It is used for remote visual signaling, alarming, electrical interlocking, and relay activation as required. The auxiliary contact terminals use screw technology.

There are two types of auxiliary contact modules depending on the contact arrangement:

- 1 NO + 1 NC contacts: LAG8N11 and LAG8N11P with different terminal identification. Each contactor is shipped with one LAG8N11P mounted on the contactor right side.
- 2 NO contacts: LAG8N20 and LAG8N20P with different terminal identification.

The NC auxiliary contacts are mirror of the main pole contact according to IEC 60947–4–1 annexure F. The NO and NC auxiliary contacts are mechanically linked according to IEC 60947-5-1 / EN 60947-5-1 annexure L.

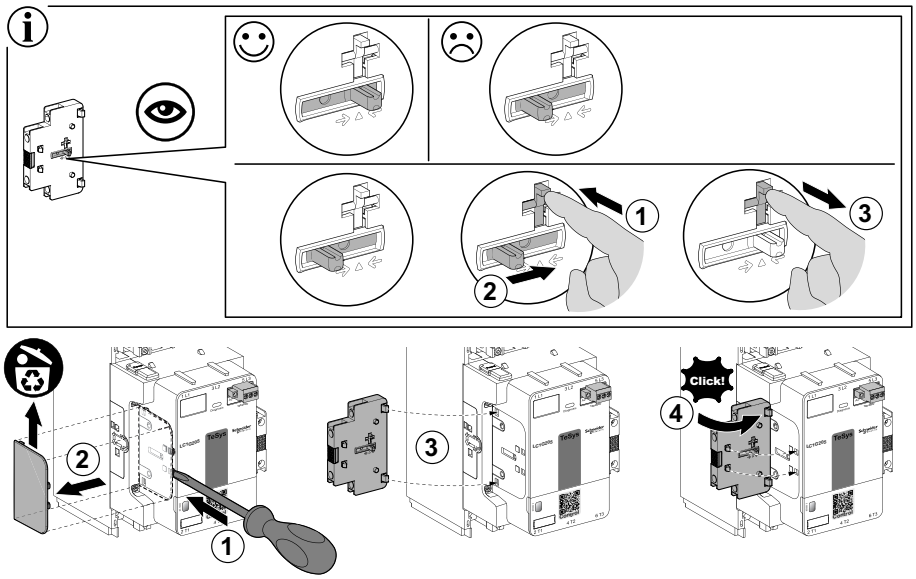
Up to four auxiliary contact modules can be mounted on one contactor. All combinations of the auxiliary contact modules are possible with maximum 2 on each side.



Installation of the Auxiliary Contact Modules

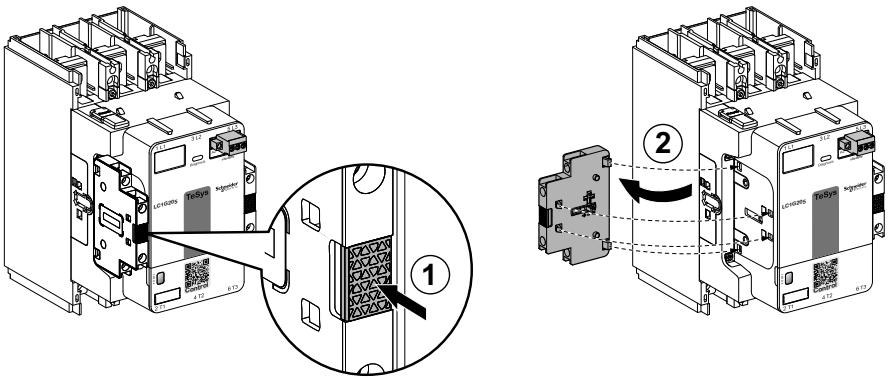
Make sure that the slider on the auxiliary contact modules should be on the right side before installation.

1. Place the screwdriver on the side of the plastic cover.
2. Push the cover inwards to remove the cover.
3. Place the auxiliary contact modules on the contactor at the fixing holes.
4. Push to lock automatically with a click.



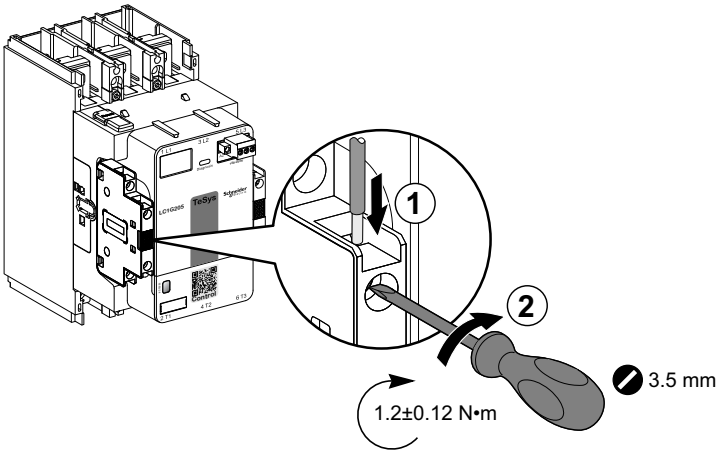
Removal of the Auxiliary Contact Modules

1. Press the green button on the auxiliary contact modules.
2. Pull out the auxiliary contact modules from the contactor.



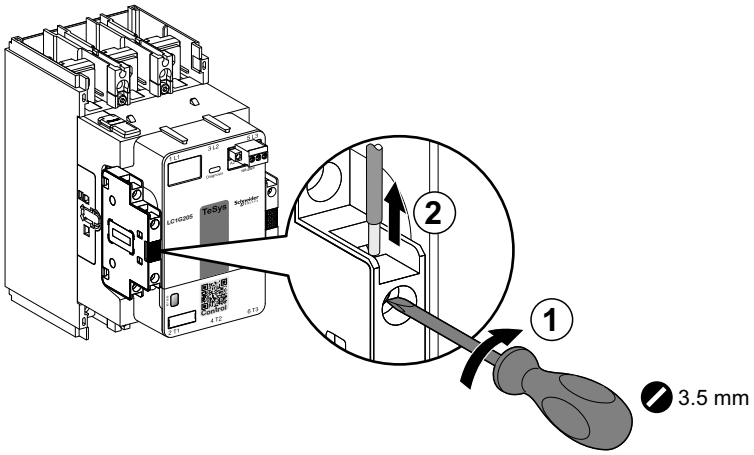
Conductor Connection

1. Insert inwards the conductor into the terminal.
2. Tighten the screws at the right torque.

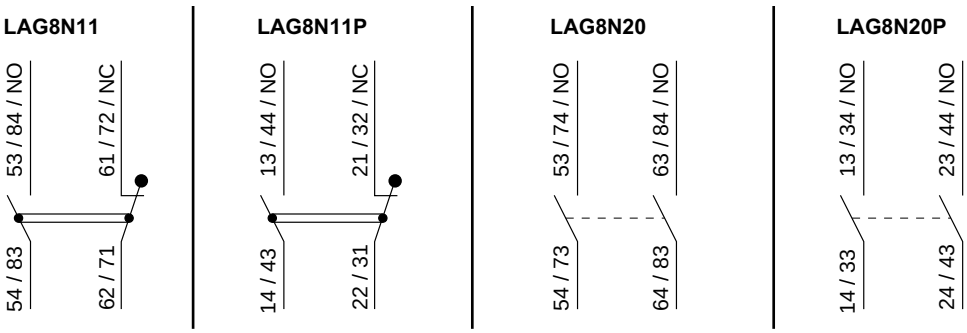


Removing the Conductor from the Terminal

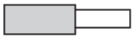
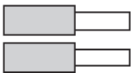
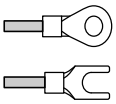
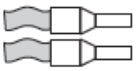
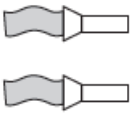
1. Loosen the screws to release the conductor from the terminal.
2. Pull the conductor out from the terminal.



Wiring Diagrams



Wiring Characteristics

Cable type	Stripping length	Number of conductors		Section
Solid cable without cable end	10 mm	1 conductor		0.75–2.5 mm²
		2 conductors		
Solid cable with lug	10 mm	2 conductors		
Flexible cable with suitable cable end	10 mm	1 conductor		
		2 conductors		
Flexible cable with suitable sleeve	10 mm	1 conductor		
		2 conductors		

Remote Diagnostic Modbus Module

Overview

Remote Diagnostic Modbus (RDM) module supports Modbus communication and one digital output (DO). It is used to provide diagnosis indications remotely for contactors with a control module with commercial references ending with LSEMC, including:

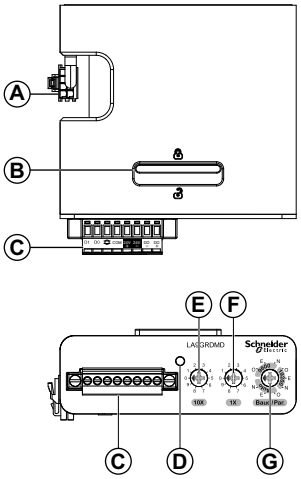
- main contact wear diagnosis
- coil over-temperature
- coil over-voltage and under-voltage
- control module internal malfunction
- contactor operating times

It can record the latest five diagnosis events. See Diagnosis Functions, page 17.

The table below provides the compatibility of the RDM module with contactors and control modules:

Contactor	Control module	RDM module reference number
LC1G205-245LSEMC	LX1G3QLSEMC	LA9GRDMD
LC1G300LSEMC	LX1G3RLSEMC	LA9GRDMD
LC1G410-475LSEMC	LX1G3SLSEMC	LA9GRDMD
LC1G620LSEMC	LX1G3TLSEMC	LA9GRDMD

Hardware Description



Label	Description
A	Plug to the contactor
B	Unlock trigger
C	Terminal block for digital output, RDM power supply and Modbus communication port
D	LED indicator
E	Modbus address tens-digit knob
F	Modbus address ones-digit knob
G	Baud rate and parity setting knob

LED Indicator

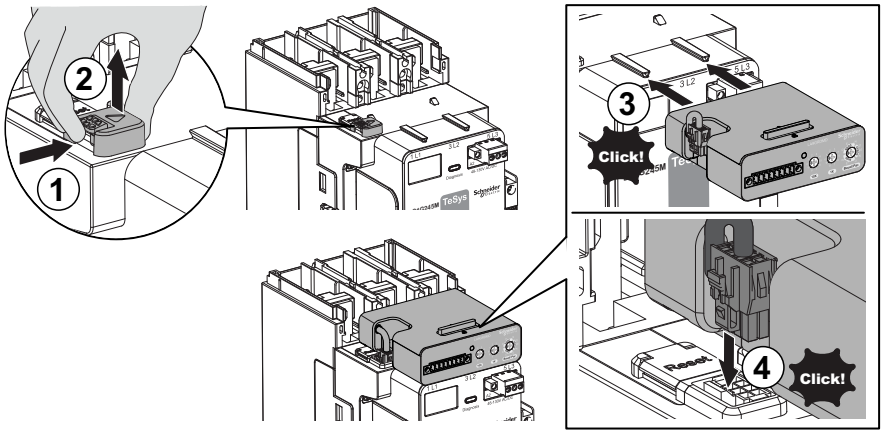
LED status	Color	Indication
On	Green	Initial idle state after RDM module is powered on. No request received.
	Orange	RDM module is powered on and a Modbus error is detected. See Troubleshooting, page 151 for more details.
	Red	RDM module is not powered and a Modbus error is detected. See Troubleshooting, page 151 for more details.
Blinking	Green and orange	RDM module is powered on, and Modbus communication is ongoing without error. If a Modbus exception code is returned, see Troubleshooting, page 151 for more details.
Off	-	RDM module is powered off.

RDM Module Installation and Wiring

Installation of Remote Diagnosis Modbus Module

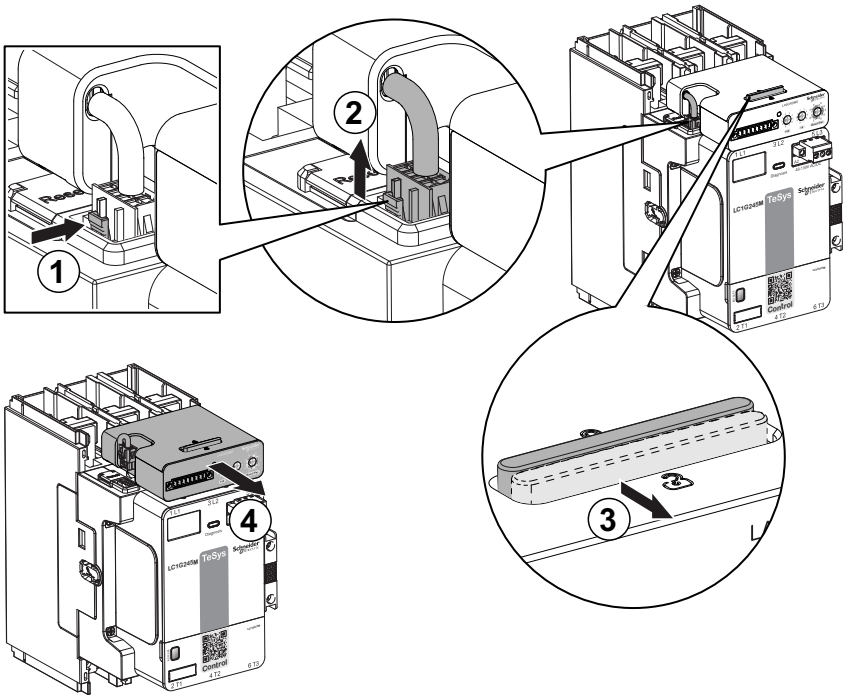
1. Press the button of the cap on top of the contactor.
2. Remove the cap. Keep it properly for future use.
3. Place the RDM module on the top of the contactor and push it inwards to lock it automatically with a click.

   NOTE: Ensure that RDM module is installed along both slots.
4. Connect the cable to lock it automatically with a click.



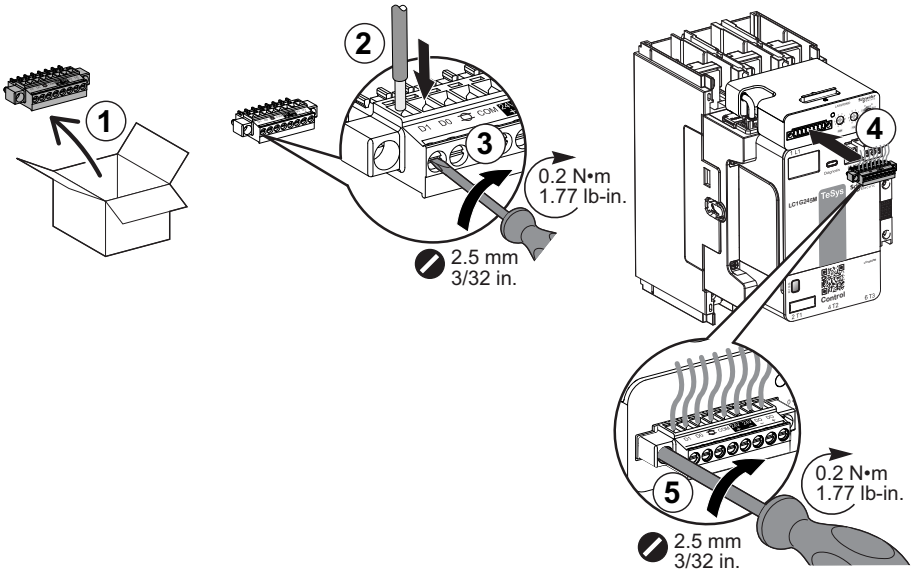
Removal of Remote Diagnosis Modbus Module

1. Press and hold the button on the side of the plug.
2. Pull out the plug.
3. Toggle the unlock trigger.
4. Pull outwards to remove the RDM module.
5. Put back the top cap.



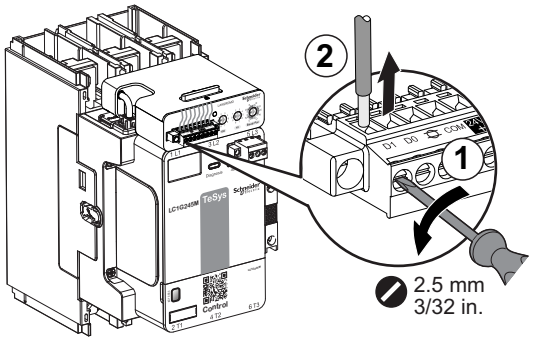
Conductor Connection

1. Take out the terminal from the packaging box.
2. Insert inwards the conductor into the terminal.
3. Tighten the screws by using a 2.5 mm flathead screwdriver at the right torque (0.2 N.m).
4. Insert the terminal into the RDM module.
5. Tighten the screws at the right torque (0.2 N.m).

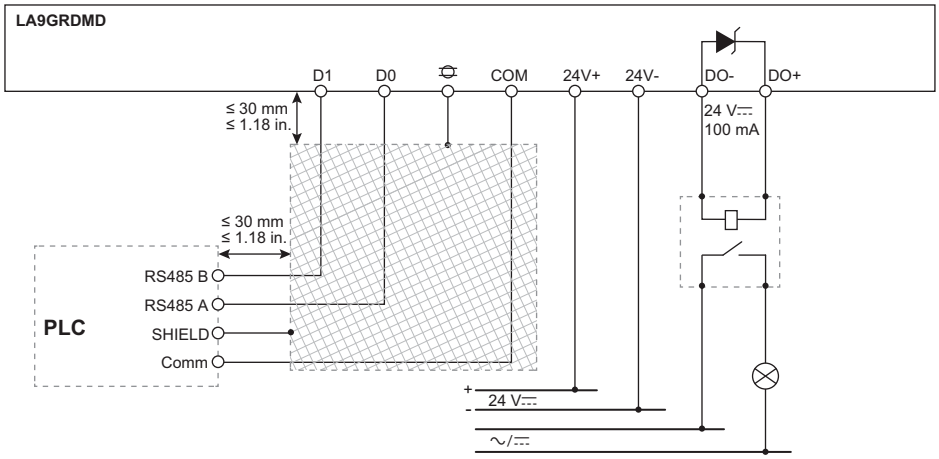


Conductor Removal

1. Loosen the screws to release the conductor from the terminal by using a 2.5 mm flathead screwdriver at the right torque (0.2 N.m).
2. Pull the conductor out from the terminal.



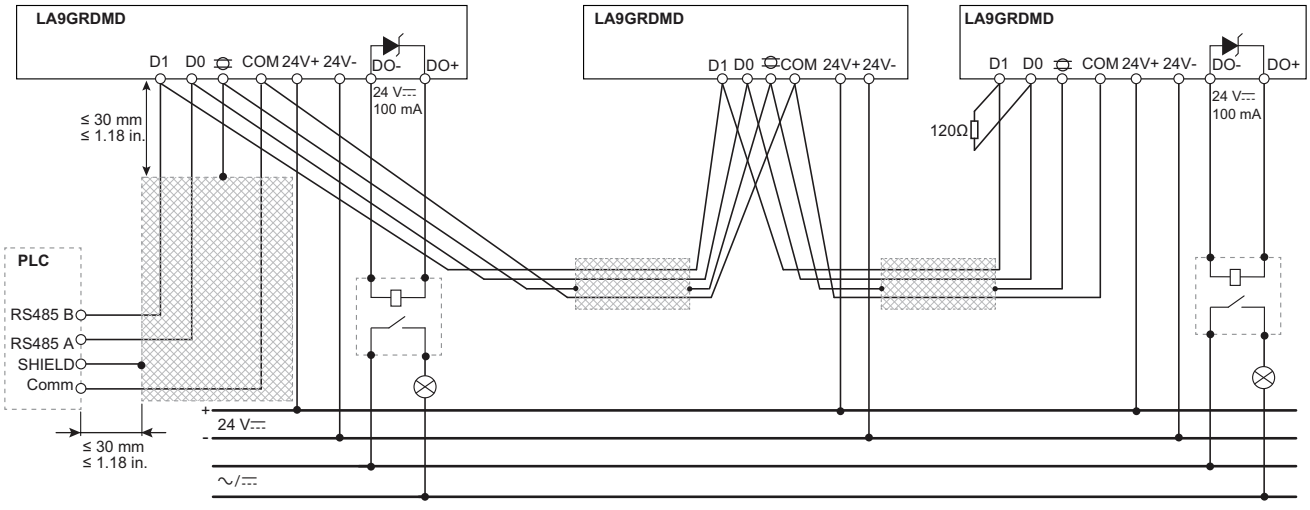
Wiring Diagram



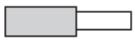
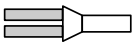
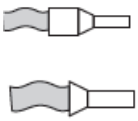
- Use a shielded twisted pair Modbus cable to reduce radiated emissions and improve shielding against external electromagnetic interference.
- A 120 Ω parallel resistor must be connected to D0–D1 when the RDM module is connected at the end of Modbus network.
- The maximum unshielded length of the Modbus cable is 30 mm.

Modbus Wiring in Daisy Chain Topology

The maximum length of the Modbus cable from the first PLC to the last RDM module is 15 meters. It is suggested to connect no more than 6 RDM modules in the daisy chain to achieve timely and responsive communication. The maximum number of RDM module in the daisy chain is 99.



Wiring Characteristics

Cable type	Stripping length	Number of conductors		Section
Solid cable	6–7 mm	1 conductor without cable end		0.14–1.5 mm²
		2 conductors with suitable dual end		0.14–0.5 mm²
Flexible cable		1 conductor with suitable cable end or sleeve		0.25-0.5 mm²
		2 conductors with suitable dual sleeve		0.5 mm²
Modbus cable (shielded twisted pair cable)	6–7 mm	-		0.14–1.5 mm²

NOTE:

- Do not use flexible cable without cable end or sleeve.
- Follow the National Electrical Code and local regulations when installing the communication wiring.

For more information about Modbus wiring and application, please refer to "MODBUS over Serial Line Specification & Implementation guide V1.1" on modbus.org.

Modbus Communication Setting

General Settings

Item	Setting
Address	1–99
Broadcast	No
Transmission mode	RTU
Baud rate (bps)	Auto(1): auto mode, support Baud rate of 9600, 19200, 38400, 57600, 115200 9600 19200
Parity	O: Odd parity E: Even parity N: None parity
Data bit number	8
Stop bit number	1(2)

(1)The first 10 data packages will not be responded when Auto mode is adapting.

(2) The stop bit is set to 1 by default for all parity setting.

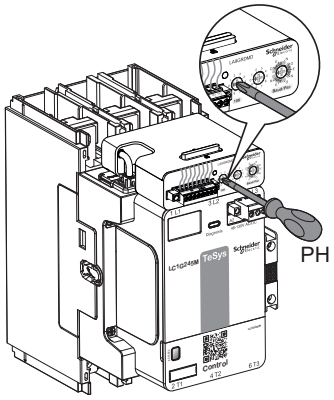
Configuring Modbus Address

RDM module supports Modbus addresses from 1 to 99. It can be set using the 2 setting knobs on the module.

The address setting will be effective once the contactor is powered on. If you want to change the address setting, disconnect the power, modify the setting and power on the contactor again.

Follow the steps below to set the Modbus address:

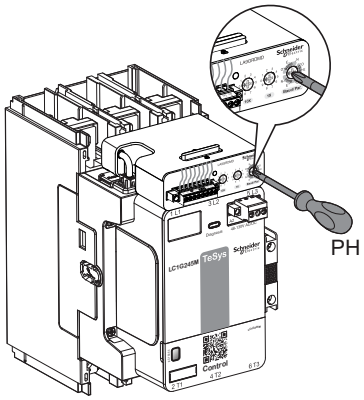
1. Insert a Phillips screwdriver to the setting knob.
2. Turn the knobs to set the tens-digit and ones-digit of the Modbus address.



Configuring Baud Rate and Parity

RDM module supports baud rate up to 115200 bps and setting parity to odd, even or none.

Use the same knob to set the baud rate and parity. The setting will be effective once the contactor is powered on. If you want to change the setting, disconnect the power, modify the setting and power on the contactor again..



Modbus Function Code

RDM module supports the following Modbus function codes:

- Read: 03 - Read Holding Registers
- Write: 06 - Write Single Register
- Write: 16 - Write Multiple Registers

Modbus Exception Code

The following table describes the exception codes handled by RDM module.

Exception code	Name	Description
01 (0x01)	Illegal function	The function code received in the request is not an authorized action for the server.
02 (0x02)	Illegal data address	The data address received by the server is not an authorized address for the server.
03 (0x03)	Illegal data value	The value in the request data field is not an authorized value for the server.
04 (0x04)	Server failure	The server fails to perform a requested action because of an unrecoverable error.

Digital Output Setting

Digital output for diagnosis indications except for internal malfunction can be set to enabled or disabled. By default, all diagnosis indications except for internal malfunction are disabled. Internal malfunction indication is fixed as enabled.

Set the bit to 1 to enable the digital output of alarms, and set to 0 to disable it. The reserved bits without any diagnosis indication should also be set to 0. The digital output configuration is written to the register 61701 with Modbus function code 06 or 16. See Modbus Registers for more information.

Modbus Register Tables

Table Formats

Register tables have the following columns:

Address	Register	Number of 16-bit registers	R/W	Type	Description

Designation	Description
Address	16-bit register address in hexadecimal. The address is the data used in the Modbus frame.
Register	16-bit register number in decimal. Register = Address + 1. For example, the register 60001 is addressed as 0xEA60.
Number of 16-bit registers	Number of 16-bit registers that need to be read / written to access the complete information.
R/W	Whether the register is read only (R) or read-write (RW).
Type	Coding data type (see Data Types table below).
Description	Information about the register and restrictions that apply.

Data Types

Name	Description
UINT16	16-bit unsigned integer (1 word)
UINT32	32-bit unsigned integer (2 word)
ASCII	String of 8–bit alphanumeric character

Register Table

Address	Register	Number of 16-bit registers	R/W	Type	Description
0xEA60	60001	9	R	ASCII	The vendor’s name of the product: Schneider Electric
0xEA69	60010	32	R	ASCII	The URL of the vendor: https://www.se.com/
0xEAC4	60101	8	R	ASCII	Product range name: TeSys Control
0xEADC	60125	8	R	ASCII	Product family name: Motor Starter
0xEB32	60211	1	R	UINT16	Internal numerical identifier of the product: 19800
0xEB33	60212	20	R	ASCII	Serial number of control module. A unique number of each control module delivered.
0xEF11	61202	1	R	UINT16	Status of the contactor: 0: Open 1: Close

Address	Register	Number of 16-bit registers	R/W	Type	Description
0xEF75	61302	1	R	UINT16	Bitmap for diagnosis indication: 0: Inactive 1: Active Bit definition: bit 0: The remaining service life of contacts is below 15% bit 4: Control voltage estimated value is over the maximum value of rated control voltage range bit 5: Control voltage estimated value is under the minimum value of rated control voltage range bit 7: Control module temperature is over the operation limit Other bits: Reserved
0xEF76	61303	1	R	UINT16	Bitmap for internal malfunction indication: 0: Inactive 1: Active Bit definition: bit 1: EEPROM error Other bits: Reserved
0xEFDD	61406	1	R	UINT16	The actual control voltage (V)
0xF03C	61501	2	R	UINT32	The number of operations performed by the contactor during its lifetime
0xF0A0	61601	2	R	UINT32	Event record 1 (latest record), see Event Records, page 113
0xF0A2	61603	2	R	UINT32	Event record 2, see Event Records, page 113
0xF0A4	61605	2	R	UINT32	Event record 3, see Event Records, page 113
0xF0A8	61609	2	R	UINT32	Event record 4, see Event Records, page 113
0xF0AA	61611	2	R	UINT32	Event record 5, see Event Records, page 113
0xF105	61702	1	R/W	UINT16	Digital output mapping for diagnosis indication 0: Disabled (default) 1: Enabled Bit definition: bit 0: The remaining service life of contacts is below 15% bit 1: Control voltage estimated value is over the maximum value of rated control voltage range bit 2: Control voltage estimated value is under the minimum value of rated control voltage range bit 3: Control module temperature is over the operation limit Other bits: Reserved (must be set to 0)

NOTE: The RDM module will answer with invalid data 0x8000 if an unused register is read. See Troubleshooting, page 151 for more details.

Event Records

The RDM module records the last 5 encountered events. Event record 1 shows the latest event, and event record 5 shows the oldest event. Earlier event records are overwritten by new ones.

Each event record consists of two 16-bit registers:

Event index (UINT8□	Event type (UINT8)
Event data (UINT16)	

- Register 1 MSB: unique index of each event record. It increases with the occurrence of events, from 0x01 to 0xFF.
- Register 1 LSB: type of events. See the following table.
- Register 2: data related to the event. See the following table.

Type of the event	Data related to the event	Event description
0x01	0xFFFF (N/A)	Wear diagnostic alarm activated
0x02	Voltage RMS in V	Contactor over voltage detected
0x03	Voltage RMS in V	Contactor under voltage detected
0x04	0xFFFF (N/A)	Contactor over temperature detected
0xFF	0xFFFF (N/A)	No event. Default event for event record

Physical Security of the Device

The following is the important physical security point to keep in mind for installing the device:

For Modbus-RTU accessories which are recognized as having security risks in the industry, physical security measures (such as dedicated pipes) are recommended to protect communication cables from unauthorized access, communication drops, data leakage and tampering, etc.

Applications

What's in This Chapter

Single-Phase Motor Application

Overview

TeSys Giga contactors and TeSys Giga overload relays can be used to control and protect single-phase asynchronous motors.

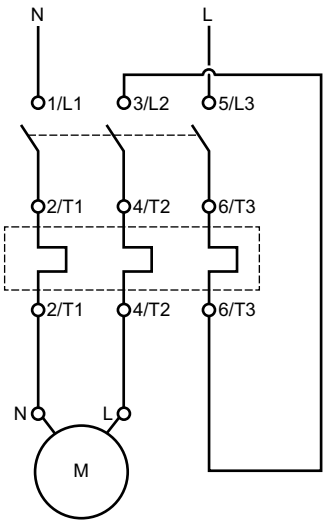
TeSys Giga overload relay protects single-phase motor from thermal overload. Thermal overload protection must be set according to the application, see Thermal Overload Protection, page 26.

To avoid nuisance tripping, phase imbalance protection (see Phase Imbalance Protection, page 31) and ground-fault protection (see Ground Fault Protection, page 32) must be disabled.

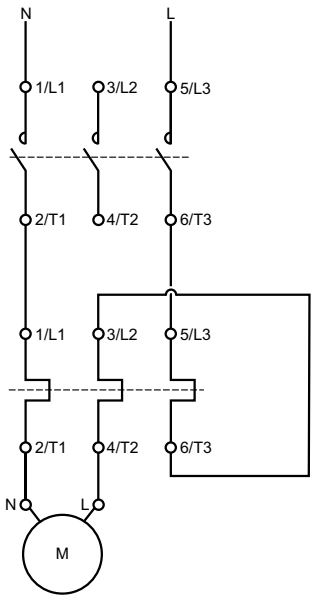
Wiring Diagram

The single-phase motor must be connected as indicated in the wiring diagrams below.

Connection to overload relay and contactor assembled



Connection to standalone overload relay



Star-Delta Starters

Star-Delta Application Description

Star-delta (or wye-delta) motor starting is used for:

- motors starting on no-load.
- motors having a low load torque.
- motor with load torque increasing with the speed to reduce the stress in the motor and in the distribution network when motor starts.

Examples of this application are fans, compressors with exhaust air and pumps starting with closed valve.

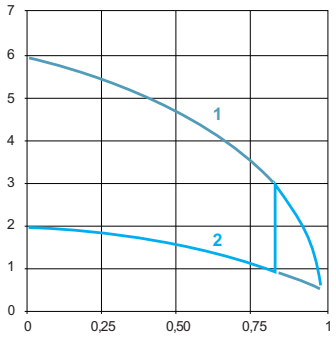
The characteristics of the star-delta starting method are:

- reduction of the starting current.
- reduction of the voltage drop.

This method of starting is applicable to three–phase motors on which all six stator terminals are accessible and whose delta connection voltage corresponds to the main voltage. It requires the combination of three contactors. It helps to start the motor with reduced voltage due to the star connection of the stator windings:

- the starting torque in star connection is reduced to one third of the direct starting torque, that is about 50% of the rated torque.
- the starting current in star connection is about 1.8–2.6 times the rated current.

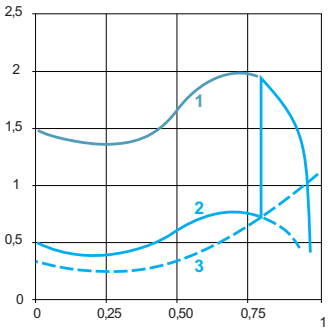
Current



Speed

1 Starting in direct delta connection
2 Starting in star connection

Torque



Speed

1 Starting in direct delta connection
2 Starting in star connection
3 Resistive torque of the machine (specified by the machine manufacturer)

The transition from star to delta connection should occur when the machine has run up to its speed. A too rapid build-up in load torque would cause the stabilized run-up speed to be too low and would therefore eliminate any advantage in this method of starting. This is the case with certain machines whose load torque depends on the machine speed (a characteristic of centrifugal machines, for example).

Star-Delta Contactors

The star-delta starter requires the combination of three contactors:

- The line contactor (L, KM2)
- The star contactor (Y, KM1)
- The delta contactor (Δ, KM3)

The line and delta contactors have the same rating and are rated for the motor FLA / √3.

The star contactor is rated for the motor FLA / 3. The size of the star contactor can be

- the same as the size of the line and delta contactors.
- the size under the size of the line and delta contactors.

The star and delta contactors must be mechanically and electrically interlocked to avoid short-circuit during transition of the motor stator connections.

The mechanical interlock depends on the type of the three contactors.

Line and delta contactors	Star contactor	Mechanical interlock	Overload relay
LC1G205-245C	LC1G205-245C	LA9G970	LR9G115–225C
LC1G300-475C	LC1G300-475C	LA9G970	LR9G500C
LC1G620C	LC1G620C	LA9G973	LR9G630C
LC1G300-475C	LC1G205-245C	LA9G971	LR9G500C
LC1G620C	LC1G300-475C	LA9G972	LR9G630C

Overload Protection of the Star-Delta Starters

The thermal overload protection of the motor in a star-delta starter can be provided by a TeSys Giga overload relay. The overload relay rating is the same as the rating of the line and delta contactors. The Ir/FLA threshold of the thermal overload protection is set to the motor FLA / √3.

The thermal overload relay can be

- mounted directly under the line contactor (recommended) or
- mounted standalone and connected between the motor stator terminals and the delta contactor.

For more information on the star-delta starter power circuit and control circuit diagrams, refer to Power Wiring Diagram, page 122 and Control Wiring Diagram, page 128.

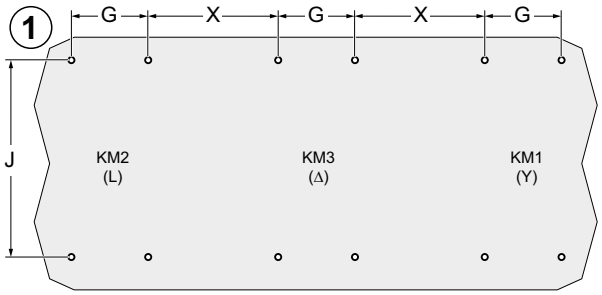
Mounting Star-Delta Contactors on Plate

Perform the following procedure to mount the star-delta contactors on the plate.

1. Drill 12 holes in the plate, with respect of the dimensions given.
   - LC1G205-475C - Maximum hole diameter: 6 mm
   - LC1G620C - Maximum hole diameter: 9 mm

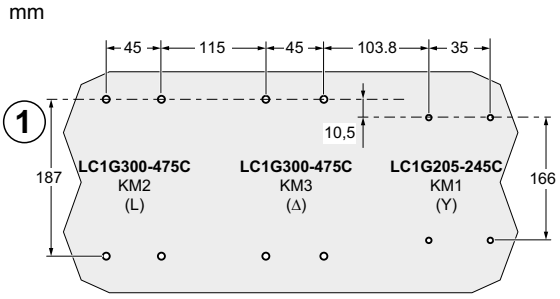
   NOTE: To ease the mounting, drilling stencils JYT1902701 can be downloaded from the www.se.com website.

Star-delta starter with three contactors of the same size:

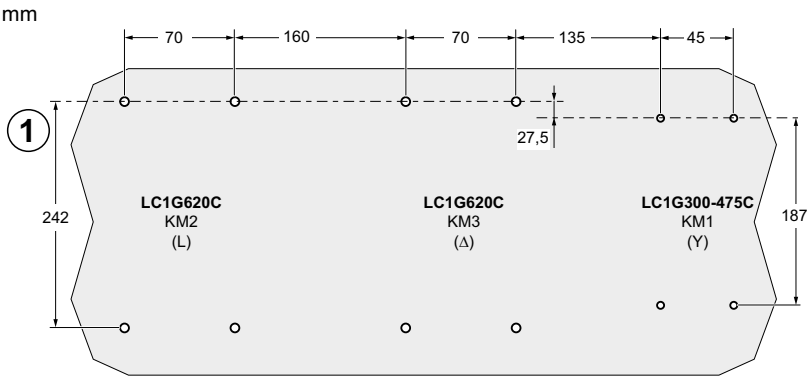


Contactor	G	J	X
LC1G205-245C	35 mm	166 mm	92,7 mm
LC1G300-475C	45 mm	187 mm	115 mm
LC1G620C	70 mm	242 mm	160 mm

Star-delta starter with LC1G300-475C line and delta contactors and LC1G205-245C star contactor.

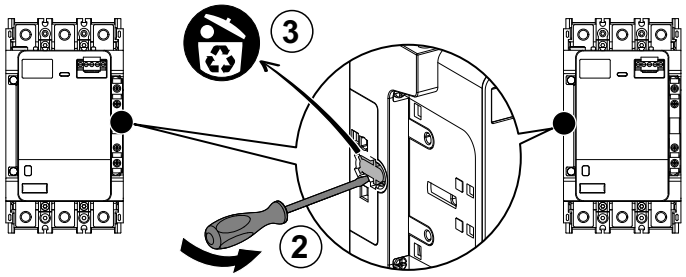


Star-delta starter with LC1G620C line and delta contactors and LC1G300-475C star contactor.

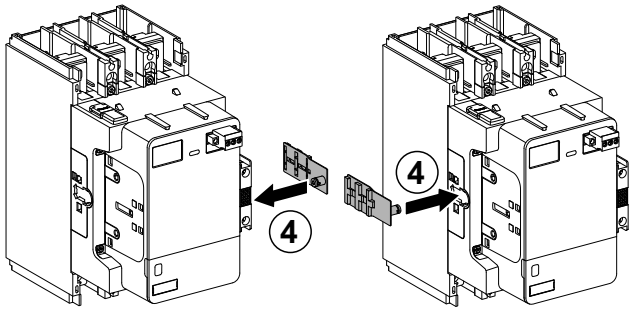


2. Remove the plastic part on the side of the star and delta contactors, where the mechanical interlock will be installed.

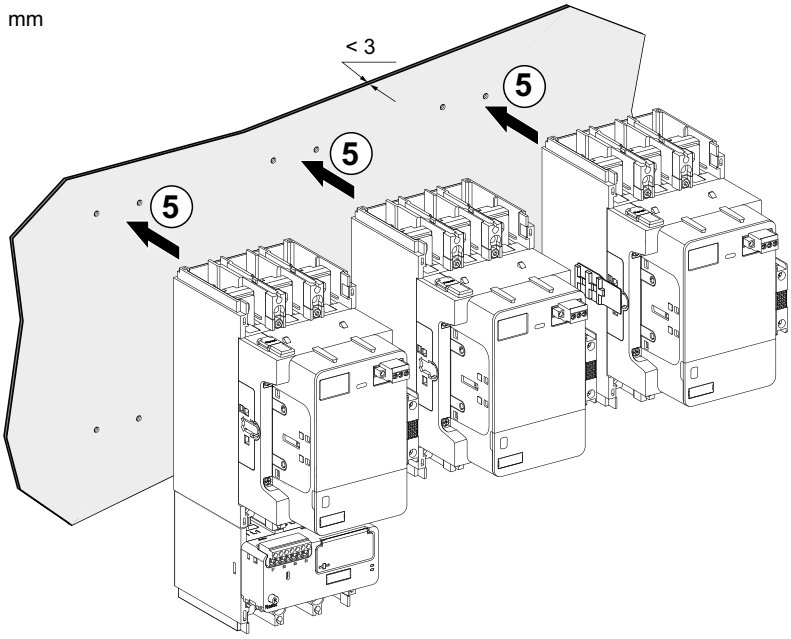
3. Discard the plastic part into the bin.



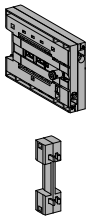
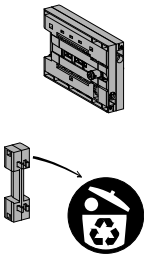
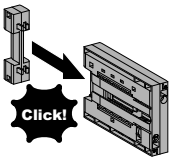
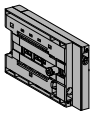
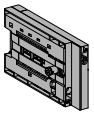
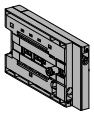
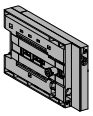
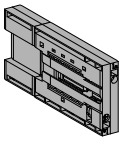
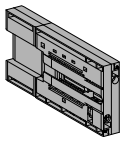
4. Insert the metal slides on the holes of the star and delta contactors.



5. Mount each contactor on the plate. Consult the relevant instructions:
   - For mounting LC1G205-245C contactors, see Mounting LC1G205-245C Contactors on Plate, page 53
   - For mounting LC1G300-620C contactors, see Mounting LC1G300-475C Contactors on Plate, page 53

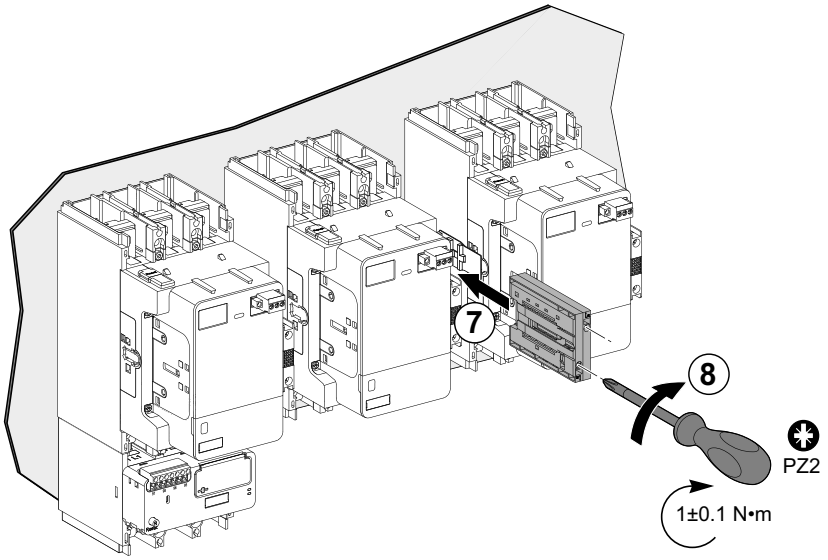


6. Assemble the mechanical interlock LA9G970 between star and delta contactors of the same size according to the size of the contactors.

	LC1G205–245C	LC1G300–475C	LC1G620C
LA9G970 			-
LA9G971 			-
LA9G972 	-		
LA9G973 	-		

NOTE: The mechanical interlock LA9G971 and LA9G972 between star and delta contactors of different sizes do not need to be adapted.

7. Insert the mechanical interlock between the star and delta contactors on the metal slides.
8. Tighten the two screws at the right torque to lock the interlock.



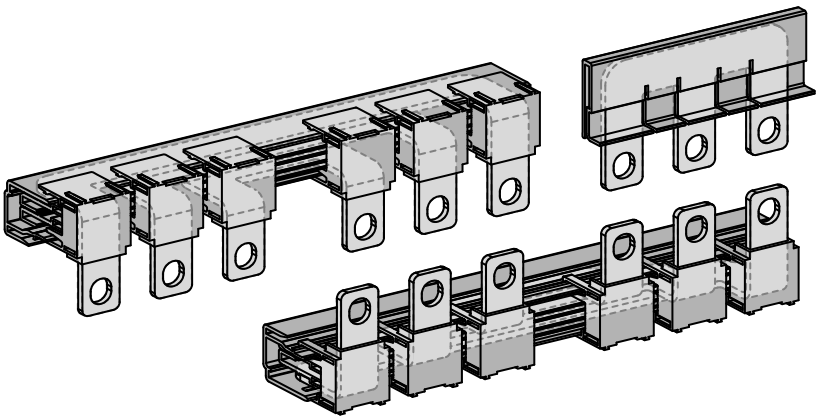
Power Connection with Star-Delta Connection Kits

Overview

Star-Delta connection kits can be used for the power connections of the three contactors. These connection kits can be used for contactors with or without cable memory. Check the below table for selection of suitable star-delta connection kits.

Star-delta connection kits are made of three coupling bars:

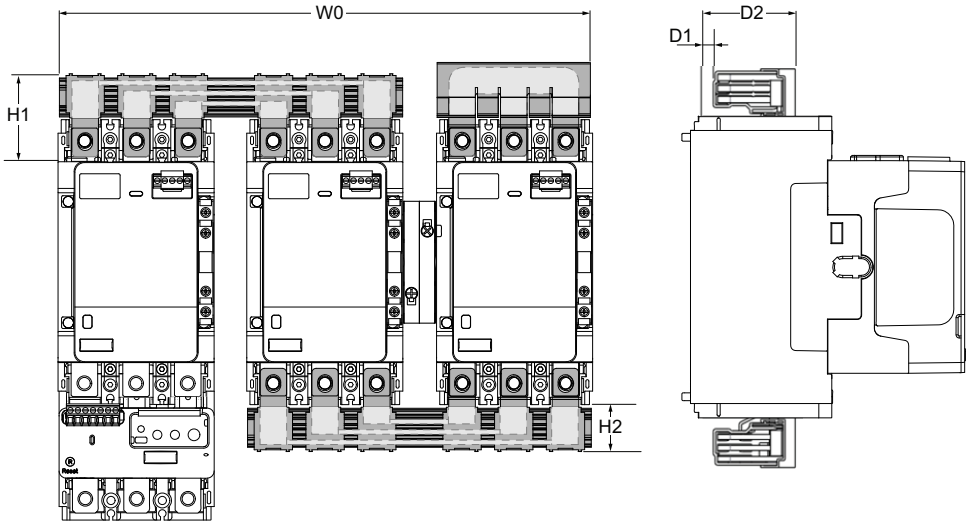
- the line-delta coupling bar, to couple the line and delta contactors with identical ratings
- the star-delta coupling bar, to couple the star and delta contactors.
- the star coupling bar to couple the motor stator windings.



The table below provides the list of the star-delta connection kits:

Contactor version	Line and delta contactors	Star contactor	Star-delta connection kit
With cable memory	LC1G205-245C	LC1G205-245C	LA9GQQ330
	LC1G300-475C	LC1G300-475C	LA9GSS330
	LC1G620C	LC1G620C	LA9GTT330
	LC1G300-475C	LC1G205-245C	LA9GSQ331
	LC1G620C	LC1G620C	LA9GTS331
Without cable memory	LC1G205-245C	LC1G205-245C	LA9GQQ330
	LC1G300-475C	LC1G300-475C	LA9GSS330
	LC1G620C	LC1G620C	LA9GTT330
	LC1G300-475C	LC1G205-245C	LA9GSQ330
	LC1G620C	LC1G300-475C	LA9GTS330

Dimensions



Commercial reference	W0	H1	H2	D1	D2
LA9GQQ330	364 mm	31.5 mm	31.5 mm	23.6 mm	68.5 mm
LA9GSQ330	428 mm	37 mm	56.5 mm	10 mm	75 mm
LA9GSS330	460 mm	37 mm	37 mm	10 mm	75 mm
LA9GTS330	600 mm	47.8 mm	77.3 mm	13.2 mm	101 mm
LA9GTT330	670 mm	47.8 mm	47.8 mm (	13.2 mm	101 mm
LA9GSQ331	460 mm	37 mm	56.5 mm	10 mm	75 mm
LA9GTS331	600 mm	47.8 mm	97 mm	13.2 mm	101 mm

Power Wiring Diagram

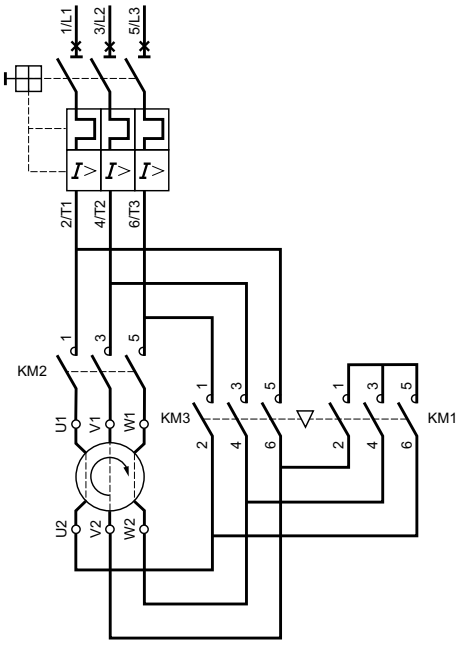
NOTICE

HIGH TRANSIENT CURRENT

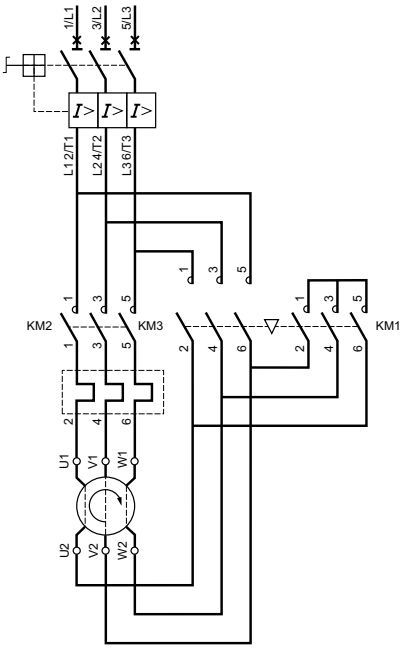
Follow scrupulously the wiring diagram and phase sequence.

Failure to follow can result in high transient current when switching from star to delta connection.

Star-delta motor starter with thermal magnetic circuit breaker and contactors



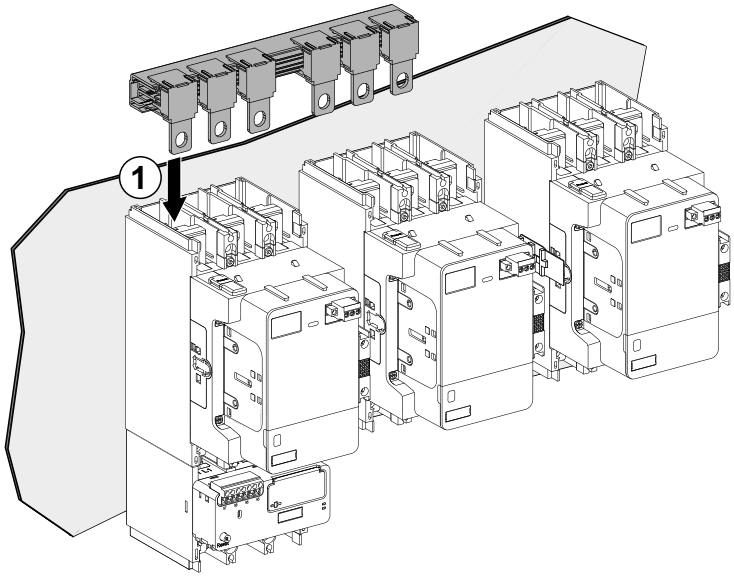
Star-delta motor starter with magnetic circuit breaker, overload relay, and contactors



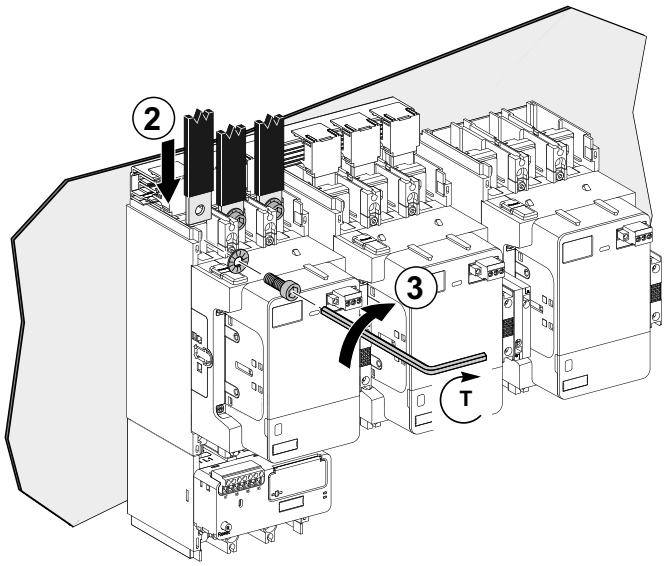
Installation of the Star-Delta Connection Kits

This section describes the installation procedure of star-delta connection kits on the power terminals of the contactors. Refer to step 9 and 10 for the installation of the star bar connection kit only.

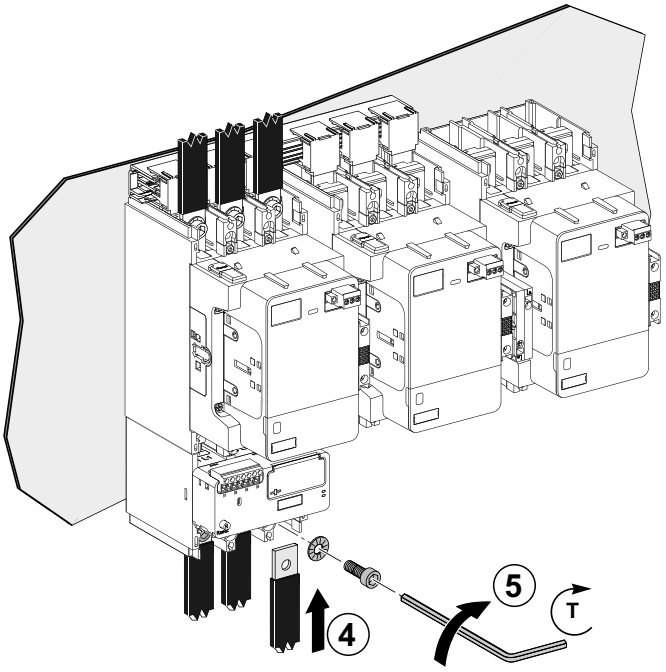
1. Place the line-delta coupling bar beside the upstream power terminals of the line and delta contactors.



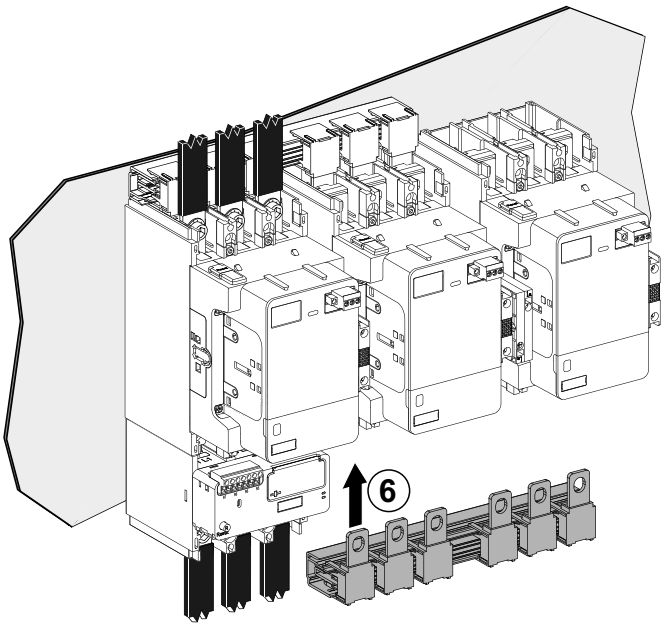
2. Place the bars to connect the line on the upstream power terminals of the line contactor.
3. Insert the screws and washers through the coupling bars and power terminals. Tighten the screws at the right torque.



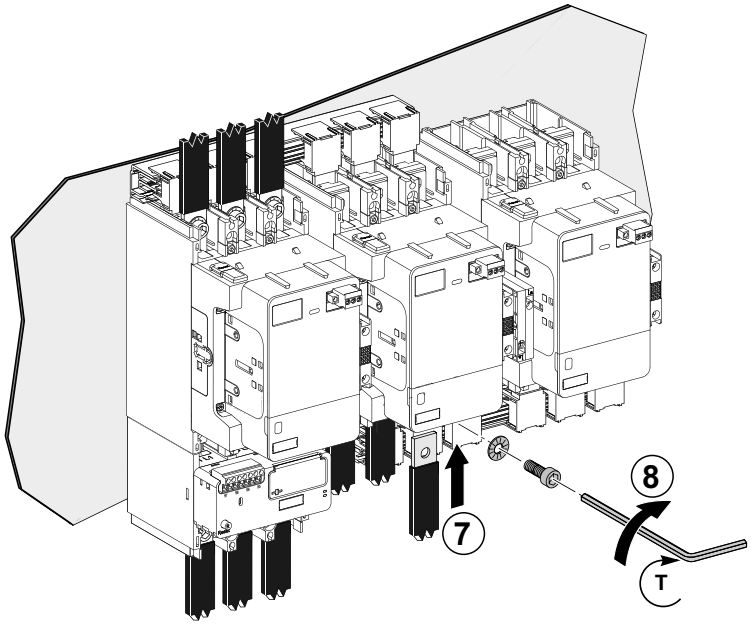
4. Place the bars to connect the motor on the downstream power terminals of the line contactor.
5. Insert the screws and washers through the coupling bars and power terminals. Tighten the screws at the right torque.



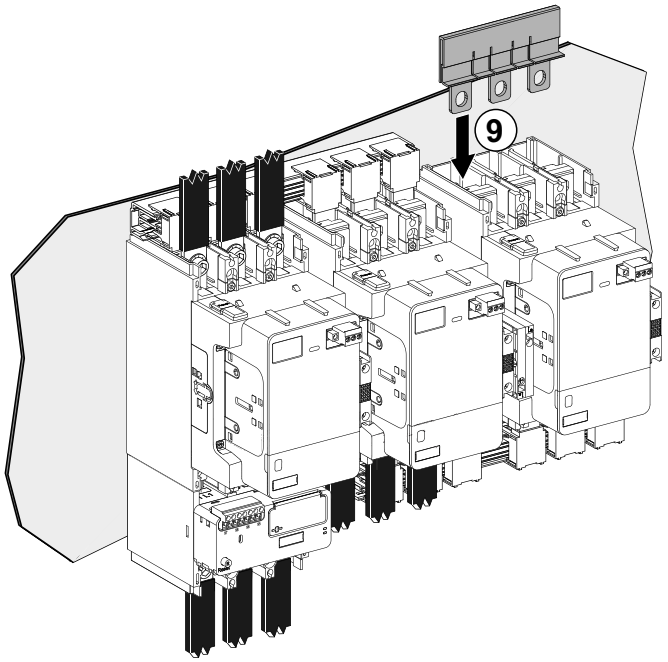
6. Place the star-delta coupling bar beside the downstream power terminals of the star and delta contactors.



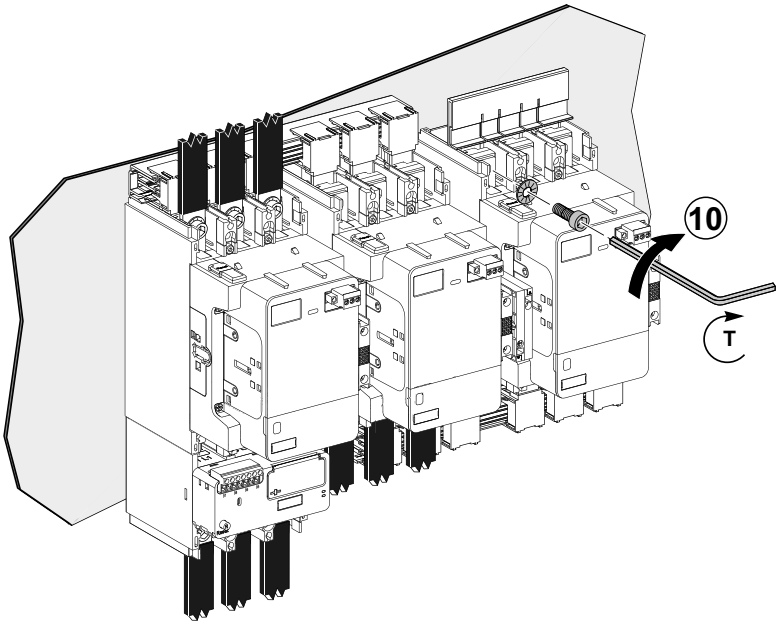
7. Place the bars to connect the motor on the downstream power terminals of the delta contactor.
8. Insert the screws and washers through the coupling bars and power terminals. Tighten the screws at the right torque.



9. Place the star coupling bar beside the upstream power terminals of the star contactor.

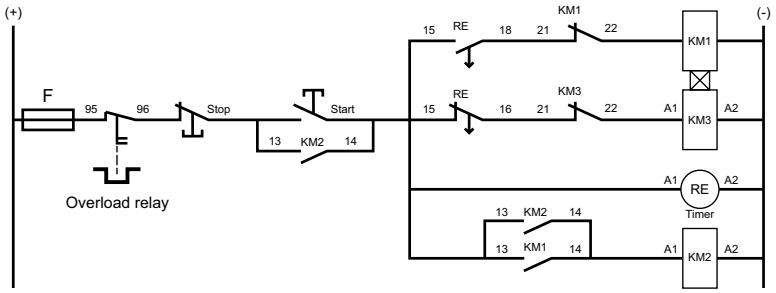


10. Insert the screws and washers through the coupling bars and power terminals. Tighten the screws at the right torque.



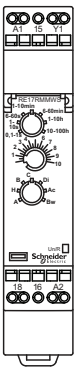
Contactor	Tool	Torque	Screws
LC1G205-245C	Allen key	18 ± 1.8 N•m	M8
LC1G300-475C	Inner hexagon	35 ± 3.5 N•m	M10
LC1G620C	Inner hexagon	58 ± 5.8 N•m	M12

Control Wiring Diagram



Timer to Control the Contactors

For the star-delta connection, RE17RMMWS Timer (TMR) can be used to control the contactor up to 250 V.



U	12...240 Vdc 1,5 W
U	12...240 Vac 50...60 Hz 3 VA
—/—	250 Vac / 8 A

Two Contactors Reverser

Reverser Application Description

A reverser contactor pair allows the control of a three–phase motor in two directions.

It switches the order of the phases supplying the motor from UVW to UWV:

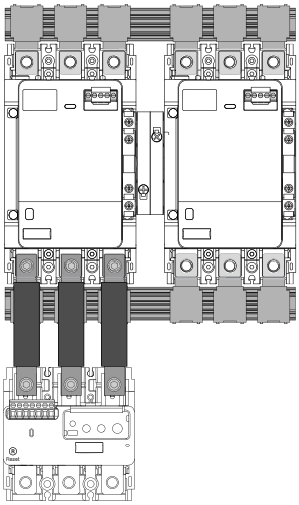
- Phase rotation is UVW: the motor rotates forward.
- Phase rotation is UWV: the motor rotates reverse.

The two contactors must be mechanically and electrically interlocked to prevent that both contactors are closed in the same time.

Overload Protection of the Reverser

The thermal overload protection of the motor in a reverser can be provided by a TeSys Giga overload relay. The thermal overload relay rating is the same as the rating of the contactors.

The thermal overload relay can be mounted standalone and connected between the motor stator terminals and the contactors.

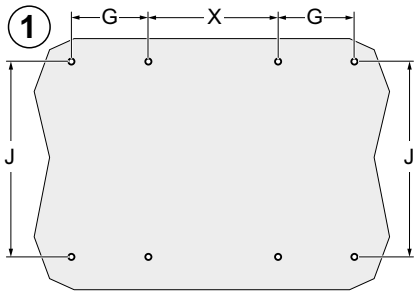


Mounting Two-Contactor Reverser on Plate

Perform the following procedure to mount a two-contactor reverser with LA9G970 mechanical interlock on the plate.

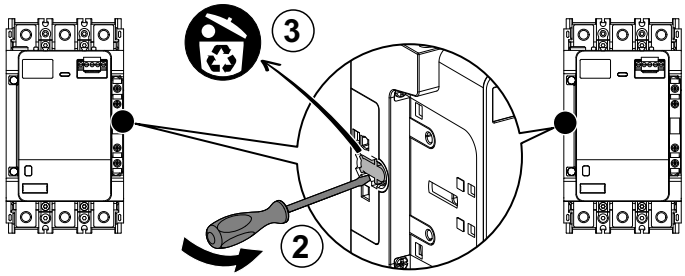
1. Drill 8 holes in the plate, with respect of the dimensions given.
   - LC1G205-475C - Maximum hole diameter: 6 mm
   - LC1G620C - Maximum hole diameter: 9 mm

   NOTE: To ease the mounting, drilling stencils JYT1902701 can be downloaded from the www.se.com website.

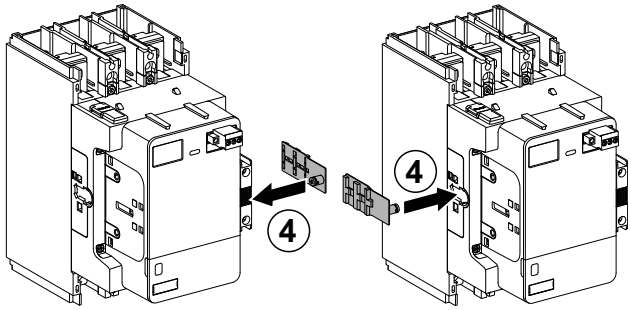


	LC1G205-245C	LC1G300-475C	LC1G620C
G	35 mm	45 mm	70 mm
J	166 mm	187 mm	242 mm
X	92.7 mm	115 mm	160 mm

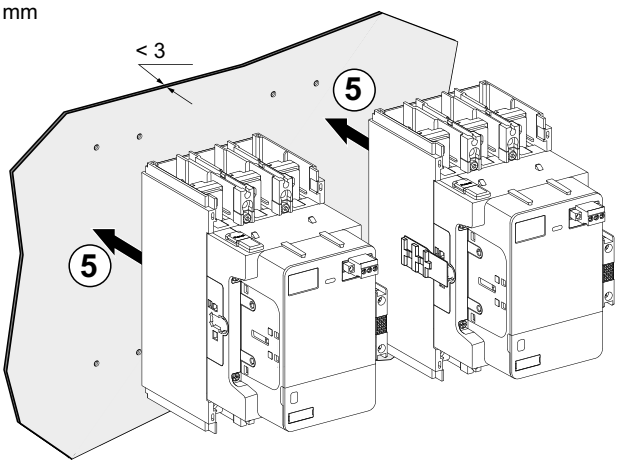
2. Remove the plastic part on the side of the contactor where the mechanical interlock will be installed.
3. Discard the plastic part into the bin.



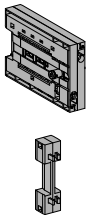
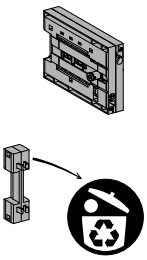
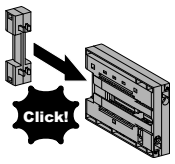
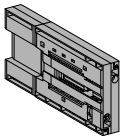
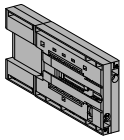
4. Insert the metal slides on the holes of each contactor.



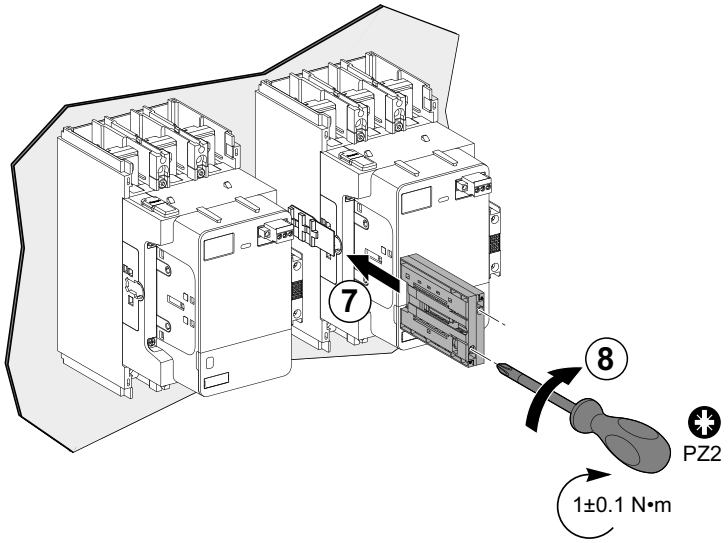
5. Mount each contactor on the plate.
   - For mounting LC1G205-245C contactors, see Mounting LC1G205-245C Contactors on Plate, page 53
   - For mounting LC1G300-620C contactors, see Mounting LC1G300-475C Contactors on Plate, page 53



6. Assemble the mechanical interlock according to the rating of the contactors.

	LC1G205–245C	LC1G300–475C	LC1G620C
LA9G970 			-
LA9G973 	-		

7. Insert the mechanical interlock between the two contactors on the metal slides.
8. Tighten the two screws at the right torque to lock the interlock.

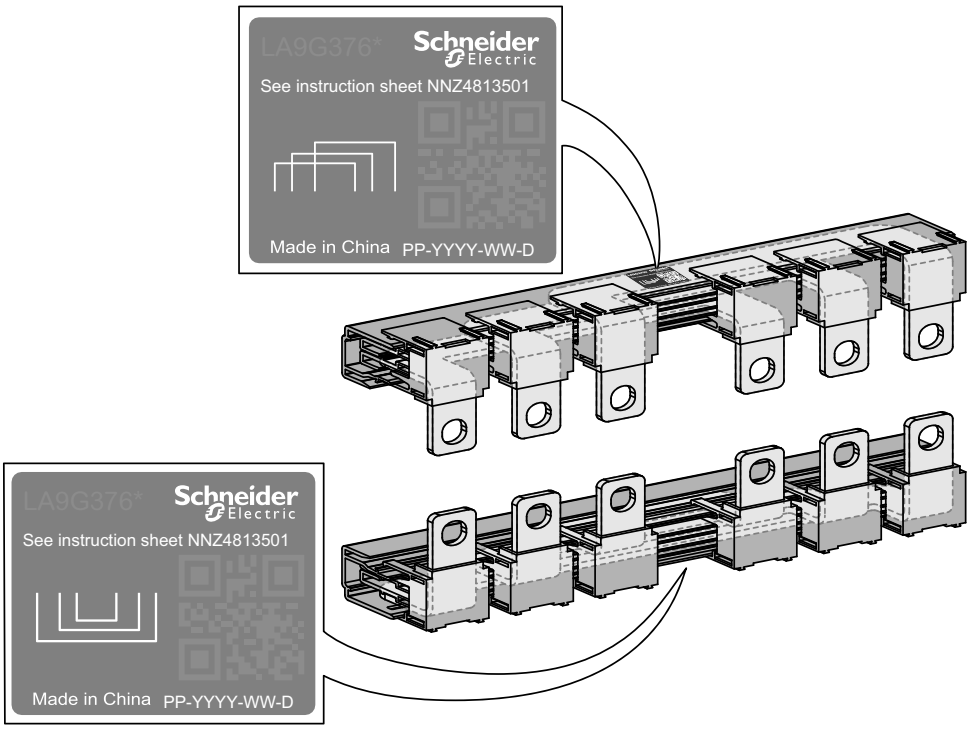


Power Connection with Reverser Connection Kits

Overview

Reverser connection kits can be used for the power connection of a 3-pole reverser contactor assembly. These connection kits can be used for contactors with or without cable memory. Check the below table for selection of suitable reverser connection kits.

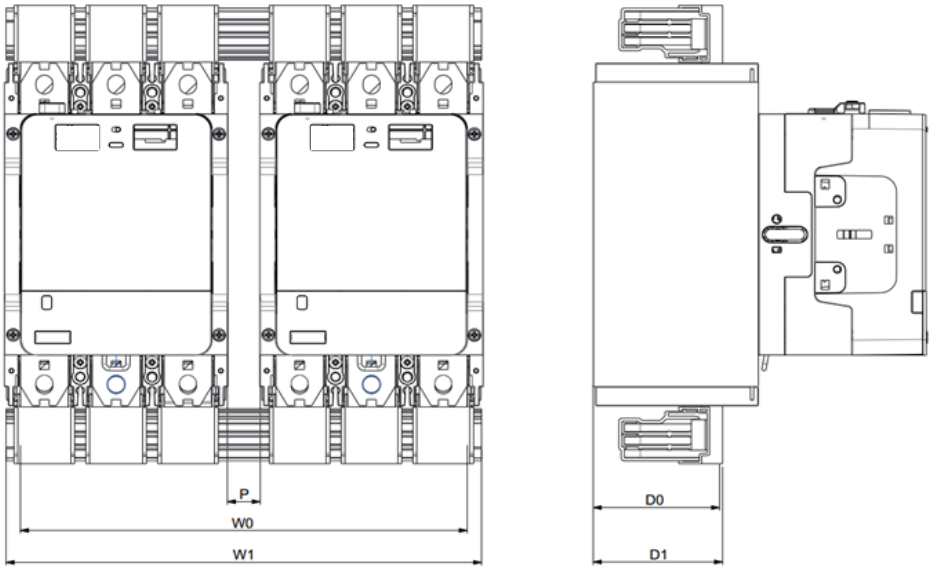
The top and bottom connection kits are discrete and can't be interchanged.



The table below provides the list of the reverser connection kits:

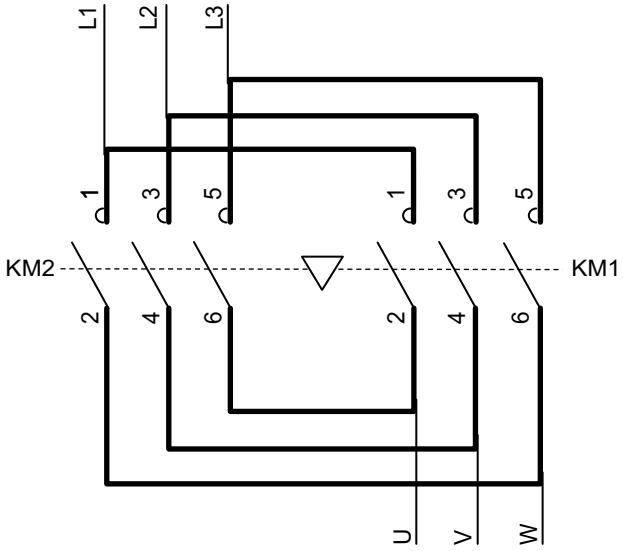
Contactor	Reverser connection kits
LC1G205-245C	LA9G3760
LC1G300-475C	LA9G3761
LC1G620C	LA9G3762

Dimensions



Commercial reference	W0	W1	H0	D0	D1	P
LA9G3760	215.7 mm	232.6 mm	31.5 mm	23.6 mm	68.5 mm	20 mm
LA9G3761	280 mm	298 mm	38 mm	79 mm	81 mm	20 mm

Power Wiring Diagram

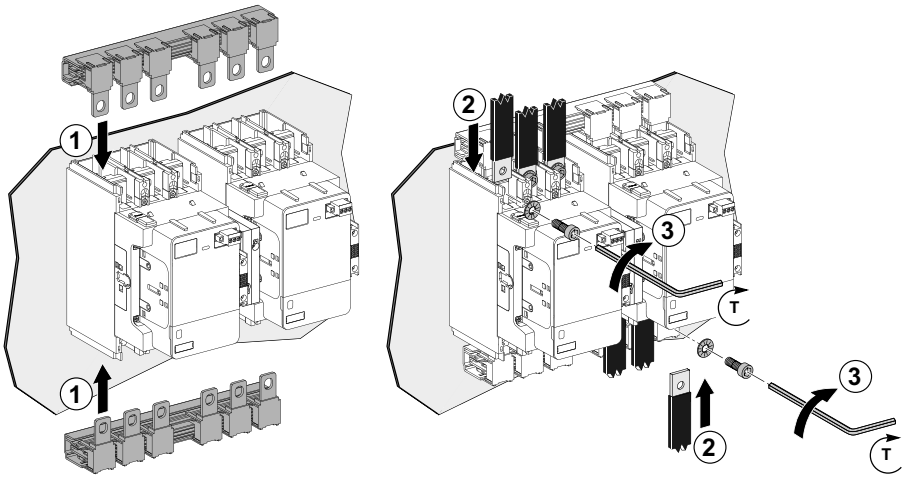


Installation of the Reverser Connection Kits

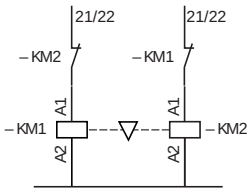
This section describes the installation procedure of reverser connection kits on the power terminals of the contactors.

1. Place the coupling bars beside the upstream and downstream power terminals of the contactors.
2. Place the bars to connect the line or the motor on the power terminals of one of the contactors.
3. Insert the screws and washers through the coupling bars and power terminals.
4. Tighten the screws at the right torque.

Contactor	Tool	Torque	Screws
LC1G205-245C	Allen key	18 ± 1.8 N•m	M8
LC1G300-475C	Inner hexagon	35 ± 3.5 N•m	M10
LC1G620C	Inner hexagon	58 ± 5.8 N•m	M12



Control Wiring Diagram with Electrical Interlocking



Two Contactors Changeover

Changeover Application Description

A changeover contactor pair helps to ensure the continuity of operation of an installation and energy management. It switches between:

- A power supply source M (main) which normally supplies the installation.
- A power supply source S (standby) which can be an incoming line from an additional network or a generating set.

The supply sources are three-phase or three-phase + neutral.

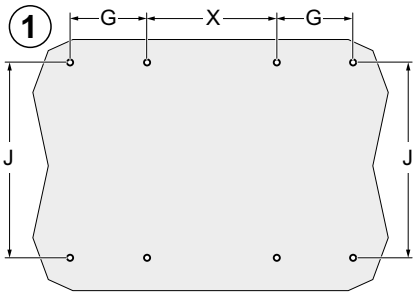
The two contactors must be mechanically and electrically interlocked to prevent any paralleling, even transitory, of the two supplies.

Mounting Two-Contactor Changeover on Plate

Perform the following procedure to mount a two-contactor changeover with LA9G970 mechanical interlock on the plate.

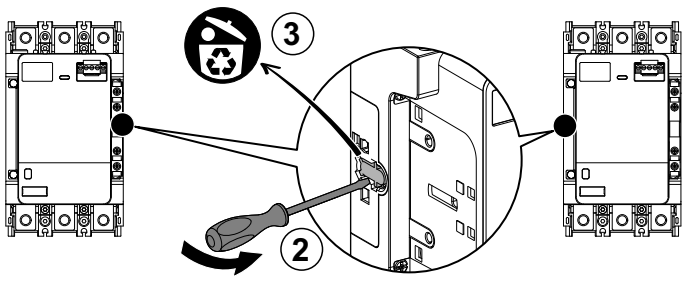
1. Drill 8 holes in the plate, with respect of the dimensions.
   - LC1G205-475C - Maximum hole diameter: 6 mm
   - LC1G620C - Maximum hole diameter: 9 mm

   NOTE: To ease the mounting, drilling stencils JYT1902701 can be downloaded from the www.se.com website.

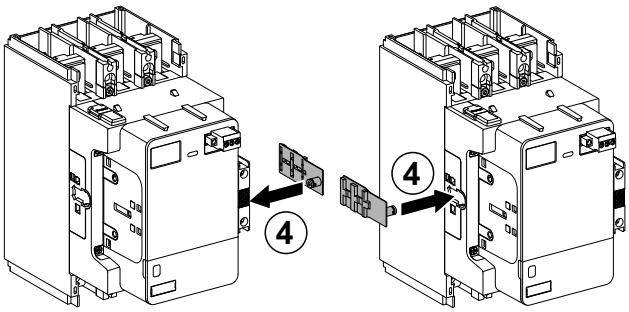


	LC1G205-245C	LC1G300-475C	LC1G620C
G	35 mm	45 mm	70 mm
J	166 mm	187 mm	242 mm
X	92.7 mm	115 mm	160 mm

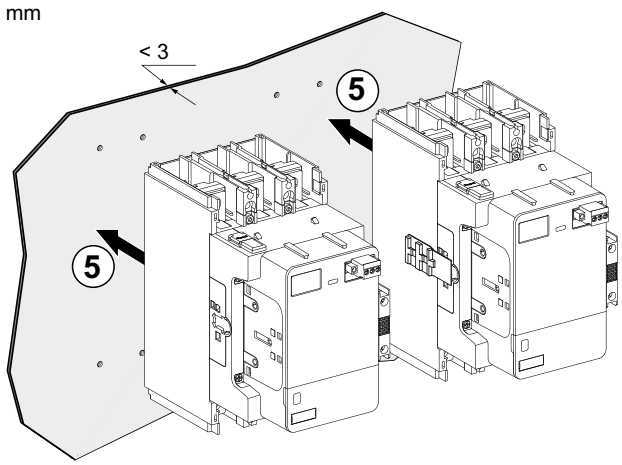
2. Remove the plastic part on the side of the contactor where the mechanical interlock will be installed.
3. Discard the plastic part into the bin.



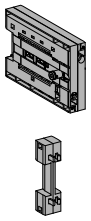
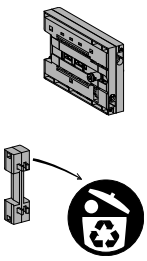
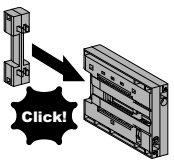
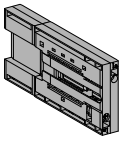
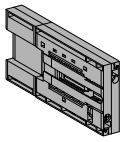
4. Insert the metal slides on the holes of each contactor.



5. Mount each contactor on the plate.
   - For mounting LC1G205-245C contactors, see Mounting LC1G205-245C Contactors on Plate, page 53
   - For mounting LC1G300-620C contactors, see Mounting LC1G300-475C Contactors on Plate, page 53

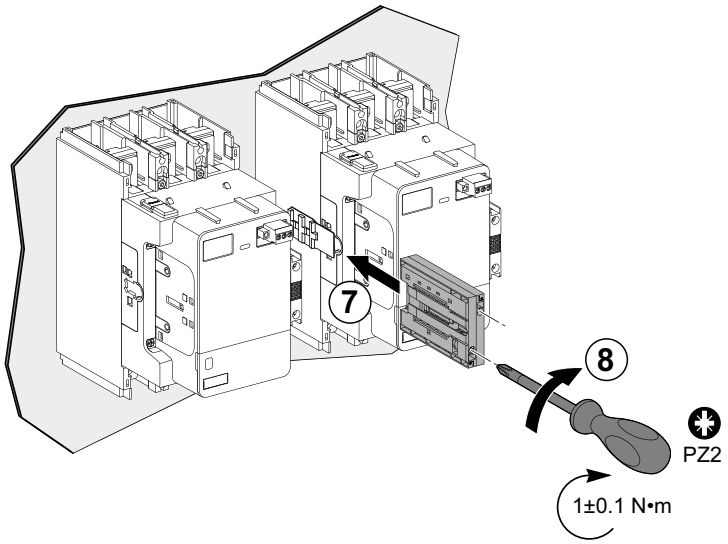


6. Assemble the mechanical interlock according to the rating of the contactors.

	LC1G205–245C	LC1G300–475C	LC1G620C
LA9G970 			-
LA9G973 	-		

7. Insert the mechanical interlock between the two contactors on the metal slides.

8. Tighten the two screws at the right torque to lock the interlock.



Power Connection with Changeover Connection Kits

Overview

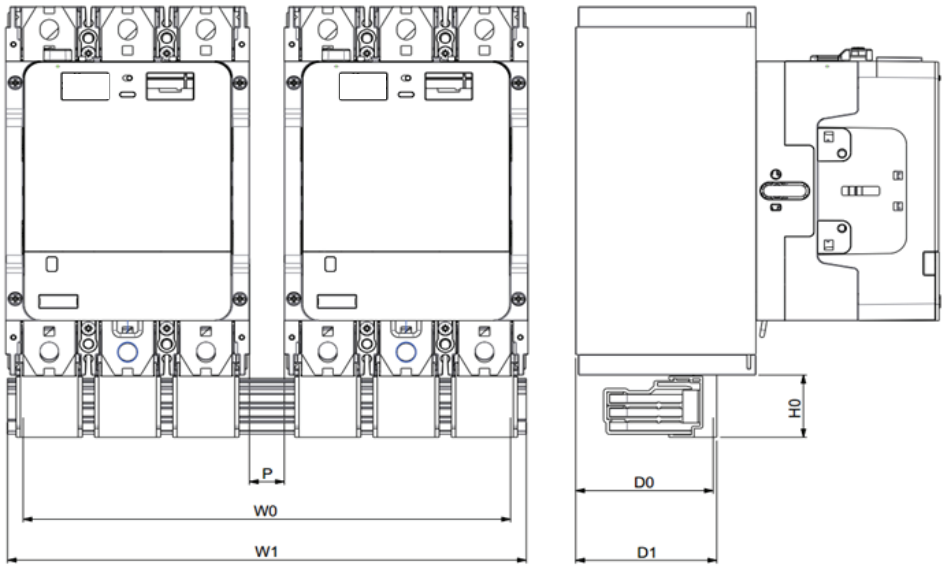
Changeover connection kits can be used for the power connection of two-contactor changeover. If using the connection kits, the two contactors must be fitted with a cable memory or must be without cable memory. This connection can be done only downstream of the contactors.

Changeover connection kits are made of one coupling bar.

The table below provides the list of the changeover connection kits:

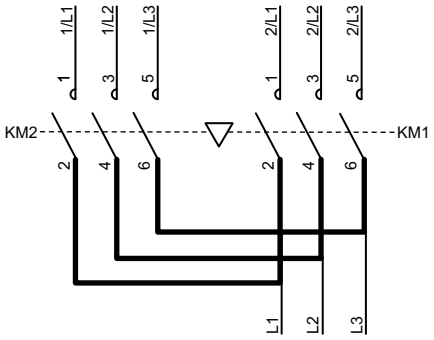
Contactor	Changeover connection kits
LC1G205-245C	LA9G3750
LC1G300-475C	LA9G3751
LC1G620C	LA9G3752

Dimensions



Commercial reference	W0	W1	H0	D0	D1	P
LA9G3750	215.7 mm	232.6 mm	31.5 mm	23.6 mm	68.5 mm	20 mm
LA9G4750	286 mm	303 mm	31.5 mm	23.6 mm	68.5 mm	20 mm
LA9G3751	280 mm	298 mm	38 mm	79 mm	81 mm	20 mm
LA9G4751	370 mm	388 mm	38 mm	79 mm	81 mm	20 mm

Power Wiring Diagram



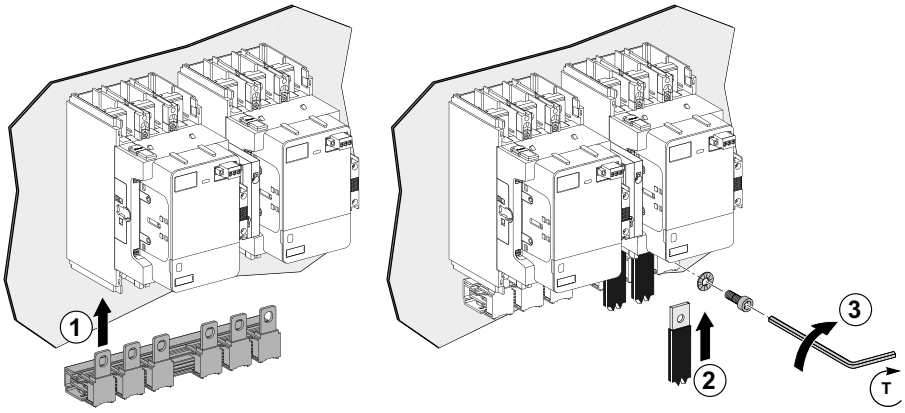
3-phase supply sources

Installation of the Changeover Connection Kits

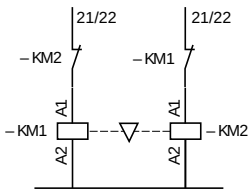
This section describes the installation procedure of changeover connection kits on the power terminals of the contactors.

1. Place the coupling bar beside the downstream power terminals of the contactors.
2. Place the bars to connect the line on the downstream power terminals of one of the contactors.
3. Insert the screws and washers through the coupling bar and power terminals.
4. Tighten the screws at the right torque.

Contactor	Tool	Torque	Screws
LC1G205-245C	Allen key	18 ± 1.8 N•m	M8
LC1G300-475C	Inner hexagon	35 ± 3.5 N•m	M10
LC1G620C	Inner hexagon	58 ± 5.8 N•m	M12



Control Wiring Diagram with Electrical Interlocking



Maintenance

What's in This Chapter

Safety Instructions

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462,NOM 029-STPS or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on this equipment.
- Use only the specified voltage when operating this equipment and any associated products.
- Power line circuits must be wired and protected in compliance with local and national regulatory requirements.
- Beware of potential hazards, and carefully inspect the work area for tools and objects that may have been left inside the equipment.

Failure to follow these instructions will result in death or serious injury.

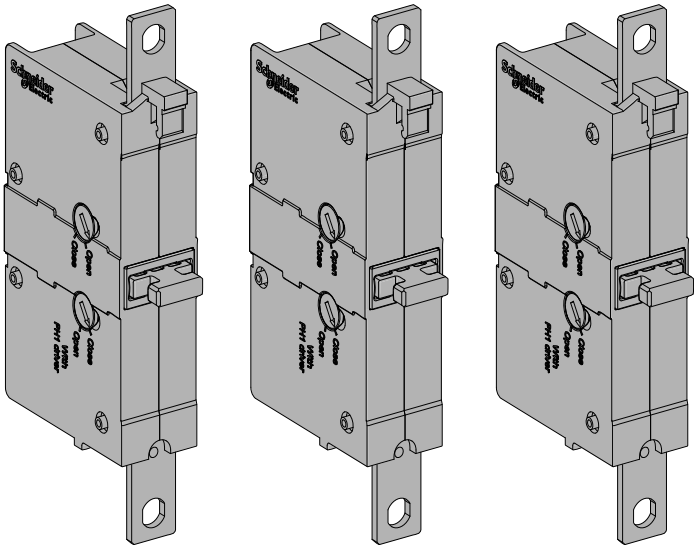
Switching Module Replacement

Overview

Based on contact wear or as needed, the switching modules can be replaced. The switching modules must be replaced when the contact wear diagnosis function has detected that the contacts are worn. When the contacts are worn, all switching modules must be replaced together.

The table below provides the commercial references of the switching modules:

Contactor	Set of 3 switching modules for 3P contactor
LC1G205-245C	LA9G3QA
LC1G300C	LA9G3RA
LC1G410-475C	LA9G3SA
LC1G620C	LA9G3TA



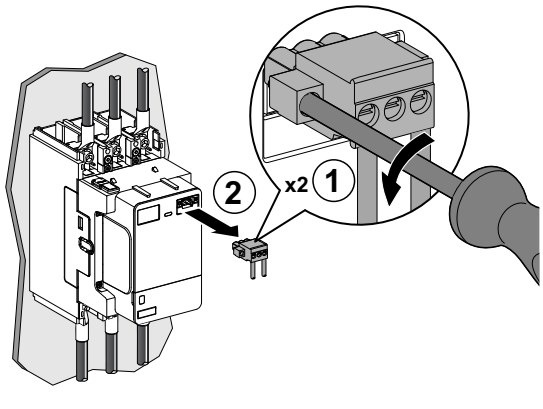
Removal of Contactor

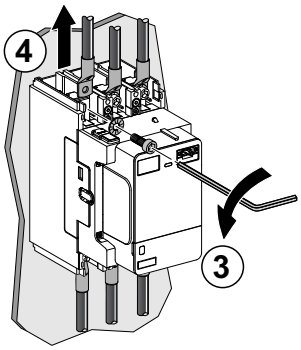
Before replacing the switching modules on a contactor :

- Remove the mechanical interlock and coupling bars, if present.
- Remove all auxiliary contact modules.
- Disconnect top and bottom power connections.

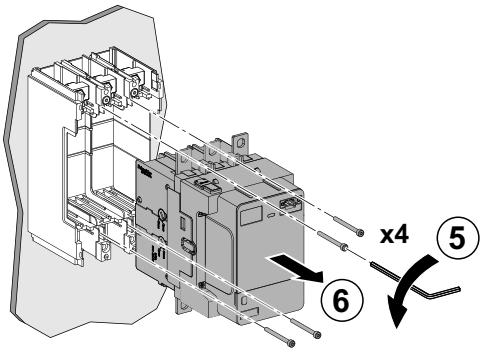
Perform the following procedure to remove the contactor :

1. Unscrew the control terminal blocks.
2. Remove the control terminal blocks.
3. Disconnect the top and bottom power connections.
4. Free the contactor from the power conductors.
5. Unscrew with an Allen key the 4 screws fixing the contactor block in the contactor housing.
6. Remove the contactor block from the contactor housing.





Contactor	Tool	Screws
LC1G205-245C	Allen key	M8
LC1G300-475C	Inner hexagon	M10
LC1G620C	Inner hexagon	M12

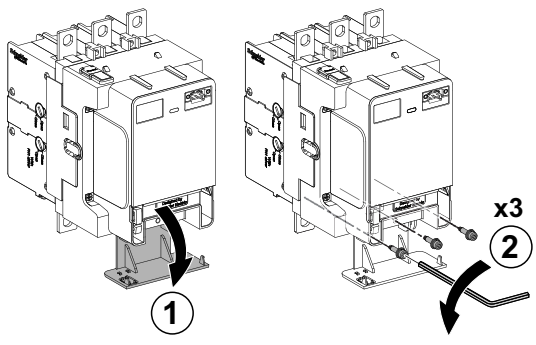


Contactor	Tool	Length of Allen Key (L)	Screws
LC1G205-245C	Allen key	≥ 95 mm	M4
LC1G300-475C	Allen key	≥ 115 mm	M4
LC1G620C	Allen key	≥ 115 mm	M6

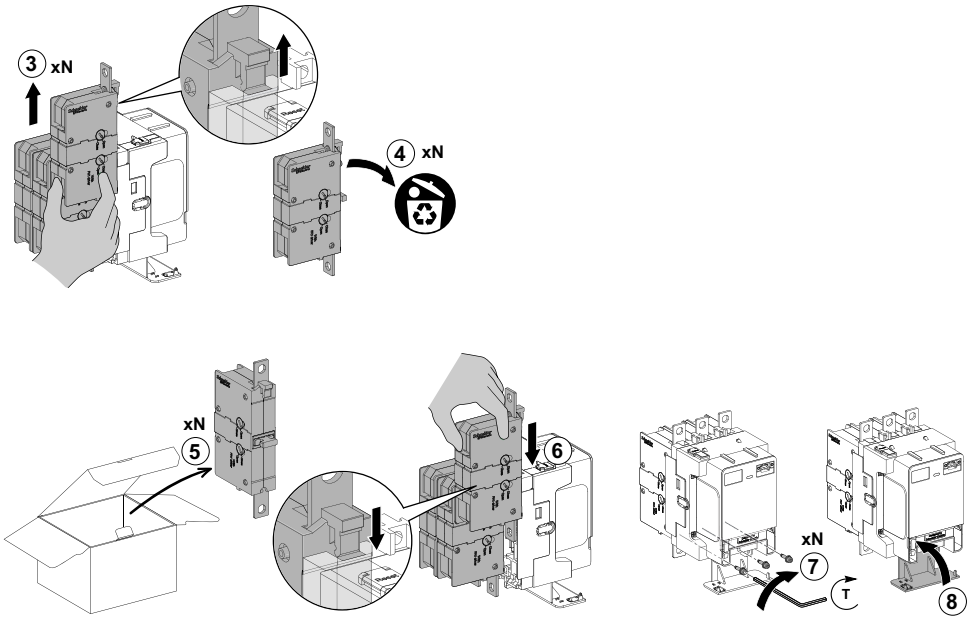
Switching Module Replacement

1. Open the flip cover under the control module.
2. Release the switching modules screws (one screw per switching module) using an Allen key.
3. Push up the switching module to unlock and remove it.

   NOTE: Clean the accessible parts of the contactor and visually check the overall condition of the contactor.
4. Recycle the switching modules.
5. Take out the new switching modules from the box for replacement.
6. Push down the switching modules to lock it on the contactor.
7. Tighten the switching modules screws (one screw per switching module) at the right torque.
8. Put the flip cover back on the control module.
9. Reset the wear diagnosis indication.



Contactor	Tool	Length of Allen Key (L)	Torque	Screws
LC1G205-245C	Allen key	≥ 95 mm	0.8 ± 0.08 N•m	M4
LC1G300-475C	Allen key	≥ 115 mm	1 ± 0.1 N•m	M4
LC1G620C	Allen key	≥ 115 mm	3 ± 0.3 N•m	M6



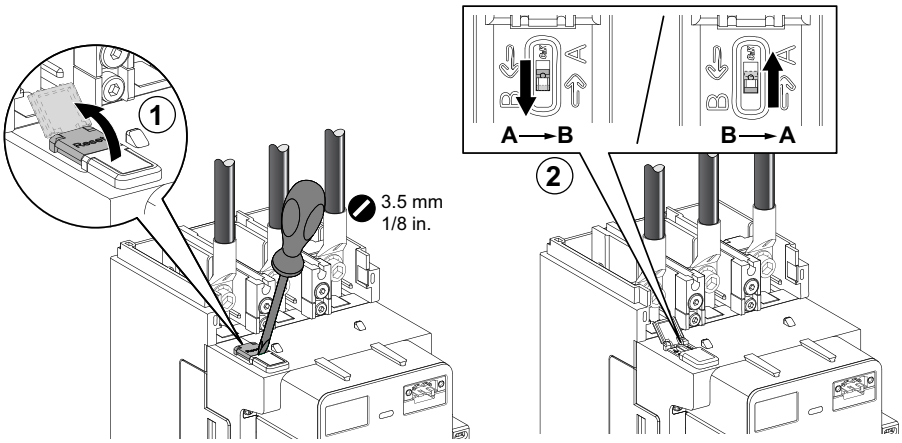
Wear Diagnosis Reset

Without Remote Wear Diagnosis Module

To reset the wear diagnosis indication after replacement of the switching modules on contactors without remote wear diagnosis module:

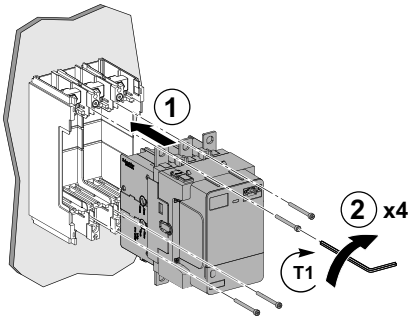
1. Open the cover of the **Reset** switch
2. Change the position of the **Reset** switch on the contactor (from A to B or from B to A).

After reset and after power on A1-A2, the contactor is in reset sequence for 10 s: the diagnosis LED is blinking, and the contactor remains open. It closes after the 10 s.

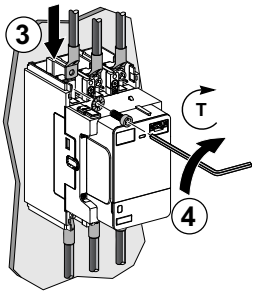


Re-installation of Contactor

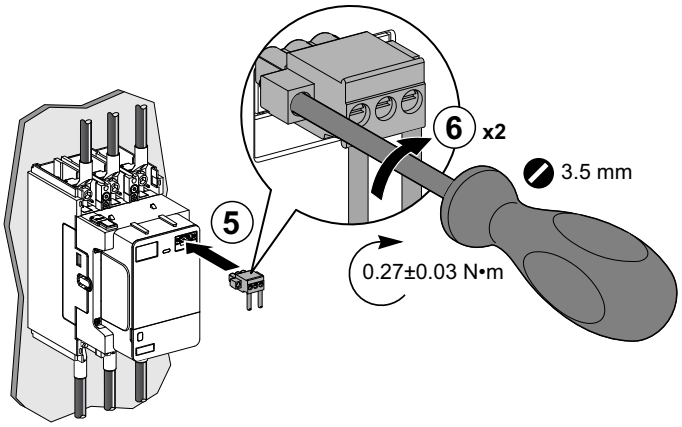
1. Insert the contactor block in the contactor housing.
2. Tighten the four screws fixing the contactor block in the contactor housing with an Allen key at the right torque.
3. Place the power conductors on the power terminals of the contactor.
4. Re-connect the top and bottom power connections at the right torque.
5. Put back the control terminal blocks.
6. Tighten the control terminal blocks at the right torque.
7. Put back the auxiliary contact modules.
8. Put back the mechanical interlock and coupling bars, if necessary.



Contactor	Tool	Length of Allen Key (L)	Torque	Screws
LC1G205-245C	Allen key	≥ 95 mm	1.5 ± 0.5 N•m	M4
LC1G300-475C	Allen key	≥ 115 mm	1.5 ± 0.5 N•m	M4
LC1G620C	Allen key	≥ 115 mm	3 ± 0.3 N•m	M6



Contactor	Tool	Torque	Screws
LC1G205-245C	Allen key	18 ± 1.8 N•m	M8
LC1G300-475C	Inner hexagon	35 ± 3.5 N•m	M10
LC1G620C	Inner hexagon	58 ± 5.8 N•m	M12


6
x2
3.5 mm
5
0.27±0.03 N•m

Control Module Replacement

Overview

The control module contains the components required to control the contactor poles:

- A fixed magnetic circuit
- a coil winding
- an electronic board

The control module can be replaced by a spare control module after detection of an internal malfunction.

Control Module

The table below provides the commercial references of the control modules:

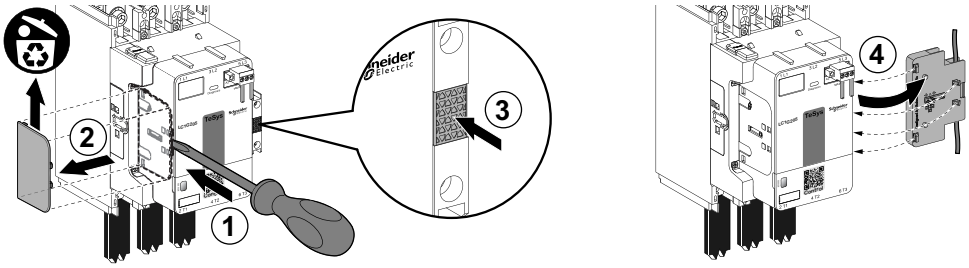
Contactor	Control voltage	3P control module
LC1G205-245C	48–130 Vac/Vdc	LX1G3QEHEC
	100–250 Vac/Vdc	LX1G3QKUEC
	200–500 Vac/Vdc	LX1G3QLSEC LX1G3QLSEMC
LC1G300C	48–130 Vac/Vdc	LX1G3REHEC
	100–250 Vac/Vdc	LX1G3RKUEC
	200–500 Vac/Vdc	LX1G3RLSEC LX1G3RLSEMC
LC1G410–475C	48–130 Vac/Vdc	LX1G3SEHEC
	100–250 Vac/Vdc	LX1G3SKUEC
	200–500 Vac/Vdc	LX1G3SLSEC LX1G3SLSEMC
LC1G620C	48–130 Vac/Vdc	LX1G3TEHEC
	100–250 Vac/Vdc	LX1G3TKUEC
	200–500 Vac/Vdc	LX1G3TLSEC LX1G3TLSEMC

Control Module Removal

The control module can be replaced without power disconnection.

Before replacing the control module on a contactor:

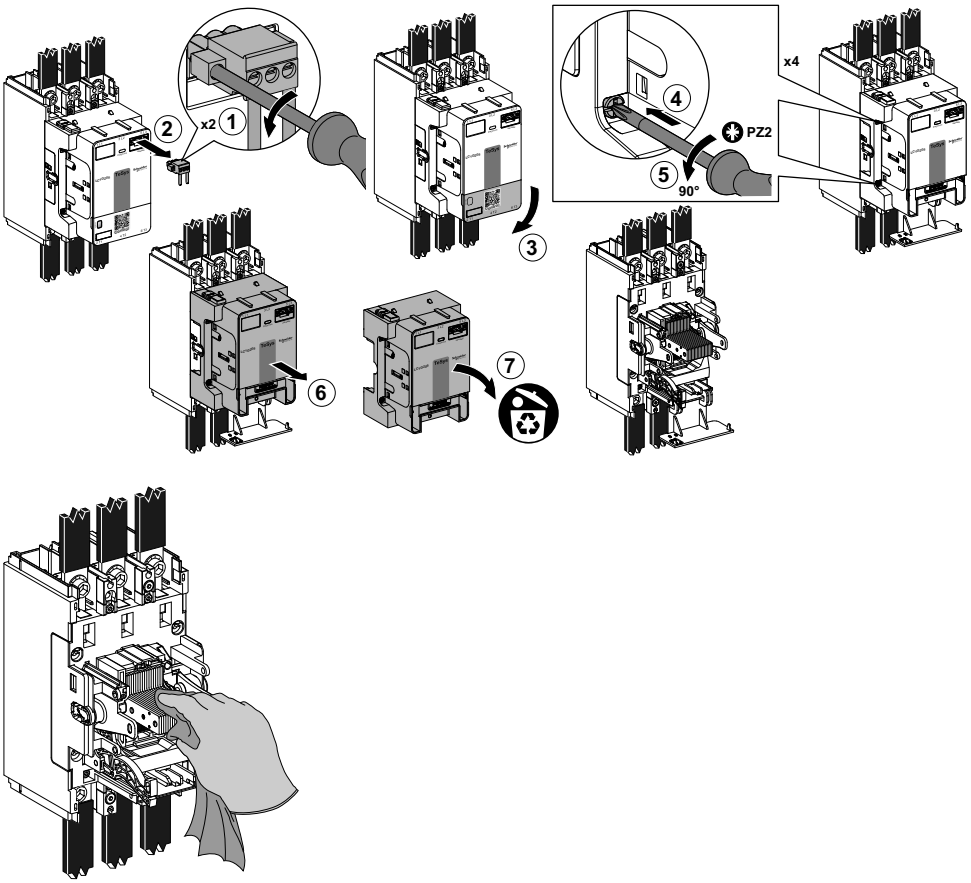
- Remove the plate on the side of the control module, if present
- Remove all auxiliary contact modules.



Perform the following procedure to remove the control module:

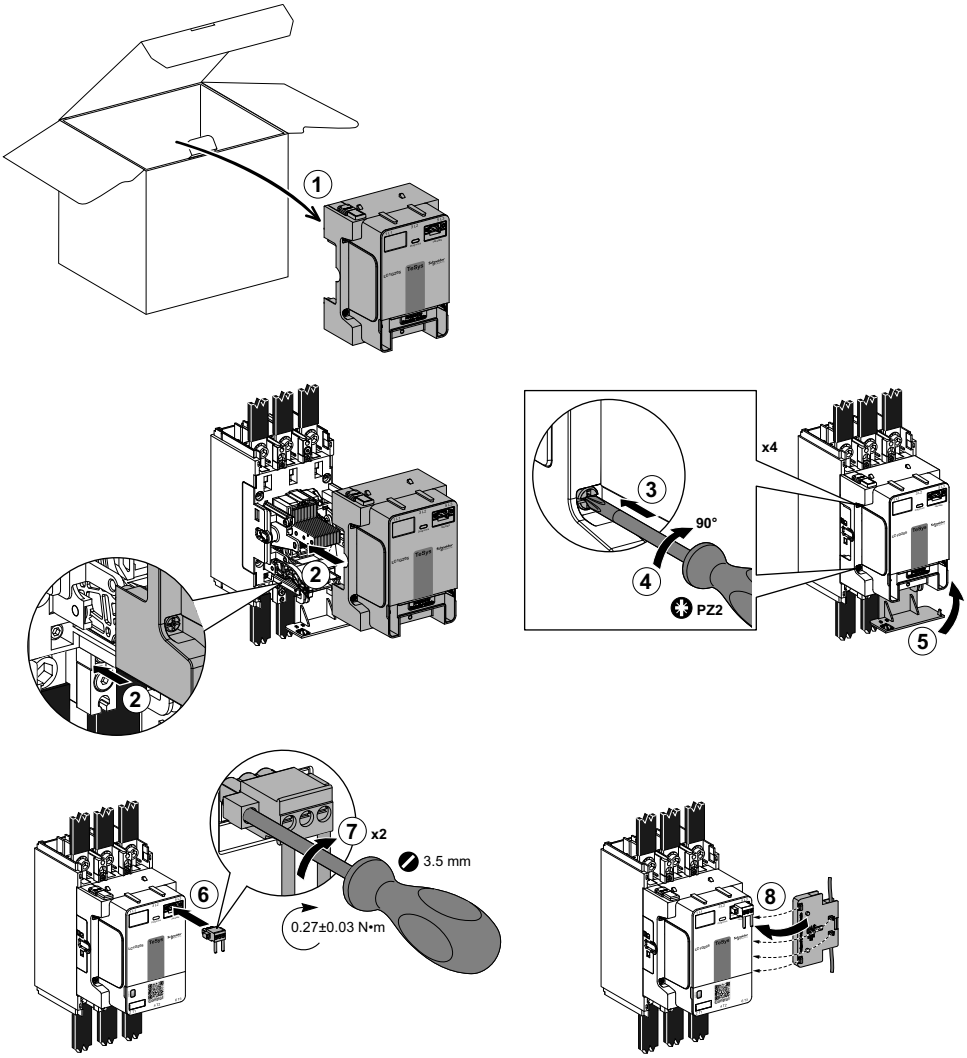
1. Unscrew the control terminal blocks.
2. Remove the control terminal blocks.
3. Open the flip cover under the control module.
4. Push on the screws fixing the control module on the contactor with a screwdriver.
5. Turn the screws 90° anti-clockwise to unlock the control module.
6. Remove the control module from the contactor.
7. Recycle the control module.

   NOTE: Clean the accessible parts of the contactor and visually check the overall condition of the contactor.



Control Module Replacement

1. Take out the new control module from the box for replacement.
2. Insert the control module on the contactor.
3. Push on the screws fixing the control module on the contactor with a screwdriver.
4. Turn the screws 90° clockwise to lock the control module.
5. Put the flip cover back on the control module.
6. Put back the control terminal blocks.
7. Tighten the control terminal blocks at the right torque.
8. Put back the auxiliary contact modules.



Troubleshooting

Installation

Problem description	Probable causes	Solution
Difficult to install the contactor on a plate	Incorrect drilling dimension or not use of hang on function pin or screws	Follow the contactor installation instructions, TeSys Giga Contactor Mounting on Plate, page 53.
Difficult to install the overload relay on a plate	Incorrect drilling dimension	Follow the overload relay installation instructions, TeSys Giga Electronic Overload Relay Mounting on Plate, page 56.
Difficult to install auxiliary contact modules on the contactor	Cannot position well the driving pin or the locating features	Follow the auxiliary contact module installation instructions, Installation of the Auxiliary Contact Modules, page 102.

Operation

Problem description	Probable causes	Solution
Contactor does not close and the Diagnosis LED on the control module flashes 2 times regularly	The control voltage is lower than 80 % of Ucmin	Check the control voltage.
Contactor does not close	Error in the wiring of the control circuit	Check the control wiring diagram, Control Mode, page 19.
	The magnetic circuit cannot close due to dust or mechanical issue	Remove the control module,Control Module Replacement, page 150 , and clean the accessible parts with a dry cloth. If the problem persists, contact your Schneider Electric field service representative.
	Poles cannot close due to mechanical issue	Remove the switching modules, Switching Module Replacement, page 144, and clean the accessible parts with a dry cloth. Test manually the switching modules to detect if there is a blocking point. If the problem persists, replace the switching modules,Switching Module Replacement, page 144.
Overload relay unexpected trip	Error in the protection settings	Check the protection settings, Current–Based Protection Functions, page 25.
	Too high level of vibration on overload relay	Check the vibration environment.
	Huge magnetic field in the environment of the overload relay	Add an external magnetic shield around the overload relay.
Overload relay manual reset does not work	**Reset** button is not fully pushed	Fully push **Reset** button again.

Contactor Switching Modules

Problem description	Probable causes	Solution
Cannot remove switching modules	Still some screws tightened	Check all the screws are untightened.
Difficult to change the switching modules	Sequence to remove cable, auxiliary contact modules, mid frame screw	Follow the switching module replacement instructions, Switching Module Replacement, page 144.

Contactor Control Module

Problem description	Probable causes	Solution
The Diagnosis LED on the control module blinks continuously	Control module internal malfunction detected	Replace the control module, Control Module Replacement, page 150

Overload Relay

Problem description	Probable causes	Solution
Overload relay motor ON LED blinking	Overload relay internal malfunction detected	Replace the overload relay.
The motor is supplied but the overload relay motor ON LED is OFF.	LED is out of order	Replace the overload relay.

RDM Modbus Communication

Problem description	Probable causes	Solution
The LED indicator on RDM module is steady orange or red.	Incorrect RDM module wiring or power supply	Properly connect the RDM module wiring and check the power supply. See Wiring Diagram, page 108
	The following settings on the client and the knobs on the RDM module are not consistent: • Modbus client device setting of transmission mode and data encoding format • Modbus server address • Baud rate • Parity	Keep the settings consistent. If baud rate is in auto mode, ensure the baud rate in use is supported. See Modbus Communication Setting, page 109
The RDM module returns a Modbus exception code to the client.	The read and write requests from the client are not correct.	Check the Modbus Exception Code, page 110 on Modbus client (PLC or HMI), and then: • Select the supported function code. • Set correct registers addresses and number of registers according to Modbus registers table. • Set correct value for digital output configuration. See Modbus Register Tables, page 111.
The RDM module returns 0x8000 (invalid data) to a read request from the client.	The read request concerns unused registers.	Check the read request from the client (PLC or HMI) and set correct registers addresses and number of registers according to Modbus registers table. See Modbus Register Tables, page 111.

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