

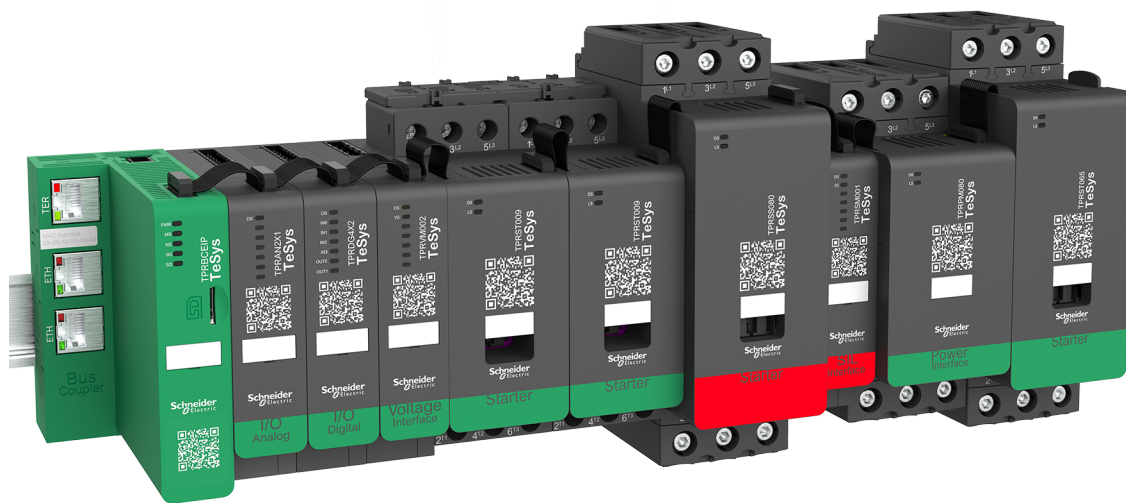
# TeSys™ island

## Installation Guide

### Instruction Bulletin

This instruction bulletin describes the mechanical installation, wiring, and commissioning of TeSys island.

8536IB1902EN R06/19  
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# Hazard Categories and Special Symbols

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 bulletin or on the equipment to warn of hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either 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 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.

**NOTE:** Provides additional information to clarify or simplify a procedure.

## 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 document to:

- Familiarize yourself with the mechanical characteristics of the components that make up TeSys™ island
- Assemble and wire your TeSys island
- Setup and test your TeSys island in preparation for integration with the PLC

**⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Read and understand this document and all related documents before installing, operating, or maintaining your TeSys island. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.

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

## Validity Note

This instruction bulletin is valid for all TeSys™ island configurations. The availability of some functions described in this bulletin depends on the communication protocol used and the physical modules installed on the island.

For product compliance with environmental directives such as RoHS, REACH, PEP, and EOL, go to [www.se.com/green-premium](http://www.se.com/green-premium).

For technical characteristics of the physical modules described in this bulletin, go to [www.se.com](http://www.se.com).

The technical characteristics presented in this bulletin should be the same as those that appear online. We may revise content over time to improve clarity and accuracy. If you see a difference between the information contained in this bulletin and online information, use the online information.

## Related Documentation

**Table 1 - Related Documentation**

Document Title	Description	Document Number
<i>TeSys™ island System Guide</i>	Introduces and describes the main functions of TeSys island	8536IB1901
<i>TeSys™ island Installation Guide</i>	Describes the mechanical installation, wiring, and commissioning of TeSys island	8536IB1902
<i>TeSys™ island Operating Guide</i>	Describes how to operate and maintain TeSys island	8536IB1903
<i>TeSys™ island Functional Safety Guide</i>	Describes the Functional Safety features of TeSys island	8536IB1904
<i>TeSys™ island Third Party Function Block Guide</i>	Contains the information needed to create function blocks for third party hardware	8536IB1905
<i>TeSys™ island EtherNet/IP™ Function Block Library Guide</i>	Describes the TeSys island library used in the Rockwell Software® Studio 5000® environment	8536IB1914

**Table 1 - Related Documentation (Continued)**

<b>Document Title</b>	<b>Description</b>	<b>Document Number</b>
<i>TeSys™ island EtherNet/IP™ Quick Start Guide</i>	Describes how to quickly integrate TeSys island into the Rockwell Software Studio 5000 environment	8536IB1906
<i>TeSys™ island DTM Online Help Guide</i>	Describes how to install and use various functions of TeSys island configuration software and how to configure the parameters of TeSys island	8536IB1907
<i>TeSys™ island Product Environmental Profile</i>	Describes constituent materials, recyclability potential, and environmental impact information for the TeSys island.	ENVPEP1904009
<i>TeSys™ island Product End of Life Instructions</i>	Contains end of life instructions for the TeSys island	ENVEOLI1904009
<i>TeSys™ island Instruction Sheet, Bus Coupler</i>	Describes how to install the TeSys island bus coupler	MFR44097
<i>TeSys™ island Instruction Sheet, Starters and Power Interface Modules, Size 1 and 2</i>	Describes how to install size 1 and 2 TeSys island starters and power interface modules	MFR77070
<i>TeSys™ island Instruction Sheet, Starters and Power Interface Modules, Size 3</i>	Describes how to install size 3 TeSys island starters and power interface modules	MFR77085
<i>TeSys™ island Instruction Sheet: Input/Output Modules</i>	Describes how to install the TeSys island analog and digital I/O modules	MFR44099
<i>TeSys™ island Instruction Sheet: SIL Interface and Voltage Interface Modules</i>	Describes how to install the TeSys island voltage interface modules and SIL interface modules	MFR44100



# Precautions

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

## **⚠ DANGER**

### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside this equipment.
- Use only the specified voltage when operating this equipment and any associated products.
- Always use a properly rated voltage sensing device to confirm power is off.
- Use appropriate interlocks where personnel and/or equipment hazards exist.
- Power line circuits must be wired and protected in compliance with local and national regulatory requirements.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices per NFPA 70E, NOM-029-STPS, or CSA Z462 or local equivalent.

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

## **⚠ WARNING**

### **UNINTENDED EQUIPMENT OPERATION**

- For complete instructions about functional safety, refer to the *TeSys™ island Functional Safety Guide*, 8536IB1904.
- Do not disassemble, repair, or modify this equipment. There are no user serviceable parts.
- Install and operate this equipment in an enclosure appropriately rated for its intended application environment.
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.

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



**WARNING:** This product can expose you to chemicals including Antimony oxide (Antimony trioxide), which is known to the State of California to cause cancer. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

## Qualified Personnel

Only appropriately trained persons who are familiar with and understand the content of this guide and all other related product documentation are authorized to work on and with this product.

The qualified person must be able to detect possible hazards that may arise from modifying parameter values and generally from mechanical, electrical, or electronic equipment. The qualified person must be familiar with the standards, provisions, and regulations for the prevention of industrial accidents, which they must observe when designing and implementing the system.

The use and application of the information contained in this guide requires expertise in the design and programming of automated control systems. Only you,

the user, machine builder, or integrator, can be aware of all the conditions and factors present during installation, setup, operation, and maintenance of the machine or process, and can therefore determine the automation and associated equipment and the related safeties and interlocks which can be effectively and properly used.

When selecting automation and control equipment, and any other related equipment or software, for a particular application, you must also consider applicable local, regional, or national standards and/or regulations.

Pay particular attention to conform to any safety information, electrical requirements, and normative standards that apply to your machine or process in the use of this equipment.

## Intended Use

The products described in this instruction bulletin, together with software, accessories, and options, are starters for low-voltage electrical loads, intended for industrial use according to the instructions, directions, examples, and safety information contained in this document and other supporting documentation.

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™ island

## Island Concept

TeSys™ island is an innovative digital load management solution—providing data for higher machine efficiency and ease of servicing, and allowing faster time to market.

TeSys island is a modular, multifunctional system providing integrated functions inside an automation architecture, primarily for the direct control and management of low-voltage loads. TeSys island can switch, help protect, and manage motors and other electrical loads up to 80 A (AC3) installed in an electrical control panel.

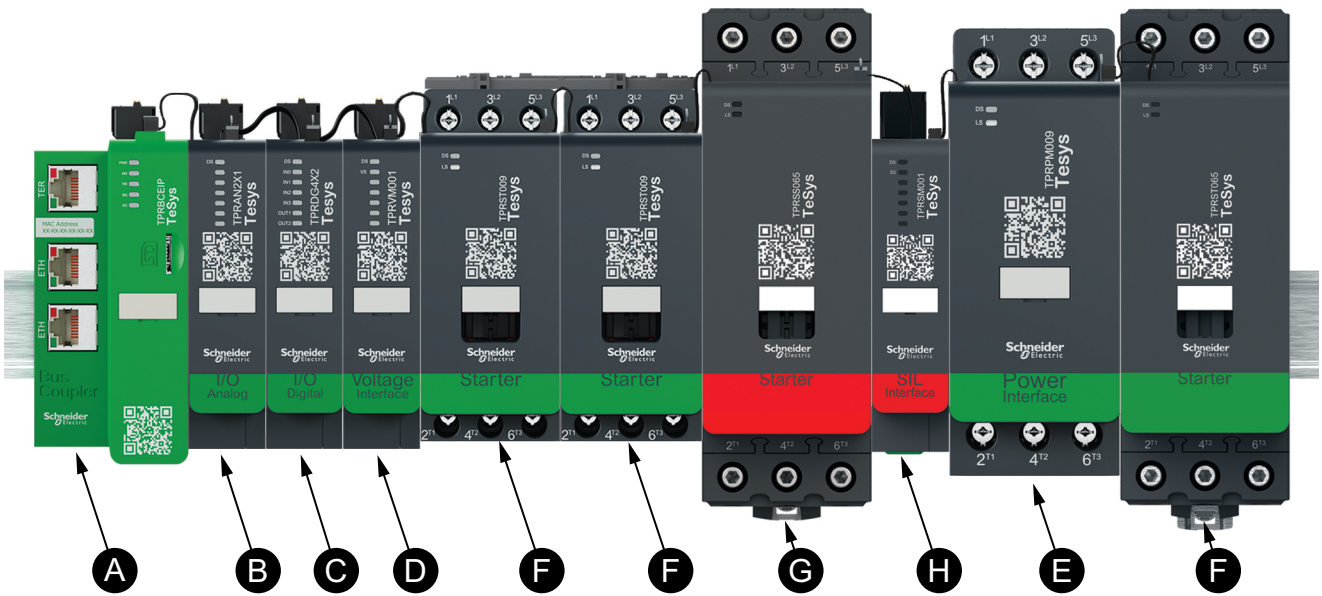
This system is designed around the concept of TeSys Avatars. These Avatars

- Represent both the logical and physical aspects of the automation functions
- Determine the configuration of the island

The logical aspects of the island are managed with software tools, covering all phases of product and application lifecycle: design, engineering, commissioning, operation, and maintenance.

The physical island consists of a set of devices installed on a single DIN rail, and connected together with flat cables providing the internal communication between modules. The external communication with the automation environment is made through a single bus coupler module, and the island is seen as a single node on the network. The other modules include starters, power interface modules, analog and digital I/O modules, voltage interface modules, and SIL (Safety Integrity Level according to standard IEC 61508) interface modules, covering a wide range of operational functions.

Figure 1 - TeSys island Overview



<b>A</b>	Bus Coupler	<b>E</b>	Power Interface Module
<b>B</b>	Analog I/O Module	<b>F</b>	Standard Starter
<b>C</b>	Digital I/O Module	<b>G</b>	SIL Starter
<b>D</b>	Voltage Interface Module	<b>H</b>	SIL Interface Module

## Technical Specifications

**Table 2 - TeSys™ island Specifications**

Width	up to 112.5 cm (3.83 ft)
Modules	up to 20 modules, excluding the bus coupler and the voltage interface modules
Control power consumption per system	3 A / 72 W maximum
Maximum load current per starter	80 A, 37 kW (50 hp), maximum
Internal data refresh time	10 ms
Mounting	Metallic DIN rail, horizontal or vertical

## Operating Conditions

TeSys™ island is designed to durably sustain the following conditions. Other conditions may apply to specific modules as described in their data sheet document, available on [www.se.com/tesys](http://www.se.com/tesys).

- 40 °C (104 °F) ambient temperature
- 400/480 V motor
- 50% humidity
- 80% load
- Horizontal mounting orientation
- All inputs activated
- All outputs activated
- 24 hours/day, 365 days/year run time

# Installation

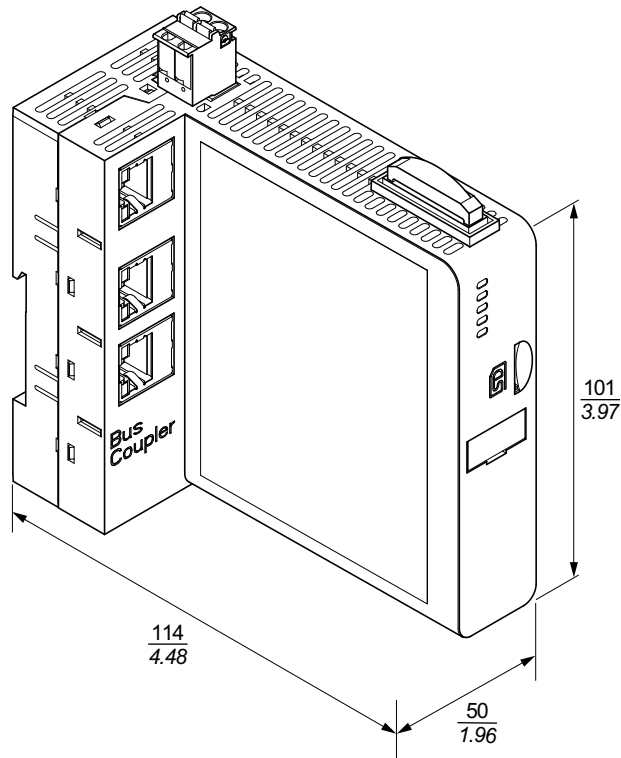
This section summarizes the installation steps described in this instruction bulletin. Remove power before performing Steps 1–4. Read and understand the information in *Precautions*, page 9 before performing any procedures in this instruction bulletin.

- 1. Receive and inspect the modules.**
  - Check that the catalog numbers printed on the labels are the same as those on the purchase order.
  - Remove the modules from the packaging and check that they have not been damaged in shipping.
- 2. Verify the supply mains.**
  - Verify that the supply mains is compatible with the power supply range of the TeSys™ island.
- 3. Assemble the island.**
  - Assemble the island following the instructions in this instruction bulletin.
  - Install any external options.
- 4. Wire the island.**
  - Connect the motor, ensuring that its connections correspond to the voltage.
  - Make sure that the power is off, then connect the supply mains.
  - Connect the control wiring.
- 5. Set up the island.**
- 6. For operation, refer to the *TeSys island Operating Guide*, document number 8536IB1903.**

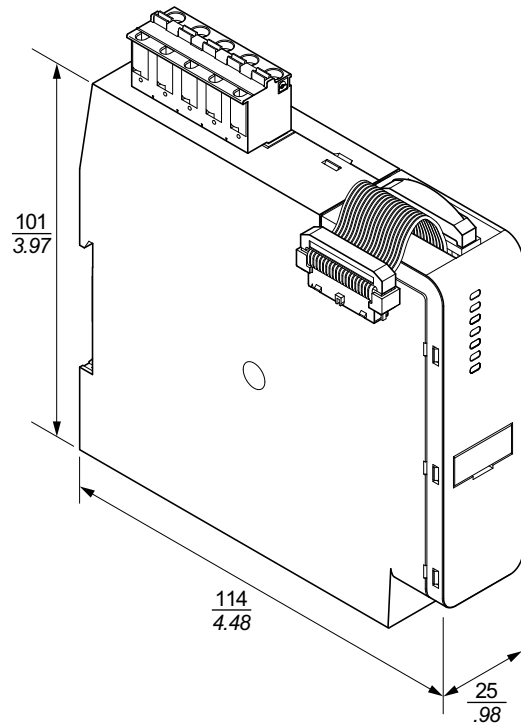
## Dimensions

This section contains the dimensions of the TeSys™ island modules. Dimensions are provided in millimeters and inches.

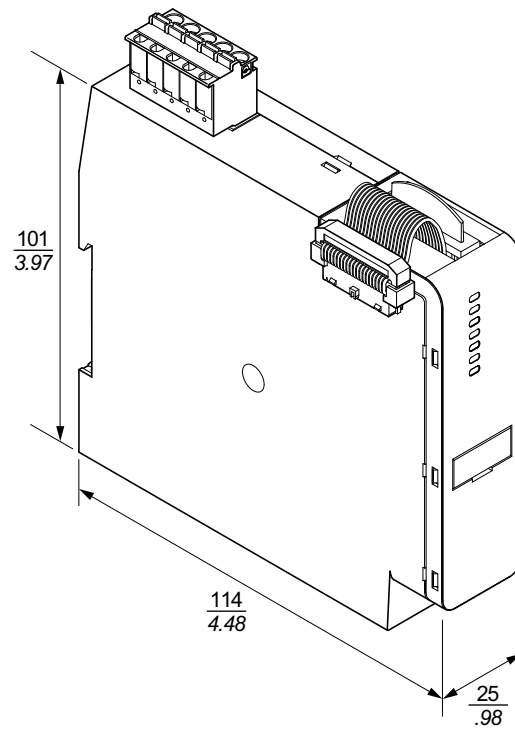
**Figure 2 - Bus Coupler: TPRBCEIP (mm/in.)**



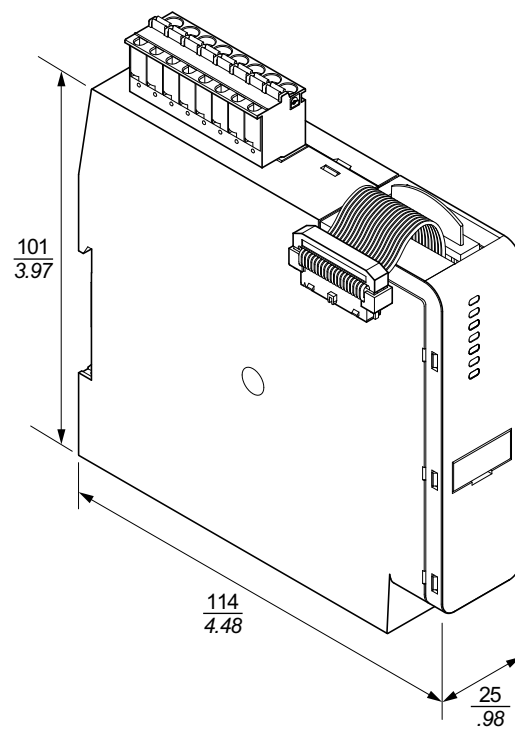
**Figure 3 - Voltage Interface Module: TPRVM001 (mm/in.)**



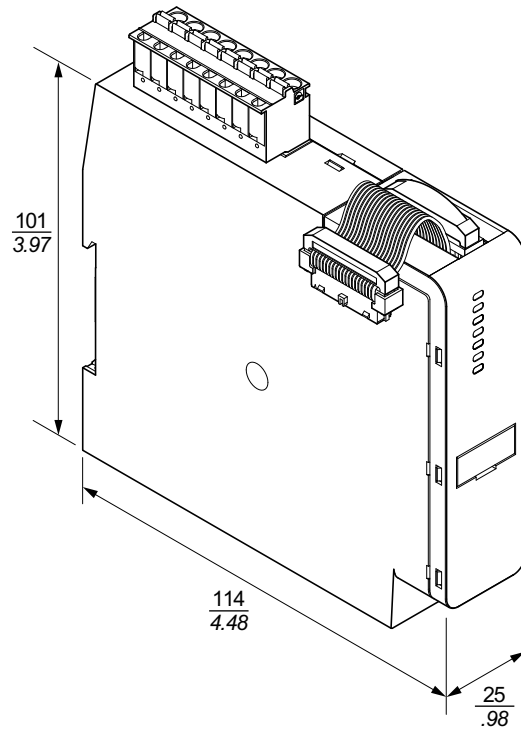
**Figure 4 - SIL Interface Module: TPRSM001 (mm/in.)**



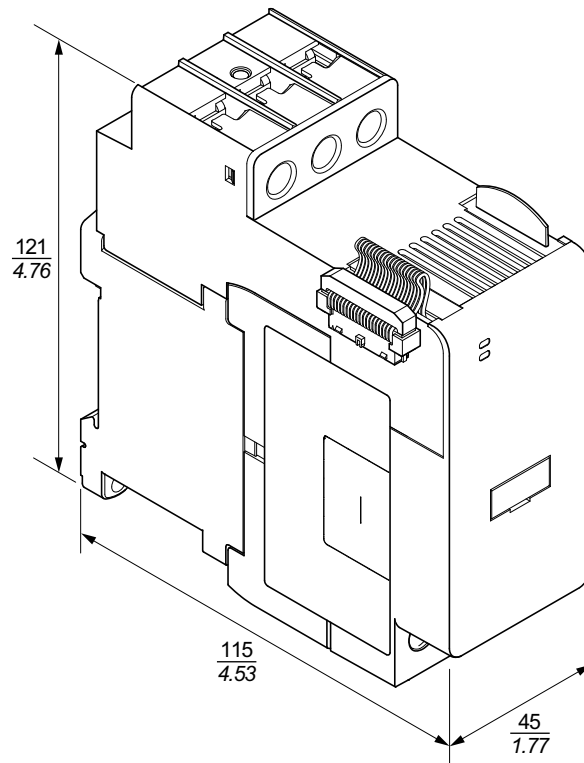
**Figure 5 - Digital I/O Module: TPRDG4X2 (mm/in.)**



**Figure 6 - Analog I/O Module: TPRAN2X1 (mm/in.)**

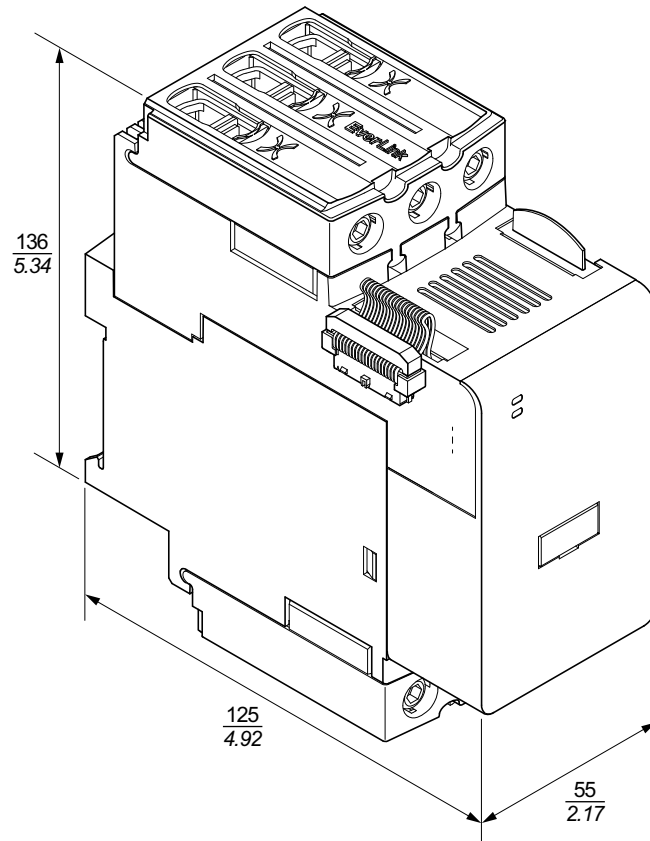


**Figure 7 - Size 1 (TPRPM009) and Size 2 (TPRPM038) Power Interface Modules (mm/in.)**

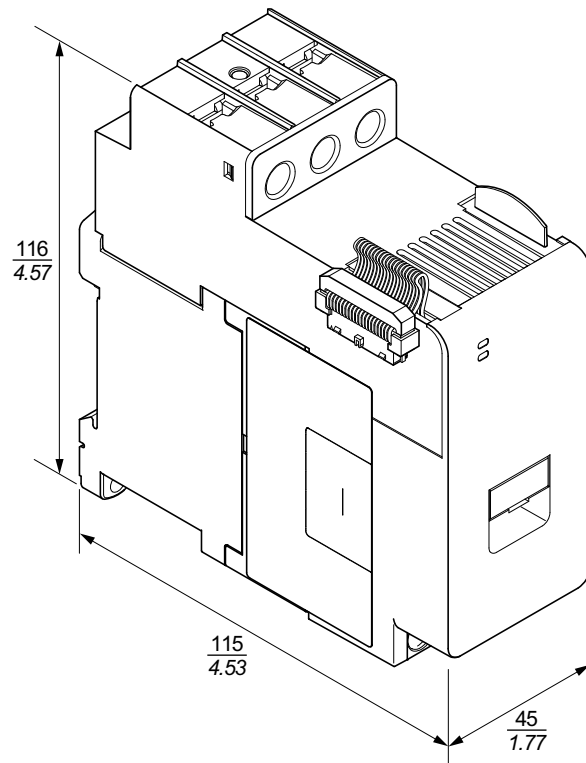




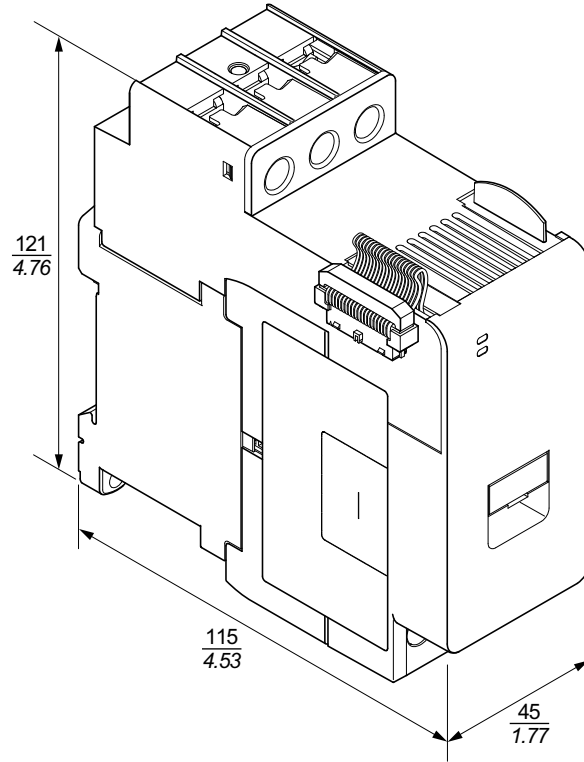
**Figure 8 - Size 3 Power Interface Module: TPRPM080 (mm/in.)**



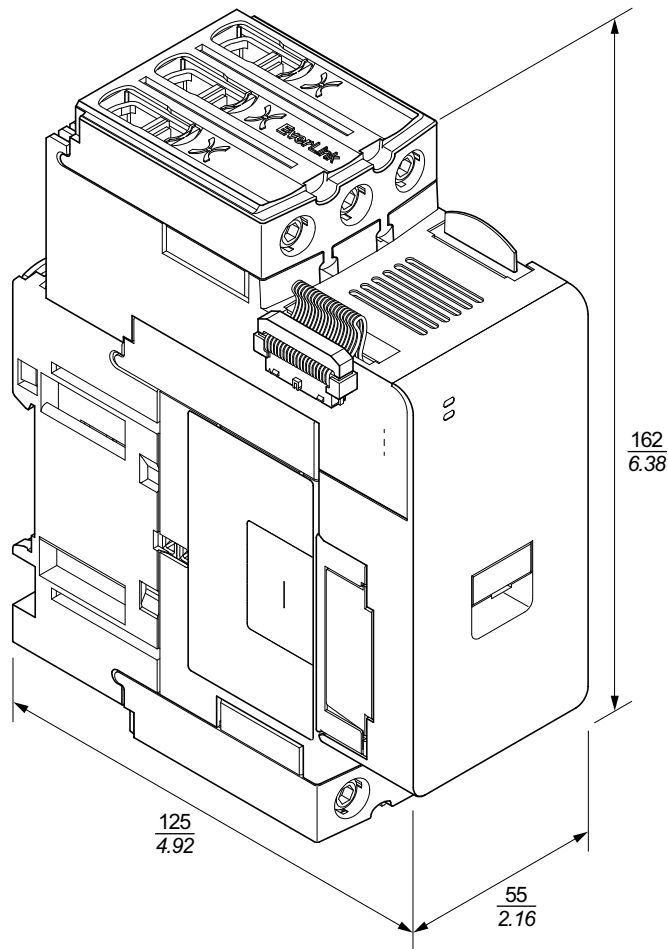
**Figure 9 - Size 1 Starters: TPRST009 and TPRSS009 (mm/in.)**



**Figure 10 - Size 2 Starters: TPRST025, TPRST038, TPRSS025, and TPRSS038 (mm/in.)**



**Figure 11 - Size 3 Starters: TPRST065, TPRST080, TPRSS065, and TPRSS080 (mm/in.)**



## Weights

**Table 3 - Weights**

Module	Description / Rating	Reference Number	Weight	
			kg	lb
Bus Coupler	Ethernet switch	TPRBCEIP	0.204	0.450
Standard Starters	4 kW (5 hp)	TPRST009	0.656	1.446
	11 kW (15 hp)	TPRST025	0.718	1.583
	18.5 kW (20 hp)	TPRST038	0.718	1.583
	30 kW (40 hp)	TPRST065	1.248	2.751
	37 kW (40 hp)	TPRST080	1.248	2.751
SIL Starters	4 kW (5 hp)	TPRSS009	0.656	1.446
	11 kW (15 hp)	TPRSS025	0.718	1.583
	18.5 kW (20 hp)	TPRSS038	0.718	1.583
	30 kW (40 hp)	TPRSS065	1.248	2.751
	37 kW (40 hp)	TPRSS080	1.248	2.751
Power Interface Modules	4 kW (5 hp)	TPRPM009	0.255	0.562
	18.5 kW (20 hp)	TPRPM038	0.255	0.562
	37 kW (40 hp)	TPRPM080	0.425	0.937
SIL Interface Module	SIL interface	TPRSM001	0.159	0.351
Digital I/O Module	4 In / 2 Out	TPRDG4X2	0.136	0.300
Analog I/O Module	2 In / 1 Out	TPRAN2X1	0.172	0.379
Voltage Interface Module	Voltage interface	TPRVM001	0.159	0.351

## General Installation Guidelines

This section contains information that is helpful for planning a TeSys™ island system. It includes requirements for enclosing the island in protective housing and for selecting the power source.

### Enclosure Requirements

#### **⚠ DANGER**

##### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside this equipment.
- Use only the specified voltage when operating this equipment and any associated products.
- Always use a properly rated voltage sensing device to confirm power is off.
- Use appropriate interlocks where personnel and/or equipment hazards exist.
- Power line circuits must be wired and protected in compliance with local and national regulatory requirements.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices per NFPA 70E, NOM-029-STPS, or CSA Z462 or local equivalent.

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

#### **⚠ WARNING**

##### **UNINTENDED EQUIPMENT OPERATION**

- For complete instructions about functional safety, refer to the *TeSys island Functional Safety Guide*, 8536IB1904.
- Do not disassemble, repair, or modify this equipment. There are no user serviceable parts.
- Install and operate this equipment in an enclosure appropriately rated for its intended application environment.
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.

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

TeSys™ island modules are designed as Zone B, Class A industrial equipment according to IEC/CISPR Publication 11. If they are used in environments other than those described in the standard, or in environments that do not meet the specifications in this instruction bulletin, they may not meet electromagnetic compatibility requirements in the presence of conducted and/or radiated interference.

All TeSys island modules meet European Community (CE) requirements for open equipment as defined by EN61131-2, and as open equipment per the North American standards. You must install them in an enclosure designed to meet the specific environmental conditions of the installation and to minimize the possibility of personnel unintentionally contacting hazardous voltages. The enclosure should be constructed of metal to improve the electromagnetic immunity of the TeSys island and should have a keyed locking mechanism to minimize unauthorized access.

## Thermal Considerations

The following tables list maximum thermal dissipation values for planning your TeSys island cooling system. The values assume maximum bus voltage, maximum field-side voltage, and maximum load currents. Typical values are often lower.

**Table 4 - Maximum Thermal Dissipation Values: Starters and Power Interface Modules**

Module Type	Reference Number	Maximum Thermal Dissipation @ AC3 (W)	Maximum Thermal Dissipation @ AC1 (W)
Standard Starters	TPRST009	3.5	5.1
	TPRST025	6.6	8.3
	TPRST038	11.8	12.8
	TPRST065	20.3	30.5
	TPRST080	30.5	30.5
SIL Starters	TPRSS009	3.5	5.1
	TPRSS025	6.6	8.3
	TPRSS038	11.8	12.8
	TPRSS065	20.3	30.5
	TPRSS080	30.5	30.5
Power Interface Modules	TPRPM009	0.6	1.3
	TPRPM038	0.9	1.0
	TPRPM080	2.3	2.3

**Table 5 - Maximum Thermal Dissipation Values: Bus Coupler, SIL Interface Module, Voltage Interface Module, I/O Modules**

Module Type	Reference Number	Maximum Thermal Dissipation (W)
Bus Coupler	TPRBCEIP	5.00
SIL Interface Module	TPRSM001	1.25
Voltage Interface Module	TPRVM001	0.20
Digital I/O Module	TPRDG4X2	1.20
Analog I/O Module	TPRAN2X1	1.70

## Environmental Characteristics

All TeSys™ island modules are electrically isolated between the internal electronic circuit and the input/output channels, within the limits described by the Environmental Characteristics table below. This equipment meets CE requirements as indicated in the table.

<b>⚠ WARNING</b>
<b>UNINTENDED EQUIPMENT OPERATION</b>
Install and operate this equipment according to the conditions described in the Environmental Characteristics table.
<b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b>

**Table 6 - Environmental Characteristics**

Storage temperature	Starters: -25 °C to +70 °C (-13 °F to 158 °F) Bus Couplers, SIL Modules, Voltage Interface Modules, and I/O Modules: -40 °C to +80 °C (-40 °F to 176 °F)
Operating temperature	-10 °C to +50 °C (14 °F to 122 °F) up to 60 °C (140 °F) with derating (horizontal and vertical mounting)
Humidity	5–95%, non-condensing
Altitude	Starters: up to 2000 m (6561.66 ft) without derating Bus Couplers, SIL Modules, Voltage Interface Modules, and I/O Modules: up to 3000 m (9842.49 ft) without derating
Corrosion immunity	Atmosphere free from corrosive gases
Protection degree	IP20 Helps protect against particulates larger than 12.5 mm (0.5 in.) diameter entering the device housing
EMC	Complying with US Code of Federal Regulations, Title 47, Part 15 (FCC Part 15) Class A for unintentional radio interference. Circuit complying with IEC 61000-6-7, EMC for safety-related systems
Vibration	Horizontal and vertical mounting orientation: <ul style="list-style-type: none"> <li>• 1.5 mm peak to peak, 3–13 Hz per IEC 60068-2-6</li> <li>• 1 gn 13–200 Hz per IEC 60068-2-6</li> </ul>
Mechanical shock resistance	15 gn at 11 ms in horizontal and vertical mounting orientations, according to IEC 60068–2–27
Force withstand	50 N for 30 s applied to the top of the device, perpendicular to the DIN rail
Degree of pollution	Pollution degree 2 per IEC/EN 61131–2
Environmental compliance and performance	REACH declaration—compliance with EU-REACH annex XVII RoHS compliance—compliant with European Directive (EU) 2015/863 and WEEE

## Electromagnetic Compatibility

**Table 7 - EMC Specifications**

Phenomenon	Basic Standard	Product Compliance IEC/UL 60947 and 61010 series	Functional Safety Compliance IEC 61000-6-7 for Bus Coupler, SIL Starter and SIL Interface Module
Electrostatic discharge	IEC/EN 61000-4-2	Air Discharge: 8 kV Contact discharge: 4 kV	Air Discharge: 8 kV Contact discharge: 6 kV
Radiated electromagnetic field	IEC/EN 61000-4-3	Field strength: 10 V/m Frequency: 80–1000 MHz  Field strength: 3 V/m Frequency: 1.4–2.0 GHz  Field strength: 1 V/m Frequency: 2.0–2.7 GHz	Field strength: 20 V/m Frequency: 80–1000 MHz  Field strength: 10 V/m Frequency: 1.0–2.0 GHz  Field strength: 3 V/m Frequency: 2.0–6.0 GHz
Fast transient burst	IEC/EN 61000-4-4	Starter, DIN Rail, and Bus Coupler Power Connector: 2 kV  Digital and Analog Connector: 1 kV	Starter and DIN Rail: 4 kV  Bus Coupler Power Connector, Ethernet Port, and SIM Connector: 2 kV
Surge immunity	IEC/EN 61000-4-5	Starter: 2 kV CM (12 Ω) and 1 kV DM (2 Ω)  Bus Coupler Power Connector: 2 kV CM (42 Ω) and 1 kV DM (42 Ω)  Ethernet Port and Analog Connector: 1 kV CM (2 Ω)  Digital Connector: 1 kV CM (42 Ω) and 500 V DM (42 Ω)	Starter: 4 kV CM (12 Ω) and 2 kV DM (2 Ω)  Bus Coupler Power Connector: 2 kV CM (42 Ω) and 2 kV DM (42 Ω)  SIM Connector, Ethernet Port, and Analog Connector: 2 kV CM (2 Ω)
Conducted electromagnetic field	IEC/EN 61000-4-6	10 Vms (0.15–80 MHz)	20 Vms (0.15–80 MHz)
Magnetic field	IEC/EN 61000-4-8	30 A/m, 50/60 Hz	30 A/m, 50/60 Hz
Conducted emission	EN 55011	Class A / Environment A	
Radiated emission	EN 55011	Class A / Environment A	
<b>NOTE:</b> Communication and Analog input and output cables must be shielded.			

## Mounting Positions

This section describes mounting positions and DIN rail requirements for TeSys™ island.

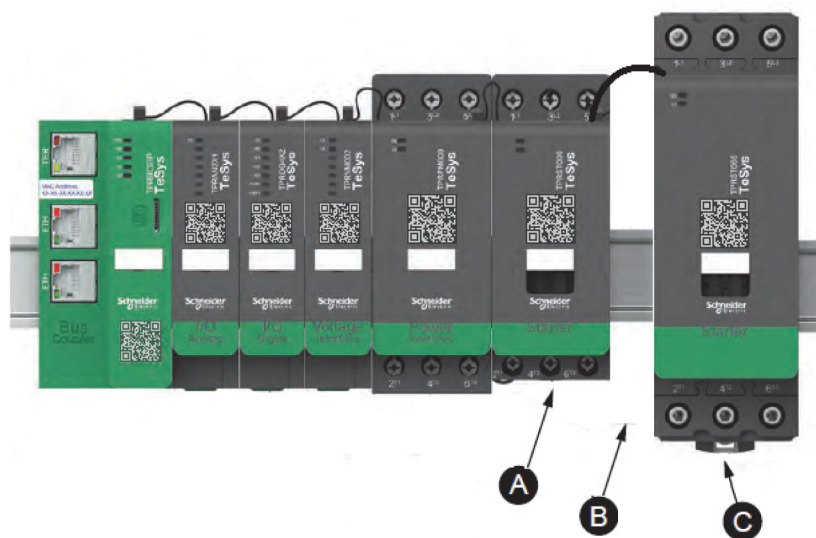
### Electromagnetic Interference

The protection and energy monitoring features of TeSys™ island devices are based on current sensors. To reduce the risk of electromagnetic interference between two adjacent devices, we recommend that you implement one of the following installation rules if the ratio between the FLA settings of two adjacent devices is >100:1.

- Option 1: Using the engineering tool, reorganize the order of the Avatars on the island so there are no adjacent devices with FLA ratios >100:1
- Option 2: Leave a spacing of 30 mm (1.18 in.) between the two adjacent devices.

The figure below illustrates Option 2.

**Figure 12 - Avoiding Electromagnetic Interference: Option 2**



**Table 8 - Legend**

<b>A</b>	A TeSys island device with an FLA setting of 0.6 A
<b>C</b>	An adjacent TeSys island device with an FLA of 65 A (>0.6 A × 100)
<b>B</b>	The recommended 30 mm (1.18 in.) spacing between the two adjacent devices with an FLA ratio >100:1

Additionally:

1. Maintain a minimum distance of 30 cm (11.8 in.) between the island and sources of extremely high 50/60 Hz magnetic fields, such as three-phase bus systems.
2. TeSys island modules have integrated electrostatic discharge (ESD) protection. Discharge potential body charge to the equipment ground before handling or installing a module to reduce the risk of ESD damage.
3. Keep mobile communication devices at least 20 cm (7.87 in.) away from the island to reduce the likelihood of interference with the island.
4. Integrating radio communication devices in the same panel or in a near-by panel requires specific precautions related to transmit power and antenna location. Contact a Schneider Electric representative for more information.
5. TeSys island is a Class A device designed for use in environment A (according to *FCC Rules & Regulations*, Title 47, Part 15, Subpart B). Using



TeSys island in environment B may cause radio interference necessitating additional mitigation methods.

- For additional information on EMC installation practices, refer to Schneider Electric's *Electrical Installation Guide*, EIGED306001, or contact a Schneider Electric representative.

## Heat Dissipation

To allow adequate heat dissipation, always leave a spacing of 10 cm (3.94 in.) between the short-circuit protection devices and the TeSys™ island starters.

Additional installation recommendations pertain under the following conditions:

- Three or more starters are mounted on the island side-by-side
- The starters have ratings (Ie) greater than or equal to 25 A
- The starters are used with a motor having a nominal current  $I_n > 85\% \times I_e$

Under these conditions, we recommend that you implement one of the following installation rules:

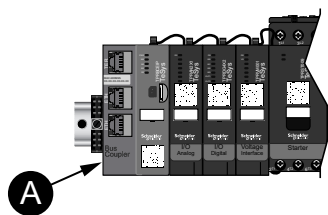
- Option 1: Using the engineering tool, reorganize the Avatars on the island to avoid these conditions.
- Option 2: Use 50 cm (1.64 ft) cables to wire the short-circuit protection devices with the affected middle starters. In a group of three starters, which all meet the conditions itemized above, the extra length is only recommended for the starter in the middle. In a group of four starters, the extra length is only recommended for the two starters in the middle.

## Island Orientation

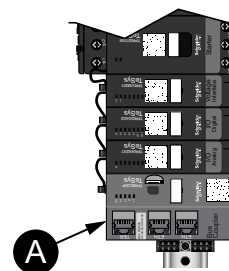
TeSys™ island can be mounted horizontally without derating. The island can also be mounted vertically with 20% derating. The maximum width of the island is 112.5 cm (3.83 ft), measured from the bottom left edge of the bus coupler to the right edge of the last module on the island. See the figures below.

- Horizontal mounting: The bus coupler (A) must be the left-most component on the island.
- Vertical mounting: The bus coupler (A) must be the bottom-most component on the island.

**Figure 13 - Bus Coupler in Horizontal Orientation**



**Figure 14 - Bus Coupler in Vertical Orientation**



## DIN Rail

The TeSys™ island modules are mountable on IEC 60715–compliant DIN rail (top hat style) with the following dimensions:

- Width: 35 mm ( $\pm 0.3$  mm)
- Thickness: 1 mm ( $\pm 0.04$  mm)
- Height: 7.5 or 15 mm (+0, -0.4 mm)

For Electromagnetic Compatibility (EMC) compliance, the galvanized steel DIN rail must be attached to a flat metal mounting surface, or mounted on an

Electronic Industries Alliance (EIA) rack or in a metal cabinet enclosure. Do not use aluminum DIN rail. Aluminum forms an inherent non-conductive oxide on its surface that inhibits electrical connection.

A single piece of galvanized steel DIN rail is recommended. Use metallic screws approximately every 8 in. (20.32 cm) to attach the DIN rail to the metallic equipment structure or panel. Grounding is through the DIN rail connection.

Suitable DIN rail is available from Schneider Electric. See the following table.

**Table 9 - DIN Rail References**

Rail Depth	Reference Number
15 mm (0.59 in.)	AM1DE200
7.5 mm (0.30 in.)	AM1DP200

## Required Tools

The following table lists the tools required for installing the TeSys™ island.

**Table 10 - Required Tools**

Tool	Size
Torque driver	6 mm flat head
Torque driver	#2 Phillips
Torque hex key	4 mm hexagonal

In addition, you need the following documentation:

- Bill of materials (BOM)
- Island topology: the order in which the TeSys island modules must be installed on the island

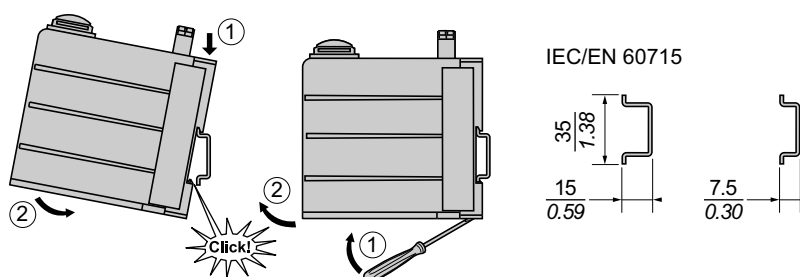
Verify that the modules you received match the BOM and the island topology before starting the installation. TeSys island modules must be installed in a specific order on the island. If the physical arrangement of the modules on the island does not match the configured topology, the island will not function properly.

## Installing the Bus Coupler

### Mounting the Bus Coupler on DIN Rail

To install the bus coupler on the DIN rail, position the top groove of the bus coupler on the top edge of the DIN rail and press it against the rail until you hear the clip snap into place. See the figure below.

**Figure 15 - DIN Rail Installation (mm/in.)**



## Micro SD Card

TeSys™ island bus couplers are designed with a card slot for a micro SD card. The island maintains files on the micro SD card for the fast device replacement (FDR) function, as well as a software/firmware backup from the device and log files.

Recommended micro SD card sizes for the TeSys island bus coupler are 4 GB, 8 GB, 16 GB, and 32 GB.

### Handling the Micro SD Card

When handling the micro SD card, observe the following precautions to help prevent the corruption or loss of internal data, or the malfunction of a micro SD card.

#### **NOTICE**

##### **LOSS OF APPLICATION DATA**

- Backup SD card data regularly.
- Do not remove power, reset the controller, or remove the SD card while it is being accessed.
- Orient the SD card correctly when inserting it into the controller.
- Use only micro SD cards formatted using FAT32.

**Failure to follow these instructions can result in equipment damage.**

When using TeSys™ island and a micro SD card, observe the following precautions to avoid data loss.

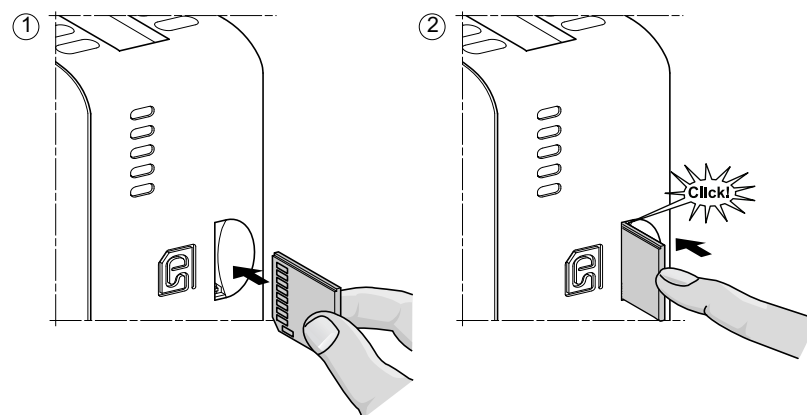
- Accidental data loss can occur at any time. Once data is lost it cannot be recovered. Backup the SD card data regularly.
- If you forcibly extract the micro SD card, data on the micro SD card may become corrupt.
- Removing a micro SD card that is being accessed could damage the micro SD card, or corrupt its data.
- If the micro SD card is not positioned correctly when inserted into the controller, the data on the card and the bus coupler could become damaged.

### Installing the Micro SD Card

To install the SD card:

1. Insert the SD card into the bus coupler's card slot.
2. Push until you hear it "click."

**Figure 16 - Installing the SD Card**



## Installing Standard Starters and SIL Starters

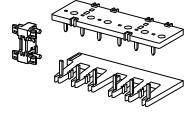
This section contains instructions for joining adjacent starters with assembly accessories for use in two direction, two speed, and wye-delta (Y/D) Avatars. It also describes how to install the starters on DIN rail. Remove power before performing the steps in this section. Read and understand the information in *Precautions, page 9* before performing any procedures in this instruction bulletin.

## Coupling Starters

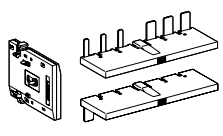
This section describes how to join adjacent starters with accessories for use in two direction, two speed, and wye-delta Avatars. Refer to the bill of materials (BOM) and the island topology to determine which starters require installation of accessories. See also *Avatar Composition*, page 64. Join the starters with the accessories before mounting them on DIN rail.

The accessories come packaged as kits or can be ordered individually. The kits and their components are described in the following tables.

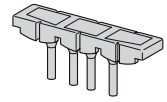

**Table 11 - LAD9R1 Assembly Kit for 9–38 A (Size 1 and 2) Starters**

Kit Components	Description	LAD9R1 Assembly Kit
LAD9V5	Parallel link between two starters	 <p>For installation instructions, refer to <i>Installing the LAD9R1 Kit (9–38 A Starters)</i>, page 30.</p>
LAD9V6	Reversing link between two starters	
LAD9V2	Mechanical interlock with assembly staple	

**Table 12 - LAD9R3 Assembly Kit for 40–65 A (Size 3) Starters**

Kit Components	Description	LAD9R3 Assembly Kit
LA9D65A6	Parallel link between two starters	 <p>For installation instructions, refer to <i>Installing the LAD9R3 Kit (40–65 A Starters)</i>, page 34.</p>
LA9D65A9	Reversing link between two starters	
LAD4CM	Mechanical interlock	

**Table 13 - Shorting Blocks for Y/D Avatars**

Reference Number	Description	Shorting Blocks
LAD9P3	Shorting block / 3P parallel link for 9–38 A (size 1 and 2) starters. Used for linking 3 poles of a contactor in a wye-delta (Y/D) starter.	 <p>For installation instructions, refer to <i>Installing the LAD9P3 Shorting Block (9–38 A Starters in Y/D Avatars)</i>, page 32.</p>
LAD9SD3S	Shorting block / 3P parallel link for 40–65 A (size 3) starters and a separate warning label. Used for linking 3 poles of a contactor in a wye-delta (Y/D) starter.	 <p>For installation instructions, refer to <i>Installing the LAD9SD3S Shorting Block (40–65 A Starters in Y/D Avatars)</i>, page 37.</p>

## Installing the LAD9R1 Kit (9–38 A Starters)

The accessories in the LAD9R1 kit are used to join adjacent 9–38 A (size 1 and 2) starters in two speed or two direction Avatars. To install the accessories, perform the steps in the following table and refer to *Installing the LAD9R1 Assembly Kit*, page 31.

**Table 14 - LAD9R1 Installation Procedure**

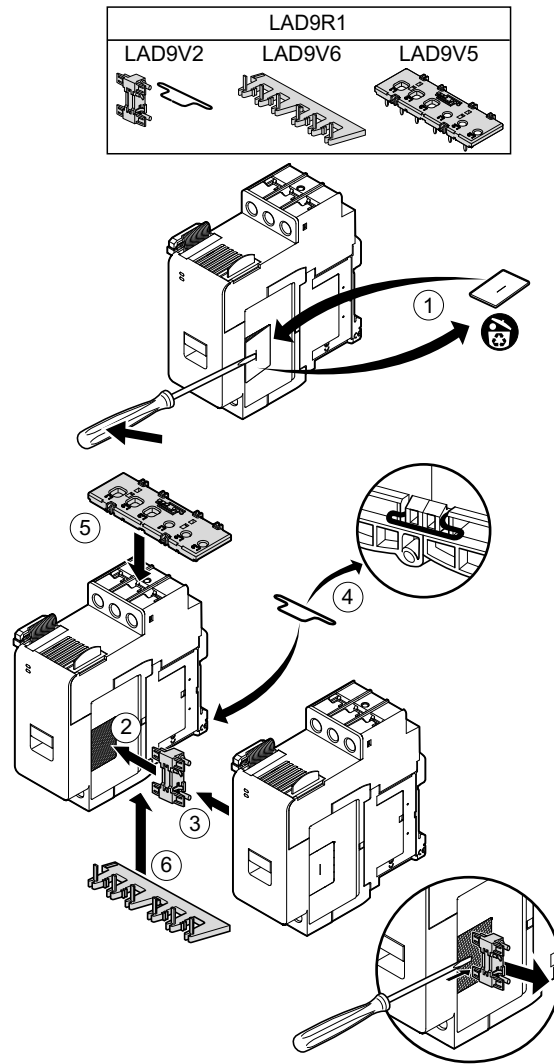
Step	Action
1	On the starter that will be mounted on the left, insert a flat-head screwdriver into the slot cut into the label near the middle of the starter on the <b>right</b> side and remove the small plastic cover under the label. The section of the label that must be removed is perforated and will easily separate from the rest of the label. Do not remove the plastic cover on the <b>left</b> side of the starter.
	On the starter that will be mounted on the right, insert a flat-head screwdriver into the slot cut into the label near the middle of the starter on the <b>left</b> side, and remove the small plastic cover under the label. The section of the label that must be removed is perforated and will easily separate from the rest of the label. Do not remove the plastic cover on the <b>right</b> side of the starter.
2	Install the LAD9V2 mechanical interlock into the opening on the starter on the left. You will hear a click once the connection is made.
3	Attach the starter on the right to the mechanical interlock. You will hear a click once the connection is made.
4	Attach the assembly staple at the back of the starters. Insert the top of the staple onto the starters and then push down to secure the bottom of the staple into position.
5	Install the LAD9V5 parallel link at the top of the starters.
6	Install the LAD9V6 reversing link at the bottom of the starters.

To separate the starters and remove the accessories, perform the steps in the following table and refer to *Installing the LAD9R1 Assembly Kit*, page 31.

**Table 15 - LAD9R1 Removal Procedure**

Step	Action
1	If the flat cables have been connected, disconnect the cables from the modules before removing the accessories.
2	Completely loosen the screws on the starter terminals.
3	Remove the reversing link from the bottom of the starters.
4	Remove the parallel link from the top of the starters.
5	Remove the assembly staple from the back of the starters.
6	Use a flat-head screwdriver to separate the two starters.
7	Use a flat-head screwdriver to remove the mechanical interlock from the starters.

**Figure 17 - Installing the LAD9R1 Assembly Kit**



## Installing the LAD9P3 Shorting Block (9–38 A Starters in Y/D Avatars)

The accessories in the LAD9R1 kit together with the LAD9P3 shorting block are used to join adjacent 9–38 A (size 1 and 2) starters for wye-delta (Y/D) Avatars. To install the accessories, perform the steps in the following table and refer to *Installing the LAD9P3 Shorting Block*, page 33.

**Table 16 - LAD9P3 Installation Procedure**

Step	Action
1	On the starter that will be mounted on the left, using a flat-head screwdriver, remove the small piece of plastic located near the middle of the starter on the <b>right</b> side. The plastic cover is hidden under a label on the side of the starter. Do not remove the plastic cover on the <b>left</b> side of the starter.
	On the starter that will be mounted on the right, using a flat-head screwdriver, remove the small piece of plastic located near the middle of the starter on the <b>left</b> side. The plastic cover is hidden under a label on the side of the starter. Do not remove the plastic cover on the <b>right</b> side of the starter.
2	Install the LAD9V2 mechanical interlock into the opening on the starter on the left. You will hear a click once the connection is made.
3	Attach the starter on the right to the mechanical interlock. You will hear a click once the connection is made.
4	Attach the assembly staple at the back of the starters. Insert the top of the staple onto the starters and then push down to secure the bottom of the staple into position.
5	Install the LAD9P3 shorting block at the top of the left starter. This is the wye (Y) starter.
6	Install the LAD9V6 reversing link at the bottom of the starters.

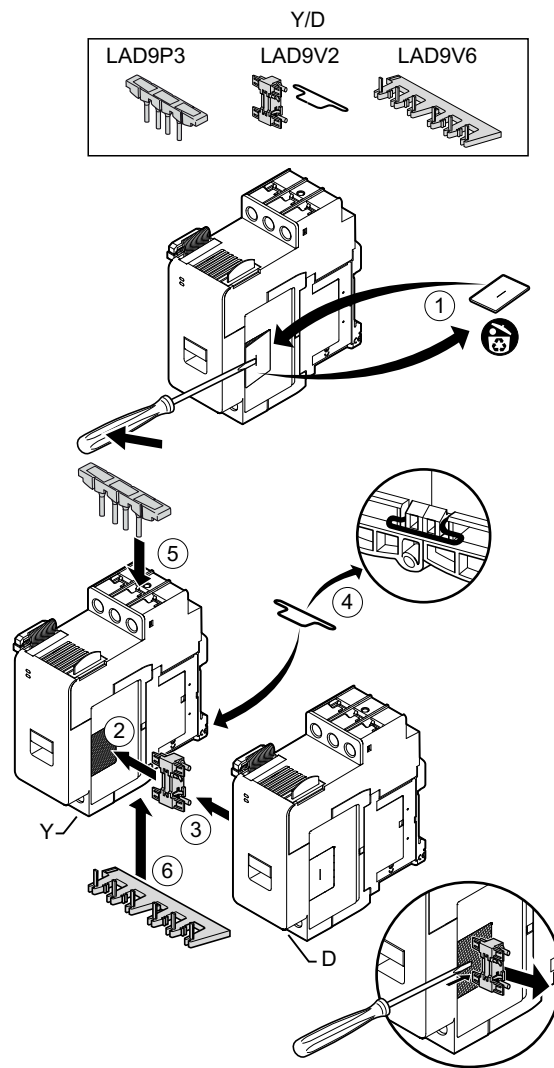
To separate the starters and remove the accessories, perform the steps in the following table and refer to *Installing the LAD9P3 Shorting Block*, page 33.

**Table 17 - LAD9P3 Removal Procedure**

Step	Action
1	If the flat cables have been connected, disconnect the cables from the modules before removing the accessories.
2	Completely loosen the screws on the starter terminals.
3	Remove the reversing link from the bottom of the starters.
4	Remove the shorting block from the top left starter.
5	Remove the assembly staple from the back of the starters.
6	Use a flat-head screwdriver to separate the two starters.
7	Use a flat-head screwdriver to remove the mechanical interlock from the starters.



**Figure 18 - Installing the LAD9P3 Shorting Block**



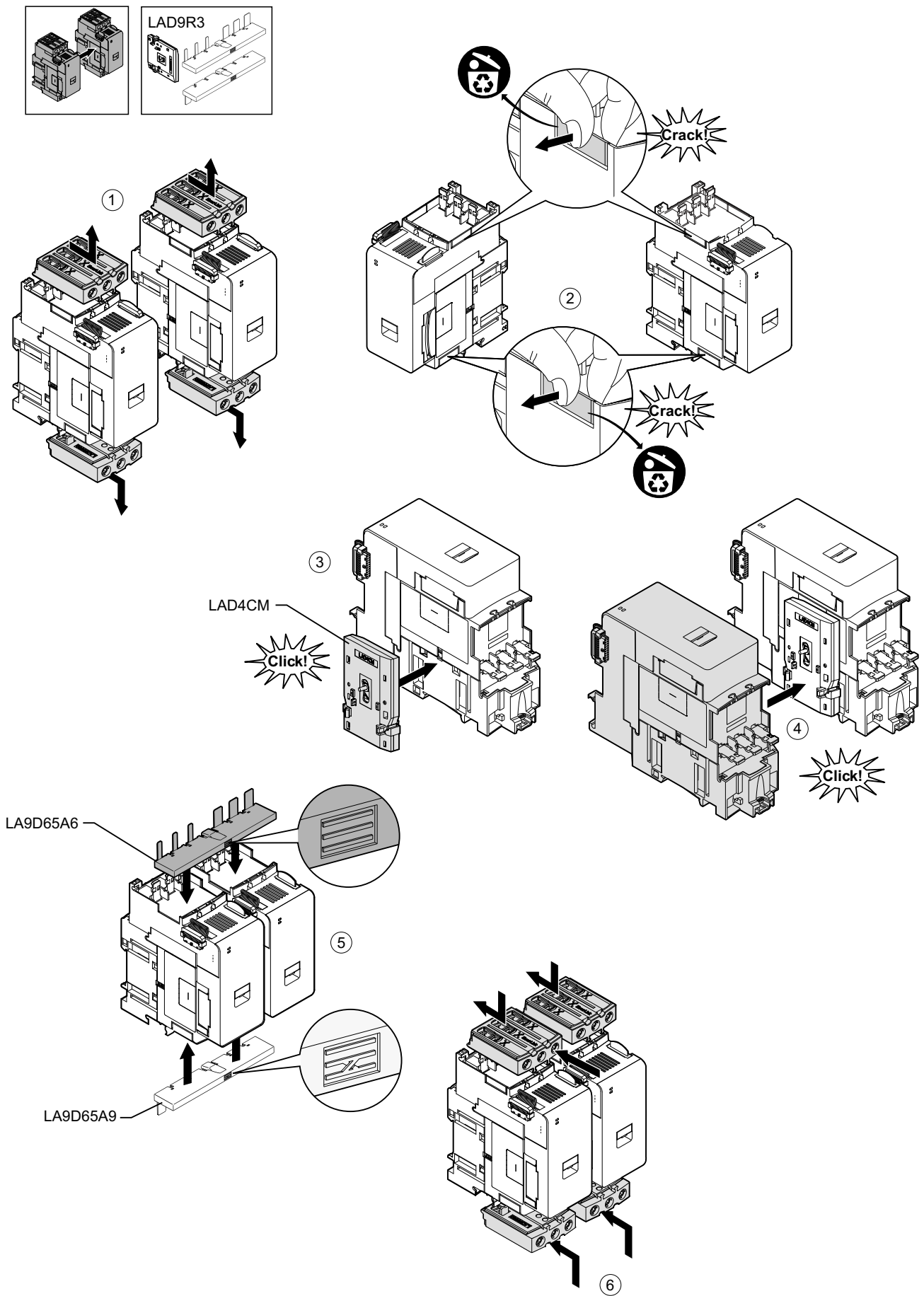
## Installing the LAD9R3 Kit (40–65 A Starters)

The accessories in the LAD9R3 kit are used to join adjacent 40–65 A (size 3) starters in two speed or two direction Avatars. To install the accessories, perform the steps in the following table and refer to *Installing the LAD9R3 Assembly Kit*, page 35.

**Table 18 - LAD9R3 Installation Procedure**

Step	Action
1	Push the Everlink™ terminals toward you to remove them from the starter.
2	On the starter on the <b>left</b> , remove the small pieces of plastic located at the top and the bottom on the right side of the starter. Do not remove these pieces from the left side of the starter.
	On the starter on the <b>right</b> , remove the small pieces of plastic located at the top and the bottom on the left side of the starter. Do not remove these pieces from the right side of the starter.
3	Install the LAD4CM mechanical interlock onto the starter on the right. Make sure the blue clip goes into the side of the starter. The spring-loaded clip will attach it to the side of the starter. You will hear a click once the connection is made.
4	Attach the starter on the left to the mechanical interlock. You will hear a click once the connection is made.
5	Install the LA9D65A6 parallel link at the top of the starters.
	Install the LA9D65A9 reversing link at the bottom of the starters.
6	Slide the Everlink terminals on the bottom and top of the starters. Push the Everlink terminal towards the starter until you hear a click.

Figure 19 - Installing the LAD9R3 Assembly Kit



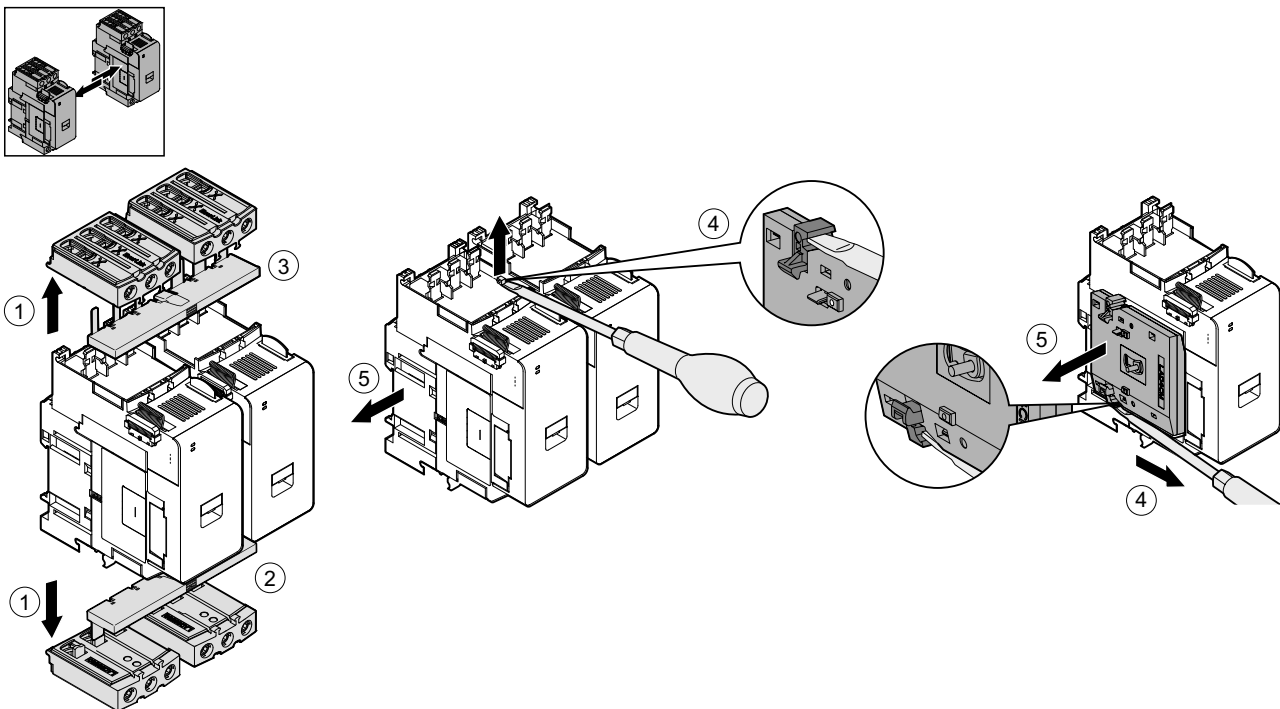
To separate the starters and remove the accessories, perform the steps in the following table and refer to *Removing the LAD9R3 Assembly Kit*, page 36.

**NOTE:** If the flat cables have been connected, disconnect the cables from the modules before performing the removal procedure.

**Table 19 - LAD9R3 Removal Procedure**

Step	Action
1	Completely loosen the screws on the Everlink terminals. Push the Everlink terminals toward you to remove them from the starter.
2	Remove the reversing link from the bottom of the starters.
3	Remove the parallel link from the top of the starters.
4	Use a flat-head screwdriver to lift the blue actuator on the top and bottom of the mechanical interlock installed between the two starters.
5	Remove the mechanical interlock.

**Figure 20 - Removing the LAD9R3 Assembly Kit**



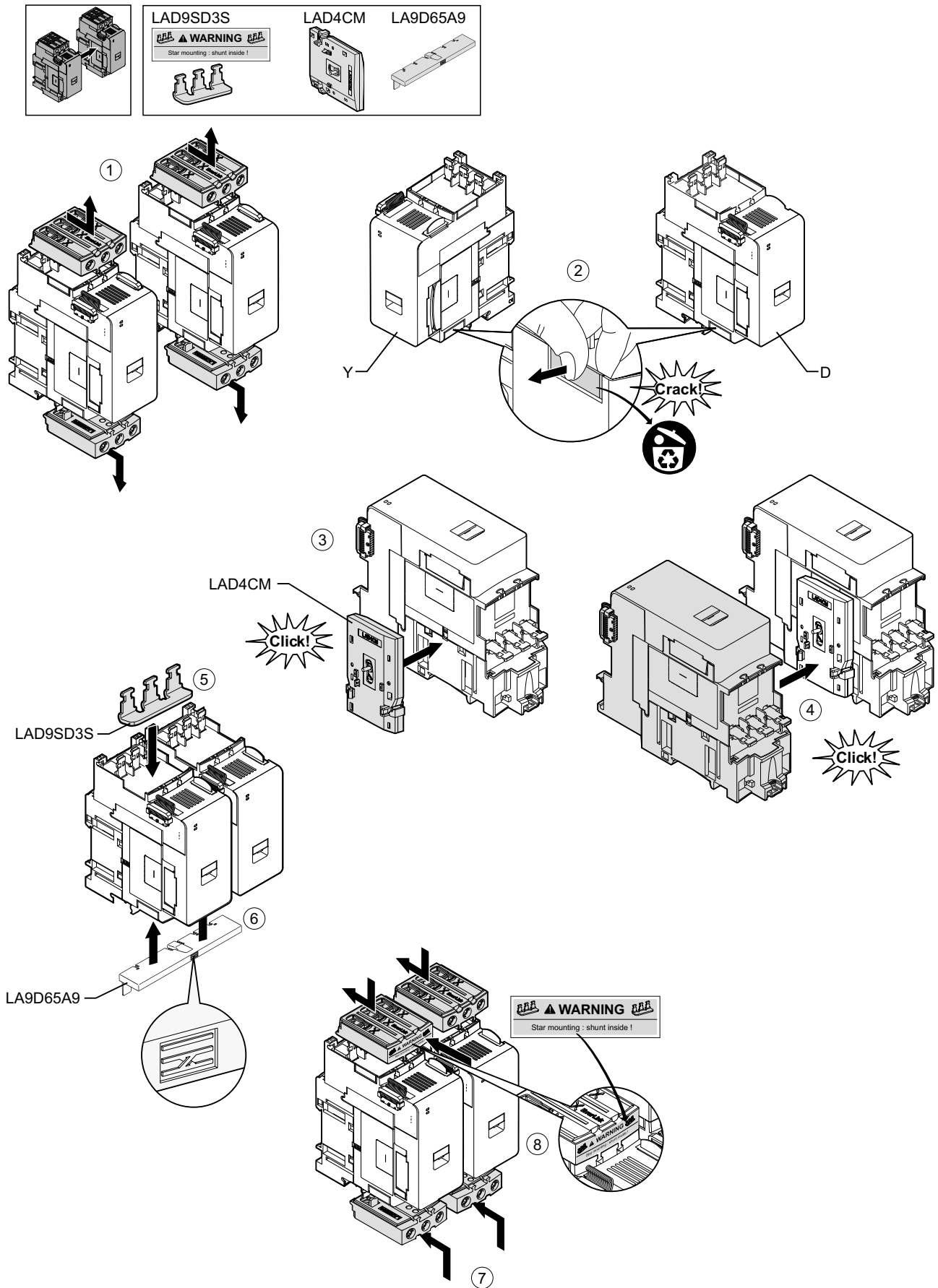
## Installing the LAD9SD3S Shorting Block (40–65 A Starters in Y/D Avatars)

The accessories in the LAD9R3 kit together with the LAD9SD3S shorting block are used to join adjacent 40–65 A (size 3) starters for wye-delta (Y/D) Avatars. To install the accessories, perform the steps in the following table and refer to *Installing the LAD9SD3S Shorting Block, page 38*.

**Table 20 - LAD9SD3S Installation Procedure**

Step	Action
1	Push the Everlink™ terminals toward you to remove them from the starter.
2	On the starter on the <b>left</b> , remove the small piece of plastic located at bottom on the right side of the starter. Do not remove this piece from the left side of the starter and do not remove the piece from the top. On the starter on the <b>right</b> , remove the small piece of plastic located at the bottom on the left side of the starter. Do not remove this piece from the right side of the starter and do not remove the piece from the top.
3	Install the LAD4CM mechanical interlock onto the starter on the right. Make sure the blue clip goes into the side of the starter. The spring-loaded clip will attach it to the side of the starter. You will hear a click once the connection is made.
4	Attach the starter on the left to the mechanical interlock. You will hear a click once the connection is made.
5	Install the LAD9SD3S shorting block at the top of the left starter. This is the wye (Y) starter.
6	Install the LA9D65A9 reversing link at the bottom of the starters.
7	Slide the Everlink terminals on the bottom and top of the starters. Push the Everlink terminal towards the starter until you hear a click.
8	Attach the warning label onto the Everlink terminal located at the top of the left starter that is covering the shorting block.

Figure 21 - Installing the LAD9SD3S Shorting Block



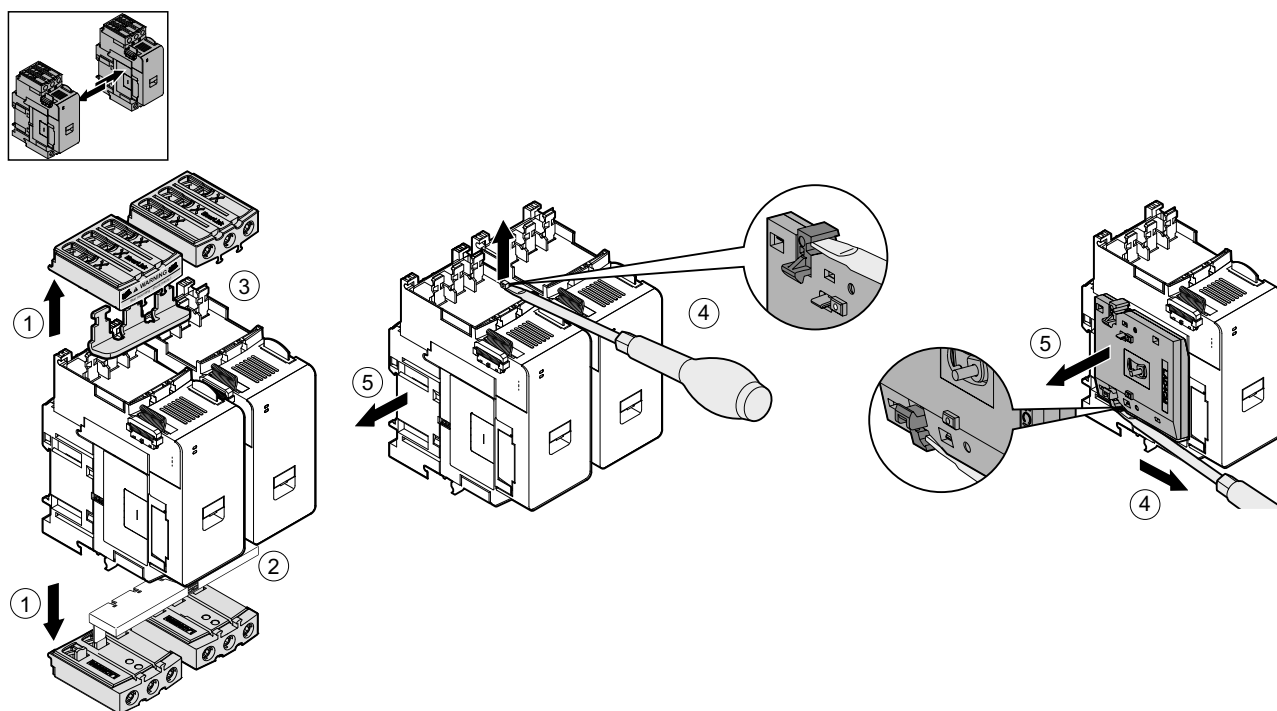
To separate the starters and remove the accessories, perform the steps in the following table and refer to *Removing the LAD9SD3S Shorting Block*, page 39.

**NOTE:** If the flat cables have been connected, disconnect the cables from the modules before performing the removal procedure.

**Table 21 - LAD9SD3S Removal Procedure**

Step	Action
1	Completely loosen the screws on the Everlink terminals. Push the Everlink terminals toward you to remove them from the starter.
2	Remove the reversing link from the bottom of the starters.
3	Remove the shorting block from the top of the starters.
4	Use a flat-head screwdriver to lift the blue actuator on the top and bottom of the mechanical interlock installed between the two starters.
5	Remove the mechanical interlock.

**Figure 22 - Removing the LAD9SD3S Shorting Block**

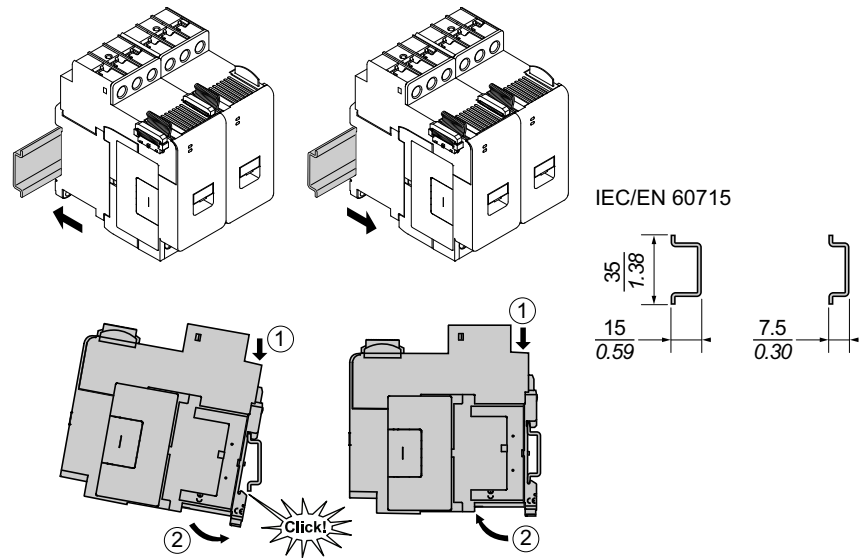


## Mounting Starters on DIN Rail

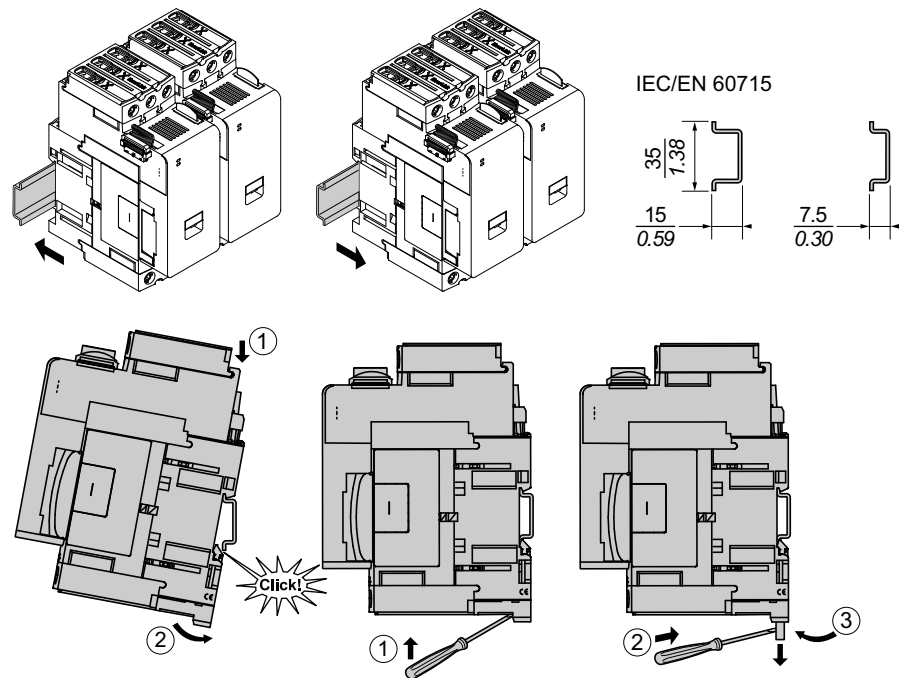
Before installing modules on the island, refer to the island topology to ensure you are installing them in the correct sequence.

To install a starter on DIN rail, position the top groove of the starter on the top edge of the DIN rail and press it against the rail until you hear the clip snap into place. See the figures below.

**Figure 23 - Size 1 (TPR•009) and Size 2 (TPR•025 and TPR•038) Starters (mm/in.)**



**Figure 24 - Size 3 Starters (TPR•065 and TPR•080) (mm/in.)**



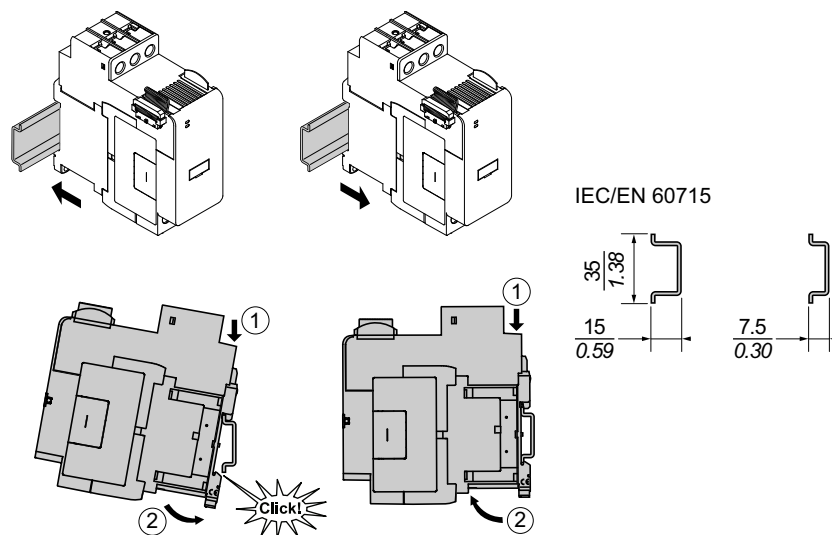


## Mounting Power Interface Modules on DIN Rail

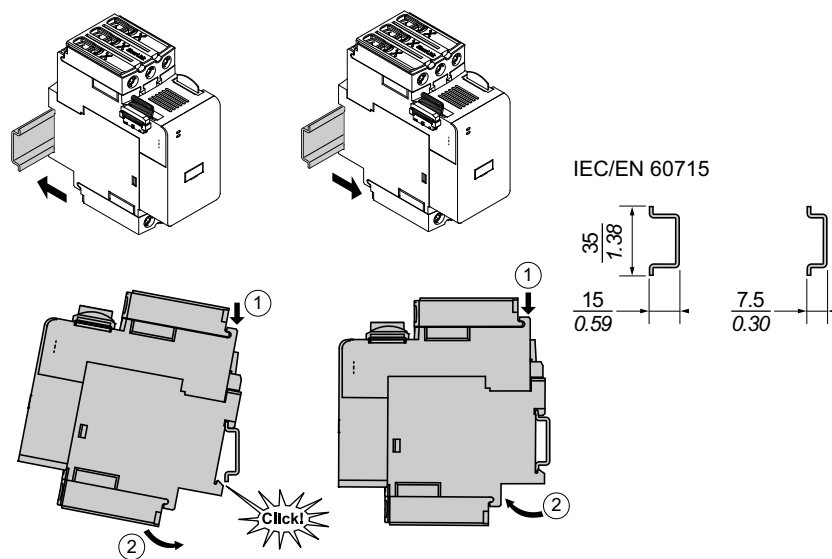
Before installing modules on the island, refer to the island topology to ensure you are installing them in the correct sequence.

To install a power interface module (PIM) on DIN rail, position the top groove of the PIM on the top edge of the DIN rail and press it against the rail until you hear the clip snap into place. See the figures below.

**Figure 25 - Size 1 (TPRPM009) and Size 2 (TPRPM038) Power Interface Modules (mm/in.)**



**Figure 26 - Size 3 Power Interface Module (TPRPM080) (mm/in.)**



## Mounting the I/O and Interface Modules on DIN Rail

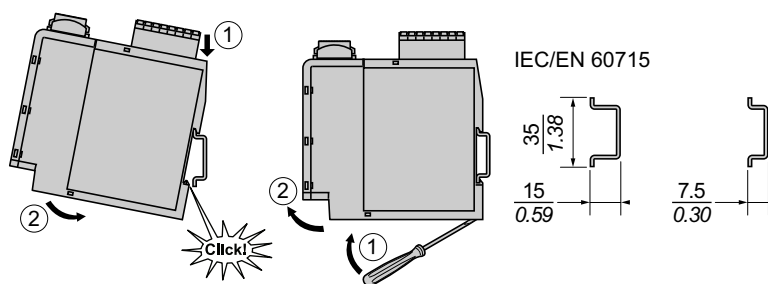
This section covers installation of:

- Digital I/O Modules
- Analog I/O Modules
- SIL Interface Modules (SIM)
- Voltage Interface Modules (VIM)

Before installing modules on the island, refer to the island topology to ensure you are installing them in the correct sequence.

To install a module on DIN rail, position the top groove of the module onto the top edge of the DIN rail and press it against the rail until you hear the clip snap into place. See the figure below.

**Figure 27 - I/O Modules (TPRDG4X2 and TPRAN2X1) and Interface Modules (TPRSM001 and TPRVM001) (mm/in.)**



## Installation Verification

Once you have mounted all TeSys™ island modules on the DIN rail, using the island topology, verify that each module is in the proper location and sequence on the island.

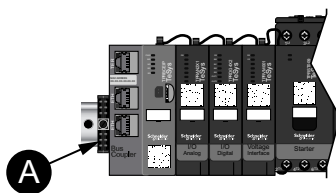
If any modules are incorrectly positioned on the island, remove the modules from the DIN rail and install them in the proper location following the installation procedures.

Once you have verified that the modules are in the correct location, install a type ABB8P35 or equivalent terminal block end clamp (A)

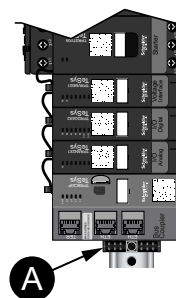
- to the left of the bus coupler and to the right of the last module on the island if you are mounting the TeSys island horizontally, or
- below the bus coupler and above the last module on the island if you are mounting the island vertically.

End clamps help minimize movement and improve the shock and vibration characteristics of the island.

**Figure 28 - End Clamp in Horizontal Orientation**



**Figure 29 - End Clamp in Vertical Orientation**



## Connecting the Flat Cables

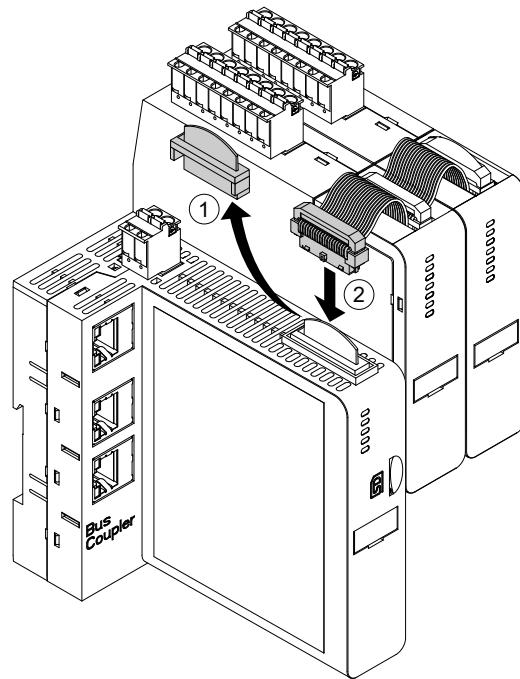
This section describes how to connect the flat cables for all modules on the TeSys™ island.

TeSys™ island modules are connected together with flat cables. The cables are keyed such that they can only be installed one way. If the island is mounted horizontally, the flat cable at the top left corner of a module plugs into a connector located on the top right corner of the left-adjacent module. If the island is mounted vertically, modules connect top to bottom. All modules except the bus coupler include the flat cable connector.

To connect the flat cables:

1. Remove the protective plug from the top right side of the bus coupler.
2. Securely connect to the bus coupler the flat cable from the module mounted directly to the right of the bus coupler.
3. Remove the protective plug from the top right of the module next to the bus coupler and connect the flat cable from the module directly to the right.
4. Connect all flat cables for each module included on the island. Do not remove the protective plug from the last module on the island.

**Figure 30 - Connecting the Flat Cables**



# Wiring

This section contains guidelines and best practices for wiring TeSys™ island.

## Wiring Precautions

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

### **⚠ DANGER**

#### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside this equipment.
- Use only the specified voltage when operating this equipment and any associated products.
- Always use a properly rated voltage sensing device to confirm power is off.
- Use appropriate interlocks where personnel and/or equipment hazards exist.
- Power line circuits must be wired and protected in compliance with local and national regulatory requirements.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices per local and national regulatory requirements.

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

### **⚠ WARNING**

#### **FIRE**

- Use only the specified wiring gauge range with the equipment and comply with the specified wire termination requirements.
- Tighten the power line connections to the specified torque values.

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

### **⚠ WARNING**

#### **UNINTENDED EQUIPMENT OPERATION**

- Use shielded cable for all communication wiring and when specified.
- Always route communication wiring and power wiring separately.

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

## Wiring Guidelines

Use shielded, properly grounded cables for all communication connections. If you do not use shielded cable for these connections, electromagnetic interference can cause signal degradation. Degraded signals can cause the bus coupler or attached modules and equipment to perform in an unintended manner.

Install cable ducts in the enclosure to manage the power and control wiring. In addition, observe the following rules when wiring the TeSys™ island:

- Verify that the operating conditions and environment are within the specified values.
- Use proper wire sizes to meet voltage and current requirements.
- Use copper conductors only.
- Use twisted pair, shielded cables for networks and the fieldbus.
- Separate the communication wiring from the power wiring. Route the communication wiring and power wiring in separate conduit.
- Keep a minimum distance of 30 cm (11.8 in.) between the communication cable and the power and/or control cables.
- Whenever power and communication wiring cross, the cables must cross at right angles.
- Do not over-bend the cables. The standard minimum bending radius is 10 times the cable diameter.
- Avoid routing cable against surfaces with sharp angles.
- Use only shielded I/O cabling for the Analog I/O module. Twisted-pair inner conductors are recommended to reduce stray field coupling. Attach the cable shield foil to the TeSys island DIN rail or panel. Do not make the shield connection by using just the shield drain wire—use a shield clamp to provide a circumferential shield connection. Spring-loaded shield clamps, like Phoenix Contact 3062799, provide a convenient means to make the shield connection to the DIN Rail.

## Electrical Characteristics

**Table 22 - Bus Couplers**

Power supply voltage	Rated power supply voltage: 24 Vdc Operating range: 20.4–28.8 Vdc
Impulse withstand voltage (UI)	0.5 kV; SELV circuit for communication

**Table 23 - Starters and SIL Starters**

Nominal voltage	100–690 <sup>1</sup> Vac (RMS), phase to ground (-15% / +20%)
Impulse withstand voltage (UI)	6 kV

**Table 24 - Power Interface Modules**

Nominal voltage	100–690 Vac (RMS), phase to ground (-15% / +20%)
Impulse withstand voltage (UI)	6 kV; SELV circuit for communication

**Table 25 - Voltage Interface Modules**

Nominal voltage	100–690 Vac (RMS), phase to ground (-15% / +20%)
Impulse withstand voltage (UI)	6 kV; SELV circuit for communication

**Table 26 - SIL Interface Modules**

Impulse withstand voltage (UI)	2 kV; SELV circuit for communication <b>NOTE:</b> The contact is rated for 8 A, AC.
--------------------------------	--

**Table 27 - Digital I/O Modules**

Voltage drop	0.4 V max
Turn on and turn off time	10 ms, maximum
Max leakage current	0.1 mA
Radio interference	FCC Part 15, Class A
Impulse withstand voltage levels	0.5 kV; SELV circuit for communication

**Table 28 - Analog I/O Modules**

Radio interference	FCC Part 15, Class A
Impulse withstand voltage levels	0.5 kV; SELV circuit for communication

1. Maximum 300 V rated operational voltage to earth per table H.1 of IEC 60947-1 (including 400/230 and 480/277 power systems) for TPRST025, TPRSS025, TPRST038, TPRSS038 unless used with appropriate surge protective device limiting the system to OVC II.

## Bus Coupler Wiring

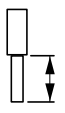



Control power to TeSys™ island is connected through a single removable 2-pin spring terminal connector on the top of the bus coupler. The connector is for 24 V and 0 V connections. To wire the bus coupler:

1. Remove the spring terminal connector from the top of the bus coupler.
2. Referring to the table and figures below, make the power connections.
3. Insert the spring terminal connector back into the top of the bus coupler.
4. Connect the fieldbus Ethernet cables to the dual port Ethernet switch on the bus coupler.

**Figure 31 - Bus Coupler Spring Terminal Connector**

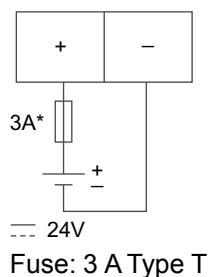


**Figure 32 - Bus Coupler Cabling**

			
10 mm	0.2–2.5 mm <sup>2</sup>	0.2–2.5 mm <sup>2</sup>	0.25–2.5 mm <sup>2</sup>
0.40 in.	AWG 24–14	AWG 24–14	AWG 22–14

The pitch between the pins is 5.08 mm.

**Figure 33 - Bus Coupler Wiring**



The 24 Vdc power supply of the bus coupler must have an SELV rating. Install the power supply in the same panel or cabinet as the TeSys island.

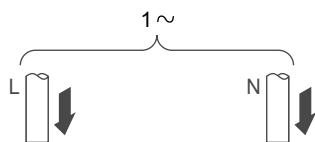
## Power Module Wiring

Power modules include:

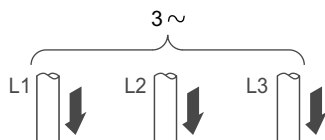
- Standard Starters
- SIL Starters
- Power Interface Modules

The following diagrams illustrate typical power module wiring for single-phase and three-phase motors.

**Figure 34 - Single-Phase Motors**



**Figure 35 - Three-Phase Motors**



To make the power connections, you will need:

- A #2 Phillips-head torque driver and a 6 mm flat-head torque driver for size 1 and 2 power modules (see the table below)
- A 4 mm hexagonal torque key for size 3 power modules

Using the island topology and bill of materials, determine which modules make up the hardware composition for the TeSys™ Avatar. Use the following wiring guidelines and reference the Avatar wiring diagrams to complete the wiring for the power modules.

1. Make the upstream power connections to the short-circuit protection devices.
2. Complete any wiring required between the starters for the Avatar.
3. Make the downstream power connections to the load.


Power devices accept the cable ranges shown in the table below.

**Table 29 - Wiring—Power Devices**

			Size 1 Starter, mm <sup>2</sup> (AWG)	Size 2 Starter, mm <sup>2</sup> (AWG)	Size 1 or 2 Power Interface Module, mm <sup>2</sup> (AWG)	Size 3 Starter plus Power Interface Module, mm <sup>2</sup> (AWG)
			TPRST009 TPRSS009	TPRST025, 038 TPRSS025, 038	TPRPM009, 038	TPRST065, 080 TPRSS065, 080 TPRPM080
<b>Solid cable without cable end</b>	1 conductor		1–4 (16–12)	1.5–10 (16–8)	1.5–10 (16–8)	1–35 (16–2)
	2 conductors		1–4 (16–12)	2.5–10 (14–8)	2.5–10 (14–8)	1–25 (16–4)
<b>Flexible cable without cable end</b>	1 conductor		1.5–4 (16–12)	2.5–10 (14–8)	1.5–10 (16–8)	1–35 (16–2)
	2 conductors		1.5–4 (16–12)	2.5–10 (14–8)	1.5–10 (16–8)	1–25 (16–4)
<b>Stranded cable with cable end</b>	1 conductor		1–4 (16–12)	1–6 (16–10)	1–6 (16–10)	1–35 (16–2)
	2 conductors		1–2.5 (16–14)	1.5–6 (16–10)	1–6 (16–10)	1–25 (16–4)



Table 29 - Wiring—Power Devices (Continued)

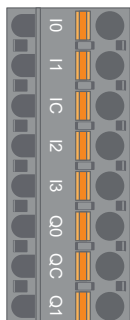
		Size 1 Starter, mm <sup>2</sup> (AWG)	Size 2 Starter, mm <sup>2</sup> (AWG)	Size 1 or 2 Power Interface Module, mm <sup>2</sup> (AWG)	Size 3 Starter plus Power Interface Module, mm <sup>2</sup> (AWG)
		TPRST009 TPRSS009	TPRST025, 038 TPRSS025, 038	TPRPM009, 038	TPRST065, 080 TPRSS065, 080 TPRPM080
Strip length, mm (in.)		8 (0.32)	10 (0.4)	10 (0.4)	16 (0.83)
Torque, N•m (lb-in)		1.7 N•m (15 lb-in)	2.5 N•m (22 lb-in)	2.5 N•m (22 lb-in)	35 mm <sup>2</sup> (2 AWG): 8 N•m (70 lb-in) 1–25 mm <sup>2</sup> (16–4 AWG): 5 N•m (44 lb-in)

## I/O Module Wiring

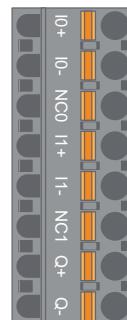
Use the following guidelines and refer to the TeSys™ Avatar wiring diagrams to wire the I/O modules.

1. Remove the spring terminal connector. It is positioned on the top of the module, behind the flat cable connection.
2. Refer to the table and figures below and make the power and control connections. See *Accessories Cabling, page 53* for cable types and sizes.
3. Insert the spring terminal connector back into the top of the module.

**Figure 36 - Digital I/O Module Terminals**



**Figure 37 - Analog I/O Module Terminals**



Pin	Digital I/O Module	Terminal Identification	Analog I/O Module	Terminal Identification
1 (closest to DIN rail)	Input 0	<b>I0</b>	Input 0 +	<b>I0+</b>
2	Input 1	<b>I1</b>	Input 0 –	<b>I0–</b>
3	Input Common	<b>IC</b>	NC 0	<b>NC0</b>
4	Input 2	<b>I2</b>	Input 1+	<b>I1+</b>
5	Input 3	<b>I3</b>	Input 1 –	<b>I1–</b>
6	Output 0	<b>Q0</b>	NC 1	<b>NC1</b>
7	Output Common	<b>QC</b>	Output +	<b>Q+</b>
8 (closest to front face)	Output 1	<b>Q1</b>	Output –	<b>Q–</b>

## Digital I/O Module Specifications

**Table 30 - Digital I/O Module Input Specifications**

Channel	Inputs
Rated power supply	24 Vdc
Input type	Type 1 (IEC/EN/UL/CSA 61131-2)
Rated input voltage	24 Vdc
Cable length, maximum	30 m (98 ft)

**Table 31 - Digital I/O Module Output Specifications**

Channel	Inputs
Rated output voltage	24 Vdc
Rated output current	0.5 A, resistive
Cable length, maximum	30 m (98 ft)

## Analog I/O Module Specifications

**Table 32 - Input / Output Specifications**

Channel	Inputs	Output
Rated power supply	24 Vdc	
Resolution, maximum	16 bits, or 15 bits + sign	12 bits (4096 points)
Cable length, maximum	30 m (98 ft) shielded cable	

**Table 33 - Signal Type: Inputs**

Channel	Inputs			
Signal type	Voltage	Current	Thermocouple	3-wire RTD
Range	0–10 Vdc –10 to +10 Vdc	0–20 mA 4–20 mA	Type K, J, R, S, B, E, T, N, C	PT100, PT1000, NI100, NI1000

**Table 34 - Signal Type: Output**

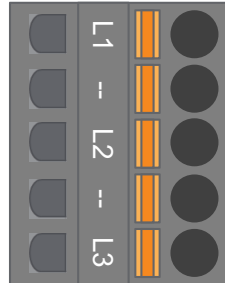
Channel	Output	
Signal type	Voltage	Current
Range	0–10 Vdc –10 to +10 Vdc	0–20 mA 4–20 mA

## Voltage Interface Module Wiring

Use the following guidelines and refer to the TeSys™ Avatar wiring diagrams to wire the voltage interface module (VIM).

The voltage interface module has one connection point through a single, removable spring terminal connector for the mains voltage measurement input. The connector is positioned on the top of the module.

**Figure 38 - VIM Spring Terminal Connector**



**Table 35 - VIM Wiring for Three-Phase Applications**

3-Phase, 5-Pin Connector Pin Number	Terminal Identification	Signal
1	L1	Phase 1 Voltage
3	L2	Phase 2 Voltage
5	L3	Phase 3 Voltage

**Table 36 - VIM Wiring for Single-Phase Applications**

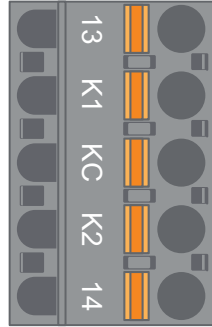
1-Phase, 5-Pin Connector Pin Number	Terminal Identification	Signal
1	L1	Line or Neutral
3	L2	—
5	L3	Neutral or Line

1. Remove the spring terminal connector. It is positioned on the top of the module, behind the flat cable connection.
2. Refer to the table above and make the power connections to the VIM connector. See *Accessories Cabling*, page 53 for cable types and sizes.
3. Insert the spring terminal connector back into the top of the VIM.

## SIL Interface Module Wiring

Using the island topology and bill of materials, determine the location of the SIL interface modules (SIMs) on the island. The SIM is supplied 24 V power and also connects to an external SIL rated device using a spring terminal connector provided with the SIM. Use the following guidelines to complete the 24 V power wiring between the SIL interface modules and the external SIL rated device.

**Figure 39 - SIM Terminal Block**



**Table 37 - SIM Terminal Block Pinout**

Pin Number	Terminal Identification	Signal
1	13	MIRROR IN
2	K1	SIL-IN 1
3	KC	SIL COMMON
4	K2	SIL-IN 2
5	14	MIRROR OUT

**NOTE:** There may be multiple SIMs on the island. Ensure that you connect the correct set of wires from the external SIL rated device to the correct SIM module. See the *Functional Safety Guide*, 85361B1904, for more information.

1. Remove the spring terminal connector. It is positioned on the top of the module, behind the flat cable connection.
2. Using the SIM wiring table, connect 24 V to both K1 and K2 on the removable spring terminal connector, regardless of the functional safety architecture. In wiring category 1 and 2 applications, terminals K1 and K2 must be shorted together. See *Accessories Cabling*, page 53 for cable types and sizes.
3. Insert the spring terminal connector back into the top of the SIM.

## Accessories Cabling

**Figure 40 - Cabling for SIM, VIM, DIOM, and AIOM**

TPRSM001 TPRVM001 TPRDG4X2 TPRAN2X1				
	10 mm	0.2–2.5 mm <sup>2</sup>	0.2–2.5 mm <sup>2</sup>	0.25–2.5 mm <sup>2</sup>
	0.40 in.	AWG 24–14	AWG 24–14	AWG 22–14

The pitch between the pins is 5.08 mm except for TPRVM001, which is 7.62 mm.

# Installation Setup

This section provides an overview for setting up TeSys™ island in preparation for commissioning with the PLC.

## Introduction

Setup must be performed after the physical installation of the island and all other hardware devices and verification of the island topology. The following table summarizes the setup steps. The person performing the setup must be familiar with the TeSys™ island modules and Avatars.

**Table 38 - Setting up TeSys™ island**

Step	Action
1	Power up the island.
2	Connect to the island with the Operation and Maintenance Tool (OMT).
3	Set the island IPv4 address.
4	Verify the system installation in Test mode.
5	Import the project file to the TeSys island DTM.
6	Configure the island parameters.
7	Connect to the island with SoMove™ software.
8	Load the project file to the island.
9	Verify the island configuration.
10	Verify the system wiring.
11	Apply mains power.
12	Use Force mode to simulate commands from the PLC.

## Configuration Tools

TeSys™ island can be set up using the Operation and Maintenance Tool (OMT) and the latest TeSys island DTM.

The initial project file for the island can be generated using the TeSys island Configurator tool. This project file must be imported into the TeSys island DTM. It includes the island topology and the TeSys™ Avatars selected for the island. If the project file has not yet been created, SoMove™ software can be used to create the island project file in offline mode.

Once the configuration of the island and parameter selection is complete, SoMove software can be used to load the project file onto the bus coupler, which manages the settings of the entire island.

Once the island has been initialized, using the digital tools you can enter Test mode to verify that the power devices are functioning properly before applying the mains power supply and using Force mode to test the Avatar logic.

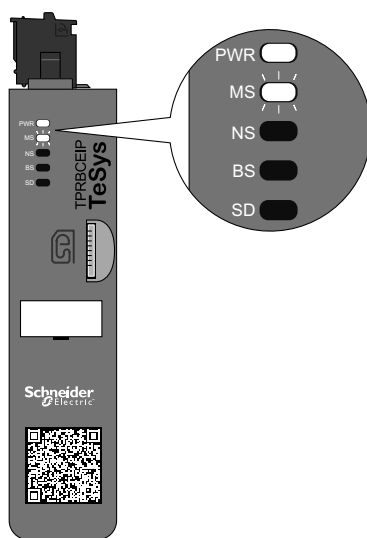
## Powering Up the Island

To power up TeSys™ island, perform the steps in the following table.

**Table 39 - Powering Up the Island**

Step	Action
1	Energize the bus coupler with 24 Vdc. The island will enter a pre-operational stage once it has completed booting.
2	Check the visual indicators on the bus coupler. See <i>Bus Coupler LEDs</i> , page 55 <ul style="list-style-type: none"> <li>The PWR LED, which indicates power supply and system status, should be steady green.</li> <li>The MS LED, which indicates bus coupler status, should be flashing green, indicating that the island has not yet been configured.</li> </ul>

**Figure 41 - Bus Coupler LEDs**



## Connecting with the OMT

Use this procedure to connect to TeSys™ island with the Operation and Maintenance Tool (OMT) after the island has been physically installed and powered up. The OMT will connect directly to the bus coupler using the default IPv6 address.

To perform this procedure, the island must be on the network and able to communicate with the OMT using a wireless or wired connection on a standard Windows® operating system.

**Table 40 - Connecting to the TeSys island with the OMT**

Step	Action
1	Verify that your PC is connected to the same network as the bus coupler through a wireless or wired connection.
2	Access the Network tab on your PC.
3	Under Other Devices, the TeSys island will appear as "TeSysisland_FFFF."
4	Right click on "TeSysisland_FFFF" and select Properties. The properties for the island will be displayed.
5	Click the Device web page link. This is the IPv6 IP address of the bus coupler. The OMT will launch in your default browser.

**Table 40 - Connecting to the TeSys island with the OMT (Continued)**

Step	Action
6	Login with the default username and password (admin, schneider18) and click Login.
7	The Change Password window will open. Set a secure password and record it before continuing. If you forget your password, a factory reset will be required to regain access to the OMT. You are now logged into the OMT and connected to the island.

## Setting the Island IPv4 Address

Use this procedure to set the IPv4 IP address and gateway information on the island after you have connected to the bus coupler and accessed the OMT using the default IPv6 IP address.

**NOTE:** You will not lose connection to the OMT while assigning the IPv4 IP address with the IPv6 IP address connection. The default IPv6 IP address and the assigned IPv4 IP address are both accessible after this procedure is complete.

**Table 41 - Setting the Island IPv4 Address**

Step	Action
1	Click the SETTINGS icon.
2	Click the System Avatar.
3	Click FIELDBUS SETTINGS.
4	Enter the IP Address, Subnet, and Gateway of the bus coupler.
5	Enter the Network Name for the bus coupler.
6	Click Save.
7	Click the CONTROL PANEL icon.
8	Click Restart System. A WARNING message is displayed, indicating that the restart function performs a detected fault reset and restarts the island.
9	Click Ok to restart the system. The island will restart, the IP address and network will take effect after the restart completes.

## Verifying the System Installation in Test Mode

⚠ WARNING
UNINTENDED EQUIPMENT OPERATION
<ul style="list-style-type: none"> <li>• Before using the Test mode, ensure that energizing loads will not result in unsafe conditions.</li> </ul>
Failure to follow these instructions can result in death, serious injury, or equipment damage.

During the pre-operational and operational states you can enter and exit Test mode.

Test Mode allows direct control of the power modules and digital I/O modules using the Operation and Maintenance Tool (OMT). In Test mode, the only TeSys™ Avatar that is activated is the system Avatar. Once you enter Test mode, you must manually exit Test mode to return the island to the pre-operational state. See *Exiting Test Mode, page 57*.



**Table 42 - Verifying the System Installation in Test Mode**

Step	Action
1	Click the Close or Open command under Test Command.
2	Click OK in the WARNING message pop-up window to execute the test command. This will close or open the contactor or input on the device.
3	Click any device in the island topology to perform a test command.
4	After you test all devices, exit Test mode as described in the following table.

**Table 43 - Exiting Test Mode**

Step	Action
1	Click the Diagnostics panel.
2	Click the Exit Test mode button. A WARNING message pop-up window will appear.
3	Click OK in the pop-up window to confirm that you want to exit Test mode. The status banner at the top will indicate that the system is no longer in Test mode.

## Importing the Project File to the DTM

This section describes how to import the project file generated with the TeSys™ island Configurator tool into the TeSys island DTM.

**NOTE:** SoMove™ software and the TeSys island DTM are available as downloads from [www.schneider-electric.com](http://www.schneider-electric.com).

Open SoMove™ software then perform the steps in the following tables.

**Table 44 - In the Start screen**

Step	Action
1	Under <b>Project</b> , click <b>create a Project OFF-line</b> .
2	In the <b>Select a Device</b> screen, click <b>TeSys island</b> and then click <b>Create</b> .

**Table 45 - In the TeSys island DTM**

Step	Action
1	Click <b>Device</b> at the top of the screen and select <b>Import -&gt; Import Pre-Sales Format</b> from the drop down menu.
2	A pop-up window will appear. Click <b>Yes</b> to continue.

**Table 46 - In the Open File screen**

Step	Action
1	Locate the .XML file that you want to import.
2	Click on the file that you want to import. The name of the file will now be displayed in the <b>File Name</b> field.
3	Click the <b>Open</b> button. The island configuration has now been imported into the TeSys island DTM.

**Table 47 - In the TeSys island DTM**

Step	Action
1	Click <b>File -&gt; Save As</b> and enter the name of the island in the <b>File Name</b> field..
2	Click the <b>Save</b> button.

Result: The initial *.xml* configuration file is now converted to a new *.psx* SoMove project file.

## Configuring the Island Parameters

Settings are configurable for the system, load, and device Avatars to enable energy monitoring and to customize the Avatar settings. Refer to TeSys™ island DTM online help for assistance in selecting the settings. Press F1 while in the tool for help.

### System Avatar Settings

Configure the system Avatar settings for the Fieldbus and Ethernet services settings.

**Table 48 - System Avatar Settings**

Step	Action
1	Click on the <b>SETTINGS</b> tab in the DTM tool.
2	Under <b>AVATARS</b> , click the System Avatar.
3	Configure the system Avatar settings for the Fieldbus and Ethernet services settings.
4	Click <b>OK</b> to confirm the settings. Save the project.

### Energy Monitoring

Enable energy monitoring for each TeSys™ Avatar (except the system and device Avatars) as shown in the following table.

**Table 49 - Enable Energy Monitoring**

Step	Action
1	Click on <b>MY AVATAR</b> .
2	Click on each Avatar where energy monitoring will be used.
3	In <b>AVATAR PARAMETERS</b> , change the setting in <b>LOAD ENERGY MONITORING</b> from <b>No</b> to <b>Yes</b> .
4	Click <b>OK</b> to save the changes.

### Avatar Settings

<b>⚠ WARNING</b>
<p><b>UNINTENDED EQUIPMENT OPERATION</b></p> <ul style="list-style-type: none"> <li>• Be sure to set the protection function parameters according to the required protection level of the controlled motors and loads.</li> <li>• TeSys™ GV2 motor circuit breakers should not be used with TeSys island for loads with trip classes set above trip class 15.</li> </ul> <p><b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b></p>

Configure the protection functions for each TeSys™ Avatar. Protection functions vary based on the Avatar selected.

**Table 50 - Avatar Settings**

Step	Action
1	Click on the <b>SETTINGS</b> tab in the DTM tool.
2	Under <b>AVATARS</b> , click the Avatar to be configured.
3	Configure the protection functions for each Avatar.
4	Click <b>OK</b> to confirm the settings. Save the project.

## Connecting to TeSys™ island with SoMove™ Software

Perform the steps in the following table the first time you connect to TeSys island with a PC running SoMove software and the TeSys island DTM. SoMove software is a Microsoft® Windows®-based application using open FDT/DTM technology. SoMove contains DTMs for different devices. The TeSys island DTM enables the configuration, monitoring, control, and customization of TeSys island functions.

**NOTE:** Ensure that you always use the latest version of TeSys island DTM.

**Table 51 - Connect to the Island with SoMove Software**

Step	Action
1	Check the LED indicators on the bus coupler and verify that power is applied. Verify that the <b>PWR LED</b> , indicating the power supply and system status, is steady green and the <b>MS LED</b> , indicating bus coupler status, is flashing green.
2	Connect a PC, with SoMove software and the TeSys island DTM installed, to the service port on the bus coupler using an RJ45 cable.
3	Launch the SoMove software on the PC.
4	Click the <b>Connect</b> button in the Start screen to establish communication.

## Loading the Project File to the Island

SoMove™ software with TeSys™ island DTM allows you to import a project file created with the Motor Control Configuration tool. Or you can use SoMove software to build a new island and generate the project file without being connected to the island.

After you have created the project file and powered up the island, you can connect the PC running SoMove software to the service port on the bus coupler, or you can connect a Wifer to the service port and communicate using Wi-Fi. The TeSys island DTM has a built-in scan mechanism that discovers the available islands on the network. Once the scan is complete, you can use the Locate command in the tool to trigger a visual LED indicator on the bus coupler of the correct island. Once you are connected to the island, use SoMove software to load the project file for the island to the bus coupler.

Perform the steps in the table below to load the project file.

**Table 52 - Load the Project File to the Island**

Step	Action
1	Launch SoMove software.
2	Connect to the island.
3	Click <b>Store to Device</b> .
4	Select the project file that you wish to load to the bus coupler from the PC.

## Verifying the Island Configuration

Verify that all hardware is operating correctly and that all settings for the island, including the trip and protection notifications, have been configured.

**Table 53 - Verify the Island Configuration**

Step	Action
1	Visually inspect the bus coupler LEDs.
2	Visually inspect the power module LEDs.
3	Visually inspect the I/O and accessory module LEDs.
4	In SoMove™ software, verify that the configuration settings for the TeSys™ Avatar match the intended settings.

## Verifying the System Wiring

After all required and optional parameters have been configured and you have tested the functionality of the power devices, check the system wiring, which can include:

- Power wiring (see the table below)
- Bus coupler connections (see the table below)
- I/O wiring
- SIL interface module wiring
- Voltage interface module wiring

Perform the steps in the following table to verify the power wiring.

**Table 54 - Verify the Power Wiring**

Step	Action
1	Visually confirm that the actual power wiring matches the intended power wiring, as described in the power wiring diagram.
2	Look for any detected trips or notifications in the OMT or DTM.

**Table 55 - Verify the Bus Coupler Connections**

Step	Action
1	Verify that the Fieldbus connections are in place.
2	Verify that the 24 V control power connection is securely in place.
3	Verify that the flat cables from the bus coupler to all modules are securely in place

## Apply Mains Power

### **⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Use only the specified voltage when operating this equipment and any associated products.

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

**Table 56 - Apply Mains Power**

Step	Action
1	Read and understand all instructions in <i>Precautions</i> , page 9.
2	Apply mains power.

## Force Mode

<b>⚠ WARNING</b>
<p><b>UNINTENDED EQUIPMENT OPERATION</b></p> <ul style="list-style-type: none"> <li>Before using Force mode, ensure that forcing parameters or energizing loads will not result in unsafe conditions.</li> </ul> <p><b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b></p>

**NOTE:** Once Force mode is activated, commands from the digital tools take priority over commands from the PLC until you exit Force mode.

Once the island is in the operational state, Force mode can be activated and deactivated using the OMT or TeSys island DTM.

### Using Force Mode to Simulate Commands from the PLC

Force mode allows you to test the logic of any TeSys™ Avatar by simulating receipt of commands from the PLC.

**Table 57 - Simulating a PLC Command with Force Mode**

Step	Action
1	Access Force mode: <ul style="list-style-type: none"> <li>To access Force mode using the OMT, navigate to the <b>Avatar View</b> panel and select an Avatar. Click <b>I/O View</b>. The logic diagram for the selected Avatar is displayed.</li> <li>To access Force mode using the TeSys™ island DTM, click the <b>Diagnostics</b> tab and select an Avatar from <b>Avatars</b>. Click <b>Status</b>. The logic diagram for the Avatar is displayed.</li> </ul>
2	To simulate receipt of a PLC command: <ul style="list-style-type: none"> <li>To simulate an Open command from the PLC, click <b>Force 0</b>.</li> <li>To simulate a Close command from the PLC, click <b>Force 1</b>.</li> </ul>
3	When finished, exit Force mode. See <i>Exiting Force Mode</i> , page 62.

### Using Force Mode to Simulate Status Updates to the PLC

Force mode also allows you to simulate transmission of Avatar status updates from the island to the PLC.

**Table 58 - Simulating Avatar Status Updates from the Island to the PLC**

Step	Action
1	Access Force mode from the OMT or TeSys island DTM as described in <i>Simulating a PLC Command with Force Mode</i> , page 61.
2	To simulate Avatar status: <ul style="list-style-type: none"> <li>Click <b>Force 0</b> to simulate transmission of contactor Closed status to the PLC.</li> <li>Click <b>Force 1</b> to simulate transmission of contactor Open status to the PLC.</li> </ul>
3	When finished, exit Force mode. See <i>Exiting Force Mode</i> , page 62.

### Using Force Mode to Simulate Status Changes of the Digital I/O Module Inputs and Outputs

Force mode also allows you to simulate status changes of the digital I/O module inputs and outputs. When force mode has not been applied, the status box is gray and shows Not Applied.

**Table 59 - Status Box**

Force Command	Input From PLC	Status To PLC
Force 0	Off	Off
Force 1	On	On

**Table 60 - Simulating Status Changes of the Digital I/O Module Inputs and Outputs**

Step	Action
1	Access Force mode from the OMT or TeSys island DTM as described in <i>Simulating a PLC Command with Force Mode, page 61</i> .
2	To simulate I/O status, under <b>From PLC</b> : <ul style="list-style-type: none"> <li>• Click <b>Force 0</b> to turn Off the digital output.</li> <li>• Click <b>Force 1</b> to Close the digital output status.</li> </ul> Under <b>To PLC</b> : <ul style="list-style-type: none"> <li>• Click <b>Force 0</b> to Close the digital input status.</li> <li>• Click <b>Force 1</b> to Open the digital input status.</li> </ul>

**Exiting Force Mode**

To exit Force mode, perform the steps in the following table:

**Table 61 - Exiting Force Mode**

Step	Action
1	To exit Force mode using the TeSys island DTM, in the <b>Diagnostics</b> tab, click <b>Exit</b> next to <b>Force Mode</b> , and then confirm you wish to exit.
2	To exit Force mode from the OMT: Click the <b>Diagnostics</b> panel. Click the <b>Exit force mode</b> button. A hazard message pop-up window appears. Click <b>Yes</b> to confirm that you want to exit Force mode. The status banner at the top indicates that the system is no longer in Force mode.

## Disconnect Mains Power

**Table 62 - Disconnect Mains Power**

Step	Action
1	Read and understand all instructions in <i>Precautions, page 9</i> .
2	Disconnect mains power. TeSys™ island is now ready to be integrated into the machine programming environment.

# Appendix

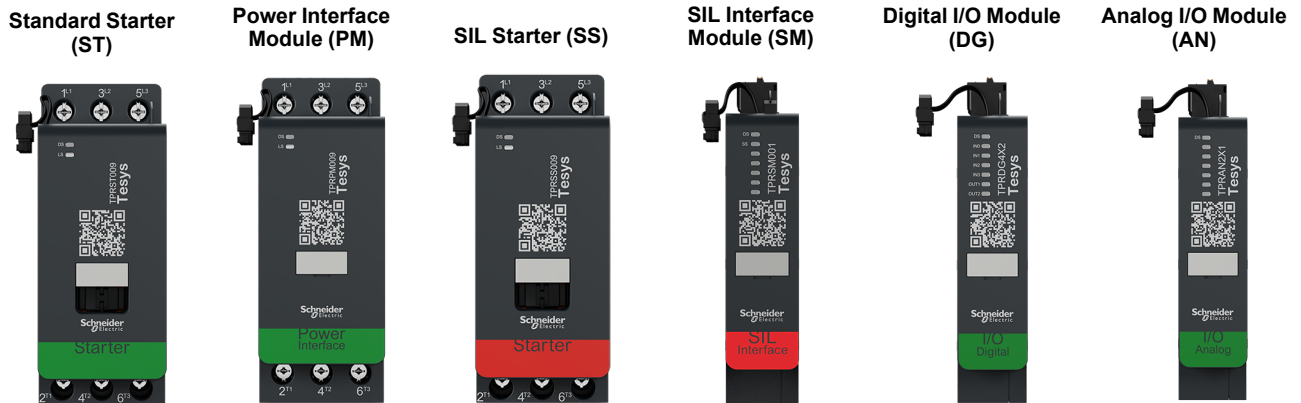
## **▲ WARNING**

### **UNINTENDED EQUIPMENT OPERATION**

- For complete instructions about functional safety, refer to the *TeSys island Functional Safety Guide*, 8536IB1904.

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

# Avatar Composition



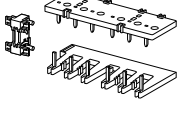
**Table 63 - Avatar Modules**

TeSys™ Avatar	Module 1	Module 2	Module 3	Module 4	Module 5	Optional
Switch	ST					
Switch - Safe Stop, W. Cat 1/2 <sup>2</sup>	SS	SM				
Digital I/O	DG					
Analog I/O	AN					
Power Interface without I/O (Measure)	PM					AN
Power Interface with I/O (Control)	DG	PM				AN
Motor One Direction	ST					AN
Motor One Direction - Safe Stop, W. Cat 1/2 <sup>2</sup>	SS	SM				AN
Motor Two Directions	ST	ST				AN
Motor Two Directions - Safe Stop, W. Cat 1/2 <sup>2</sup>	SS	SS	SM			AN
Motor Y/D One Direction	ST	ST	ST			AN
Motor Y/D Two Directions	ST	ST	ST	ST		AN
Motor Two Speeds	ST	ST				AN
Motor Two Speeds - Safe Stop, W. Cat 1/2 <sup>2</sup>	SS	SS	SM			AN
Motor Two Speeds Two Directions	ST	ST	ST	ST		AN
Motor Two Speeds Two Directions - Safe Stop, W. Cat 1/2 <sup>2</sup>	ST	ST	SS	SS	SM	AN
Resistor	ST					
Power Supply	ST					
Transformer	ST					

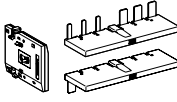
2. Safe Stop according to EN 61800-5-2.



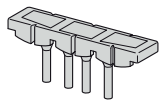

**Table 64 - LAD9R1 Assembly Kit for 9–38 A (Size 1 and 2) Starters**

LAD9R1 Assembly Kit	For Use with Avatars:	Kit Components	Description
	Motor Two Directions	LAD9V5	Parallel link between two starters
	Motor Two Directions - Safe Stop, W. Cat 1/2 <sup>3</sup>	LAD9V6	Reversing link between two starters
	Motor Y/D One Direction	LAD9V2	Mechanical interlock with assembly staple
	Motor Two Speeds Two Directions		

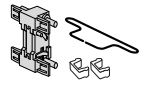
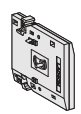
**Table 65 - LAD9R3 Assembly Kit for 40–65 A (Size 3) Starters**

LAD9R3 Assembly Kit	For Use with Avatars:	Kit Components	Description
	Motor Two Directions	LA9D65A6	Parallel link between two starters
	Motor Two Directions - Safe Stop, W. Cat 1/2 <sup>3</sup>	LA9D65A9	Reversing link between two starters
	Motor Y/D One Direction	LAD4CM	Mechanical interlock
	Motor Two Speeds Two Directions		

**Table 66 - Shorting Blocks for Y/D Avatars**

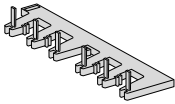
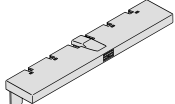
Shorting Blocks	For Use with Avatars:	Reference Number	Description
	Motor Y/D One Direction Motor Y/D Two Directions	LAD9P3	Shorting block / 3P parallel link for 9–38 A (size 1 and 2) starters Used for linking 3 poles of a contactor in a wye-delta (Y/D) starter
	Motor Y/D One Direction Motor Y/D Two Directions	LAD9SD3S	Shorting block / 3P parallel link for 40–65 A (size 3) starters and hazard label Used for linking 3 poles of a contactor in a wye-delta (Y/D) starter

**Table 67 - Mechanical Interlocks**

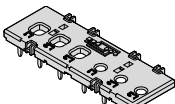
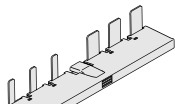
Mechanical Interlocks	For Use with Avatars:	Reference Number	Description
	Motor Y/D One Direction	LAD9V2	Mechanical interlock for 9–38 A (size 1 and 2) starters
	Motor Y/D Two Directions		
	Motor Two Speeds		
	Motor Two Speeds - Safe Stop, W. Cat 1/2 <sup>3</sup>		
	Motor Two Speeds Two Directions		
	Motor Y/D One Direction	LAD4CM	Mechanical interlock for 40–65 A (size 3) starters
	Motor Y/D Two Directions		
	Motor Two Speeds		
	Motor Two Speeds - Safe Stop, W. Cat 1/2 <sup>3</sup>		
	Motor Two Speeds Two Directions		

3. Safe Stop according to EN 61800-5-2.

**Table 68 - Reversing Links**

Reversing Links	For Use with Avatars:	Reference Number	Description
	Motor Y/D One Direction Motor Y/D Two Directions	LAD9V6	Reversing link for 9–38 A (size 1 and 2) starters
	Motor Y/D One Direction Motor Y/D Two Directions	LA9D65A9	Reversing link for 40–65 A (size 3) starters

**Table 69 - Parallel Links**

Parallel Links	For Use with Avatars:	Reference Number	Description
	Motor Two Speeds Motor Two Speeds - Safe Stop, W. Cat 1/2 <sup>4</sup> Motor Two Speeds Two Directions	LAD9V5	Parallel link for 9–38 A (size 1 and 2) starters
	Motor Two Speeds Motor Two Speeds - Safe Stop, W. Cat 1/2 <sup>4</sup> Motor Two Speeds Two Directions	LA9D65A6	Parallel link for 40–65 A (size 3) starters

4. Safe Stop according to EN 61800-5-2.

# Avatar Wiring Schematics and Accessory Diagrams

## Bus Coupler with I/O Modules and Voltage Interface Modules

Figure 42 - Wiring

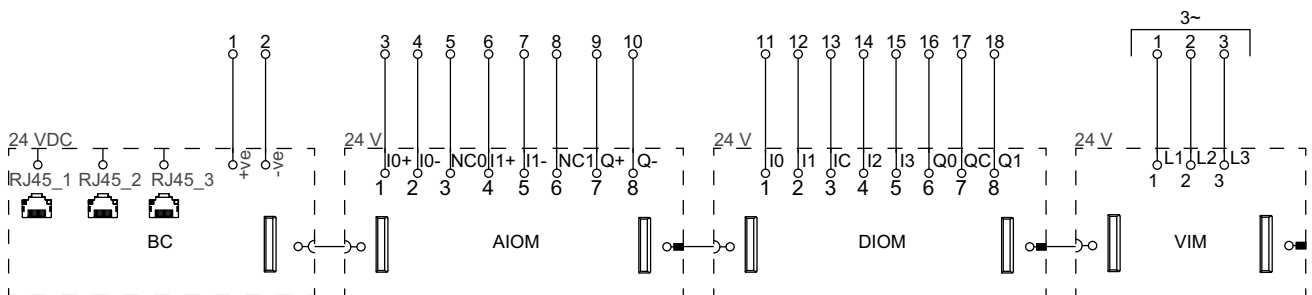
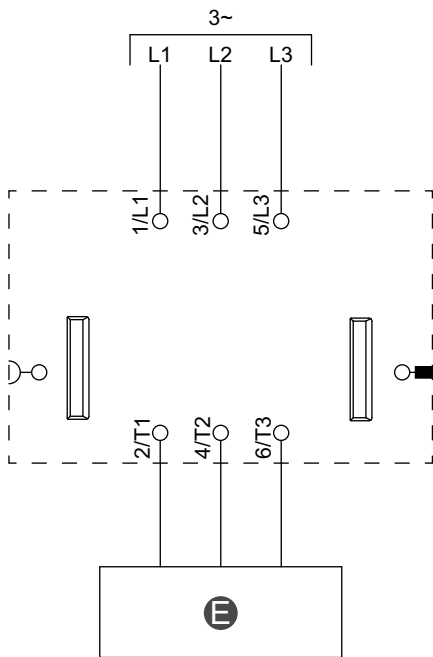


Table 70 - Legend

<b>BC</b>	Bus Coupler
<b>AIOM</b>	Analog I/O Module
<b>DIOM</b>	Digital I/O Module
<b>VIM</b>	Voltage Interface Module

## Switch

**Figure 43 - Wiring**



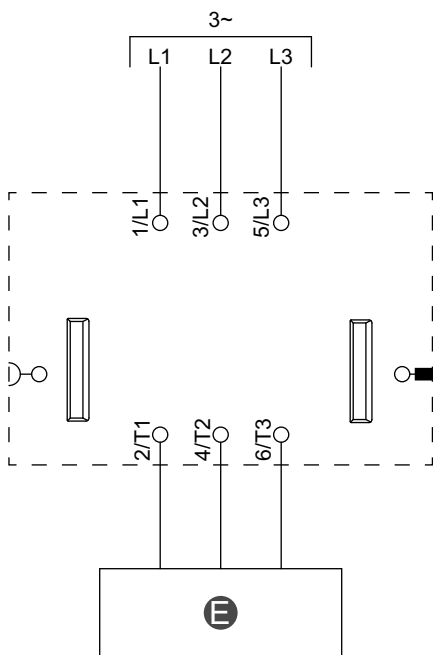
**Table 71 - Legend**

<b>E</b>	Electrical circuit
----------	--------------------

## Switch - Safe Stop, W. Cat 1/2

**NOTE:** Safe Stop according to EN 61800-5-2.

**Figure 44 - Wiring**

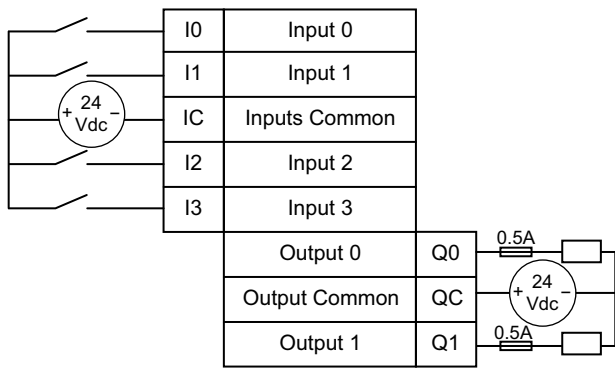


**Table 72 - Legend**

<b>E</b>	Electrical circuit
----------	--------------------

## Digital I/O

Figure 45 - Wiring



## Analog I/O

Figure 46 - Current/Voltage Analog Device Input

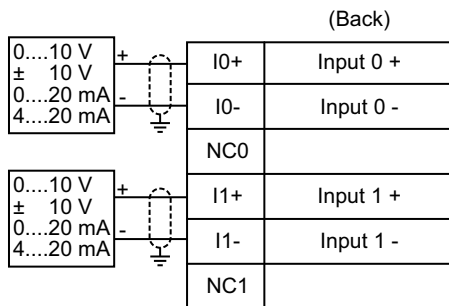


Figure 47 - Thermocouples

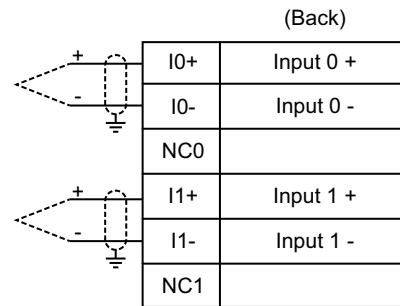


Figure 48 - Resistance Temperature Detector

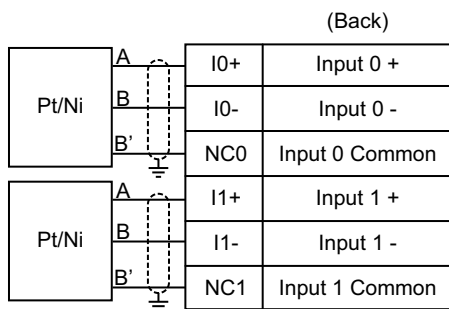
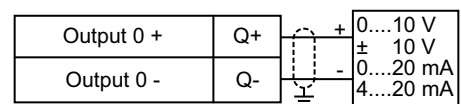


Figure 49 - Current/Voltage Analog Device Output



### Power Interface without I/O (Measure)

Figure 50 - Wiring

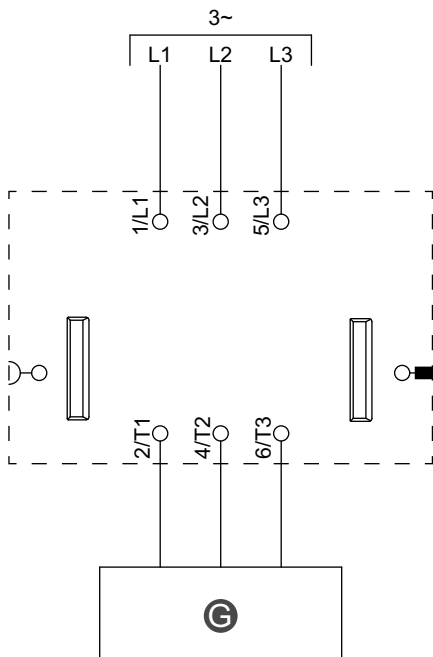


Table 73 - Legend

<b>G</b>	Relay, soft starter, or variable speed drive
----------	--

### Power Interface with I/O (Control)

Figure 51 - Wiring

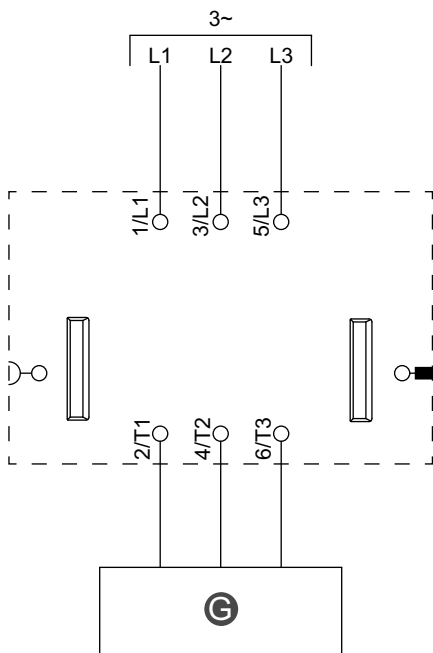
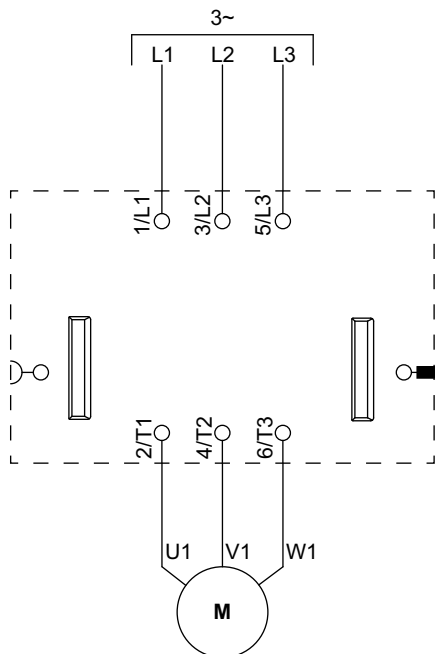


Table 74 - Legend

<b>G</b>	Relay, soft starter, or variable speed drive
----------	--

## Motor One Direction

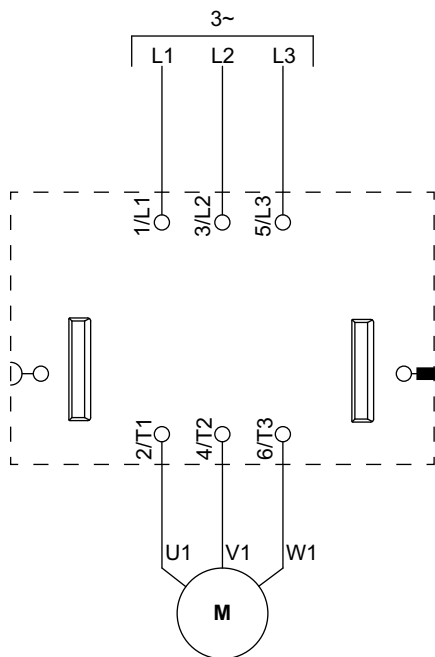
Figure 52 - Wiring



## Motor One Direction - Safe Stop, W. Cat 1/2

**NOTE:** Safe Stop according to EN 61800-5-2.

Figure 53 - Wiring



## Motor Two Directions

Figure 54 - Wiring (See Legend Table below.)

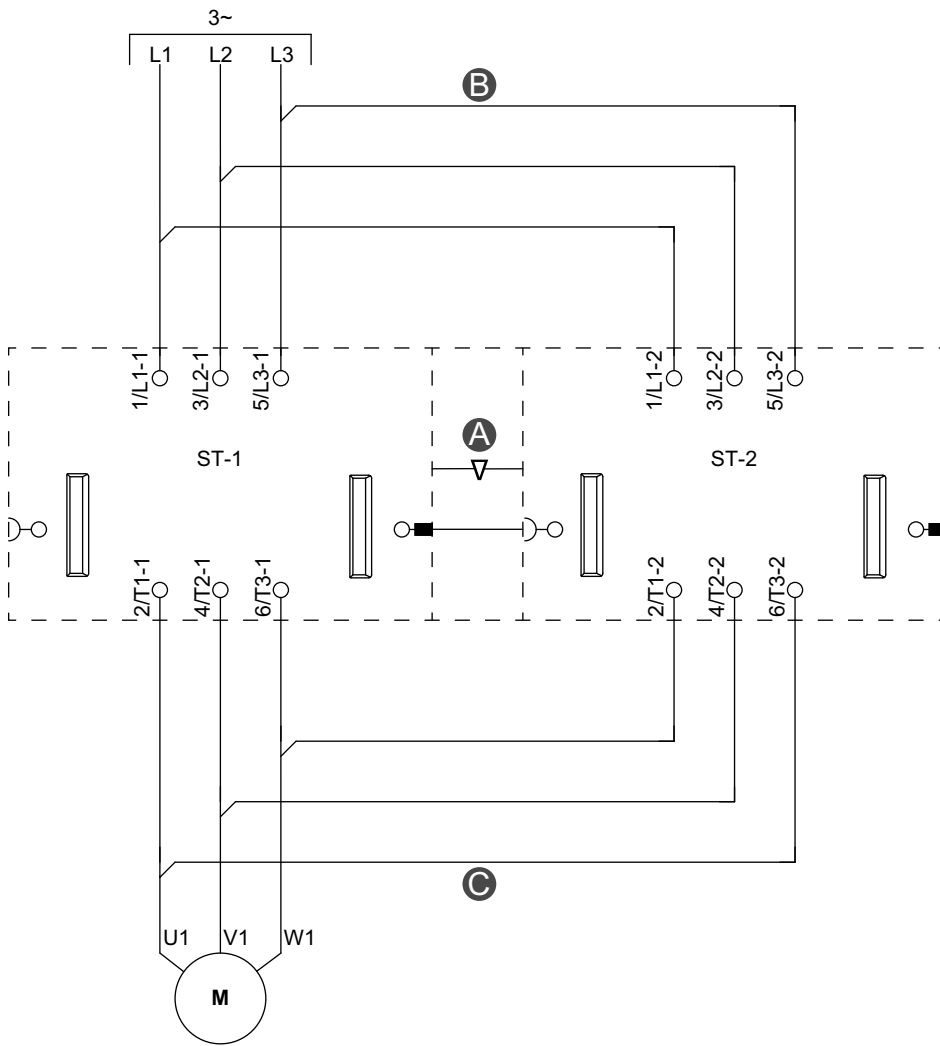


Figure 55 - Accessories

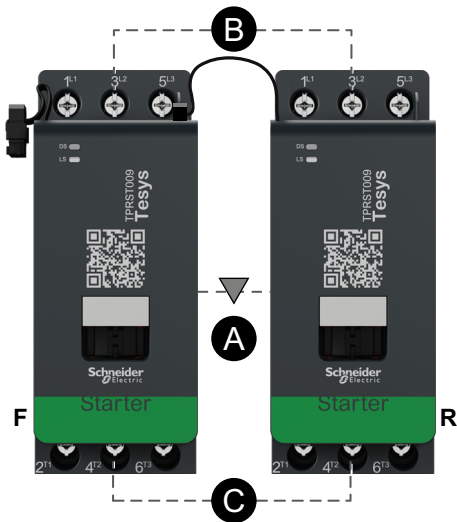


Table 75 - Legend

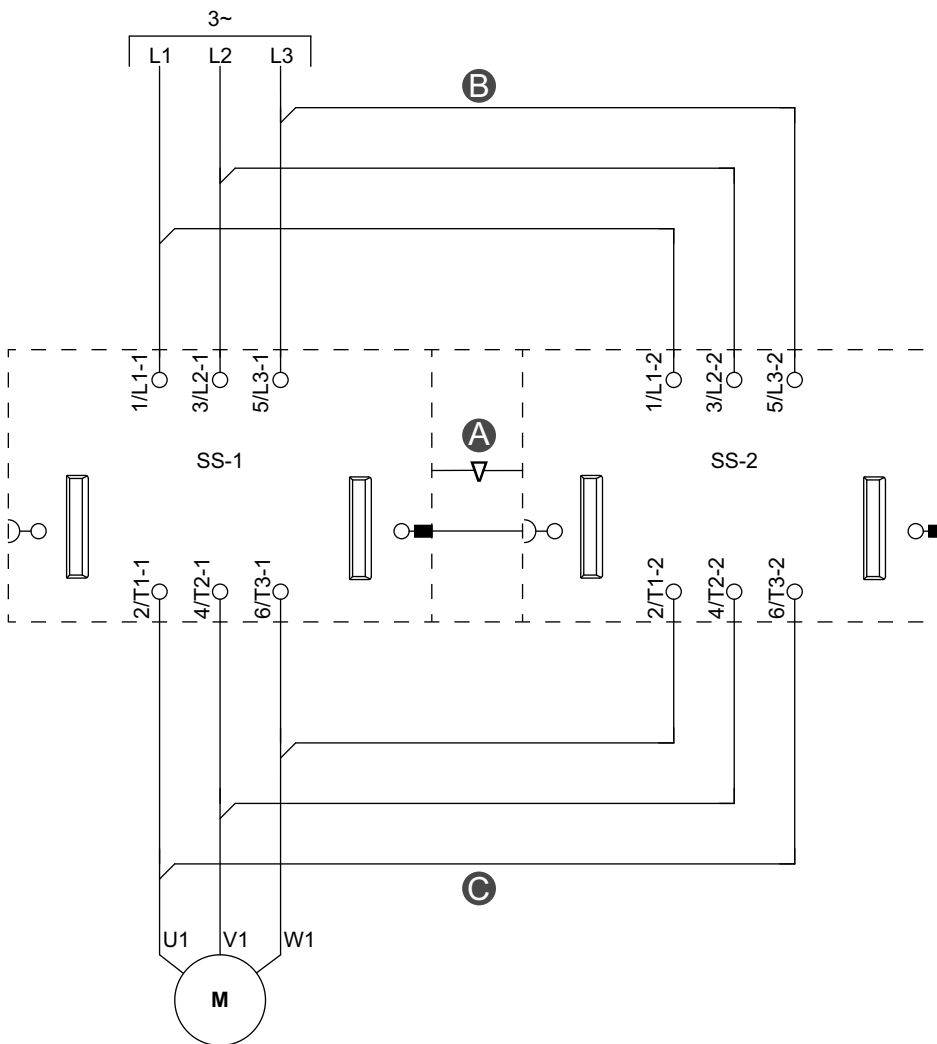
<b>A</b>	Mechanical interlock
<b>B</b>	Parallel link
<b>C</b>	Reversing link
<b>F</b>	Forward starter
<b>R</b>	Reverse starter
<b>ST-1</b>	Starter 1
<b>ST-2</b>	Starter 2



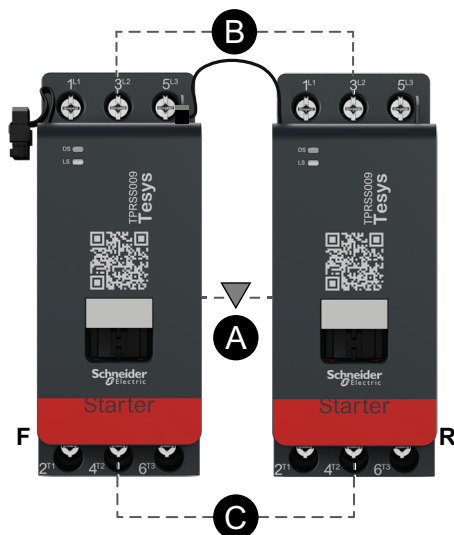
## Motor Two Directions - Safe Stop, W. Cat 1/2

**NOTE:** Safe Stop according to EN 61800-5-2.

**Figure 56 - Wiring (See Legend Table below.)**



**Figure 57 - Accessories**



**Table 76 - Legend**

<b>A</b>	Mechanical interlock
<b>B</b>	Parallel link
<b>C</b>	Reversing link
<b>F</b>	Forward
<b>R</b>	Reverse
<b>SS-1</b>	SIL starter 1
<b>SS-1</b>	SIL starter 2

### Motor Y/D One Direction

Figure 58 - Wiring (See Legend Table below.)

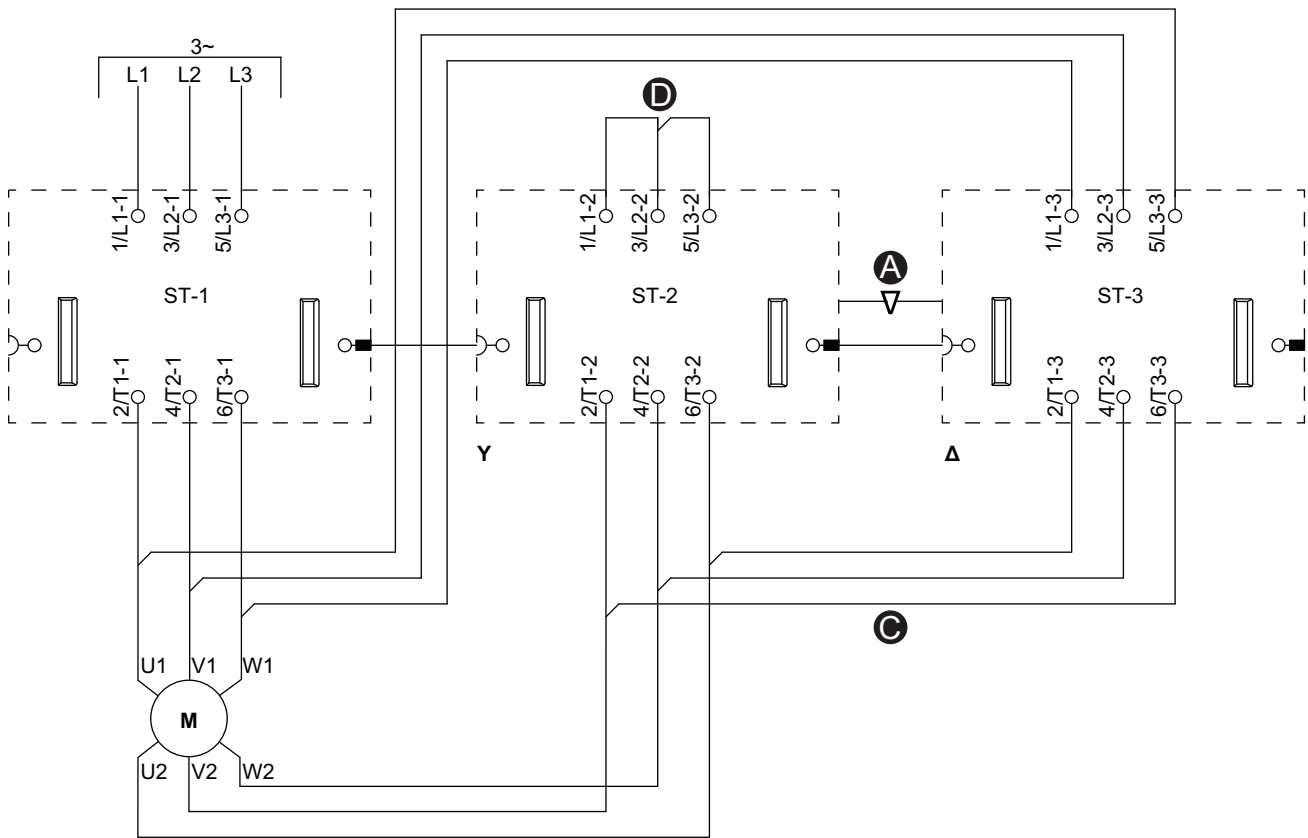


Figure 59 - Accessories

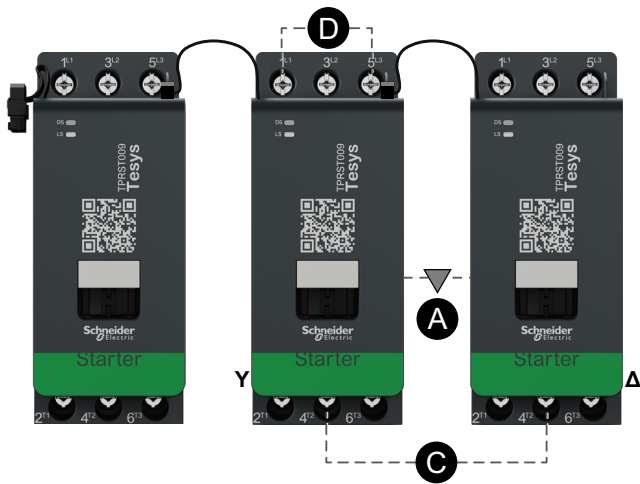


Table 77 - Legend

<b>A</b>	Mechanical interlock
<b>C</b>	Reversing link
<b>D</b>	Shorting block
<b>Y</b>	Wye
<b>Δ</b>	Delta
<b>ST-1</b>	Starter 1
<b>ST-2</b>	Starter 2
<b>ST-3</b>	Starter 3

### Motor Y/D Two Directions

Figure 60 - Wiring (See Legend Table below.)

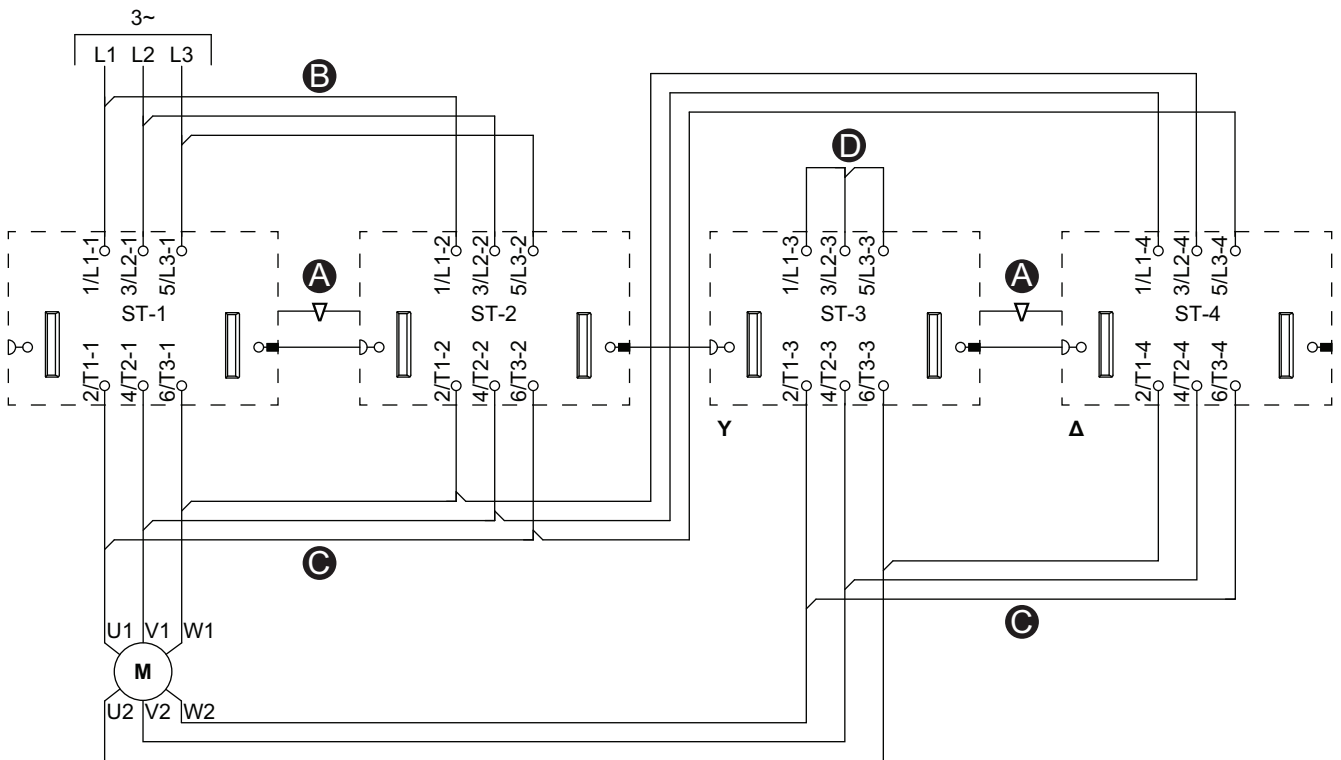


Figure 61 - Accessories

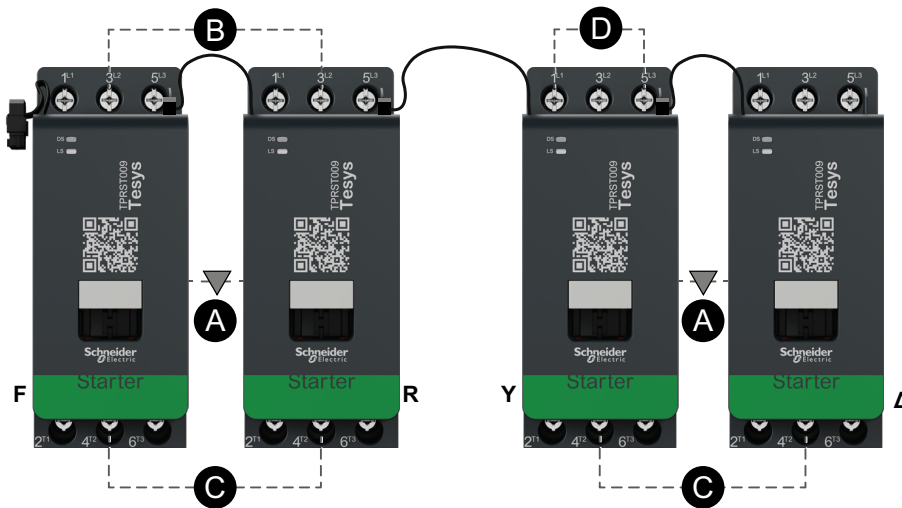


Table 78 - Legend

<b>A</b>	Mechanical interlock
<b>B</b>	Parallel link
<b>C</b>	Reversing link
<b>D</b>	Shorting block
<b>F</b>	Forward
<b>R</b>	Reverse
<b>Y</b>	Wye
<b>Δ</b>	Delta
<b>ST-1</b>	Starter 1
<b>ST-2</b>	Starter 2
<b>ST-3</b>	Starter 3
<b>ST-4</b>	Starter 4

### Motor Two Speeds

Figure 62 - Wiring (See Legend Table below.)

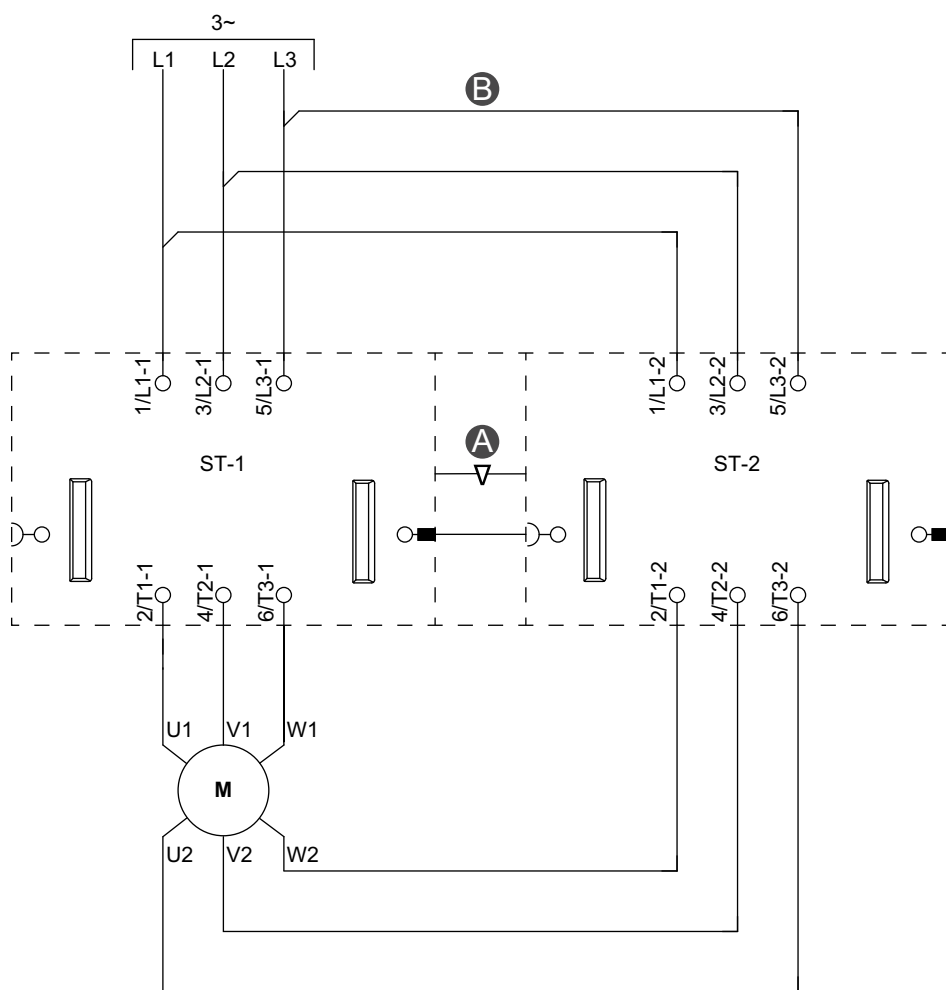


Figure 63 - Accessories

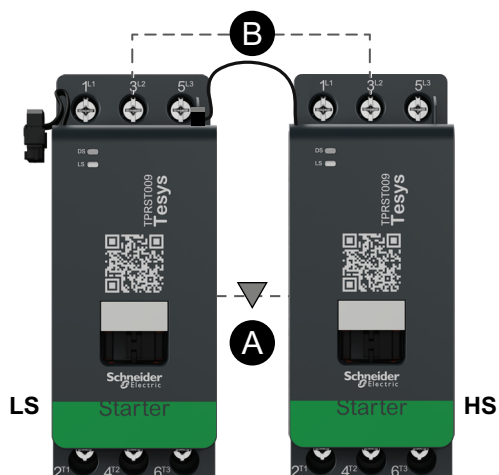


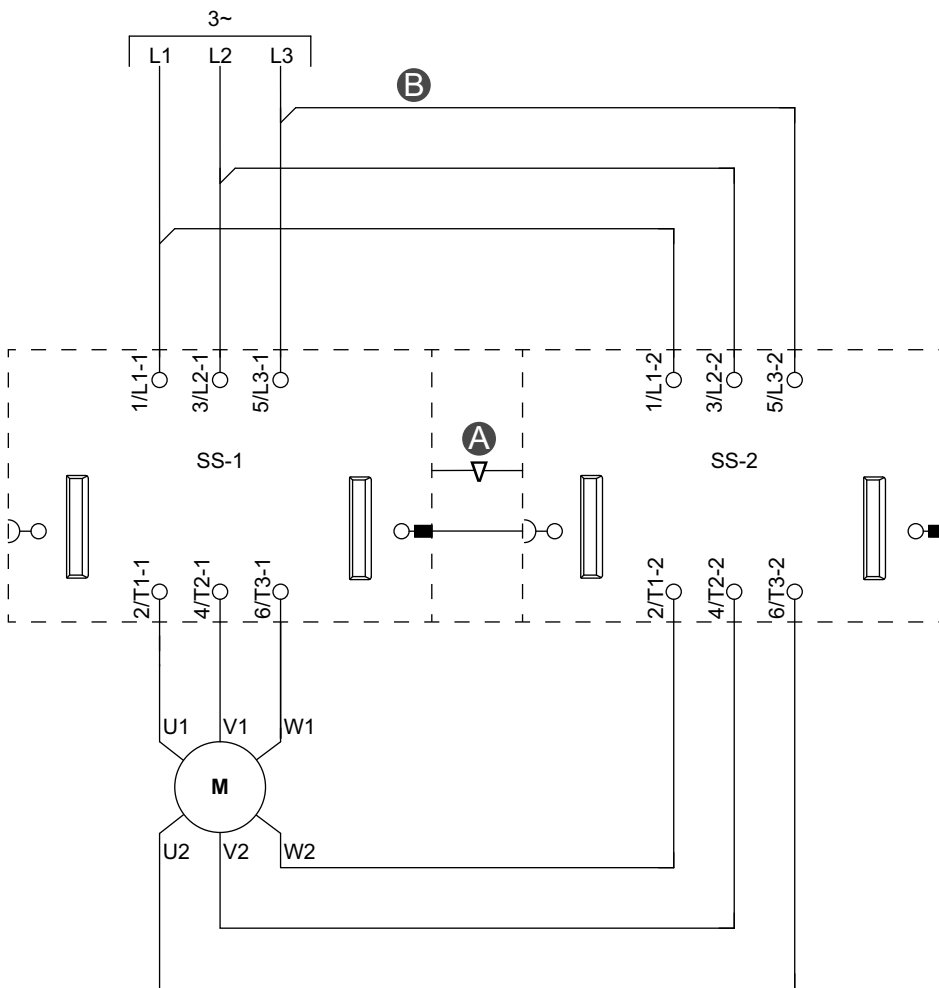
Table 79 - Legend

<b>A</b>	Mechanical interlock
<b>B</b>	Parallel link
<b>LS</b>	Low speed
<b>HS</b>	High speed
<b>ST-1</b>	Starter 1
<b>ST-2</b>	Starter 2

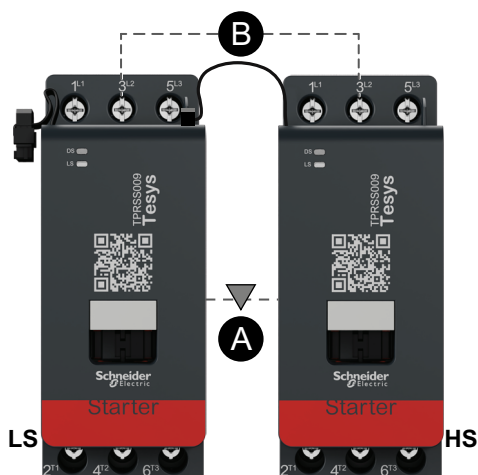
## Motor Two Speeds - Safe Stop, W. Cat 1/2

**NOTE:** Safe Stop according to EN 61800-5-2.

**Figure 64 - Wiring (See Legend Table below.)**



**Figure 65 - Accessories**



**Table 80 - Legend**

<b>A</b>	Mechanical interlock
<b>B</b>	Parallel link
<b>LS</b>	Low speed
<b>HS</b>	High speed
<b>SS-1</b>	SIL starter 1
<b>SS-2</b>	SIL starter 2

### Motor Two Speeds Two Directions

Figure 66 - Wiring (See Legend Table below.)

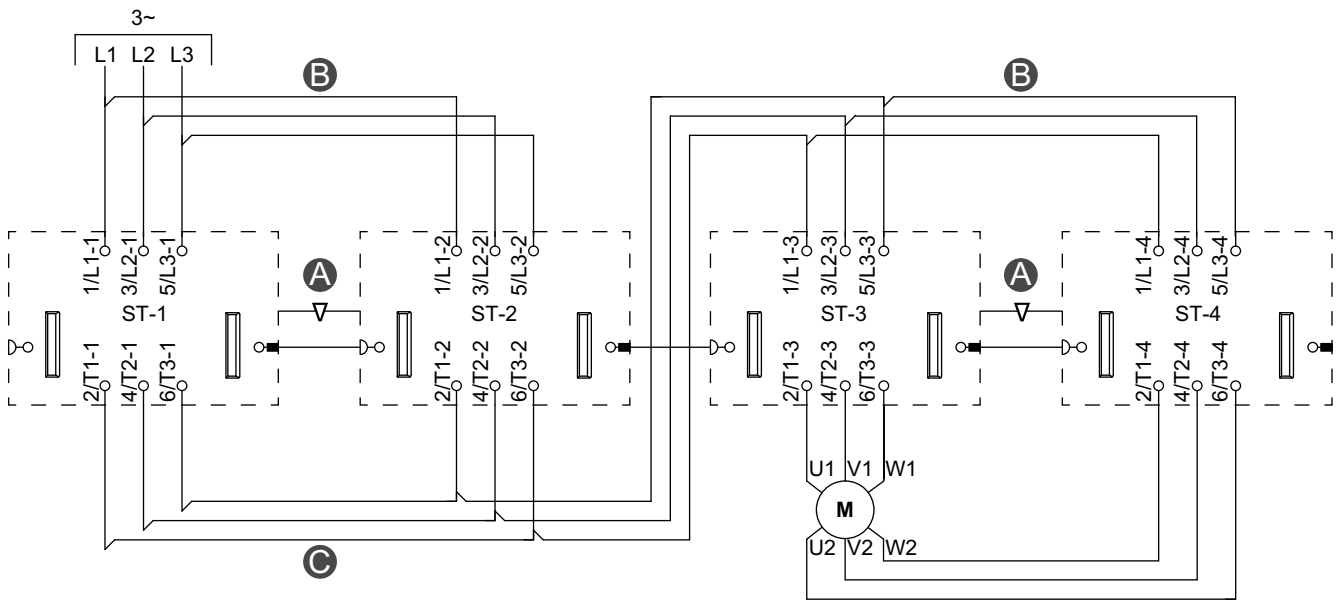


Figure 67 - Accessories

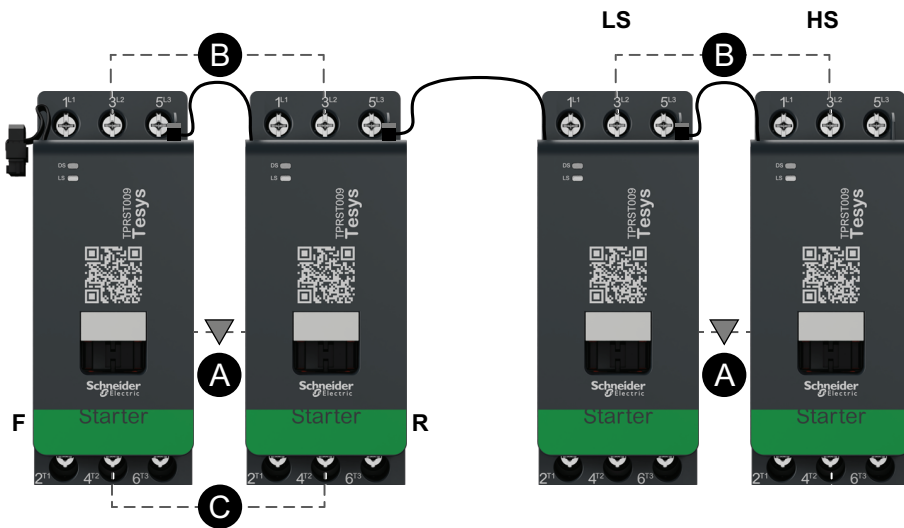


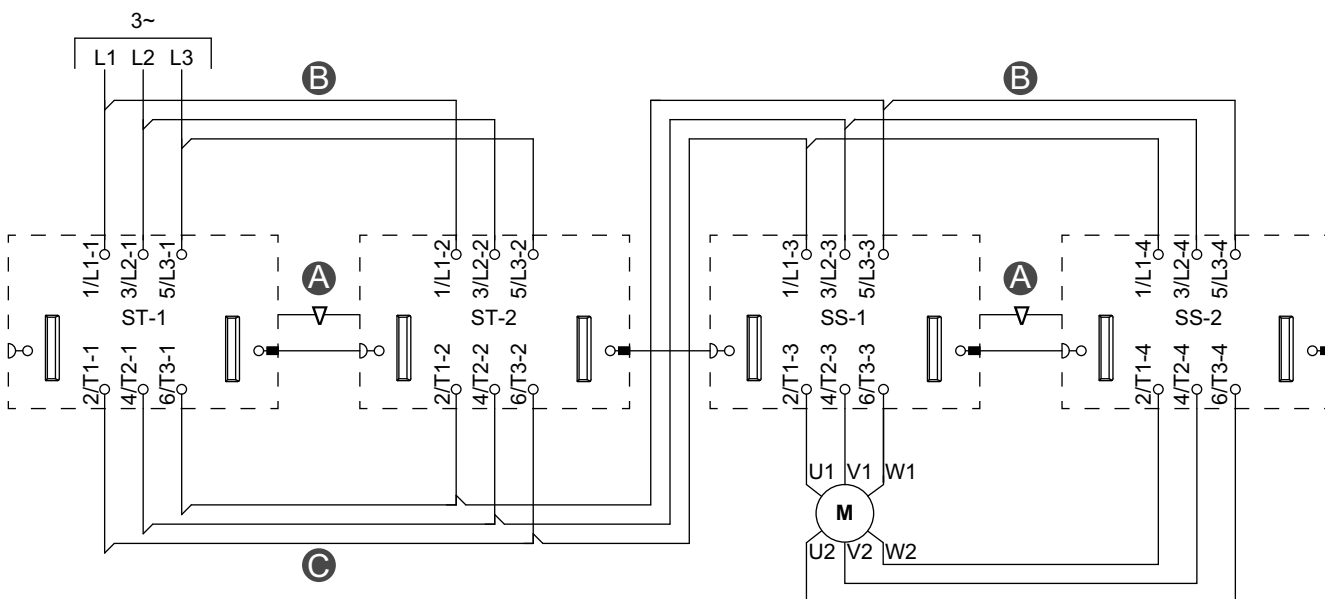
Table 81 - Legend

<b>A</b>	Mechanical interlock
<b>B</b>	Parallel link
<b>C</b>	Reversing link
<b>F</b>	Forward
<b>R</b>	Reverse
<b>LS</b>	Low speed
<b>HS</b>	High speed
<b>ST-1</b>	Starter 1
<b>ST-2</b>	Starter 2
<b>ST-3</b>	Starter 3
<b>ST-4</b>	Starter 4

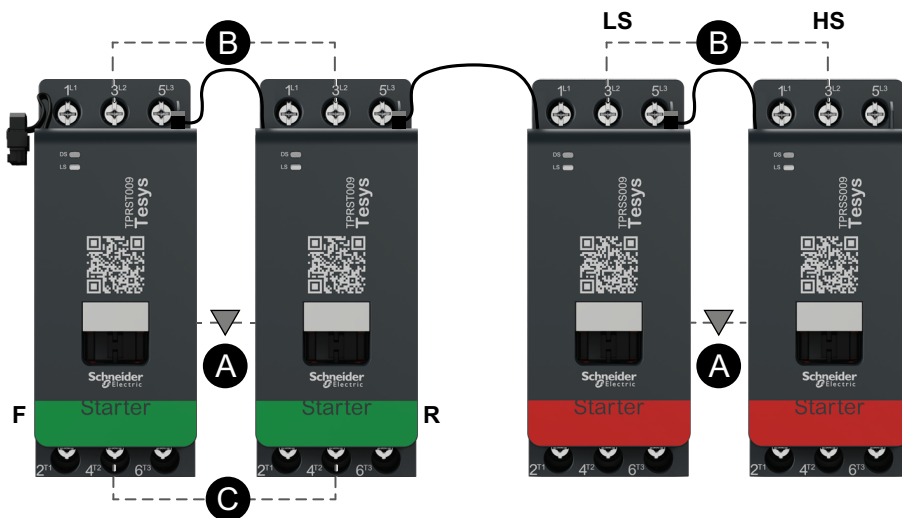
## Motor Two Speeds Two Directions - Safe Stop, W. Cat 1/2

**NOTE:** Safe Stop according to EN 61800-5-2.

**Figure 68 - Wiring (See Legend Table below.)**



**Figure 69 - Accessories**

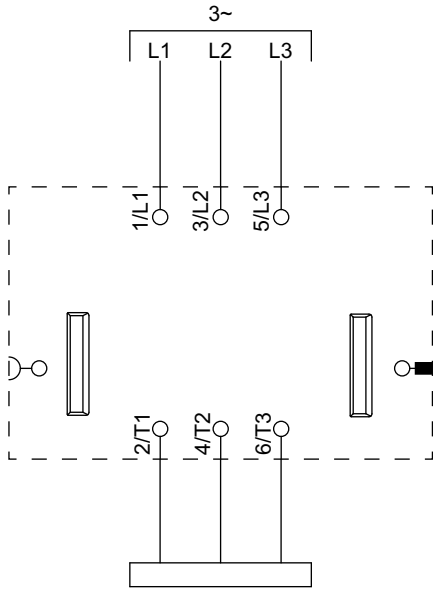


**Table 82 - Legend**

<b>A</b>	Mechanical interlock
<b>B</b>	Parallel link
<b>C</b>	Reversing link
<b>F</b>	Forward starter
<b>R</b>	Reverse starter
<b>LS</b>	Low speed
<b>HS</b>	High speed
<b>ST-1</b>	Starter 1
<b>ST-2</b>	Starter 2
<b>SS-1</b>	SIL starter 1
<b>SS-2</b>	SIL starter 2

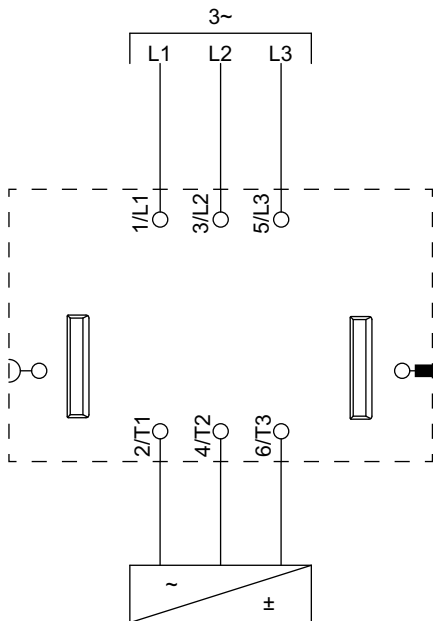
## Resistor

Figure 70 - Wiring



## Power Supply

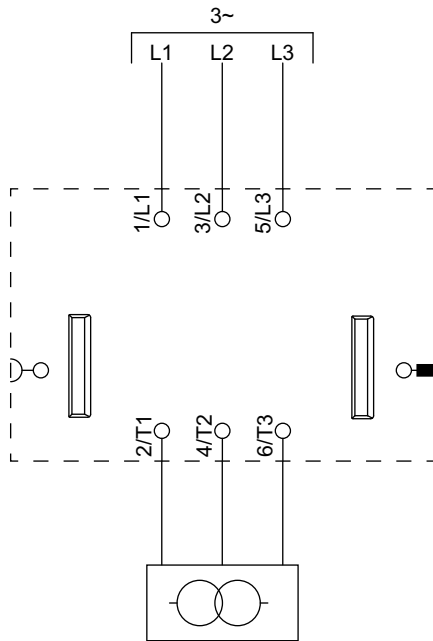
Figure 71 - Wiring





## Transformer

Figure 72 - Wiring



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As standards, specifications, and design change from time to time,  
please ask for confirmation of the information given in this publication.

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