

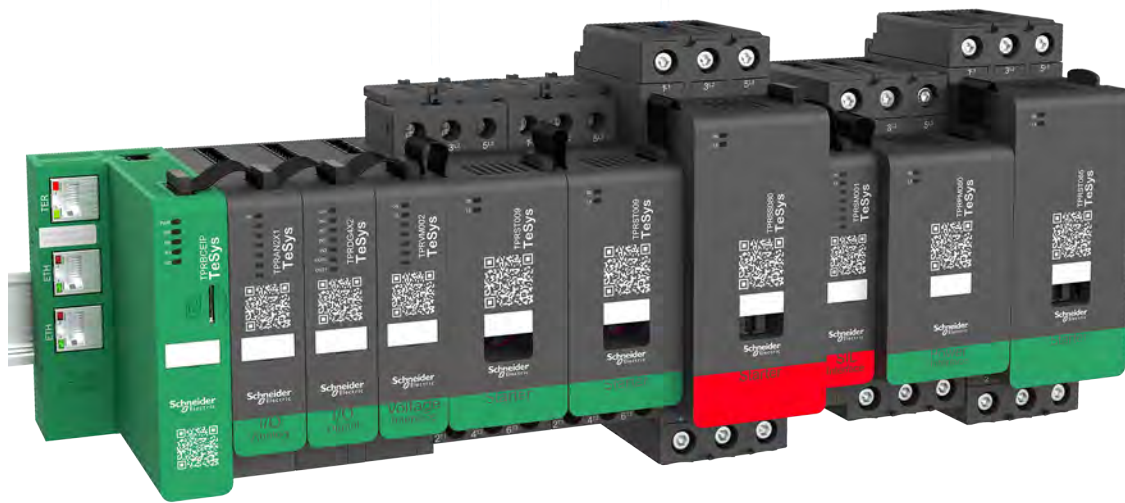
TeSys™ island

Installation Guide

Instruction Bulletin

TeSys offers innovative and connected solutions for motor starters. This instruction bulletin describes the mechanical installation, wiring, and commissioning of TeSys island.

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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

Master Range: TeSys

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

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.

For technical characteristics of the physical modules described in this bulletin, go to 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	<i>8536IB1901</i>
<i>TeSys™ island Installation Guide</i>	Describes the mechanical installation, wiring, and commissioning of TeSys island	<i>8536IB1902</i>
<i>TeSys™ island Operating Guide</i>	Describes how to operate and maintain TeSys island	<i>8536IB1903</i>

Table 1 - Related Documentation (Continued)

Document Title	Description	Document Number
<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® EtherNet/IP™ environment	8536IB1914
<i>TeSys™ island EtherNet/IP™ Quick Start Guide</i>	Describes how to quickly integrate TeSys island into the Rockwell Software Studio 5000 EtherNet/IP 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 PROFINET and PROFIBUS Function Block Library Guide</i>	Describes the TeSys island library used in the Siemens™ TIA Portal environment	8536IB1917
<i>TeSys™ island Quick Start Guide for PROFINET and PROFIBUS Applications</i>	Describes how to quickly integrate TeSys island into the Siemens™ TIA Portal environment	8536IB1916
<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, TPRBCEIP</i>	Describes how to install the TeSys island Ethernet/IP bus coupler	MFR44097
<i>TeSys™ island Instruction Sheet, Bus Coupler, TPRBCPFN</i>	Describes how to install the TeSys island PROFINET bus coupler	MFR44098
<i>TeSys™ island Instruction Sheet, Bus Coupler, TPRBCPFB</i>	Describes how to install the TeSys island PROFIBUS DP bus coupler	GDE55148
<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 ¹ interface modules	MFR44100

1. Safety Integrity Level according to standard IEC 61508.

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.

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, the machine builder, or the 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 adhere 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.

Cybersecurity

NOTE: Schneider Electric adheres to industry best practices in the development and implementation of control systems. This includes a “Defense-in-Depth” approach to secure an industrial Control System. This approach places the controllers behind one or more firewalls to restrict access to authorized personnel and protocols only.

▲ WARNING**UNAUTHENTICATED ACCESS AND SUBSEQUENT UNAUTHORIZED MACHINE OPERATION**

- Evaluate whether your environment or your machines are connected to your critical infrastructure and, if so, take appropriate steps in terms of prevention, based on Defense-in-Depth, before connecting the automation system to any network.
- Limit the number of devices connected to a network inside your company.
- Isolate your industrial network from other networks inside your company.
- Protect any network against unintended access by using firewalls, VPN, or other, proven security measures.
- Monitor activities within your systems.
- Prevent subject devices from direct access or direct link by unauthorized parties or unauthenticated actions.
- Prepare a recovery plan including backup of your system and process information.

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

Introduction to TeSys™ island

Island Concept

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 (AC1) installed in an electrical control panel.

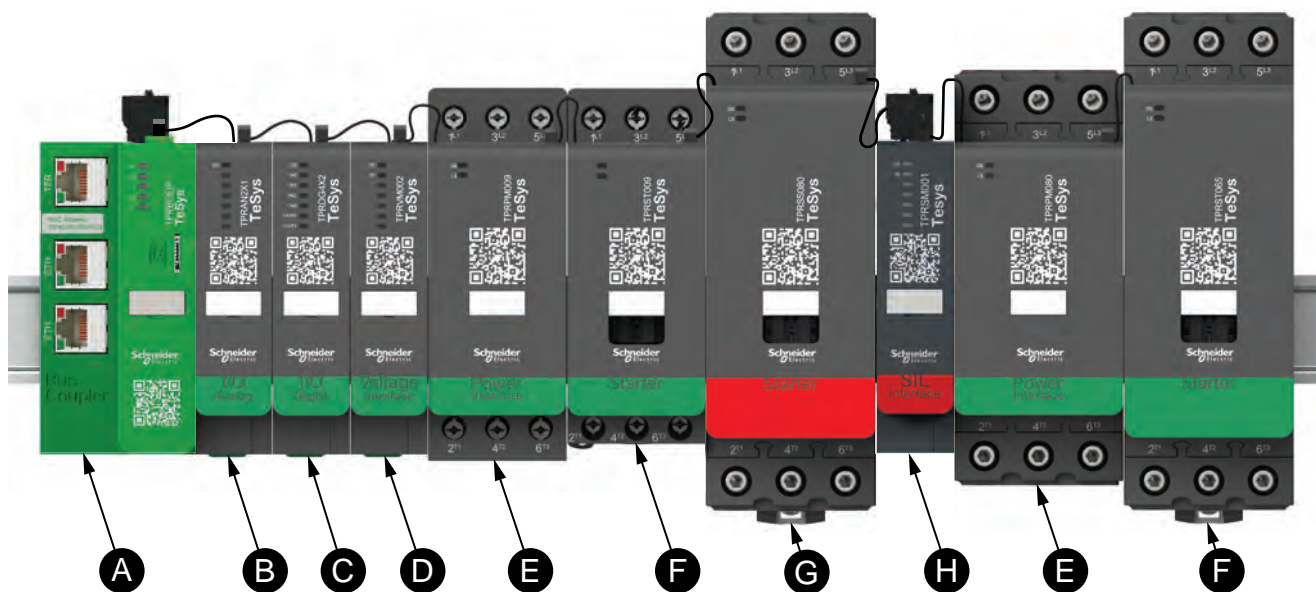
This system is designed around the concept of TeSys avatars. These avatars

- 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



A	Bus Coupler	E	Power Interface Module
B	Analog I/O Module	F	Standard Starter
C	Digital I/O Module	G	SIL Starter
D	Voltage Interface Module	H	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
PROFIBUS fieldbus only: Cyclic data size limit	Maximum size of 240 bytes possible
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-island.

- 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 and TPRBCPFN (mm/in.)

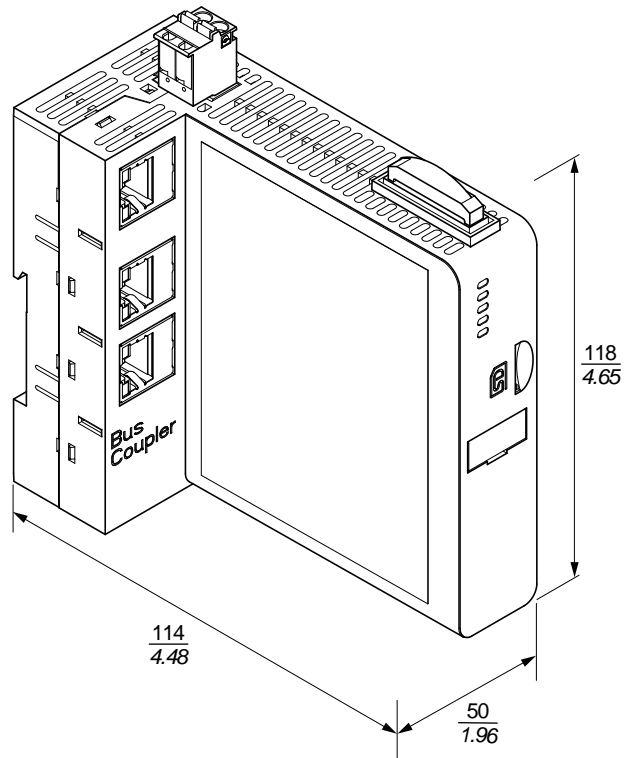


Figure 3 - Bus Coupler: TPRBCPFB (mm/in.)

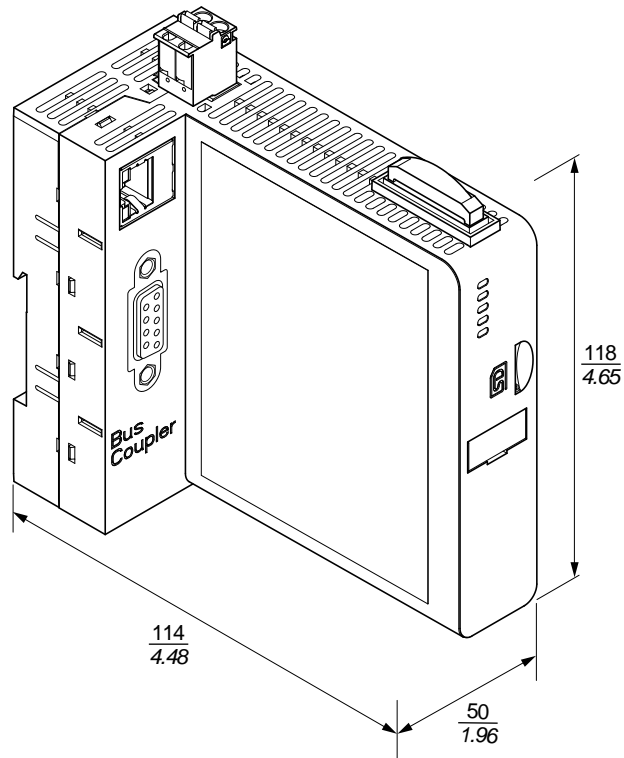


Figure 4 - Voltage Interface Module: TPRVM001 (mm/in.)

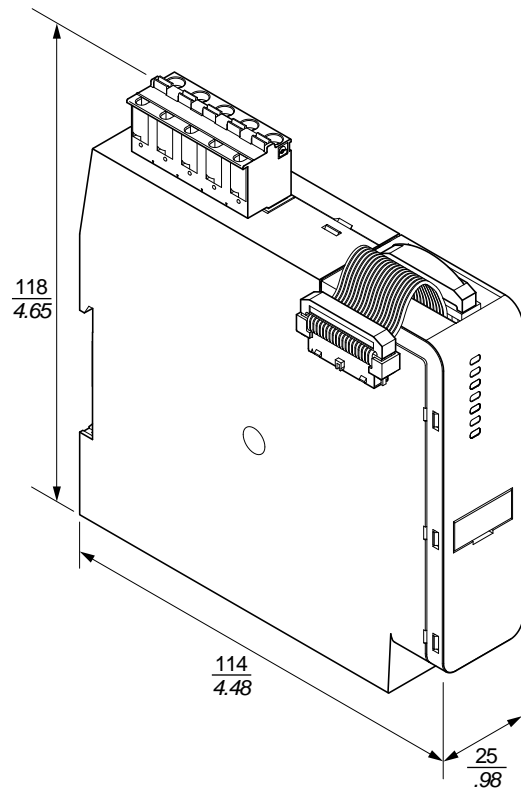
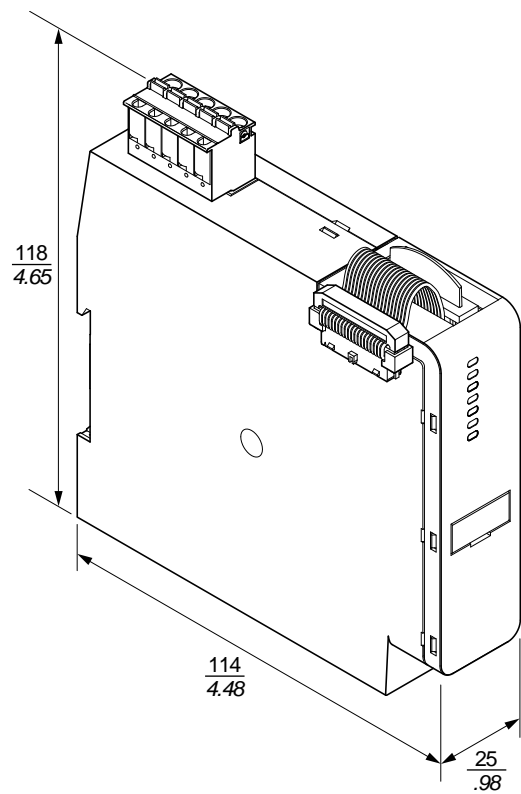


Figure 5 - SIL² Interface Module: TPRSM001 (mm/in.)



2. Safety Integrity Level according to standard IEC 61508.

Figure 6 - Digital I/O Module: TPRDG4X2 (mm/in.)

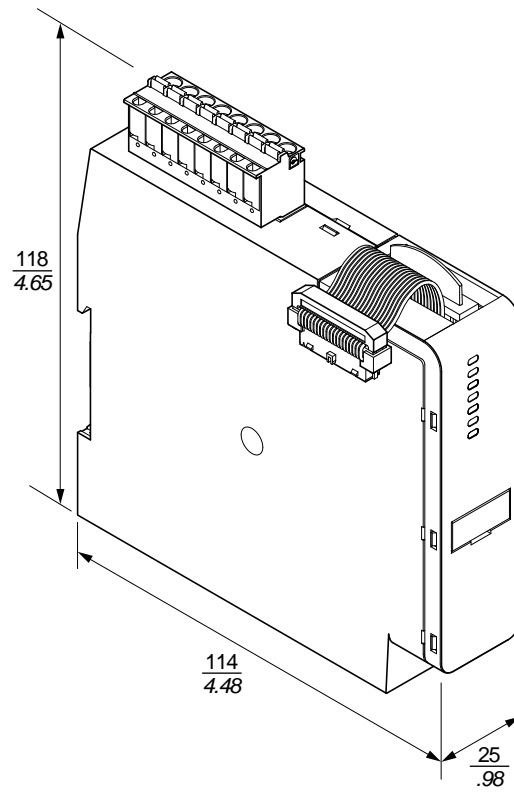


Figure 7 - Analog I/O Module: TPRAN2X1 (mm/in.)

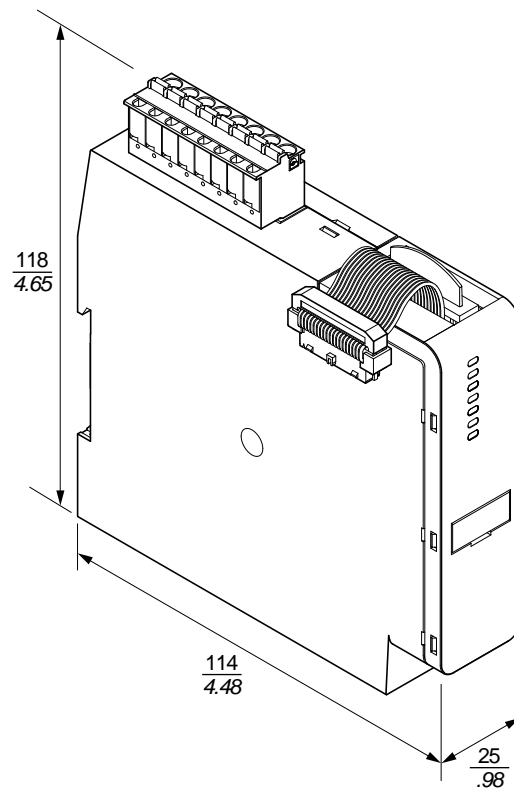


Figure 8 - Size 1 (TPRPM009) and Size 2 (TPRPM038) Power Interface Modules (mm/in.)

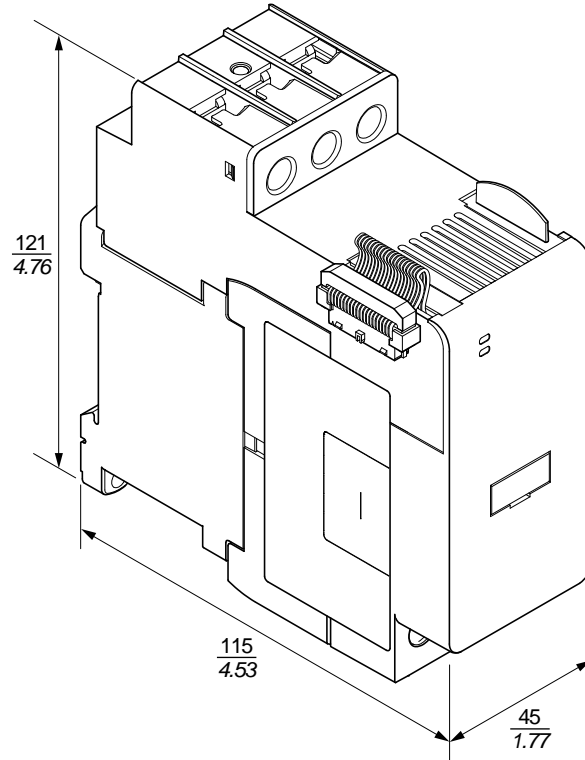


Figure 9 - Size 3 Power Interface Module: TPRPM080 (mm/in.)

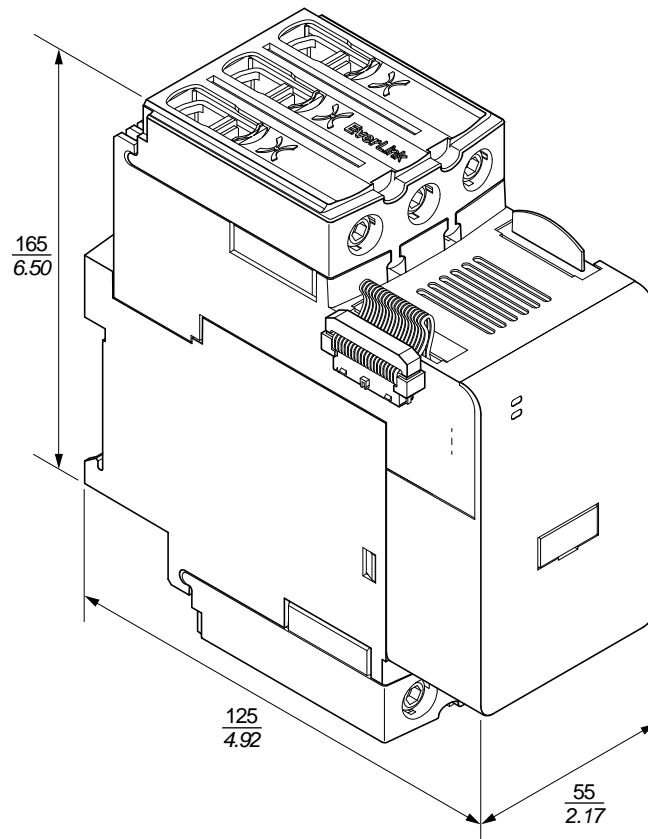


Figure 10 - Size 1 Starters: TPRST009 and TPRSS009 (mm/in.)

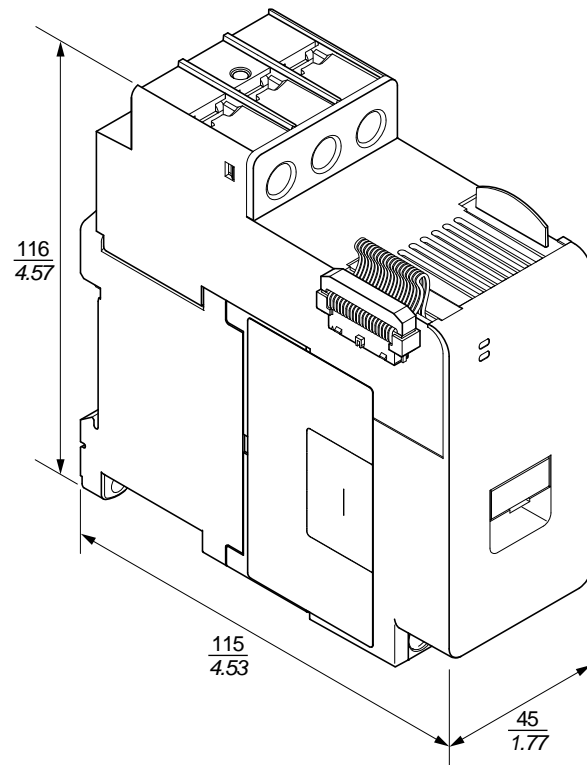


Figure 11 - Size 2 Starters: TPRST025, TPRST038, TPRSS025, and TPRSS038 (mm/in.)

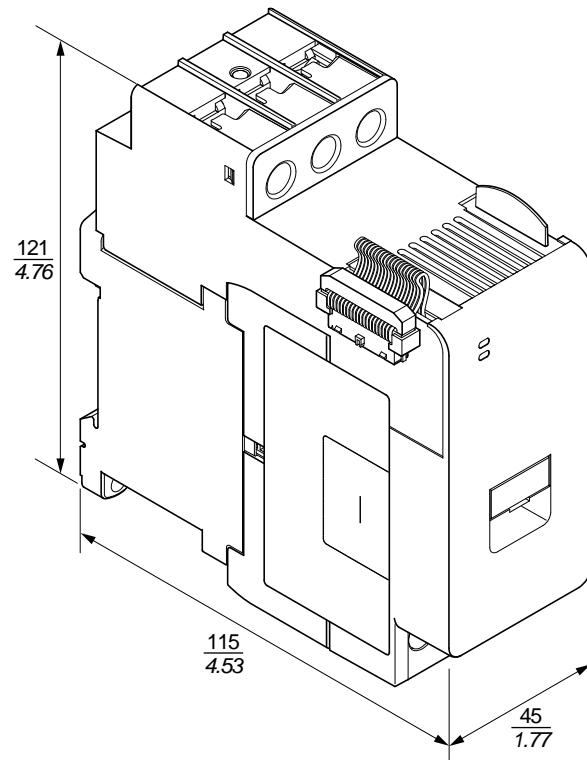
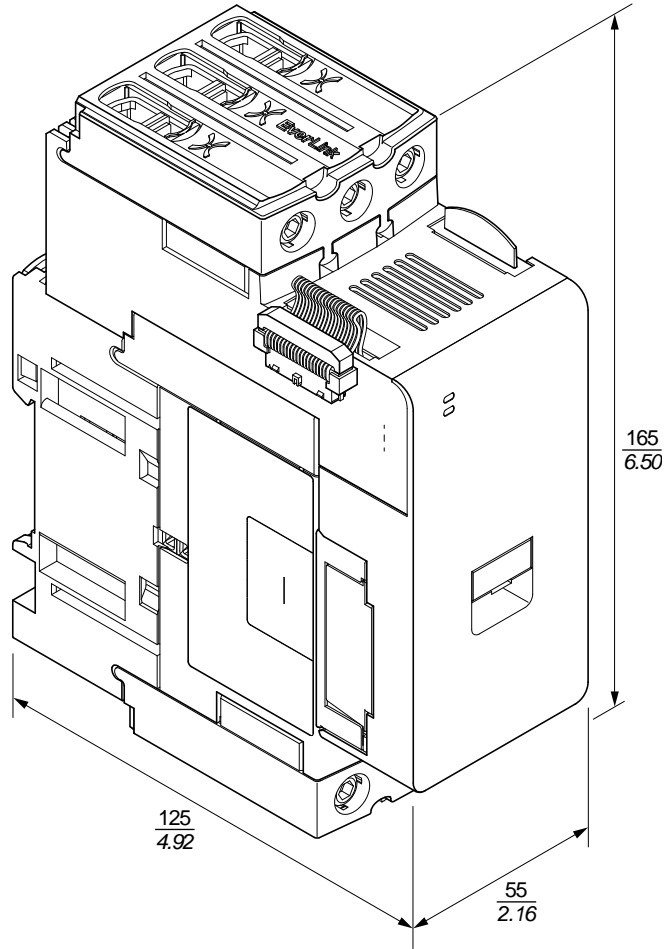


Figure 12 - Size 3 Starters: TPRST065, TPRST080, TPRSS065, and TPRSS080 (mm/in.)



Weights

Table 3 - Weights

Module	Description / Rating	Reference Number	Weight	
			kg	lb
Bus Coupler	Ethernet switch	TPRBCEIP	0.204	0.450
	PROFINET	TPRBCPFN	0.204	0.450
	PROFIBUS-DP	TPRBCPFB	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 ³ 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.

3. Safety Integrity Level according to standard IEC 61508.

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 ⁴ 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
	TPRBCPFN	5.00
	TPRBCPFB	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.

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

4. Safety Integrity Level according to standard IEC 61508.

Table 6 - Environmental Characteristics

Storage temperature	Starters: -25 °C to +70 °C (-13 °F to 158 °F) Bus Couplers, SIL ⁵ 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, Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations
Vibration	Horizontal and vertical mounting orientation: <ul style="list-style-type: none"> • 1.5 mm peak to peak, 3–13 Hz per IEC 60068-2-6 • 1 gn 13–200 Hz per IEC 60068-2-6
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

5. Safety Integrity Level according to standard IEC 61508.

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 ⁶ 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 (42 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	
NOTE: Communication and Analog input and output cables must be shielded.			

Mounting Positions

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

6. Safety Integrity Level according to standard IEC 61508.

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 13 - Avoiding Electromagnetic Interference: Option 2

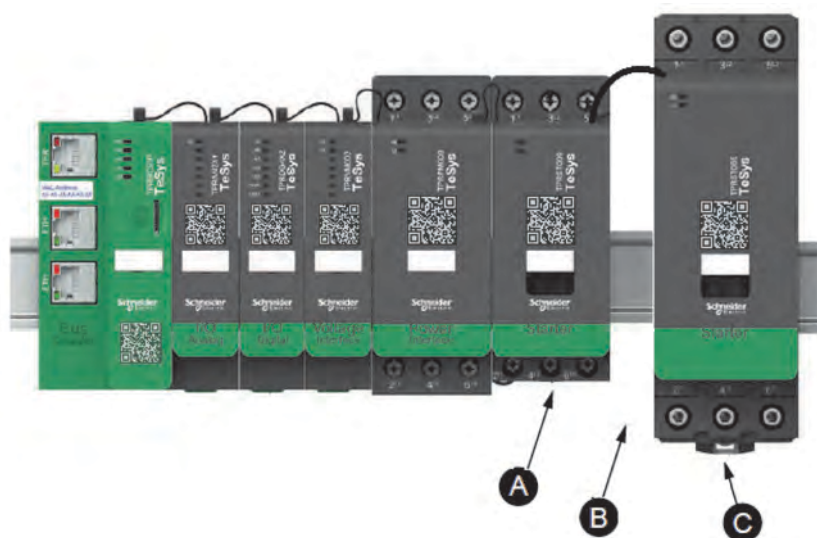


Table 8 - Legend

A	A TeSys island device with an FLA setting of 0.6 A
C	An adjacent TeSys island device with an FLA of 65 A (>0.6 A ×100)
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.
6. 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 14 - Bus Coupler in Horizontal Orientation

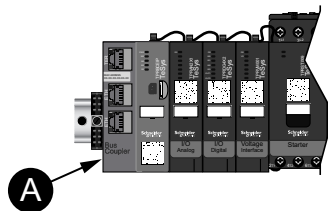
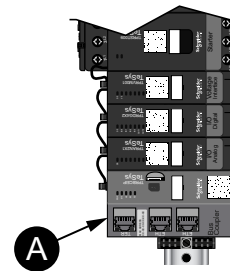


Figure 15 - Bus Coupler in Vertical Orientation



DIN Rail

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

- Width: 35 mm (± 0.3 mm)
- Thickness: 1 mm (± 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

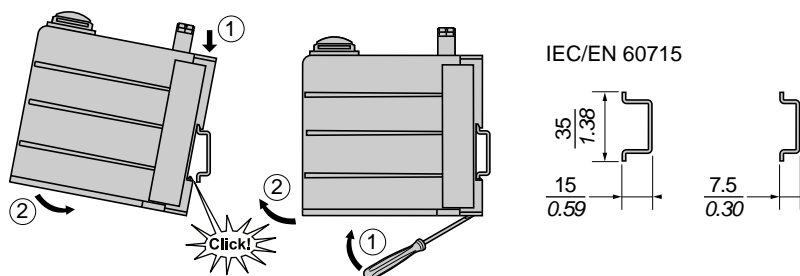
Verify that the modules you received match the BOM and the island topology before starting the installation. TeSys island modules must be installed in a specific order on the island. If the physical arrangement of the modules on the island does not match the configured topology, the island will not function 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 16 - 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.

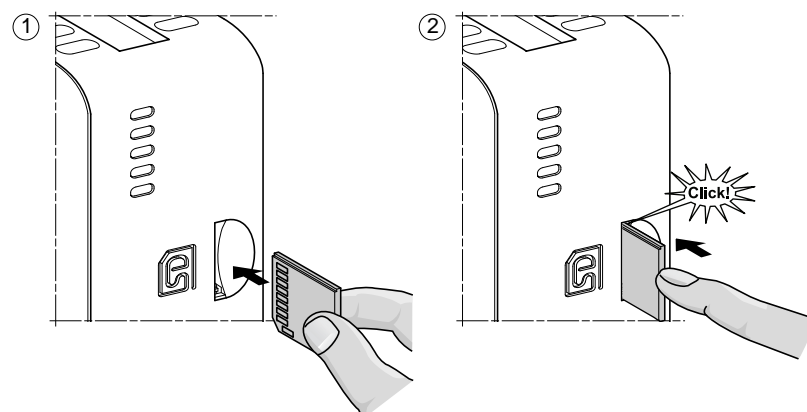
- Accidental data loss can occur at any time. Once data is lost it cannot be recovered. Backup the SD card data regularly.
- If you forcibly extract the micro SD card, data on the micro SD card may become corrupt.
- Removing a micro SD card that is being accessed could damage the micro SD card, or corrupt 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.
- If you are updating the TeSys island firmware, be sure to update the SD card backup also.

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 17 - Installing the SD Card



Installing Standard Starters and SIL Starters

NOTE: Safety Integrity Level according to standard IEC 61508.

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 69*. 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

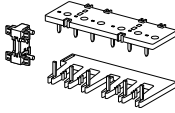
Kit Components	Description	LAD9R1 Assembly Kit
LAD9V5	Parallel link between two starters	 <p>For installation instructions, refer to <i>Installing the LAD9R1 Kit (9–38 A Starters), page 31</i>.</p>
LAD9V6	Reversing link between two starters	
LAD9V2	Mechanical interlock with assembly staple	

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

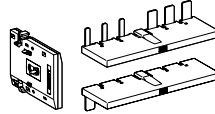
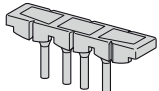

Kit Components	Description	LAD9R3 Assembly Kit
LA9D65A6	Parallel link between two starters	 <p>For installation instructions, refer to <i>Installing the LAD9R3 Kit (40–65 A Starters), page 35</i>.</p>
LA9D65A9	Reversing link between two starters	
LAD4CM	Mechanical interlock	

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), page 33</i>.</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), page 38</i>.</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 32.

Table 14 - LAD9R1 Installation Procedure

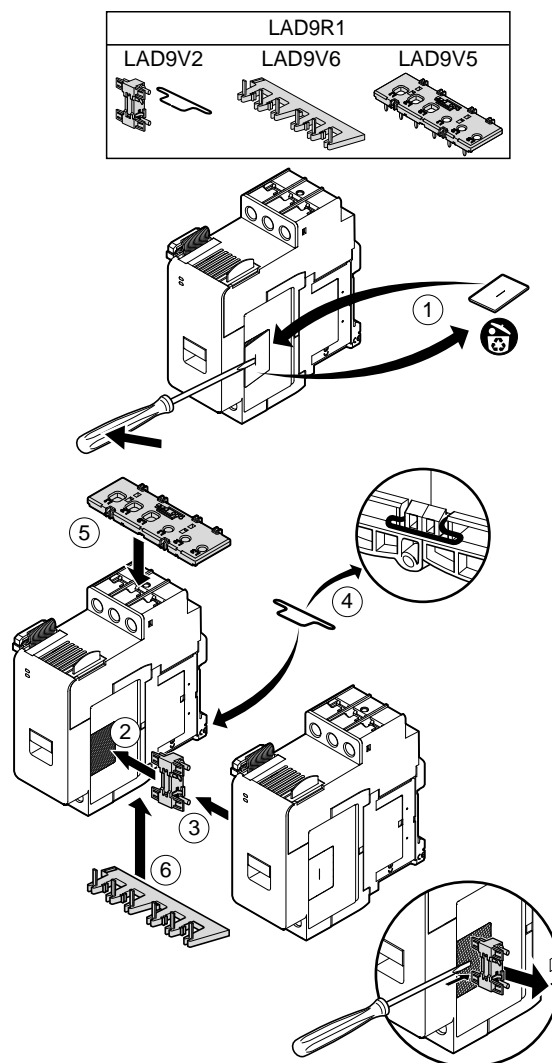
Step	Action
1	On the starter that will be mounted on the left, insert a flat-head screwdriver into the slot cut into the label near the middle of the starter on the right side and remove the small plastic cover under the label. The section of the label that must be removed is perforated and will easily separate from the rest of the label. Do not remove the plastic cover on the left 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 left 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 right 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 32*.

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 18 - 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 34*.

Table 16 - LAD9P3 Installation Procedure

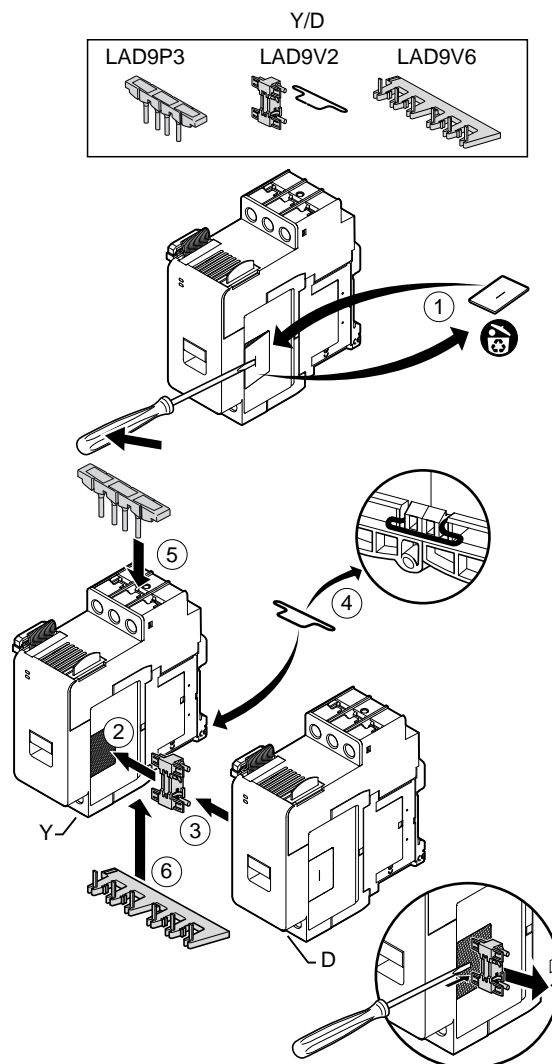
Step	Action
1	On the starter that will be mounted on the left, using a flat-head screwdriver, remove the small piece of plastic located near the middle of the starter on the right side. The plastic cover is hidden under a label on the side of the starter. Do not remove the plastic cover on the left side 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 left side. The plastic cover is hidden under a label on the side of the starter. Do not remove the plastic cover on the right 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 34.

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 19 - Installing the LAD9P3 Shorting Block



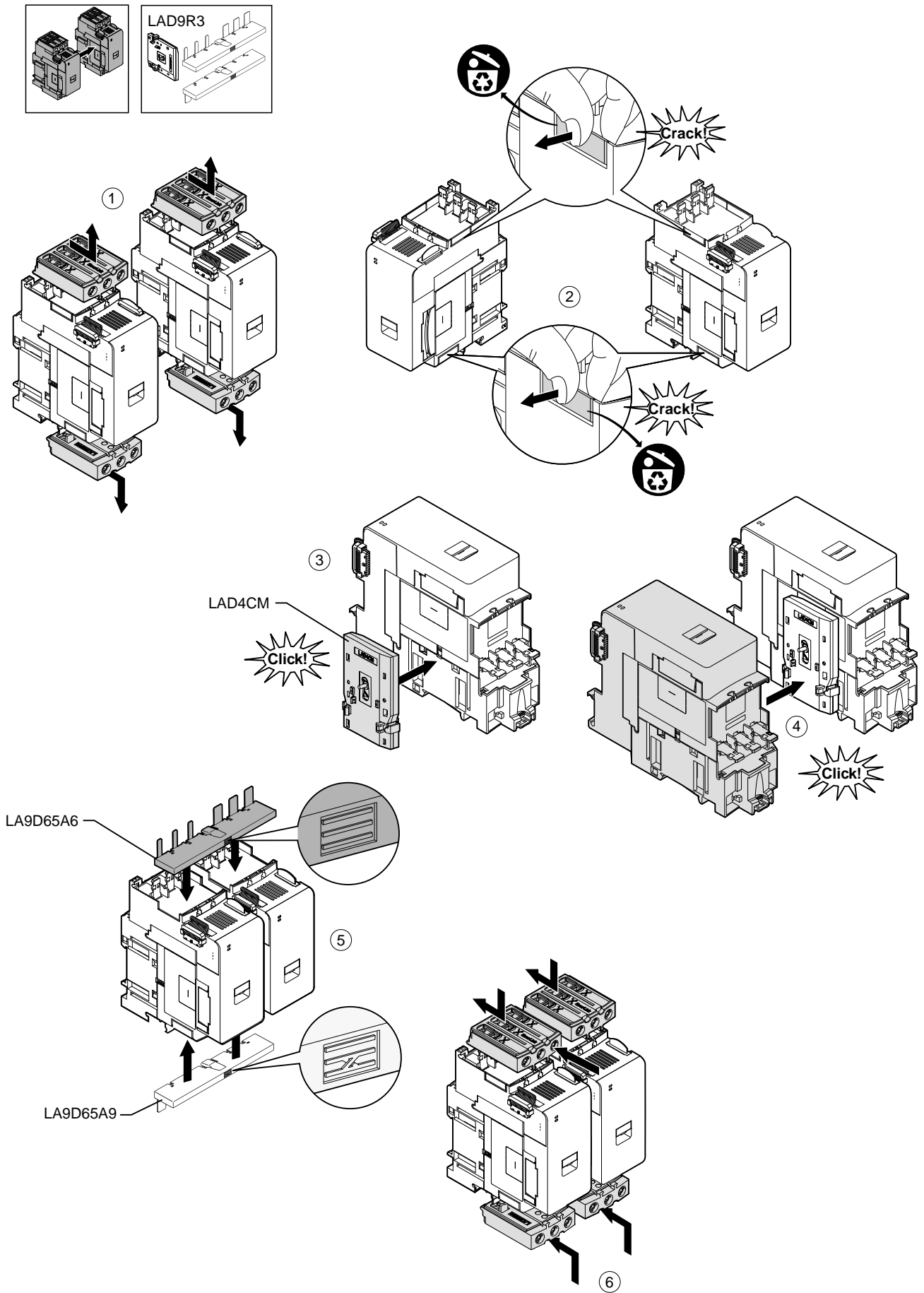
Installing the LAD9R3 Kit (40–65 A Starters)

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 36.

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 left , 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 right , 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 20 - Installing the LAD9R3 Assembly Kit



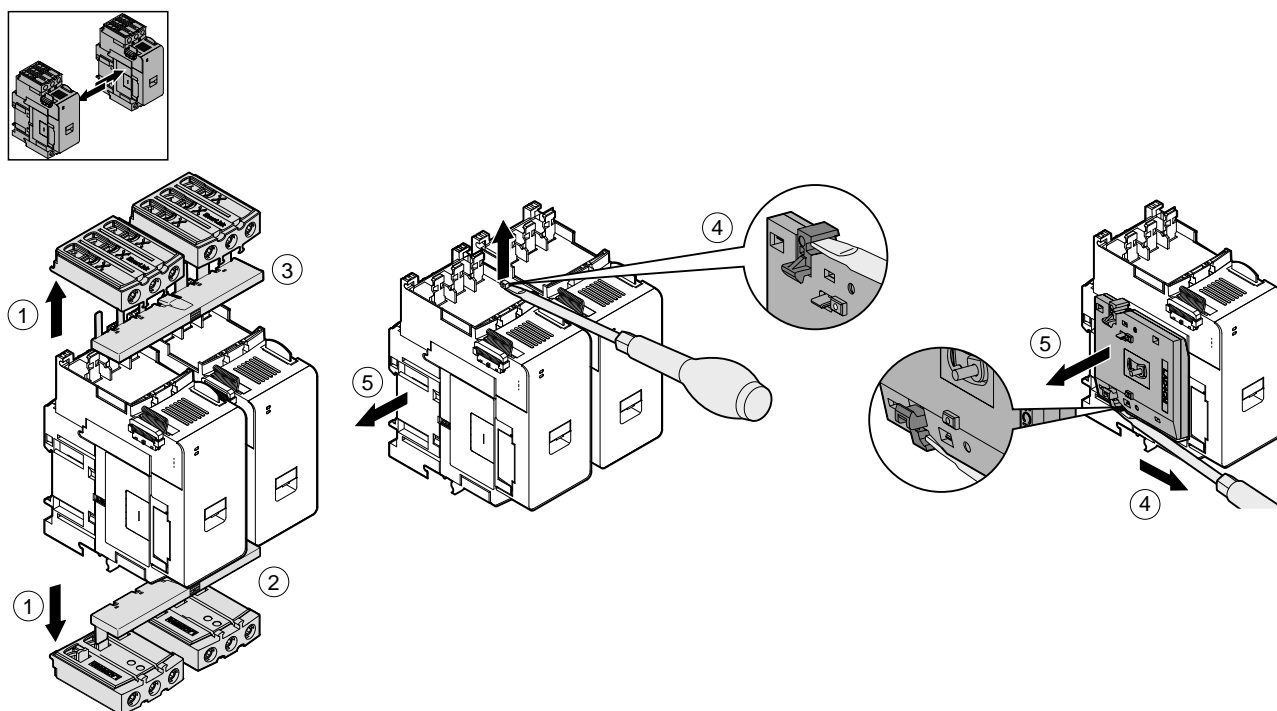
To separate the starters and remove the accessories, perform the steps in the following table and refer to *Removing the LAD9R3 Assembly Kit*, page 37.

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 21 - Removing the LAD9R3 Assembly Kit



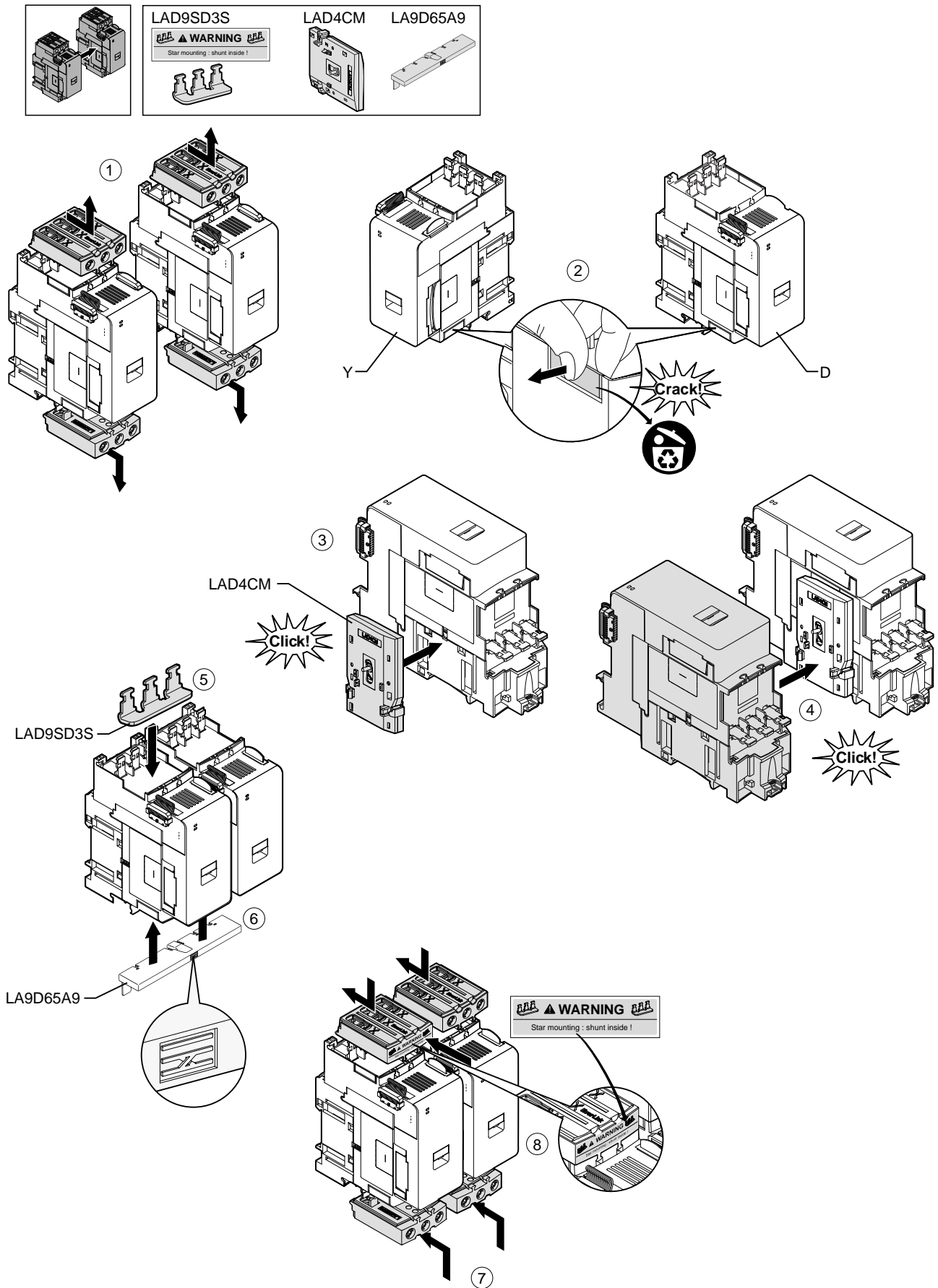
Installing the LAD9SD3S Shorting Block (40–65 A Starters in Y/D Avatars)

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 39.

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 left , 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 right , 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 22 - Installing the LAD9SD3S Shorting Block



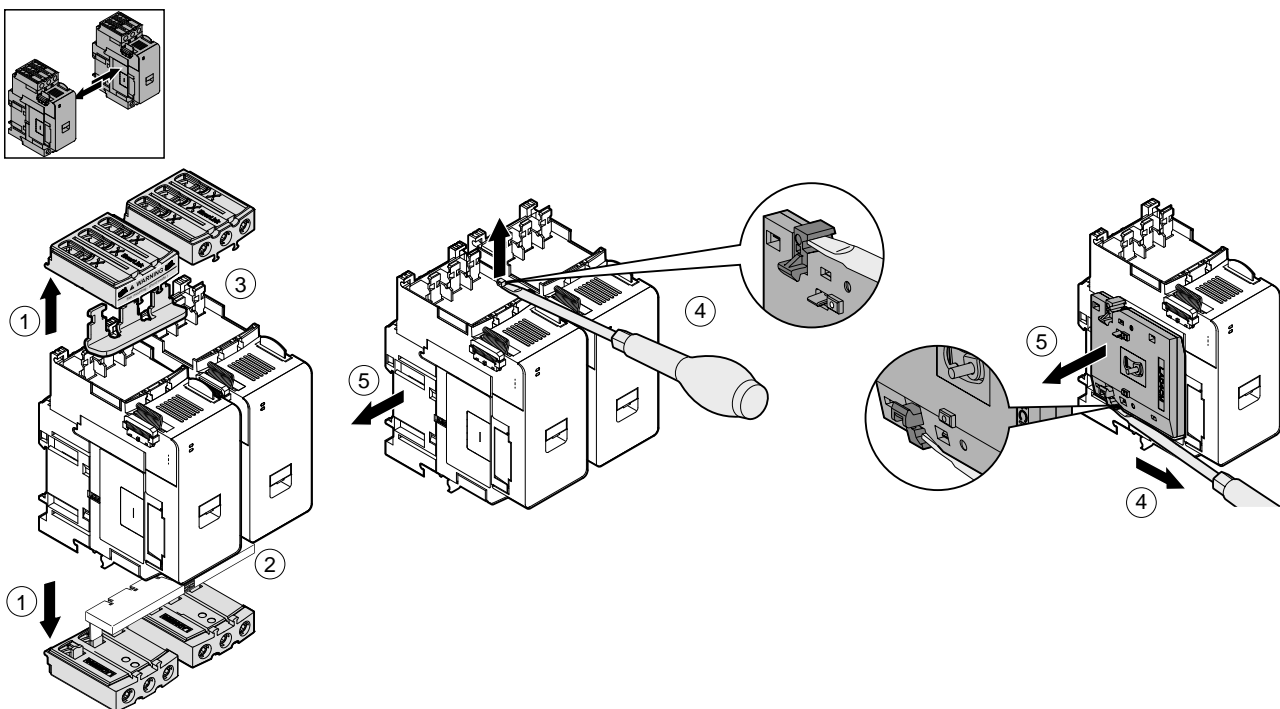
To separate the starters and remove the accessories, perform the steps in the following table and refer to *Removing the LAD9SD3S Shorting Block*, page 40.

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 23 - 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 24 - Size 1 (TPR•009) and Size 2 (TPR•025 and TPR•038) Starters (mm/in.)

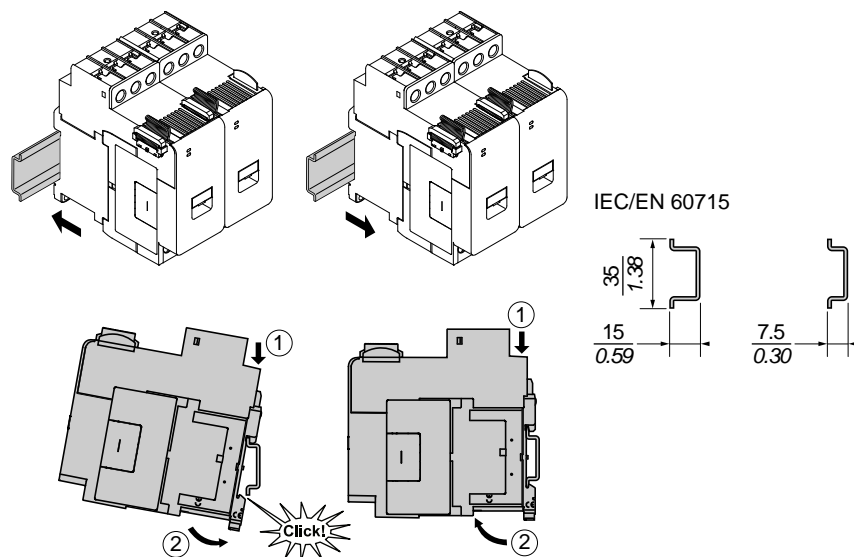
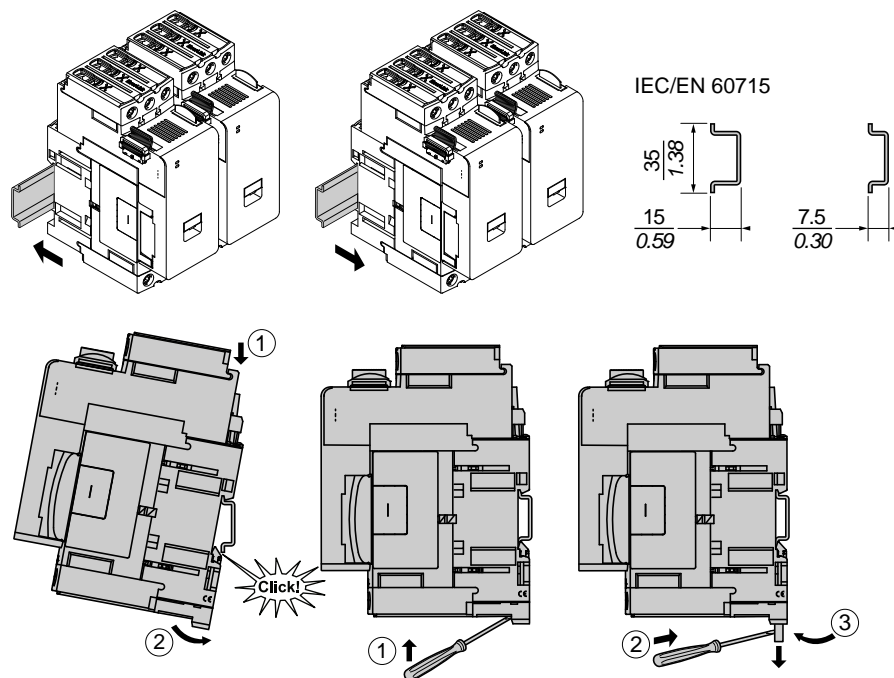


Figure 25 - Size 3 Starters (TPR•065 and TPR•080) (mm/in.)



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

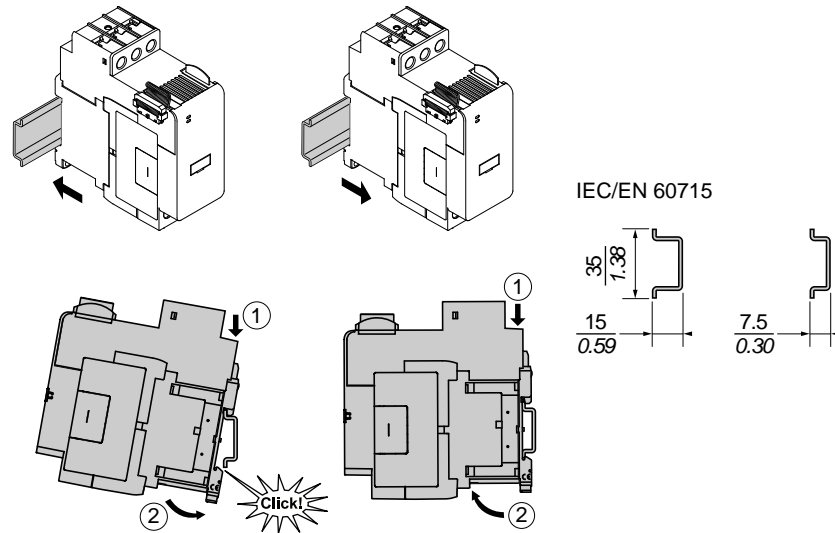
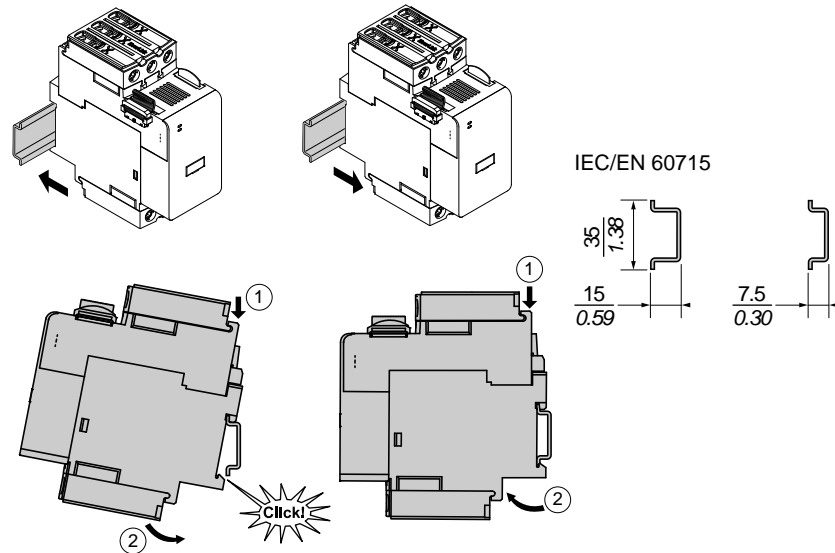


Figure 27 - Size 3 Power Interface Module (TPRPM080) (mm/in.)



Mounting the I/O and Interface Modules on DIN Rail

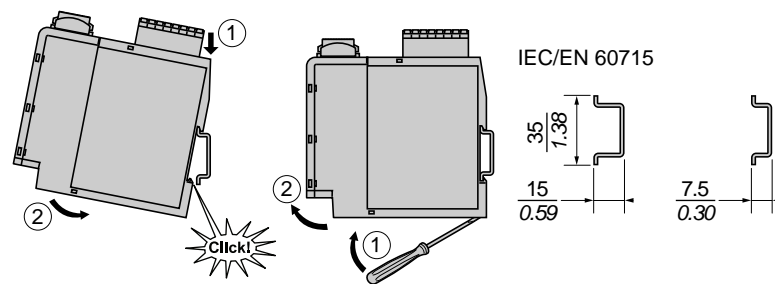
This section covers installation of:

- Digital I/O Modules
- Analog I/O Modules
- SIL7 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 28 - 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 29 - End Clamp in Horizontal Orientation

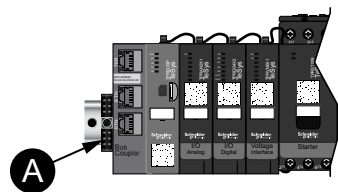
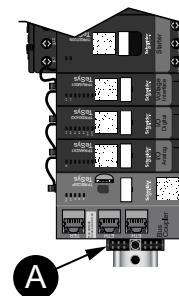


Figure 30 - End Clamp in Vertical Orientation



7. Safety Integrity Level according to standard IEC 61508.

Connecting the Flat Cables

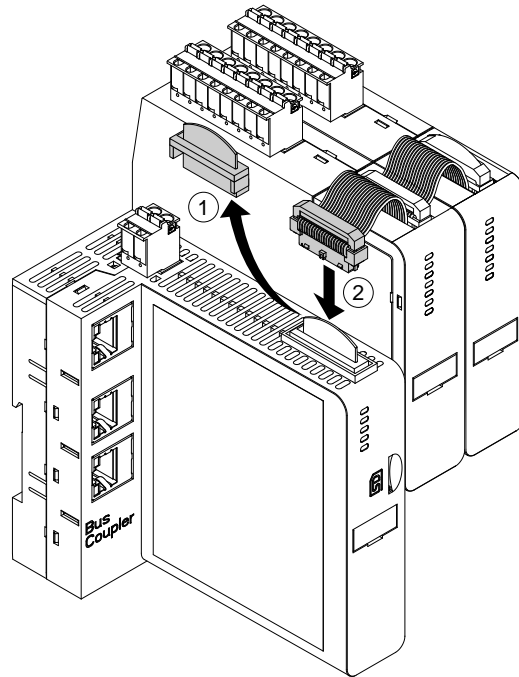
This section describes how to connect the flat cables for all modules on the TeSys™ island.

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 31 - 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 SIL⁸ Starters

Nominal voltage	100–690 ⁹ 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 NOTE: 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

8. Safety Integrity Level according to standard IEC 61508.

9. Maximum 300 V rated operational voltage to earth (Ground) 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 cable(s) to the bus coupler. Connect the fieldbus Ethernet cables to the dual port Ethernet switch on the TPRBCEIP and TPRBCPFN bus couplers. Connect the PROFIBUS-DP cable to the DB-9 port on the TPRBCPFB bus coupler.
5. An RJ45 cable can be connected to the service port on the TPRBCEIP and TPRBCPFB bus couplers for communication with the digital tools.

The service port on the TPRBCPFN bus coupler is intended for temporary use only during commissioning and troubleshooting.

Figure 32 - Bus Coupler Spring Terminal Connector

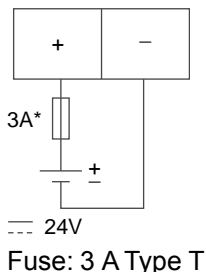


Figure 33 - Bus Coupler Cabling

10 mm	0.2–2.5 mm ²	0.2–2.5 mm ²	0.25–2.5 mm ²
0.40 in.	AWG 24–14	AWG 24–14	AWG 22–14

The pitch between the pins is 5.08 mm.

Figure 34 - 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
- SIL¹⁰ Starters
- Power Interface Modules

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

Figure 35 - Single-Phase Motors

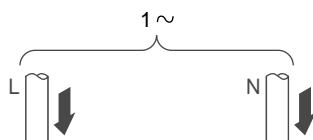
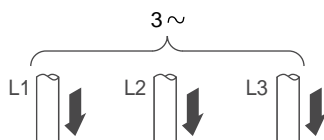


Figure 36 - Three-Phase Motors



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 ² (AWG)	Size 2 Starter, mm ² (AWG)	Size 1 or 2 Power Interface Module, mm ² (AWG)	Size 3 Starter plus Power Interface Module, mm ² (AWG)
			TPRST009 TPRSS009	TPRST025, 038 TPRSS025, 038	TPRPM009, 038	TPRST065, 080 TPRSS065, 080 TPRPM080
Solid cable without cable end	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)
Flexible cable without cable end	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)

10. Safety Integrity Level according to standard IEC 61508.

Table 29 - Wiring—Power Devices (Continued)

			Size 1 Starter, mm ² (AWG)	Size 2 Starter, mm ² (AWG)	Size 1 or 2 Power Interface Module, mm ² (AWG)	Size 3 Starter plus Power Interface Module, mm ² (AWG)
			TPRST009 TPRSS009	TPRST025, 038 TPRSS025, 038	TPRPM009, 038	TPRST065, 080 TPRSS065, 080 TPRPM080
Stranded cable with cable end	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)
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 ² (2 AWG): 8 N•m (70 lb-in) 1–25 mm ² (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 55 for cable types and sizes.
3. Insert the spring terminal connector back into the top of the module.

Figure 37 - Digital I/O Module Terminals

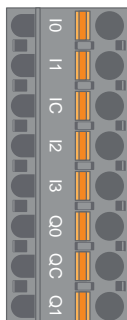
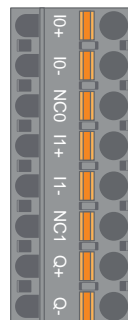


Figure 38 - Analog I/O Module Terminals



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

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			
	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

Avatar I/O Port Assignments

Application and certain load avatars introduce process variable (PV) inputs and PV switches.

PV inputs are connected to Analog I/O modules (AIOM) that are included as part of the application avatar. Each AIOM module allows up to two PV inputs. A maximum of five PV inputs, requiring up to three AIOM modules, can be selected for the avatar.

PV switches are connected to Digital I/O modules (DIOM) that are included as part of the application avatar. Each DIOM module allows up to four PV switches or control mode digital inputs. A maximum of five PV switches and three control modes, requiring up to two DIOM modules, can be selected for the avatar.

The PV input and PV switch port assignments on the DIOM and AIOM modules are made during the initial configuration of the island settings using the TeSys™ island DTM.

The I/O port assignments can be found in the DTM once the avatars on the island have been selected and the number of PV Inputs and PV Switches have been assigned. The I/O port assignments can be found in the Diagnostics section for the System avatar. The inputs for the avatars are assigned to specific I/O devices and then mapped to ports on that I/O device.

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 39 - VIM Spring Terminal Connector

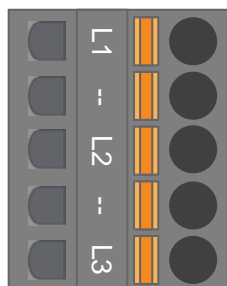


Table 35 - VIM Wiring for Three-Phase Applications

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 55 for cable types and sizes.
3. Insert the spring terminal connector back into the top of the VIM.

NOTE: Voltage frequency detection is on L1. When wiring a line-neutral single-phase system, if the neutral is grounded, ensure that the line is in L1 and the neutral is in L3. Otherwise the frequency reported may be zero.

SIL Interface Module Wiring

Using the island topology and bill of materials, determine the location of the SIL¹¹ 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 40 - SIM Terminal Block

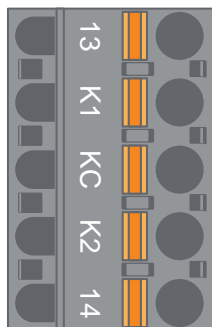


Table 37 - SIM Terminal Block Pinout

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

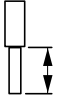



NOTE: There may be multiple SIMs on the island. Ensure that you connect the correct set of wires from the external SIL rated device to the correct SIM module. See the *Functional Safety Guide*, 8536IB1904, for more information.

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 control architecture. In wiring category 1 and 2 applications, terminals K1 and K2 must be shorted together. See *Accessories Cabling*, page 55 for cable types and sizes.
3. Insert the spring terminal connector back into the top of the SIM.

11. Safety Integrity Level according to standard IEC 61508.

Accessories Cabling

Figure 41 - Cabling for SIM, VIM, DIOM, and AIOM

TPRSM001 TPRVM001 TPRDG4X2 TPRAN2X1				
	10 mm	0.2–2.5 mm ²	0.2–2.5 mm ²	0.25–2.5 mm ²
	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 TeSys Island DTM or Operation and Maintenance Tool (OMT).
3	Set the island IPv4 address, if connected via OMT.
4	Import the project file to the TeSys island DTM.
5	Configure the island parameters.
6	Connect to the island with SoMove™ software.
7	Load the project file to the island.
8	Verify the system installation in Test mode.
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	<p>Check the visual indicators on the bus coupler. See <i>TPRBCEIP — Bus Coupler LEDs</i>, page 57</p> <ul style="list-style-type: none"> • The PWR LED on the bus coupler, which indicates power supply and system status, should be steady green. • TPRBCEIP — The MS LED, which indicates bus coupler status, should be flashing green, indicating that the island has not yet been configured. • TPRBCPFN — The BF LED, which indicates an inoperative bus coupler system, should be red, indicating that the island has not yet been configured. • TPRBCPFB — The COM LED, which indicates bus coupler status, should be flashing red acyclic (two quick flashes per second), indicating that the island has not yet been configured.

Figure 42 - TPRBCEIP — Bus Coupler LEDs

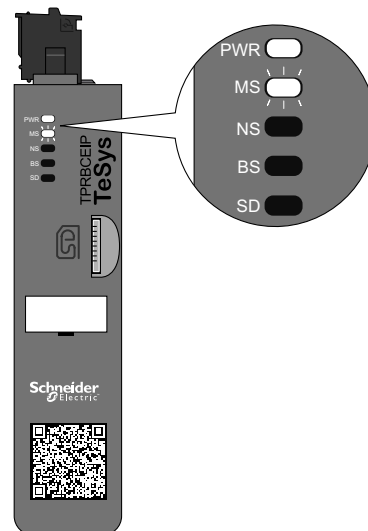


Figure 43 - TPRBCPFN — Bus Coupler LEDs

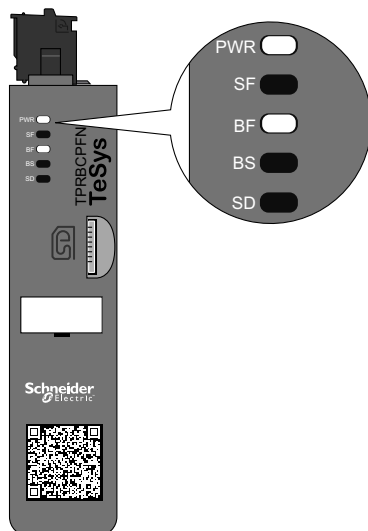
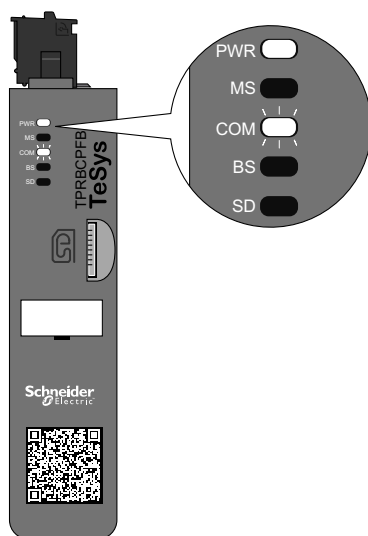


Figure 44 - TPRBCPFB — Bus Coupler LEDs



Connecting to TeSys™ island

The initial connection to TeSys island can be performed using the TeSys island DTM or the Operation and Maintenance Tool (OMT). Depending on your preference, follow the instructions for using DTM or the OMT.

Connecting with TeSys™ island DTM

You can connect to the TeSys island using the default IPv4 IP address on the bus coupler with SoMove™ software running the TeSys island DTM. The PC must be on the same subnet as the default IPv4 address of the bus coupler. The island default addressing mode is DHCP. While in DHCP mode, the island can be reached with a default IP address of 10.10.0.1 with subnet mask 255.0.0.0.

Proceed to the Connecting to TeSys™ island with SoMove™ Software procedure to use the TeSys island DTM.

If you prefer to connect to the island using the OMT, proceed to the Connecting with the OMT procedure.

Connecting with the OMT

This section describes how to connect to the island with the Operation and Maintenance Tool (OMT) using IPv6 or IPv4.

OMT IPv6 Connection

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 via IPv6

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 using File Explorer.
3	Under Other Devices, the TeSys island will appear as "TeSysisland_FFFF." If the island does not appear, you may have to disable the firewall running on your PC.
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.
6	If you are taken to the page, "Your Connection is not private": a. Click the Advanced button. b. Click the link "Proceed to xxx.xxx.xx.xx (unsafe)" to continue.
7	Login with the default username and password (admin, schneider18) and click Login.
8	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.

OMT IPv4 Connection

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. If the TeSys island is set to DHCP (which is the default), then the OMT can connect directly to the bus coupler using the default IPv4 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.

Table 41 - Connecting to the TeSys island with the OMT via IPv4

Step	Action
1	Verify that your PC is connected to the same network as the bus coupler through a wireless or wired connection.
2	Configure your PC with the IPv4 IP address of 10.10.0.2 and the subnet mask of 255.0.0.0.
3	Enter the address (format: <i>https://10.10.0.1</i>) of the bus coupler into the web browser on your tablet to access the OMT running on the bus coupler. NOTE: The recommended browsers are Chrome or Safari.

Table 41 - Connecting to the TeSys island with the OMT via IPv4 (Continued)

Step	Action
4	If you are taken to the page, "Your Connection is not private": a. Click the Advanced button. b. Click the link "Proceed to 10.10.0.1 (unsafe)" to continue.
5	Login with the default username and password (admin, schneider18) and click Login.
6	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 via OMT

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

Once you are connected to the island, setting the IPv4 IP address and gateway information can be performed using the OMT.

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. You will lose connection to the OMT while assigning the IPv4 IP address with the default IPv4 address connection.

Table 42 - Setting the Island IPv4 Address — OMT

Step	Action
1	Click the SETTINGS icon.
2	Click the System Avatar.
3	Click FIELDBUS SETTINGS.
4	Change the IP Mode to Fixed Address to manually set the IP address.
5	Enter the Fieldbus IPv4 Address, Fieldbus Subnet Mask, and Gateway Address of the bus coupler.
6	Enter the Network Name for the bus coupler.
7	Click Save.
8	Configure your PC with an IPv4 IP address and subnet mask in the same network that you recently applied to the bus coupler.
9	Enter the new address (format: https://xxx.xxx.xxx.xxx) of the bus coupler into the web browser on your tablet to access the OMT running on the bus coupler. NOTE: The recommended browsers are Chrome or Safari.
10	Login to the OMT with the new password and verify the IP address has been successfully changed.

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 43 - Connecting to the TeSys island with SoMove Software

Step	Action
1	Check the LED indicators on the bus coupler and verify that power is applied. Verify that the PWR LED , indicating the power supply and system status, is steady green, and the MS LED , indicating the bus coupler status, is flashing green.
2	Connect a PC (with SoMove software and the TeSys island DTM installed) to the terminal/service port on the bus coupler using an RJ45 cable.
3	Launch the SoMove software on the PC.
4	Click the Connect button in the Start screen.
5	In the Scan Result dialog box, click the Modbus TCP tab.
6	Click the edit symbol next to the question mark.
7	In the Advanced settings dialog box, enter the network address of the TeSys island in the Target address. The network address by default is 10.10.0.1 or enter the IP address that was assigned using the OMT.
8	Select Single as the Scan Type and click OK.
9	Click Scan Network in the Scan Result dialog box.
10	Select the TeSys island device and click Connect.

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.

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

Table 44 - In the Start screen

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

Table 45 - In the TeSys island DTM

Step	Action
1	Click Device at the top of the screen and select Import -> Import Pre-Sales Format from the drop down menu.
2	A pop-up window will appear. Click Yes 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 File Name field.
3	Click the Open button. The island configuration has now been imported into the TeSys island DTM.

Table 47 - In the TeSys island DTM

Step	Action
1	Click File -> Save As and enter the name of the island in the File Name field..
2	Click the Save 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.

If the DTM displays the message "The system as configured using Modbus/TCP may result in a lack of data consistency for one function block input. Please see the installation guide for more information." then one multi-byte function block input datum may be accessed by multiple Modbus/TCP PLC reads and could be incorrectly displayed in the function blocks. Use EtherNet/IP to ensure data consistency.

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 SETTINGS tab in the DTM tool.
2	Under AVATARS , click the System Avatar.
3	Configure the system Avatar settings for the Fieldbus and Ethernet services settings.
4	Click OK 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 MY AVATAR .
2	Click on each Avatar where energy monitoring will be used.
3	In AVATAR PARAMETERS , change the setting in LOAD ENERGY MONITORING from No to Yes .
4	Click OK to save the changes.

Avatar Settings

⚠ WARNING
<p>UNINTENDED EQUIPMENT OPERATION</p> <ul style="list-style-type: none"> • Be sure to set the protection function parameters according to the required protection level of the controlled motors and loads. • TeSys™ GV2 motor circuit breakers should not be used with TeSys island for loads with trip classes set above trip class 15. <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</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 SETTINGS tab in the DTM tool.
2	Under AVATARS , click the Avatar to be configured.
3	Configure the protection functions for each Avatar.
4	Click OK 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 PWR LED , indicating the power supply and system status, is steady green and the MS LED , 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 Connect 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 Store to Device .
4	Select the project file that you wish to load to the bus coupler from the PC.

Verifying the System Installation in Test Mode

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

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 64.

Table 53 - Verifying the System Installation in Test Mode

Step	Action
1	Access the physical devices on the island: <ul style="list-style-type: none"> • To access the PHYSICAL VIEW using the TeSys island DTM, go to the Diagnostics → Devices tab and click on the device in the Physical View section. • To access the Island View using the OMT, click on the Island View panel, then click on the device.
2	Click the Close or Open command under Test Command.
3	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.
4	Click any device in the island topology to perform a test command.
5	After you test all devices, exit Test mode as described in the following table.

Table 54 - Exiting Test Mode

Step	Action
1	Click the Diagnostics panel or tab.
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.

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 55 - 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
- SIL¹² interface module wiring
- Voltage interface module wiring

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

Table 56 - 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 57 - 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
<ul style="list-style-type: none"> • 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 58 - Apply Mains Power

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

12. Safety Integrity Level according to standard IEC 61508.

Force Mode

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Before using Force mode, ensure that forcing parameters or energizing loads will not result in unsafe conditions.

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

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 59 - Simulating a PLC Command with Force Mode

Step	Action
1	Access Force mode: <ul style="list-style-type: none"> • To access Force mode using the OMT, navigate to the Avatar View panel and select an avatar. Click I/O View. The logic diagram for the selected avatar is displayed. • To access Force mode using the TeSys™ island DTM, click the Diagnostics tab and select an avatar from Avatars. Click Status. The logic diagram for the avatar is displayed.
2	To simulate receipt of a PLC command: <ul style="list-style-type: none"> • To simulate an Open command from the PLC, click Force 0. • To simulate a Close command from the PLC, click Force 1.
3	When finished, exit Force mode. See <i>Exiting Force Mode</i> , page 67.

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 60 - 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 66.
2	To simulate avatar status: <ul style="list-style-type: none"> • Click Force 0 to simulate transmission of contactor Closed status to the PLC. • Click Force 1 to simulate transmission of contactor Open status to the PLC.
3	When finished, exit Force mode. See <i>Exiting Force Mode</i> , page 67.

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 61 - Status Box

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

Table 62 - 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 66</i> .
2	To simulate I/O status, under From PLC : <ul style="list-style-type: none"> Click Force 0 to turn Off the digital output. Click Force 1 to Close the digital output status. Under To PLC : <ul style="list-style-type: none"> Click Force 0 to Close the digital input status. Click Force 1 to Open the digital input status.

Exiting Force Mode

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

Table 63 - Exiting Force Mode

Step	Action
1	To exit Force mode using the TeSys island DTM, in the Diagnostics tab, click Exit next to Force Mode , and then confirm you wish to exit.
2	To exit Force mode from the OMT: <ul style="list-style-type: none"> Click the Diagnostics panel. Click the Exit force mode button. A hazard message pop-up window appears. Click Yes 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 64 - 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

Standard Starter (ST)



Power Interface Module (PM)



SIL¹³ Starter (SS)



SIL Interface Module (SM)



Digital I/O Module (DG)



Analog I/O Module (AN)



Table 65 - Avatar Modules

TeSys™ Avatar	Module 1	Module 2	Module 3	Module 4	Module 5	Optional
Switch	ST					
Switch - SIL Stop, W. Cat 1/2 ¹⁴	SS	SM				
Switch - SIL Stop, W. Cat 3/4 ¹⁵	SS	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/DG
Motor One Direction - SIL Stop, W. Cat 1/2	SS	SM				AN
Motor One Direction - SIL Stop, W. Cat 3/4	SS	SS	SM			AN
Motor Two Directions	ST	ST				AN/DG
Motor Two Directions - SIL Stop, W. Cat 1/2	SS	SS	SM			AN
Motor Two Directions - SIL Stop, W. Cat 3/4	SS	SS	SS	SM		AN
Motor Y/D One Direction	ST	ST	ST			AN/DG
Motor Y/D Two Directions	ST	ST	ST	ST		AN/DG
Motor Two Speeds	ST	ST				AN/DG
Motor Two Speeds - SIL Stop, W. Cat 1/2	SS	SS	SM			AN
Motor Two Speeds - SIL Stop, W. Cat 3/4	SS	SS	SS	SM		AN
Motor Two Speeds Two Directions	ST	ST	ST	ST		AN/DG
Motor Two Speeds Two Directions - SIL Stop, W. Cat 1/2	ST	ST	SS	SS	SM	AN
Motor Two Speeds Two Directions - SIL Stop, W. Cat 3/4	SS	SS	SS	SS	SM	AN
Resistor	ST					
Power Supply	ST					

13. Safety Integrity Level according to standard IEC 61508.

14. Wiring Category 1 and Category 2 according to ISO 13849.

15. Wiring Category 3 and Category 4 according to ISO 13849.

Table 65 - Avatar Modules (Continued)

TeSys™ Avatar	Module 1	Module 2	Module 3	Module 4	Module 5	Optional
Transformer	ST					
Pump	DG	ST				AN/DG
Conveyor One Direction	DG	ST				AN/DG
Conveyor One Direction - SIL Stop, W. Cat 1/2	DG	SS	SM			AN/DG
Conveyor Two Directions	DG	ST	ST			AN/DG
Conveyor Two Directions - SIL Stop, W. Cat 1/2	DG	SS	SS	SM		AN/DG

Table 66 - LAD9R1 Assembly Kit for 9–38 A (Size 1 and 2) Starters

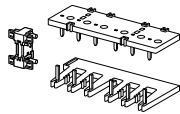
LAD9R1 Assembly Kit	For Use with Avatars:	Kit Components	Description
	Motor Two Directions	LAD9V5	Parallel link between two starters
	Motor Two Directions - SIL Stop, W. Cat 1/2	LAD9V6	Reversing link between two starters
	Motor Two Directions - SIL Stop, W. Cat 3/4	LAD9V2	Mechanical interlock with assembly staple
	Motor Y/D One Direction		
	Motor Two Speeds Two Directions		
	Motor Two Speeds Two Directions - SIL Stop, W. Cat 1/2		
	Motor Two Speeds Two Directions - SIL Stop, W. Cat 3/4		
	Conveyor Two Directions		
Conveyor Two Directions - SIL Stop, W. Cat 1/2			

Table 67 - LAD9R3 Assembly Kit for 40–65 A (Size 3) Starters

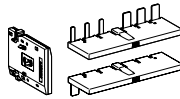
LAD9R3 Assembly Kit	For Use with Avatars:	Kit Components	Description
	Motor Two Directions	LA9D65A6	Parallel link between two starters
	Motor Two Directions - SIL Stop, W. Cat 1/2	LA9D65A9	Reversing link between two starters
	Motor Two Directions - SIL Stop, W. Cat 3/4	LAD4CM	Mechanical interlock
	Motor Y/D One Direction		
	Motor Two Speeds Two Directions		
	Motor Two Speeds Two Directions - SIL Stop, W. Cat 1/2		
	Motor Two Speeds Two Directions - SIL Stop, W. Cat 3/4		
	Conveyor Two Directions		
Conveyor Two Directions - SIL Stop, W. Cat 1/2			

Table 68 - Shorting Blocks for Y/D Avatars

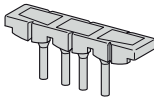

Shorting Blocks	For Use with Avatars:	Reference Number	Description
	Motor Y/D One Direction Motor Y/D Two Directions	LAD9P3	Shorting block / 3P parallel link for 9–38 A (size 1 and 2) starters Used for linking 3 poles of a contactor in a wye-delta (Y/D) starter
	Motor Y/D One Direction Motor Y/D Two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

Table 69 - Mechanical Interlocks

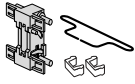

Mechanical Interlocks	For Use with Avatars:	Reference Number	Description
	Motor Y/D One Direction Motor Y/D Two Directions Motor Two Speeds Motor Two Speeds - SIL Stop, W. Cat 1/2 Motor Two Speeds - SIL Stop, W. Cat 3/4 Motor Two Speeds Two Directions Motor Two Speeds Two Directions - SIL Stop, W. Cat 1/2 Motor Two Speeds - SIL Stop, W. Cat 3/4	LAD9V2	Mechanical interlock for 9–38 A (size 1 and 2) starters
	Motor Y/D One Direction Motor Y/D Two Directions Motor Two Speeds Motor Two Speeds - SIL Stop, W. Cat 1/2 Motor Two Speeds - SIL Stop, W. Cat 3/4 Motor Two Speeds Two Directions Motor Two Speeds Two Directions - SIL Stop, W. Cat 1/2 Motor Two Speeds Two Directions - SIL Stop, W. Cat 3/4	LAD4CM	Mechanical interlock for 40–65 A (size 3) starters

Table 70 - Reversing Links

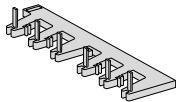
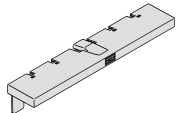
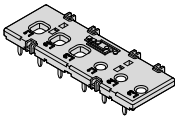
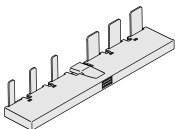
Reversing Links	For Use with Avatars:	Reference Number	Description
	Motor Y/D One Direction Motor Y/D Two Directions	LAD9V6	Reversing link for 9–38 A (size 1 and 2) starters
	Motor Y/D One Direction Motor Y/D Two Directions	LA9D65A9	Reversing link for 40–65 A (size 3) starters

Table 71 - Parallel Links

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

Avatar Wiring Schematics and Accessory Diagrams

Bus Coupler with I/O Modules and Voltage Interface Modules

NOTE: The TPRBCEIP and TPRBCPFN bus couplers each have three RJ45 ports. The TPRBCPFB bus coupler has only one RJ45 port.

Figure 45 - Wiring

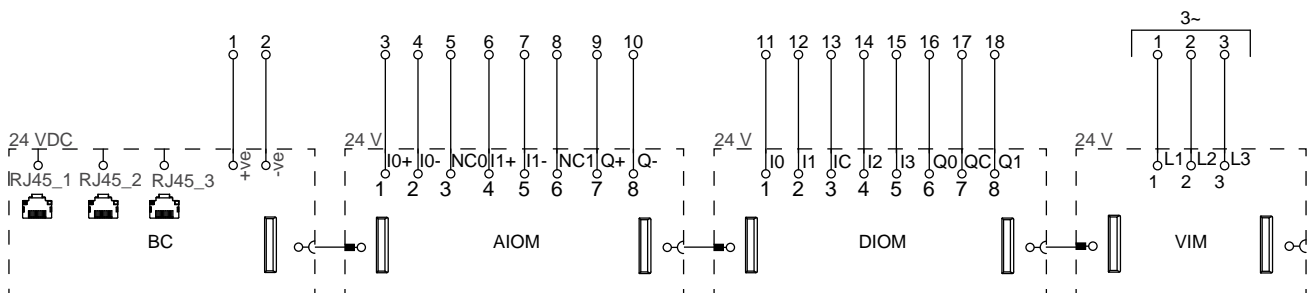


Table 72 - Legend

BC	Bus Coupler (TPRBCEIP)
AIOM	Analog I/O Module
DIOM	Digital I/O Module
VIM	Voltage Interface Module

Switch

Figure 46 - Wiring

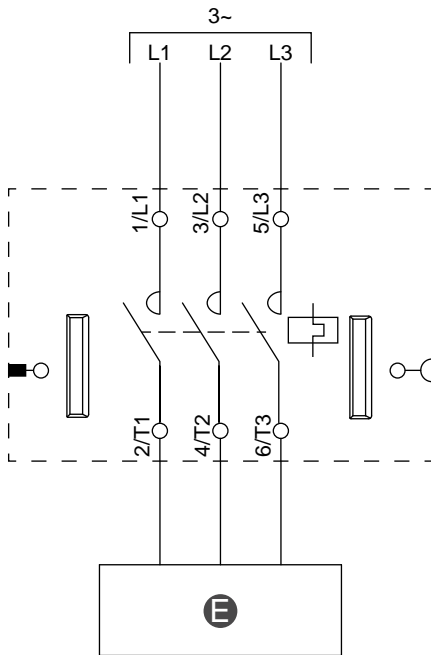


Table 73 - Legend

E	Electrical circuit
---	--------------------

Switch - SIL Stop, W. Cat 1/2

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

Figure 47 - Wiring

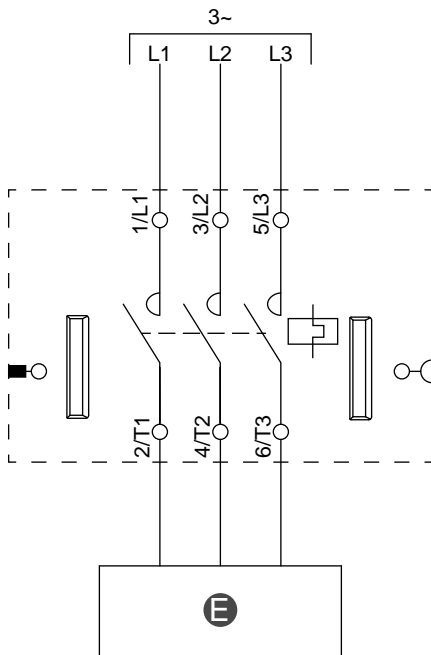


Table 74 - Legend

E	Electrical circuit
---	--------------------

Switch - SIL Stop, W. Cat 3/4

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 3 and Category 4 according to ISO 13849.

Figure 48 - Wiring (See Legend Table below)

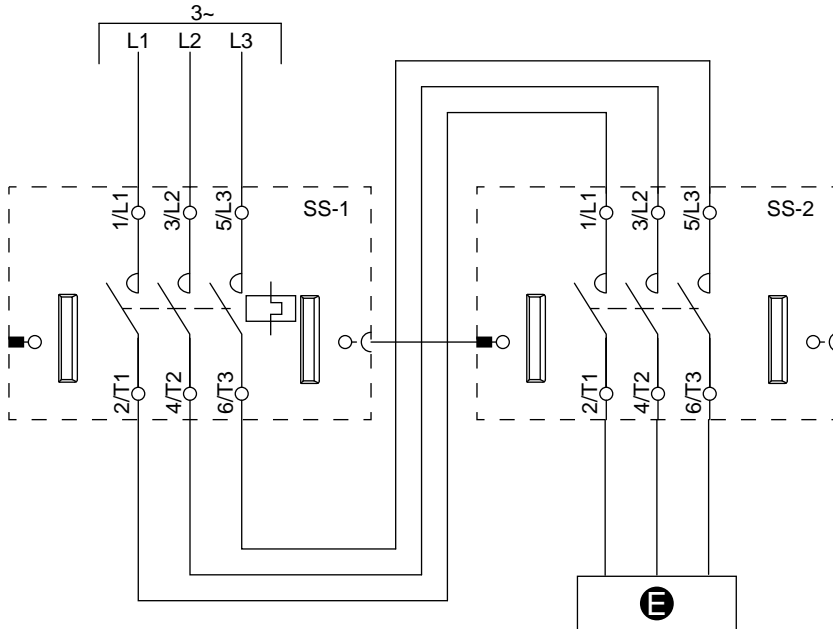
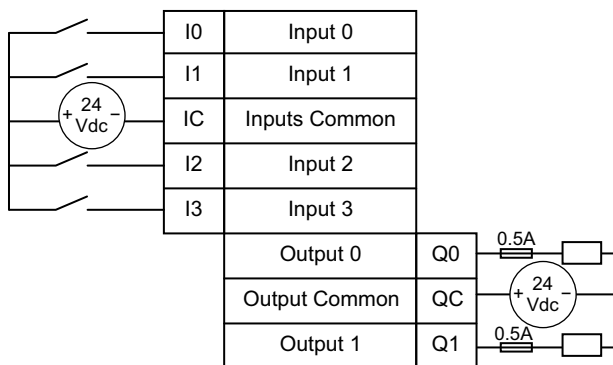


Table 75 - Legend

E	Electrical Circuit
SS-1	SIL starter 1
SS-2	SIL starter 2

Digital I/O

Figure 49 - Wiring



Analog I/O

Figure 50 - Current/Voltage Analog Device Input

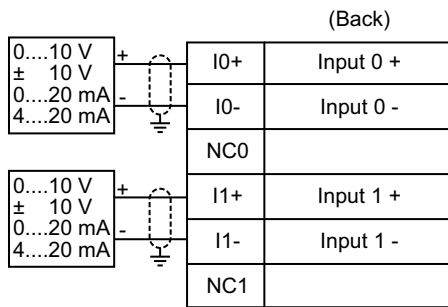


Figure 51 - Thermocouples and Positive Temperature Coefficient (PTC) Binary

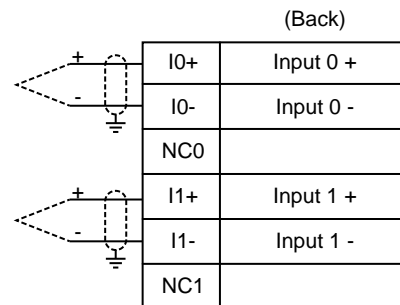


Figure 52 - Resistance Temperature Detector

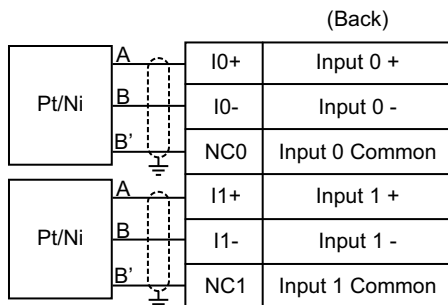
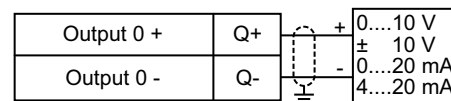


Figure 53 - Current/Voltage Analog Device Output



Power Interface without I/O (Measure)

Figure 54 - Wiring

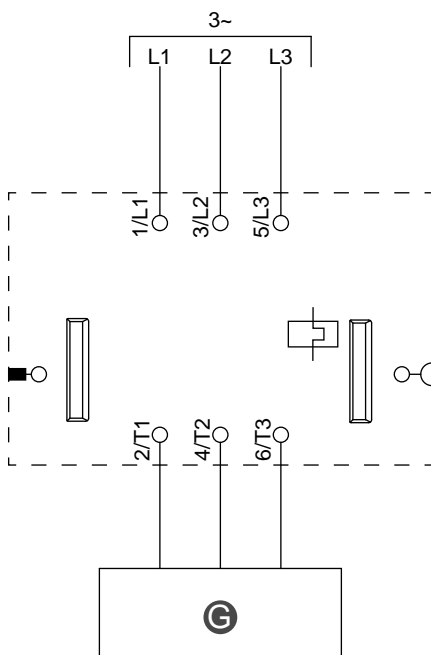


Table 76 - Legend

G	Relay, soft starter, or variable speed drive
----------	--

Power Interface with I/O (Control)

Figure 55 - Wiring

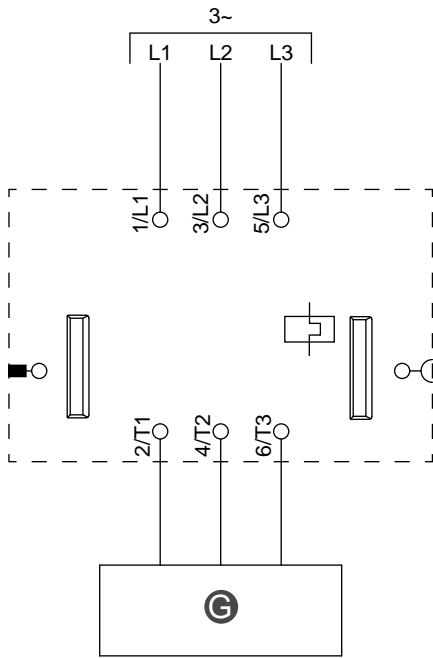
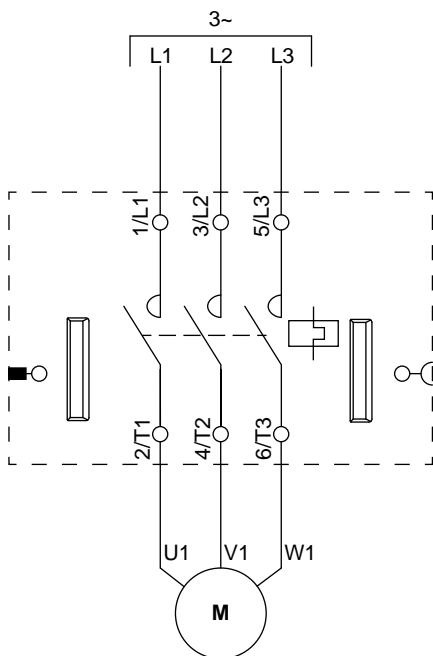


Table 77 - Legend

G	Relay, soft starter, or variable speed drive
---	--

Motor One Direction

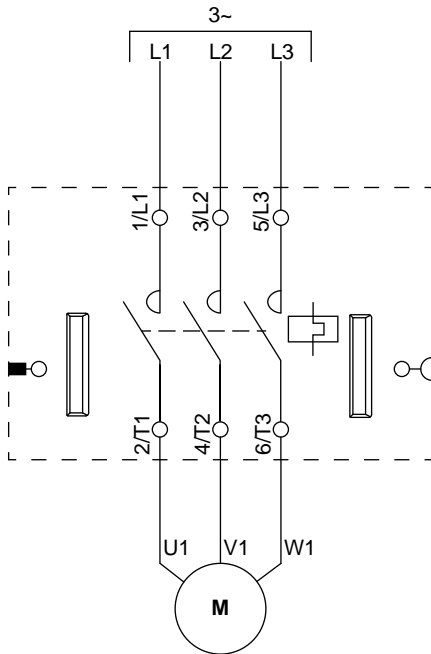
Figure 56 - Wiring



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

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

Figure 57 - Wiring



Motor One Direction - SIL Stop, W. Cat 3/4

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 3 and Category 4 according to ISO 13849.

Figure 58 - Wiring (See Legend Table below)

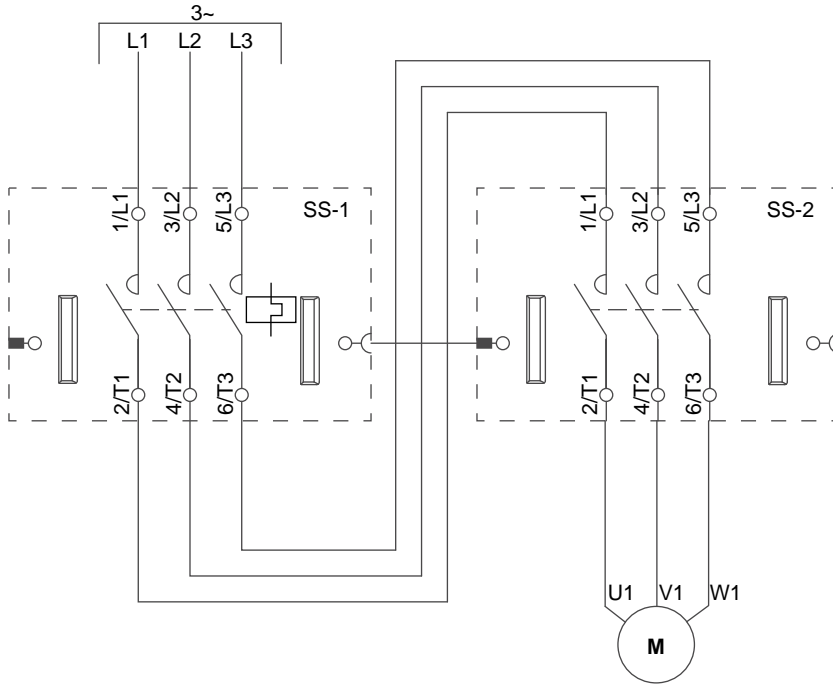


Table 78 - Legend

SS-1	SIL starter 1
SS-2	SIL starter 2

Motor Two Directions

Figure 59 - Wiring (See Legend Table below.)

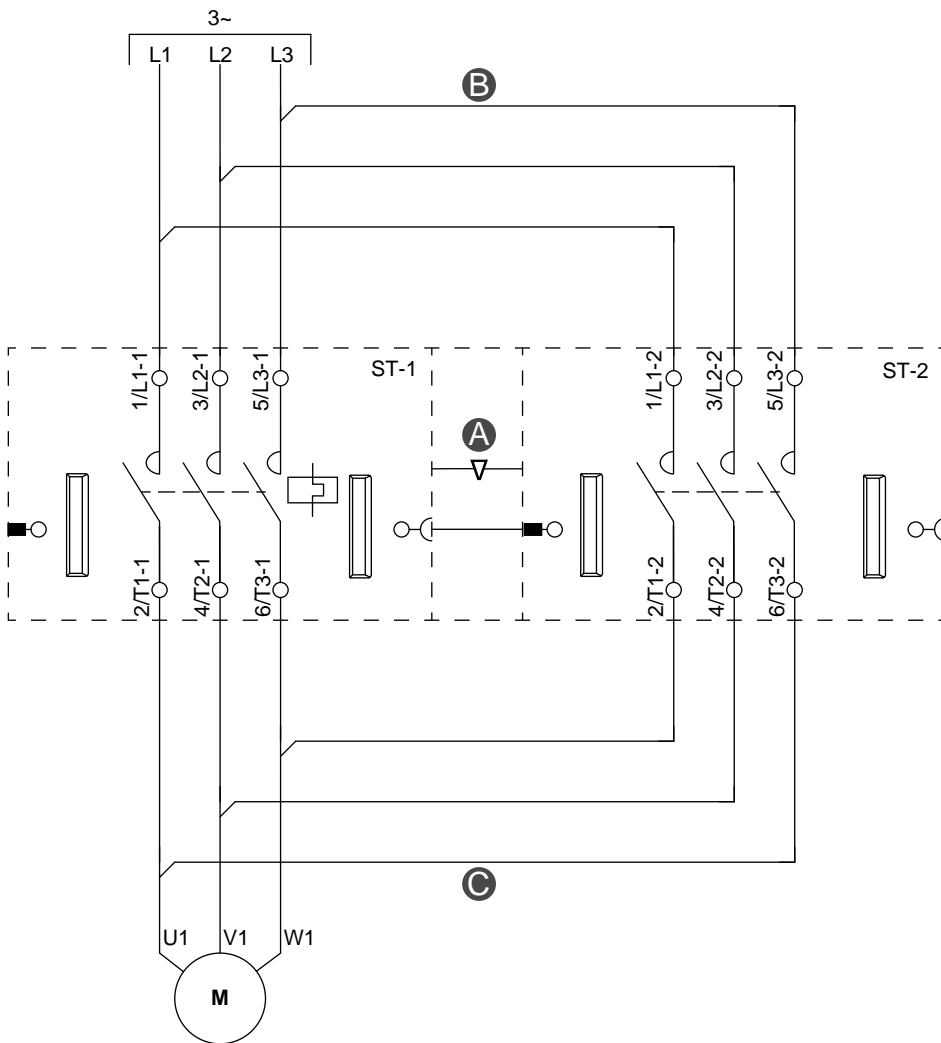


Figure 60 - Accessories

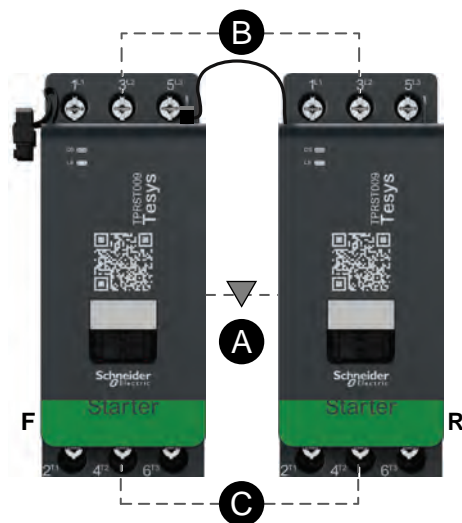


Table 79 - Legend

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

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

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

Figure 61 - Wiring (See Legend Table below.)

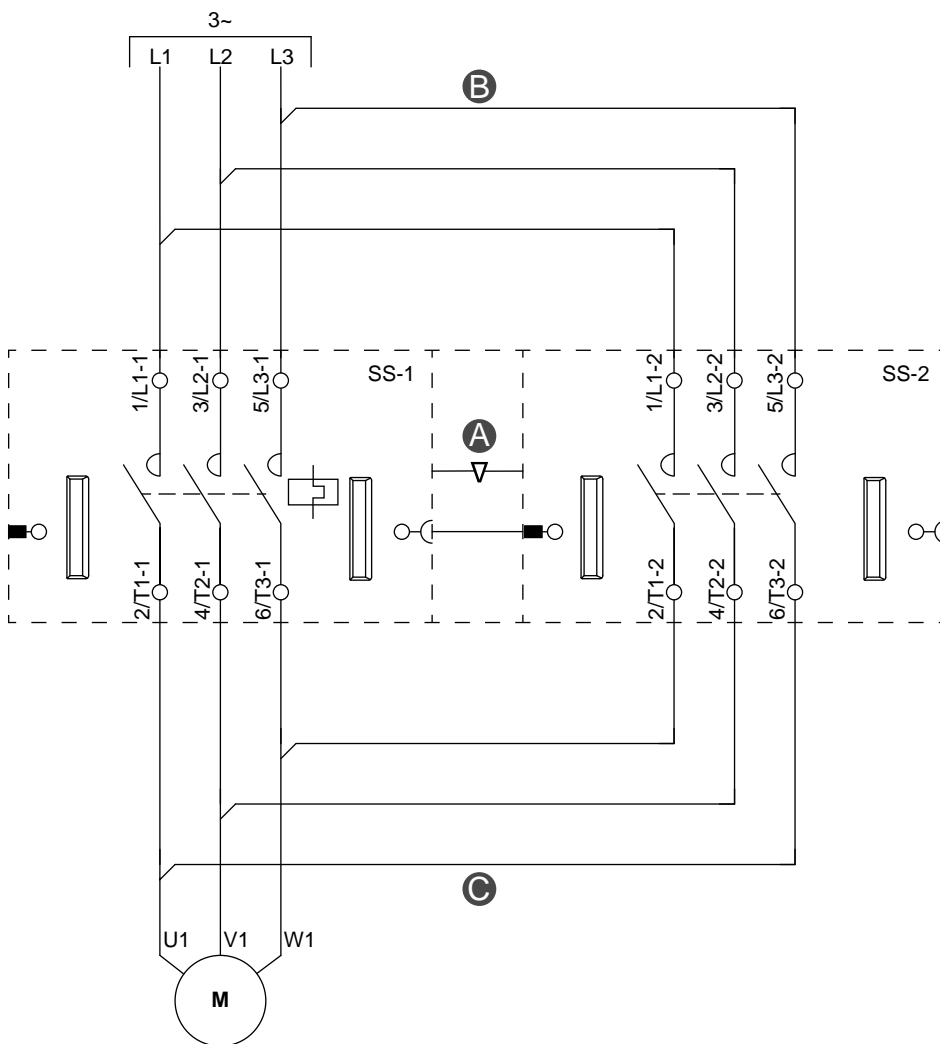


Figure 62 - Accessories

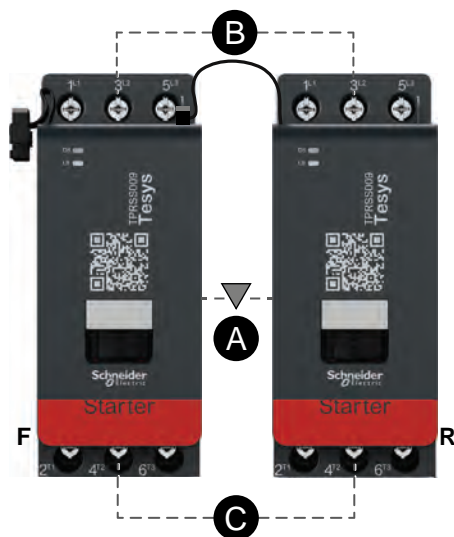


Table 80 - Legend

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

Motor Two Directions - SIL Stop, W. Cat 3/4

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 3 and Category 4 according to ISO 13849.

Figure 63 - Wiring (See Legend Table below)

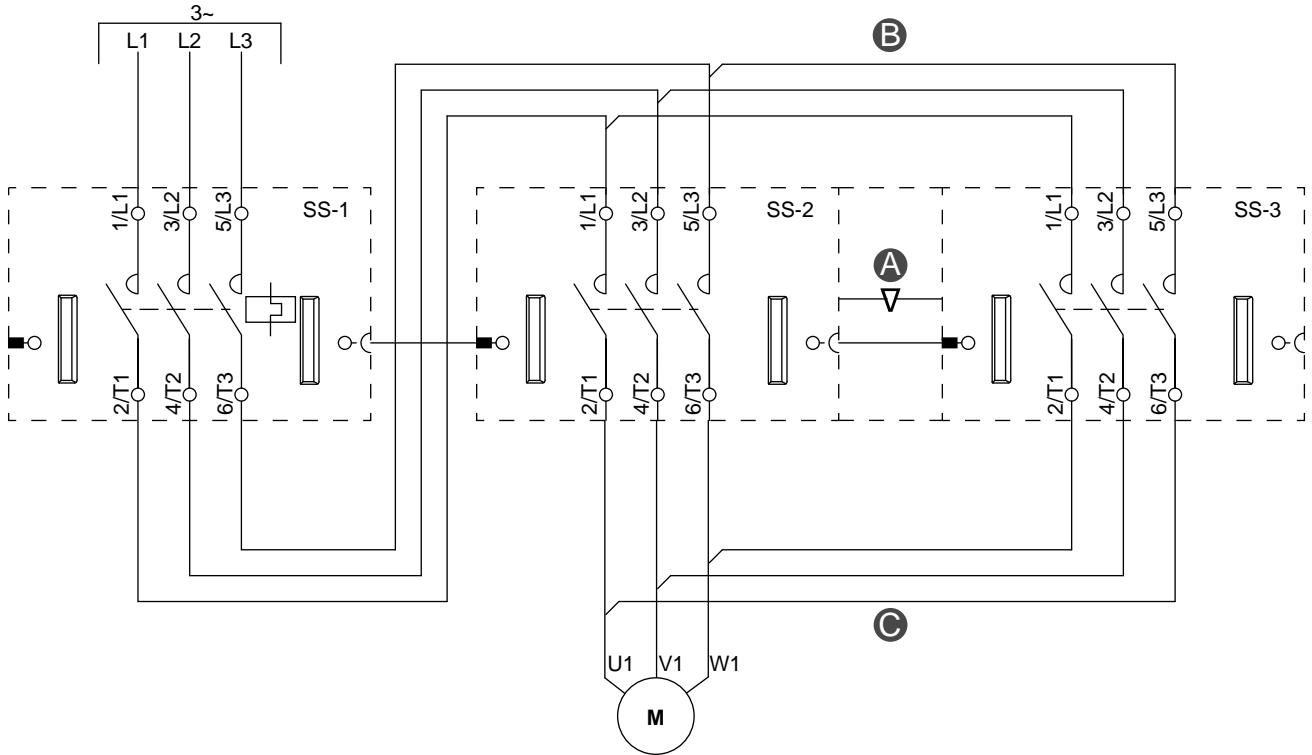


Figure 64 - Accessories

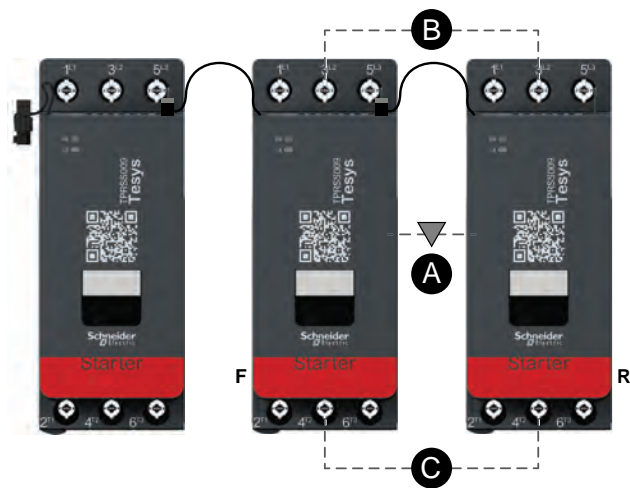


Table 81 - Legend

A	Mechanical interlock
B	Parallel link
C	Reversing link
F	Forward
R	Reverse
SS-1	SIL starter 1
SS-2	SIL starter 2
SS-3	SIL starter 3

Motor Y/D One Direction

Figure 65 - Wiring (See Legend Table below.)

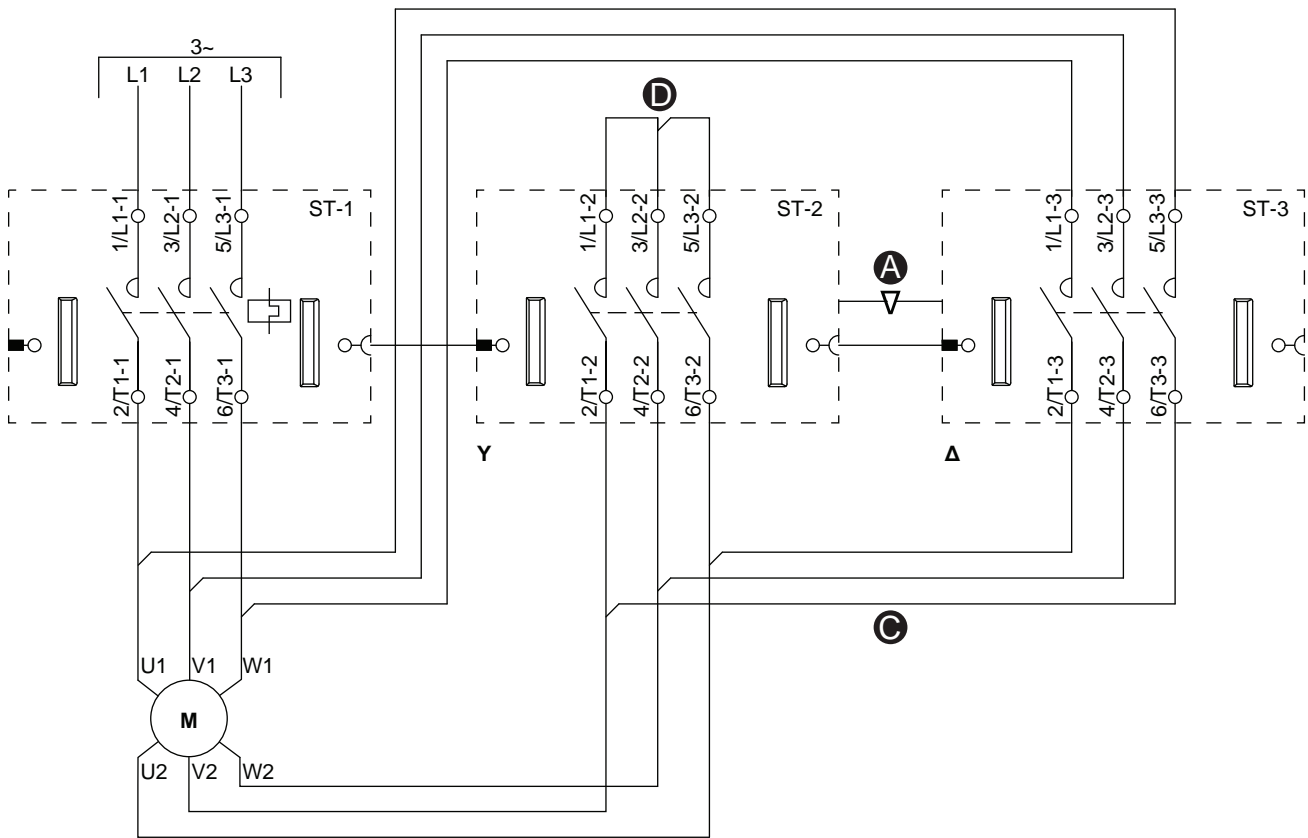


Figure 66 - Accessories

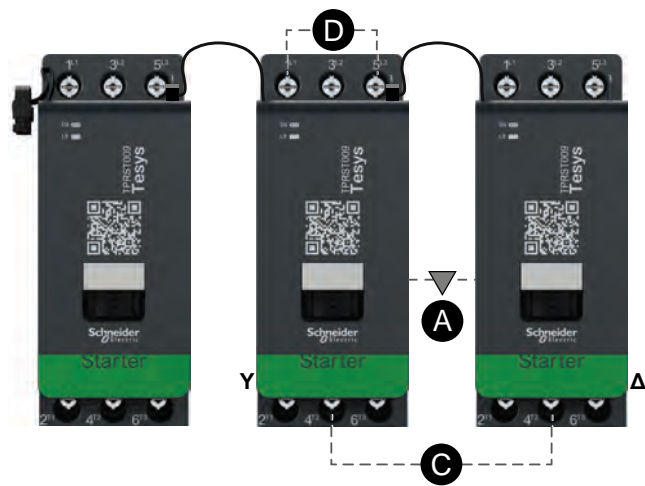


Table 82 - Legend

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

Motor Y/D Two Directions

Figure 67 - Wiring (See Legend Table below.)

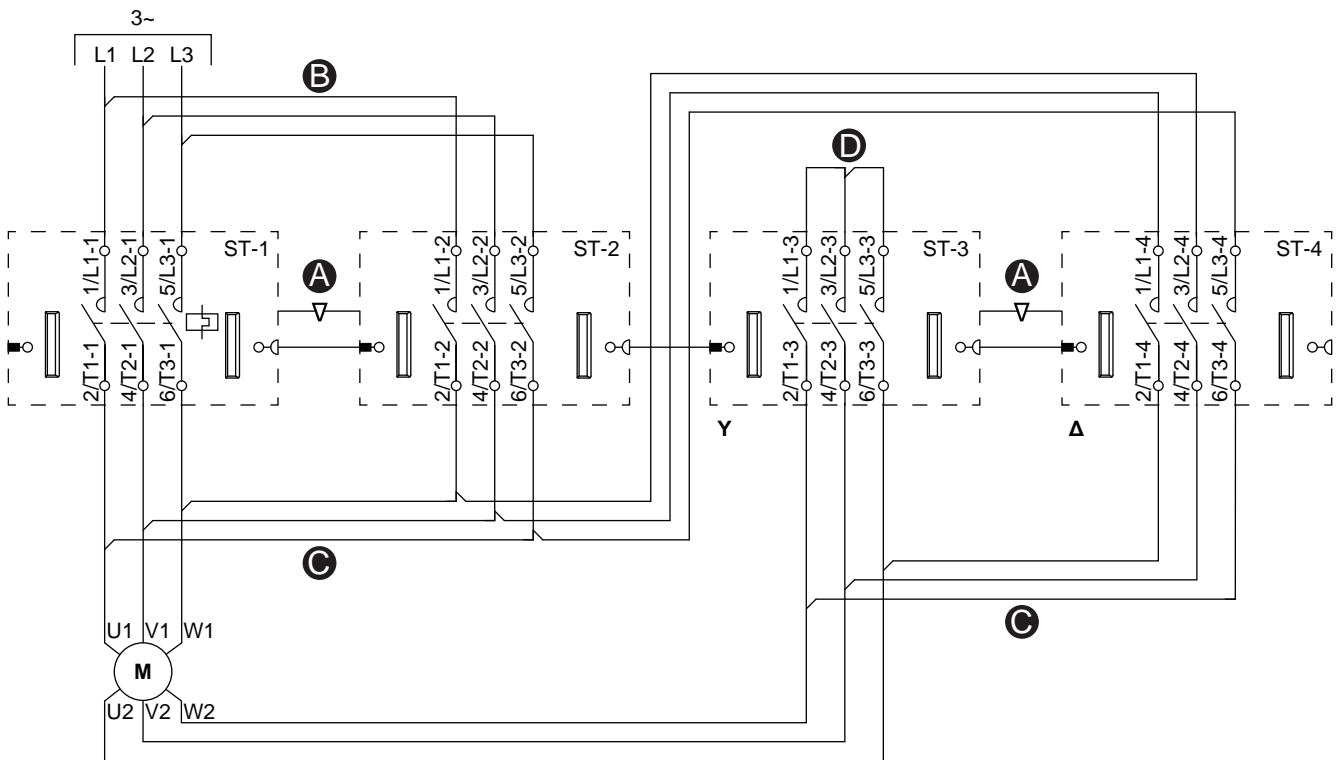


Figure 68 - Accessories

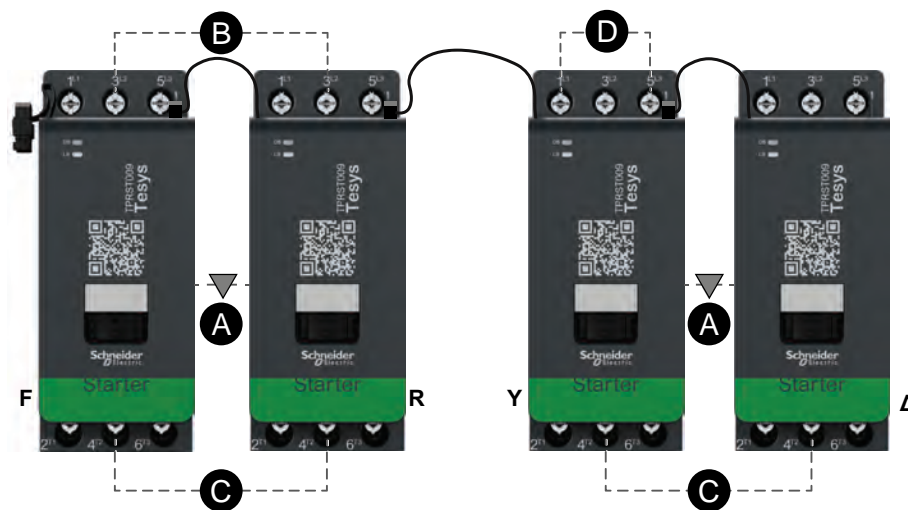


Table 83 - Legend

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

Motor Two Speeds

Figure 69 - Wiring (See Legend Table below.)

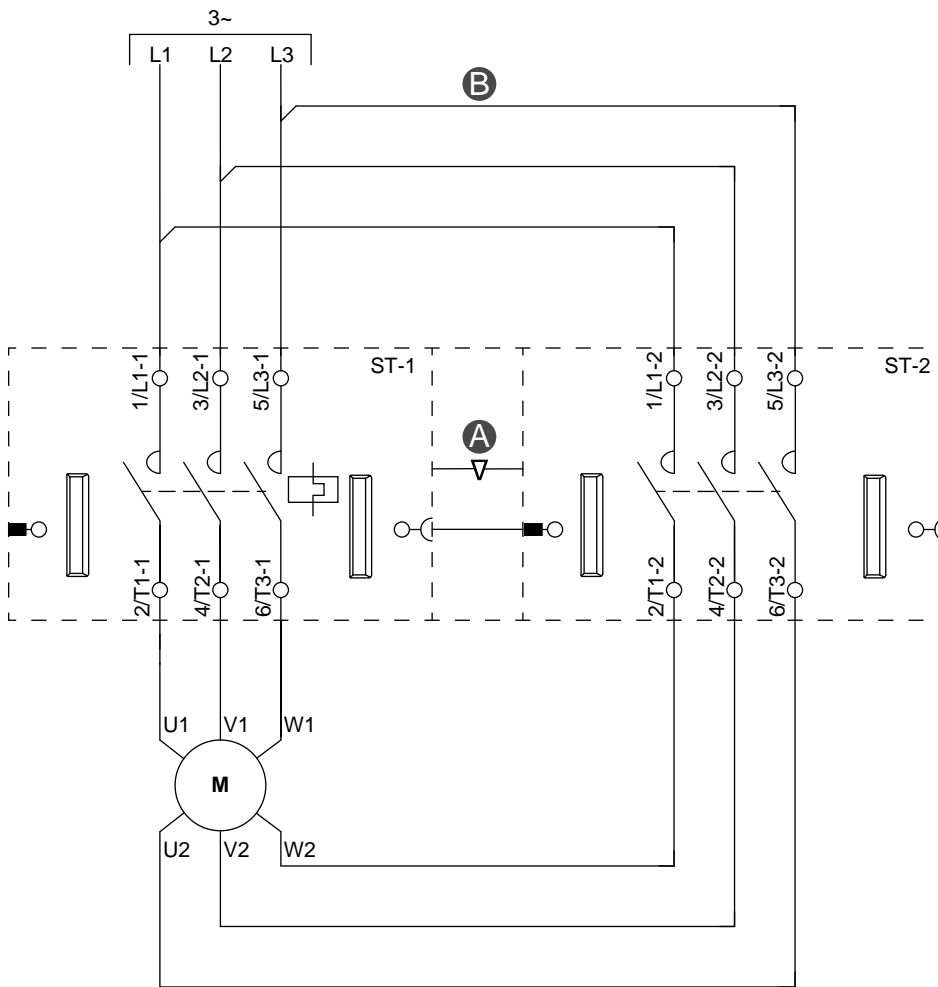


Figure 70 - Accessories

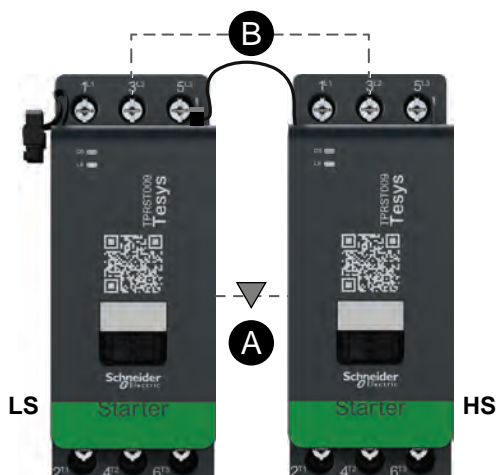


Table 84 - Legend

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

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

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

Figure 71 - Wiring (See Legend Table below.)

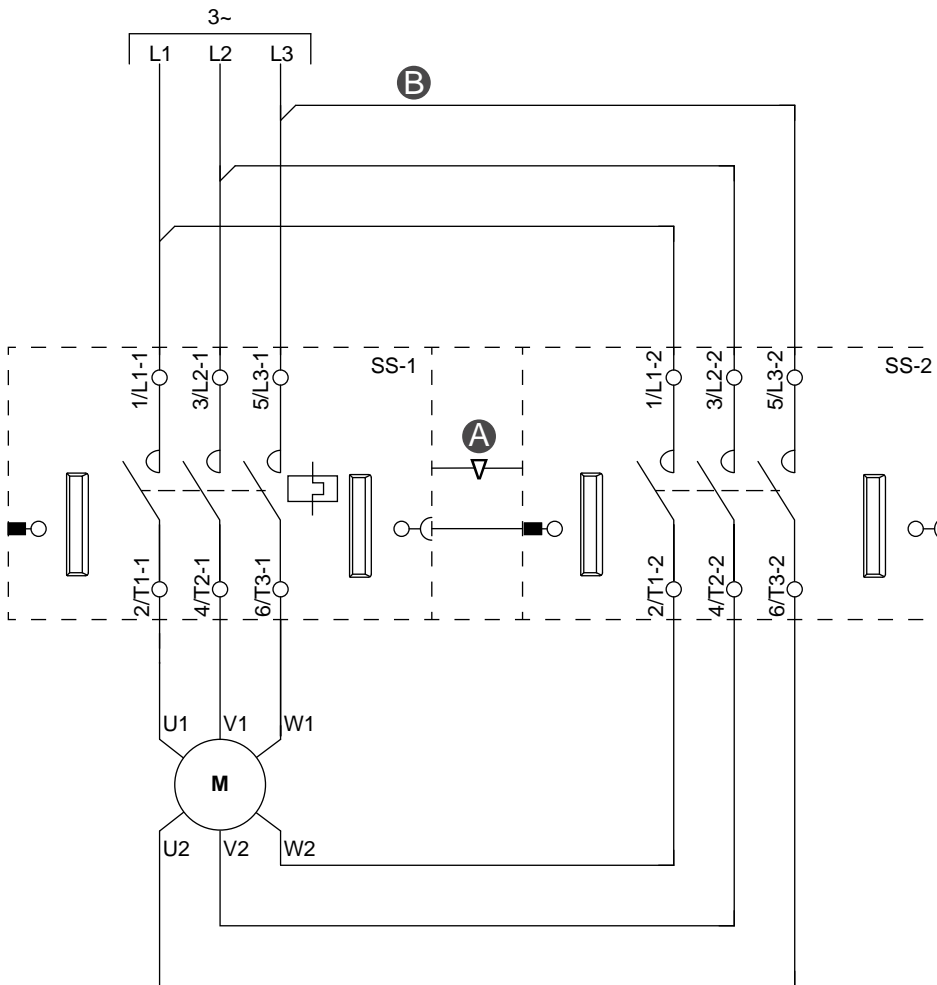


Figure 72 - Accessories

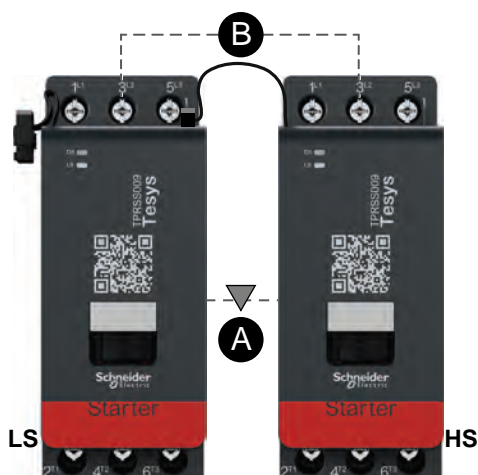


Table 85 - Legend

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

Motor Two Speeds - SIL Stop, W. Cat 3/4

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 3 and Category 4 according to ISO 13849.

Figure 73 - Wiring (See the table below.)

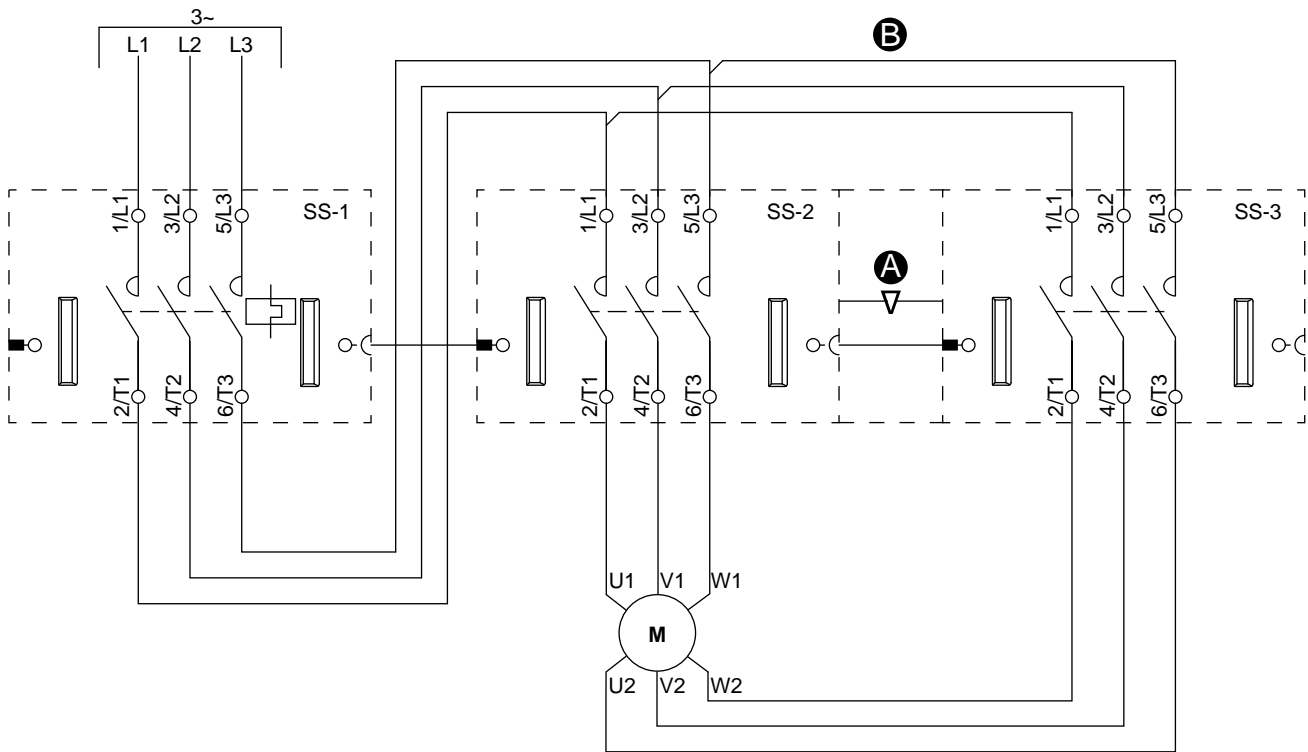


Figure 74 - Accessories

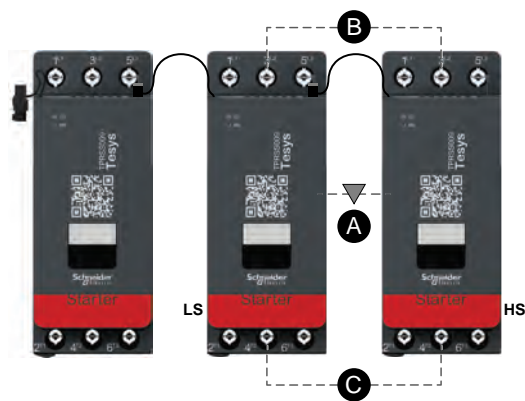


Table 86 - Legend

A	Mechanical interlock
B	Parallel link
LS	Low speed
HS	High speed
SS-1	SIL starter 1
SS-2	SIL starter 2
SS-3	SIL starter 3

Motor Two Speeds Two Directions

Figure 75 - Wiring (See Legend Table below.)

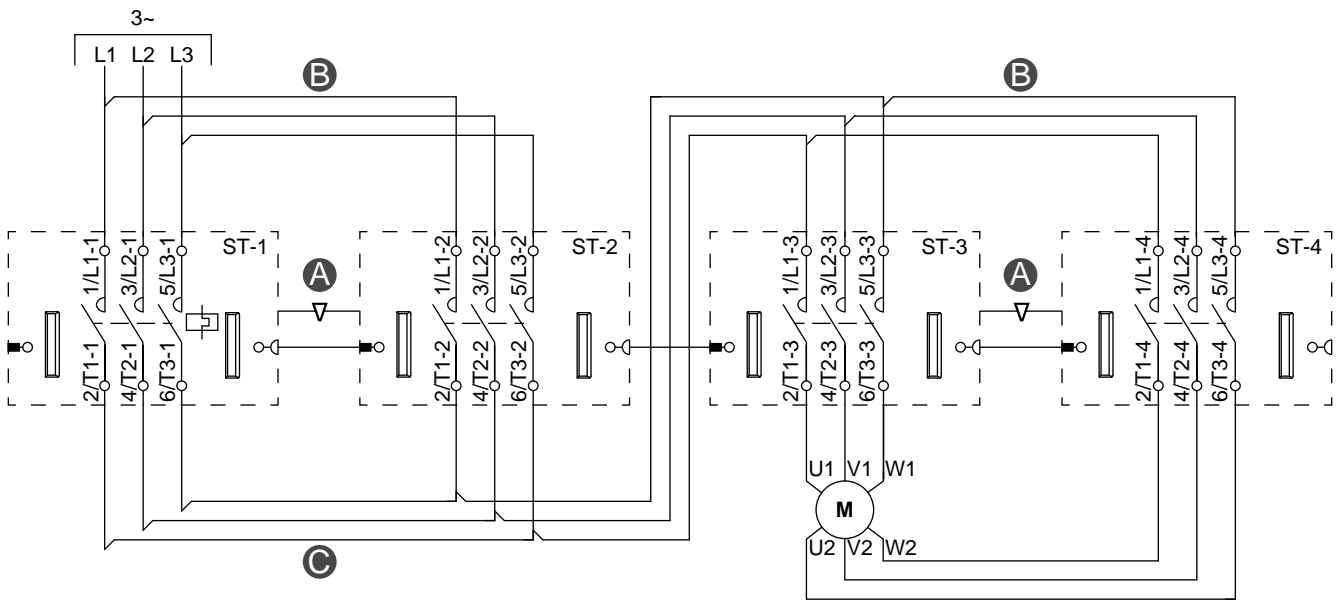


Figure 76 - Accessories

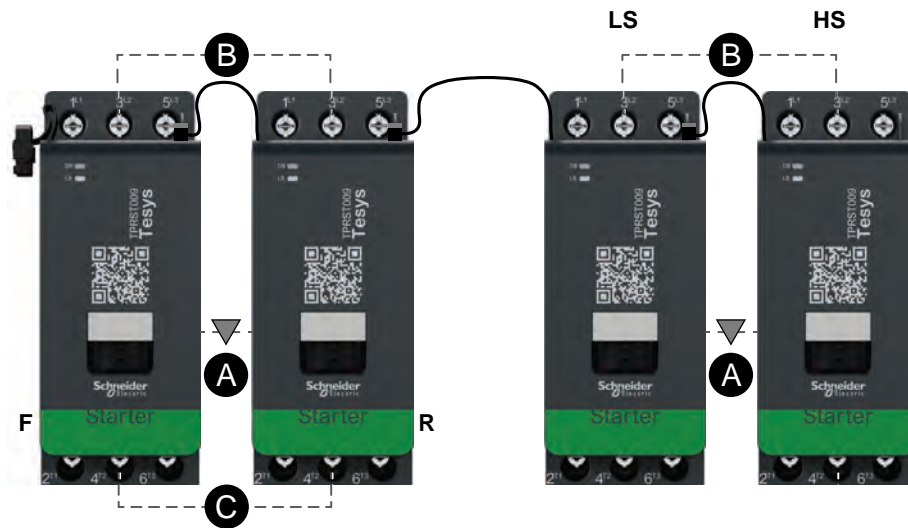


Table 87 - Legend

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

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

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

Figure 77 - Wiring (See Legend Table below.)

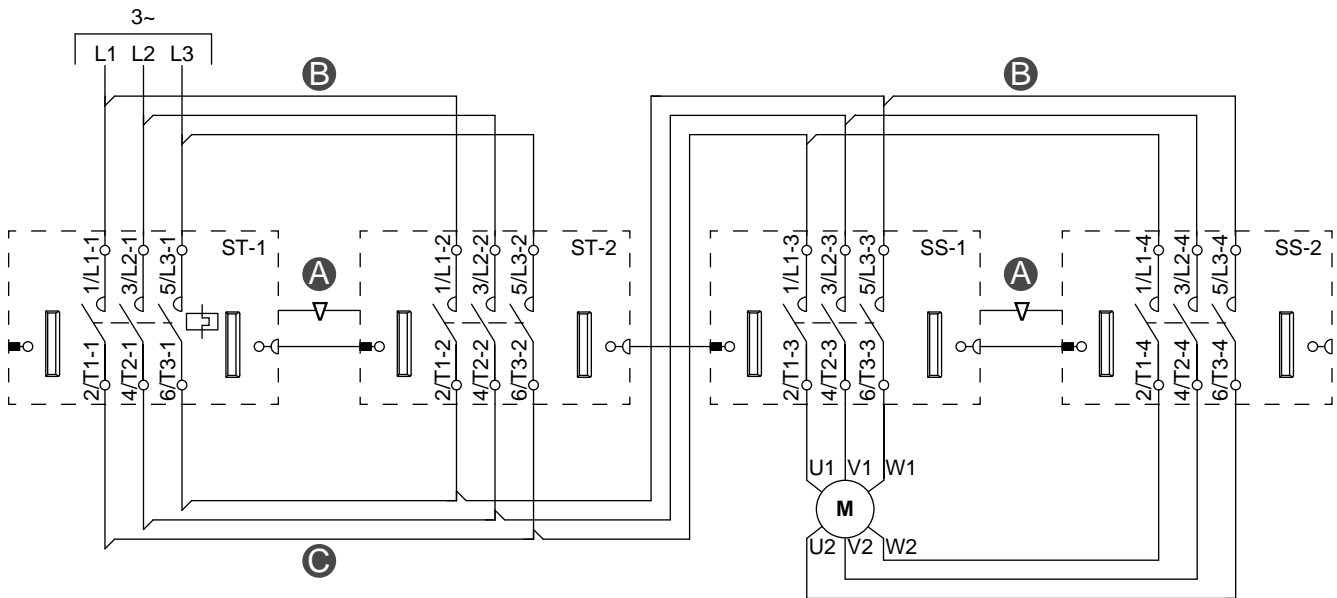


Figure 78 - Accessories

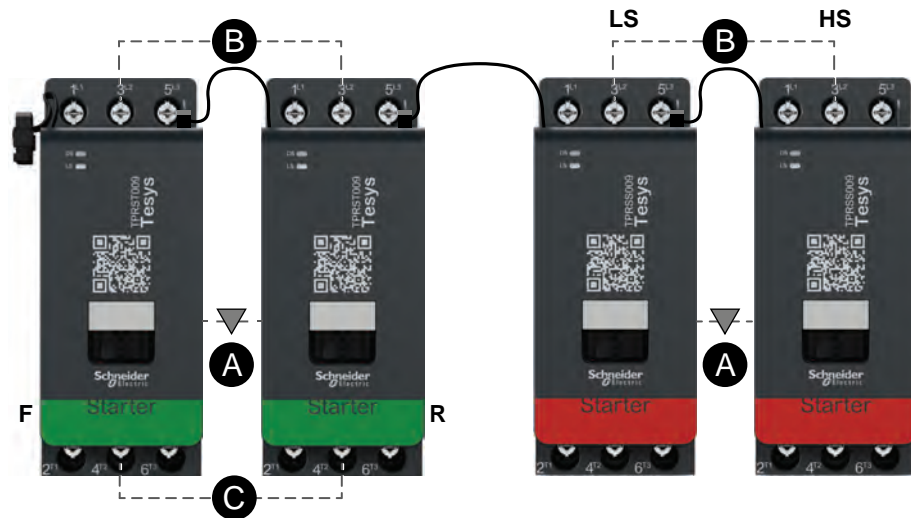


Table 88 - Legend

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

Motor Two Speeds Two Directions - SIL Stop, W. Cat 3/4

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 3 and Category 4 according to ISO 13849.

Figure 79 - Wiring (See Legend Table below)

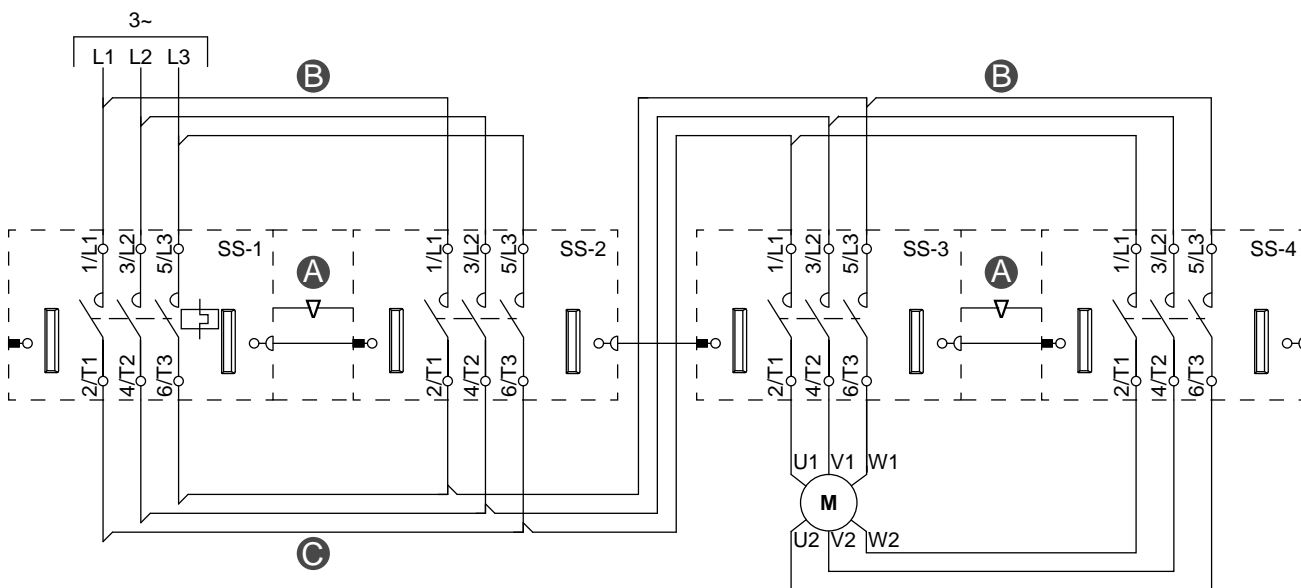


Figure 80 - Accessories

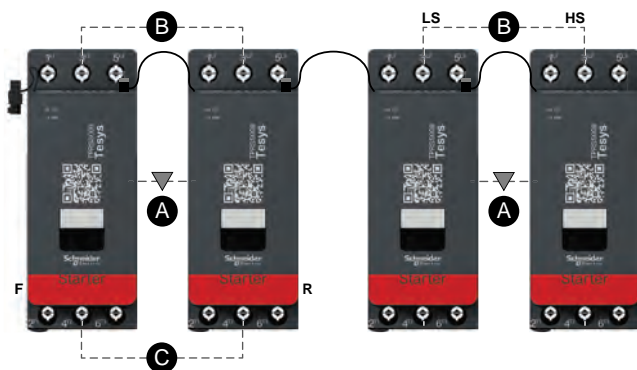
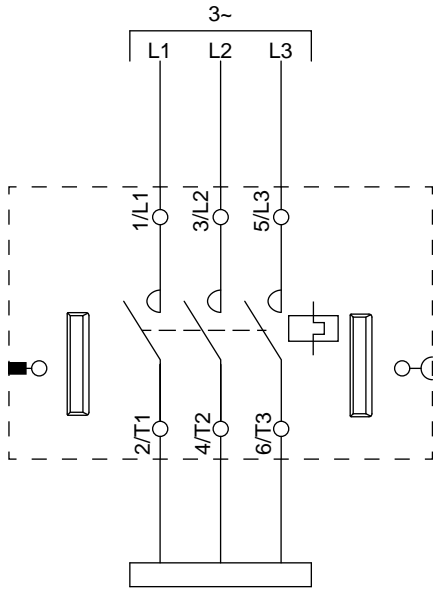


Table 89 - Legend

A	Mechanical interlock
B	Parallel link
C	Reversing link
F	Forward starter
R	Reverse starter
LS	Low speed
HS	High Speed
SS-1	SIL starter 1
SS-2	SIL starter 2
SS-3	SIL starter 3
SS-4	SIL starter 4

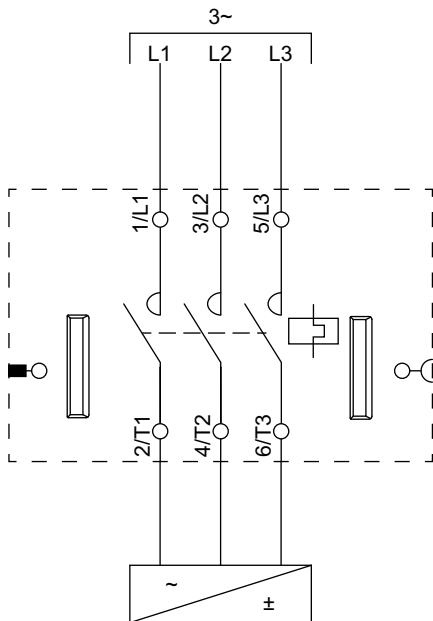
Resistor

Figure 81 - Wiring



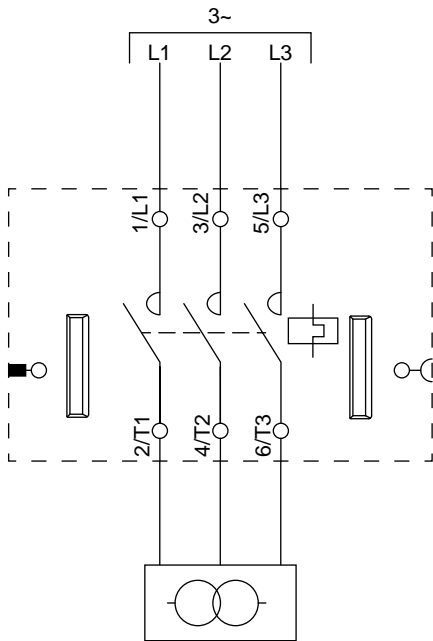
Power Supply

Figure 82 - Wiring



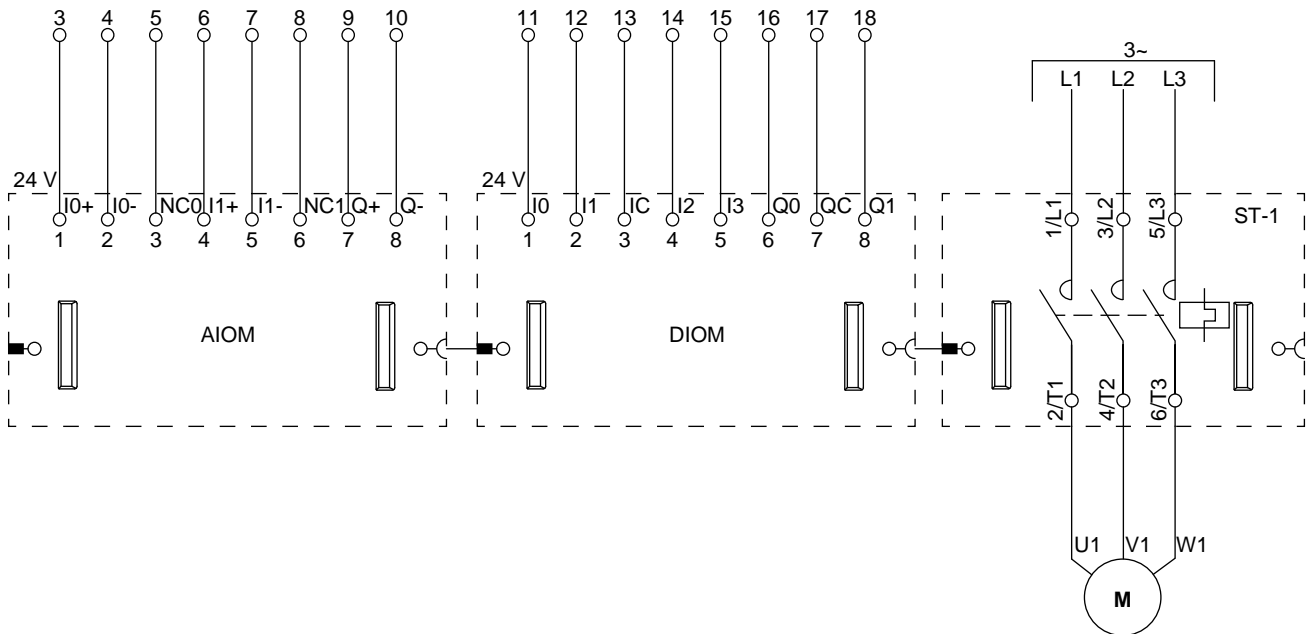
Transformer

Figure 83 - Wiring



Pump

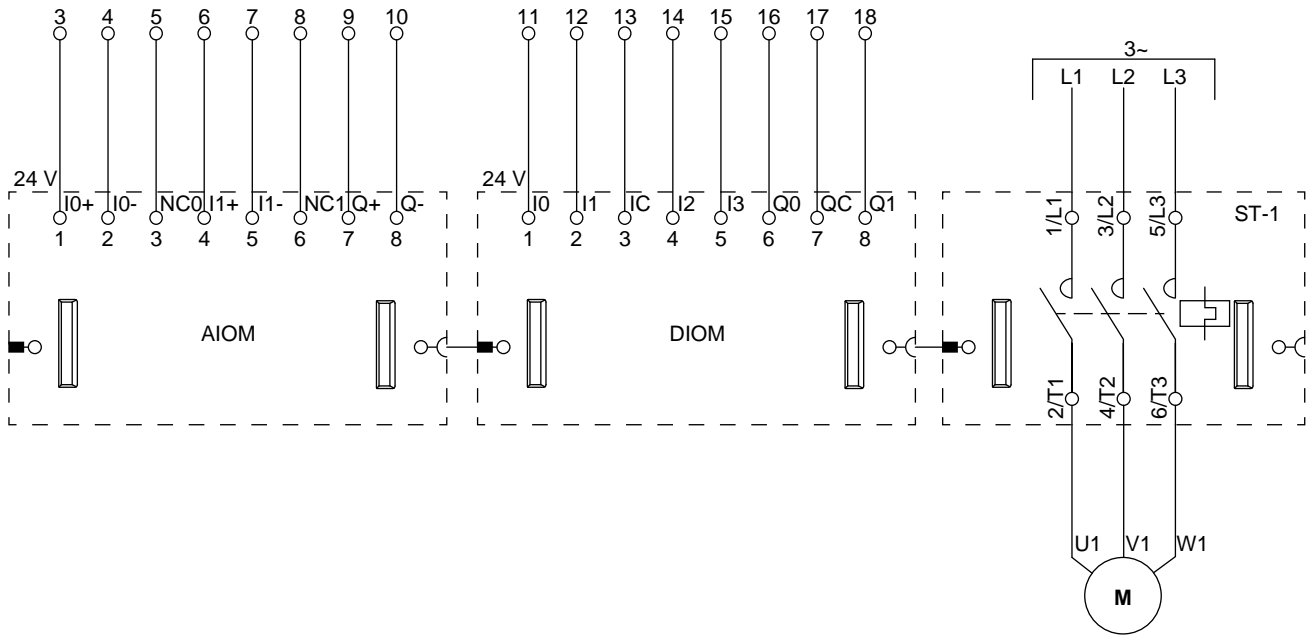
Figure 84 - Wiring



Note: Analog I/O modules (AIOMs) and digital I/O modules (DIOMs) are configurable.

Conveyor One Direction

Figure 85 - Wiring

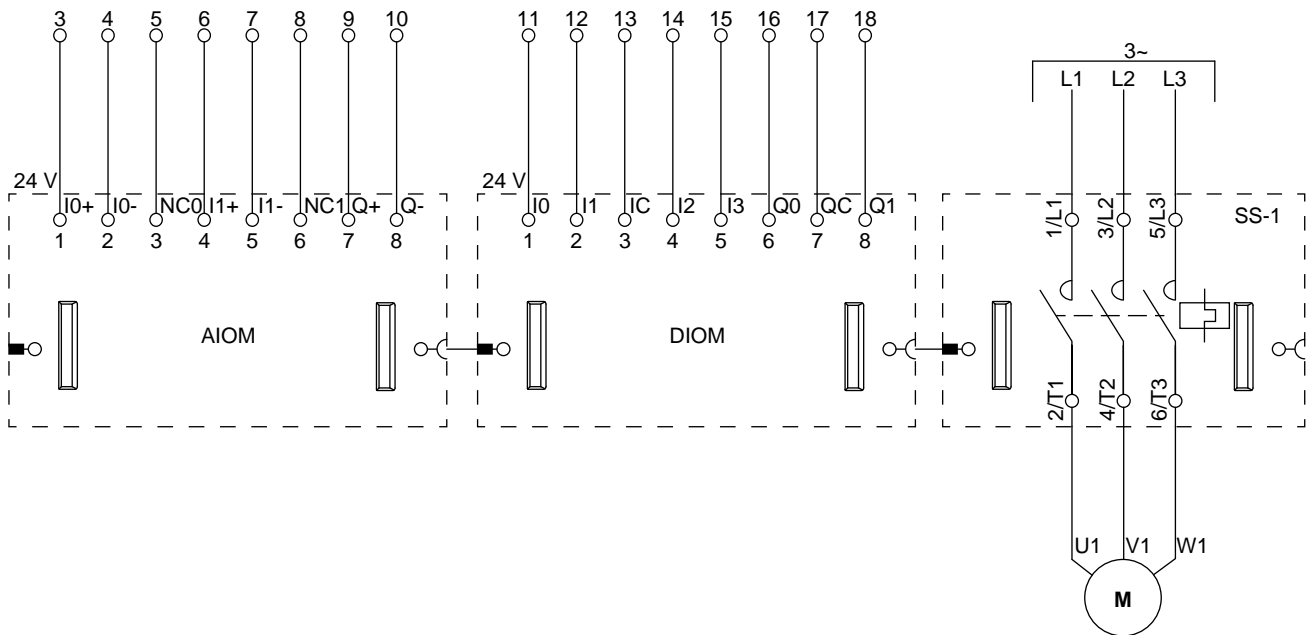


Note: Analog I/O modules (AIOMs) and digital I/O modules (DIOMs) are configurable.

Conveyor One Direction - SIL Stop, W. Cat 1/2

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

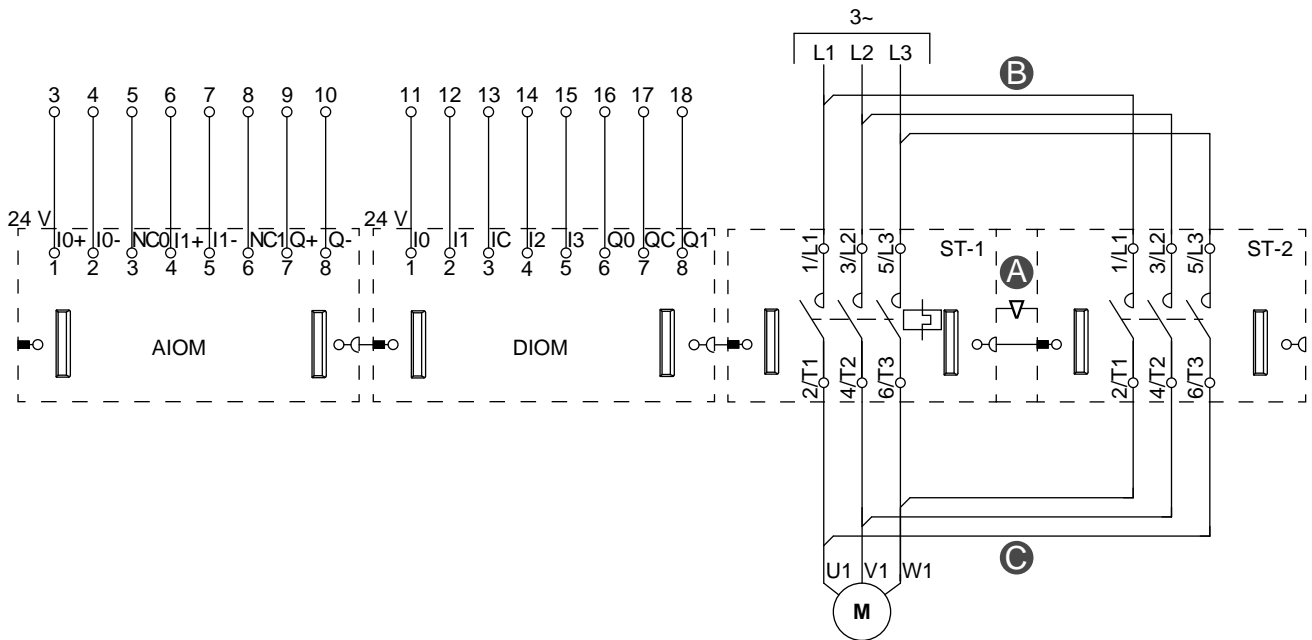
Figure 86 - Wiring



Note: Analog I/O modules (AIOMs) and digital I/O modules (DIOMs) are configurable.

Conveyor Two Directions

Figure 87 - Wiring (See Legend Table below)



Note: Analog I/O modules (AIOMs) and digital I/O modules (DIOMs) are configurable.

Figure 88 - Accessories

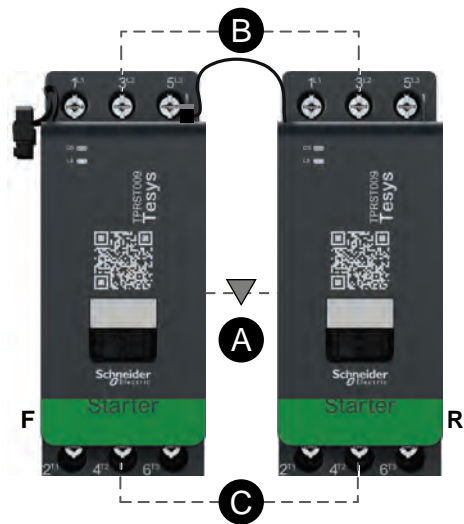


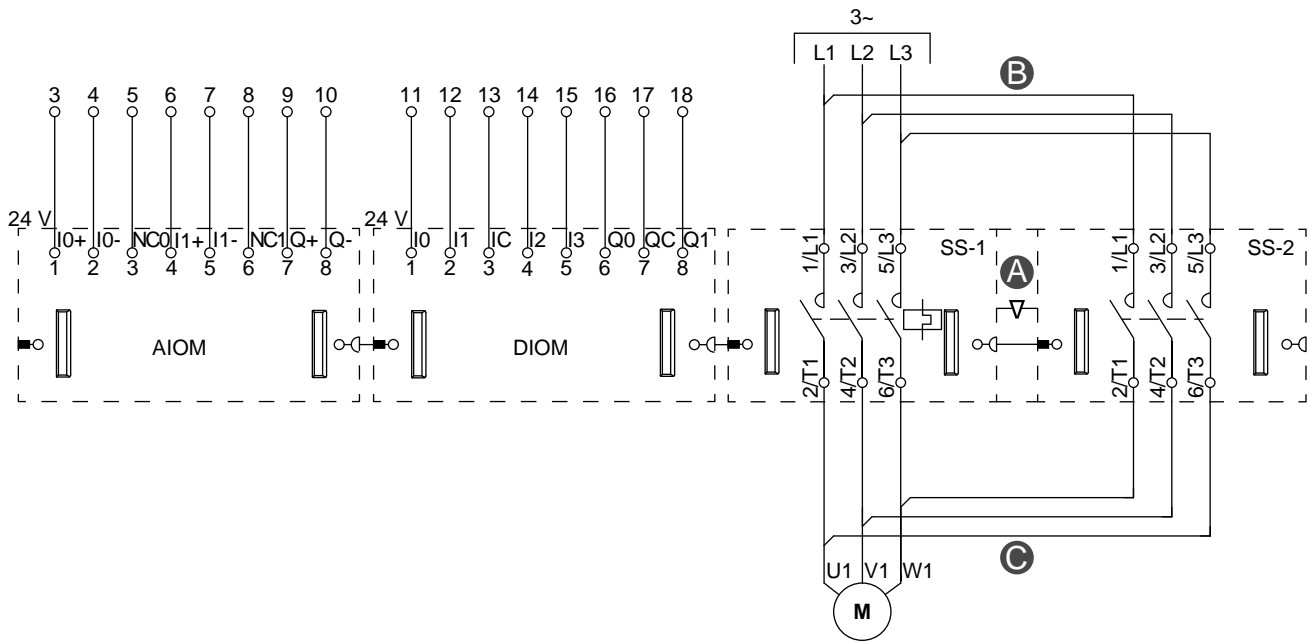
Table 90 - Legend

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

Conveyor Two Directions - SIL Stop, W. Cat 1/2

NOTE: Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

Figure 89 - Wiring (See Legend Table below)



Note: Analog I/O modules (AIOMs) and digital I/O modules (DIOMs) are configurable.

Figure 90 - Accessories

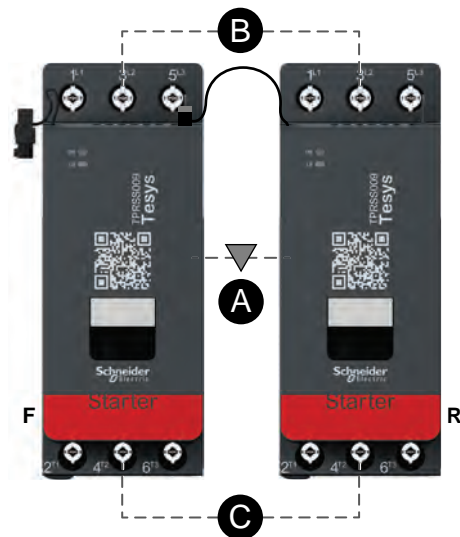


Table 91 - Legend

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

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please ask for confirmation of the information given in this publication.

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