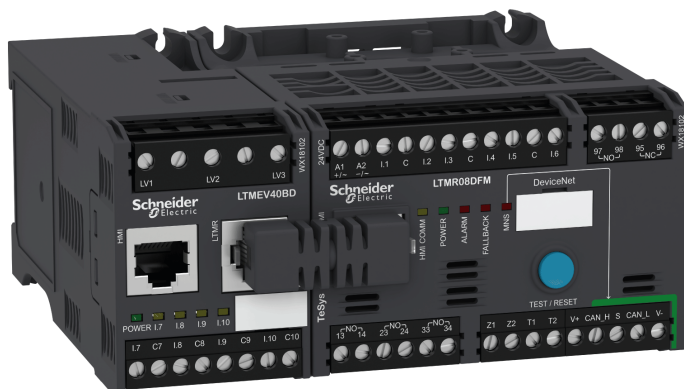


TeSys™ T LTMR DeviceNet

Motor Management Controller

Quick Start Guide

1639575EN-1
04/2024



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Safety Information

Read these instructions carefully and examine the equipment to become familiar with the device before attempting to install, operate, service, or maintain it. The following special messages may appear throughout this user guide 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.

Electrical equipment should be transported, stored, installed, and operated only in the environment for which it is designed.

Proposition 65 Notice



WARNING: This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

About the Book

Document Scope

The Quick Start Guide uses an application example to describe the different steps to quickly install, configure and use TeSys® T.

This document is not intended to replace the following documents:

- TeSys T LTM R DeviceNet Motor Management Controller User Manual
- TeSys T LTM R Instruction Sheet
- TeSys T LTM E Instruction Sheet

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Related Documents

Title of Documentation		Reference Number
TeSys T LTM R DeviceNet Motor Management Controller User Manual	This user manual introduces the complete TeSys T range and describes the main functions of the TeSys T LTMR motor management controller.	1639504EN
TeSys T LTM R•• Instruction Sheet	This document describes the mounting and connection of the TeSys T LTMR motor management controller.	AAV7709901
TeSys T LTM E•• Instruction Sheet	This document describes the mounting and connection of the TeSys T LTME expansion module.	AAV7950501
TeSys T LTMCU Control Operator Unit User Manual	This manual describes how to install, configure, and use the TeSys T LTMCU Control Operator Unit.	1639581EN

You can download these technical publications and other technical information from our website at www.se.com/ww/en/download/.

Quick Start Guide

Overview of the Application Example

Introduction

The Quick Start Guide uses an application example to illustrate each step in the process of installing, configuring and using TeSys T.

The application example uses the LTM R controller to protect and control a motor and its driven load, in this case, a pump.

This application example is intended to:

- show you how to configure the LTM R controller in a few steps,
- provide an example you can modify to develop your own configuration,
- serve as a starting point for the development of more complex configurations, incorporating such additional features as HMI or network control.

Functions Performed

When the LTM R controller has been configured in order to protect and control the motor and pump, it will perform the following functions:

- thermal overload protection
- motor temperature sensor protection
- voltage protection / undervoltage
- external ground current trip protection
- initial system configuration during commissioning using PC and SoMove software

Operating Conditions

The operating conditions used in the application example are:

- motor power: 4 kW
- line-to-line voltage: 400 Vac
- current: 9 A
- control circuit voltage: 230 Vac
- 3-wire control
- motor trip class 10
- start button
- stop button
- reset button on enclosure door
- trip light
- alarm light
- full voltage, non-reversing starter (direct over the line starter)
- 24 Vdc power supply in the motor control center or control station for future use with LTM E expansion module inputs

Network Conditions

The network conditions for the example are:

- protocol: DeviceNet
- address: 1
- baud rate: Autobaud

The LTM R controller is configured via SoMove, not via the network (configuration via network port is disabled).

The network software setup described in this document uses RSNetWorx configuration software for network configuration and Studio 5000 for PLC configuration.

Components Used

The application example uses the following components:

Item	Component Description	Reference Number
1	LTM R 100-240 Vac DeviceNet motor management controller (1.35...27 A FLC)	LTMR27DFM
2	LTM E 100-240 Vac expansion module	LTMEV40FM
3	LTM R to LTM E RJ45 connection cable	LTMCC004
4	USB to RS485 converter	TCSMCNAM3M002P
5	SoMove software version ≥ 2.3	SoMove
6	TeSys DTM Library v2.8 for TeSys T and TeSys U	DTM Files
7	External ground current trip CT	TA30
8	External PTC binary motor temperature sensor	User supplied

Presentation of the TeSys T Motor Management System

System Overview

The TeSys T Motor Management System offers protection, control, and monitoring capabilities for single-phase and 3-phase AC induction motors.

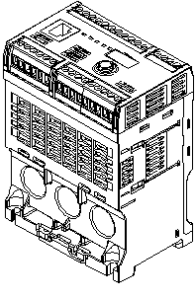
The system offers diagnostic and statistics functions and configurable alarms and trips, allowing better prediction of component maintenance, and provides data to continuously improve the entire system.

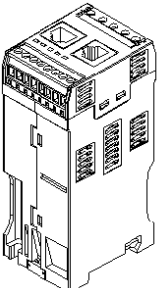
The 2 main hardware components of the system are:

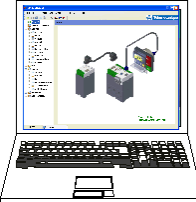
- the LTM R controller, and
- the LTM E expansion module.

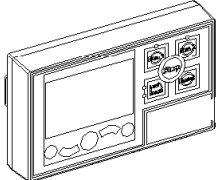
System Presentation

The following tables describe the main components of the TeSys® T Motor Management System.

LTM R Controller	Functional Description	Reference Number
	<ul style="list-style-type: none"> current sensing 0.4...100 A single-phase or 3-phase current inputs 6 discrete logic inputs 4 relay outputs: 3 SPST, 1 DPST connections for a ground current sensor connection for a motor temperature sensor connection for network connection for HMI device or expansion module current protection, metering and monitoring functions motor control functions power indicator trip and alarm LED indicators network communication and alarm indicators HMI communication LED indicator test and reset function 	LTMR08DBD (24 Vdc, 0.4...8 A FLC)
		LTMR27DBD (24 Vdc, 1.35...27 A FLC)
		LTMR100DBD (24 Vdc, 5...100 A FLC)
		LTMR08DFM (100...240 Vac, 0.4...8 A FLC)
		LTMR27DFM (100...240 Vac, 1.35...27 A FLC)
		LTMR100DFM (100...240 Vac, 5...100 A FLC)

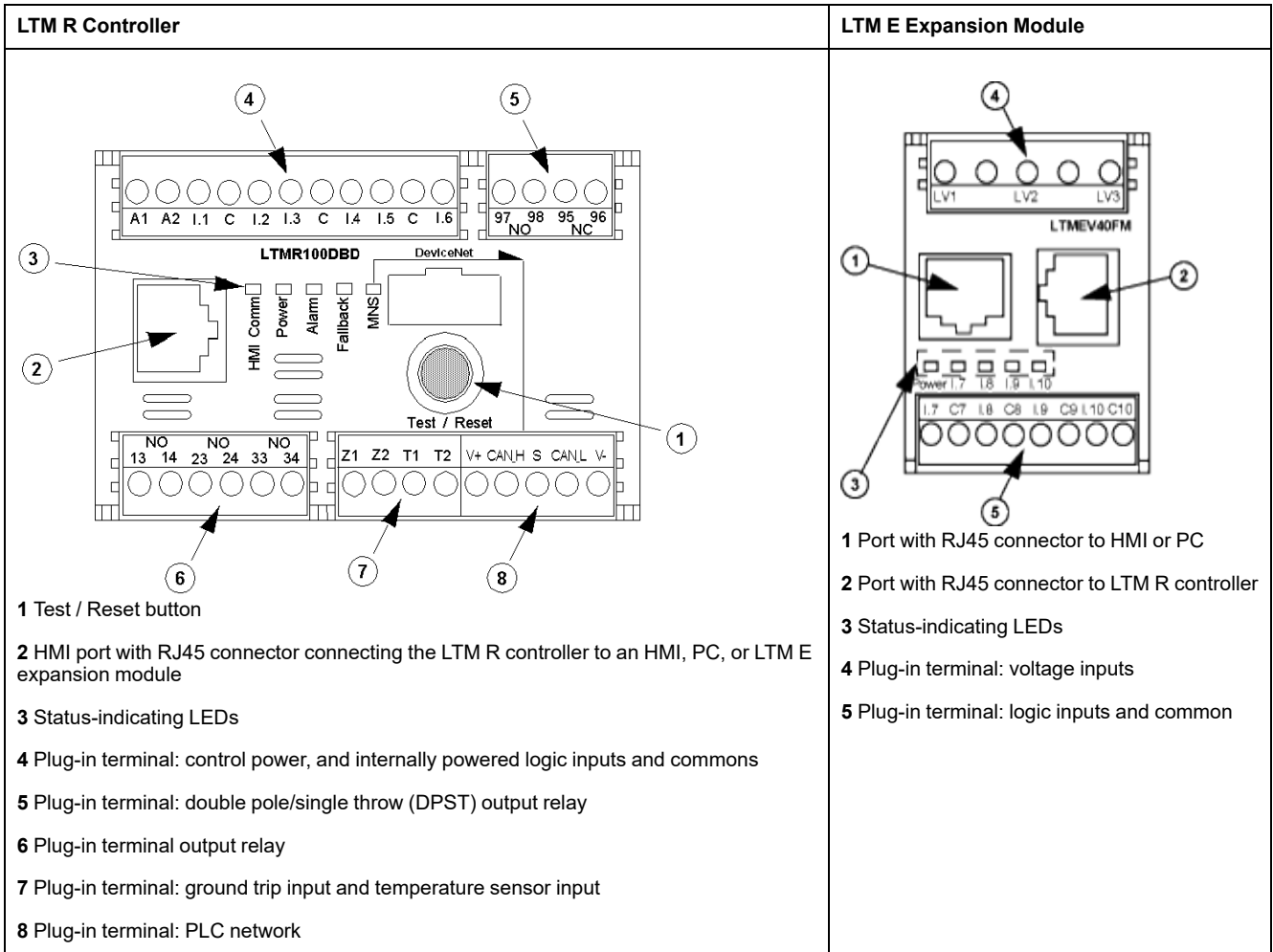
LTM E Expansion Module	Functional Description	Reference Number
	<ul style="list-style-type: none"> voltage sensing 110...690 Vac 3-phase voltage inputs 4 additional discrete logic inputs additional voltage protection, metering and monitoring functions power LED indicator logic input status LED indicators <p>Additional components required for an optional expansion module:</p> <ul style="list-style-type: none"> LTM R controller to LTM E connection cable 	LTMEV40BD (24 Vdc logic inputs)
		LTMEV40FM (100...240 Vac logic inputs)

SoMove Software	Functional Description	Reference Number
	<ul style="list-style-type: none"> configure the system through menu entries display parameters, detected alarms and trips control the motor <p>Additional components required for SoMove software:</p> <ul style="list-style-type: none"> a PC separate power source LTM R/LTM E to PC communication cable 	SoMove ≥ 2.3
		TCSMCNAM3M002P (USB to RS485 converter)

LTMCU Control Operator Unit	Functional Description	Reference Number
	<ul style="list-style-type: none"> configure the system through menu entries display parameters, detected alarms and trips control the motor <p>Additional components required for an optional HMI device:</p> <ul style="list-style-type: none"> LTM R/LTM E to HMI communication cable HMI to PC communication cable 	LTMCU
		LTMR9CU30 (HMI communication cable)
		TCSMCNAM3M002P (USB to RS485 converter)
		LTMR9KCU Kit for portable LTMCU

LTM R and LTM E Description

The following diagrams show the features of the LTM R controller and LTM E expansion module:



Installation

Overview

The following procedure describes how to install and physically configure the TeSys T system, according to the operating conditions used in the application example. The same procedure is used for other configurations.

The full installation procedure is shown on the Instruction sheets provided with the LTM R controller and the LTM E expansion module. It is also described in detail in the Installation chapter of the User Manual.

⚠ DANGER

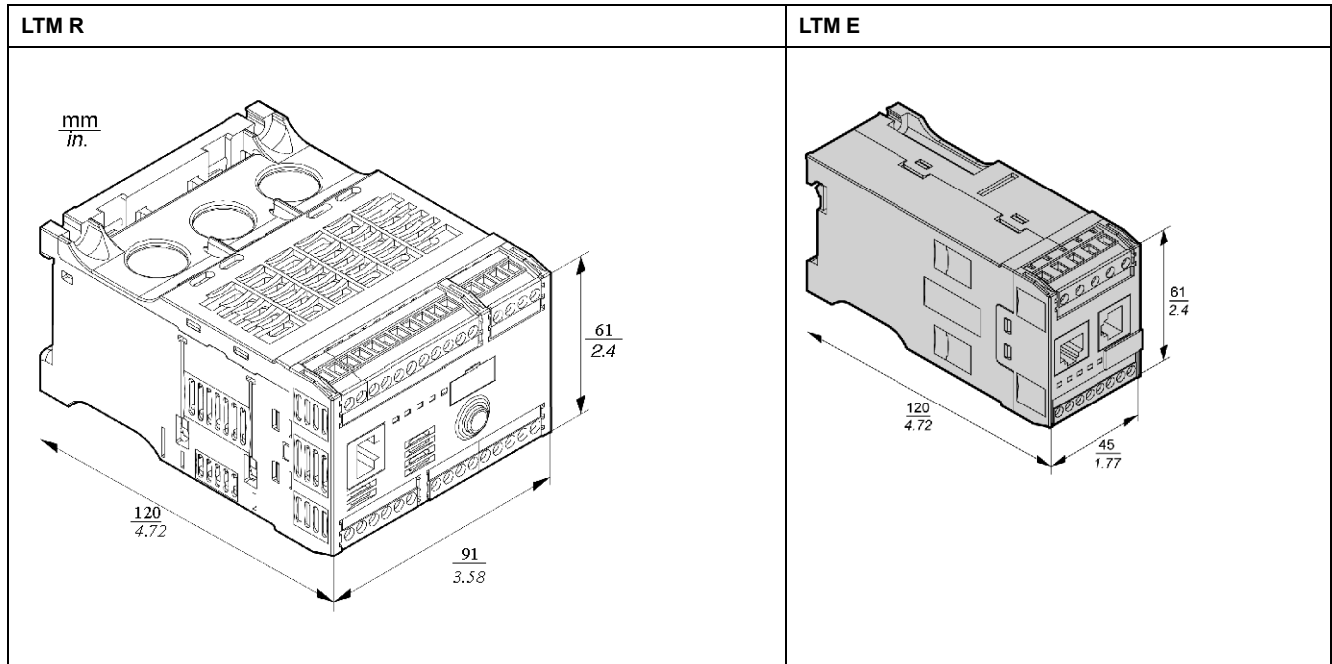
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Turn off all power supplying this equipment before working on it.

Apply appropriate personal protective equipment (PPE) and follow safe electrical work practises.

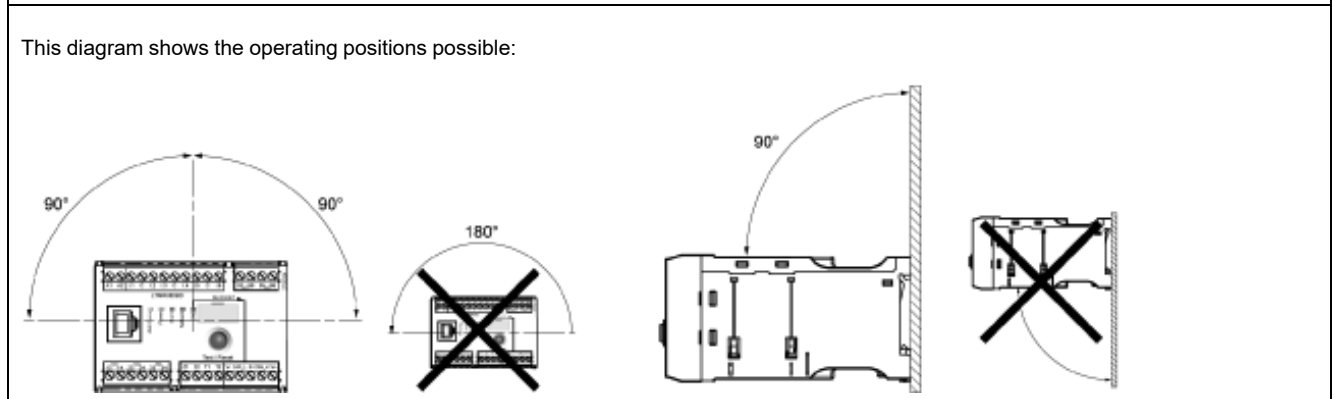
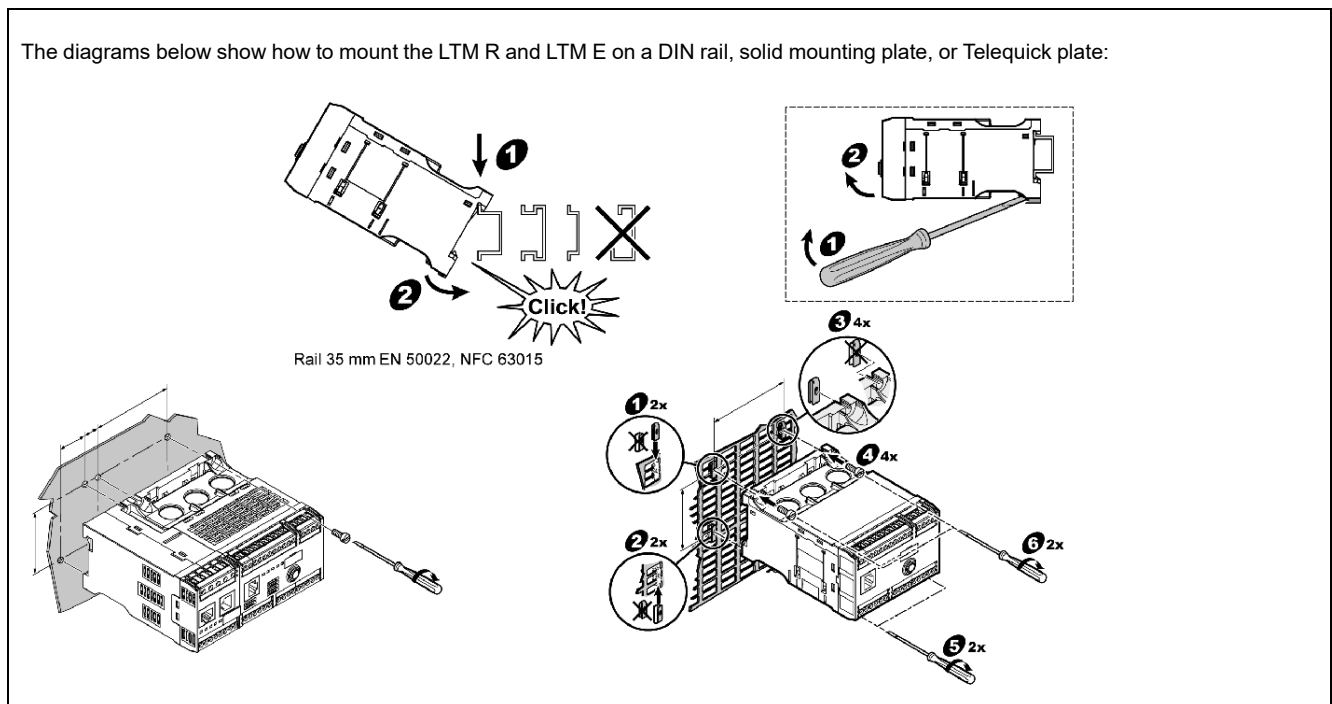
Failure to follow these instructions will result in death or serious injury.

The following diagrams show the physical dimensions of the LTM R controller and the LTM E expansion module:



Mount LTM R and LTM E

Mount the LTM R controller and the LTM E expansion module, respecting clearance zones and operating position.

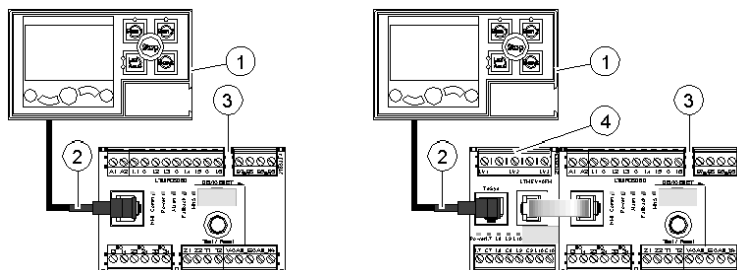


Connect LTM R to LTM E

Connect the LTM R controller and the LTM E expansion module using the RJ45 cable.

Connect to a TeSys T LTMCU HMI Device (Optional)

The diagrams below show the TeSys T LTMCU HMI device connected to the LTM R controller, with and without the LTM E expansion module:



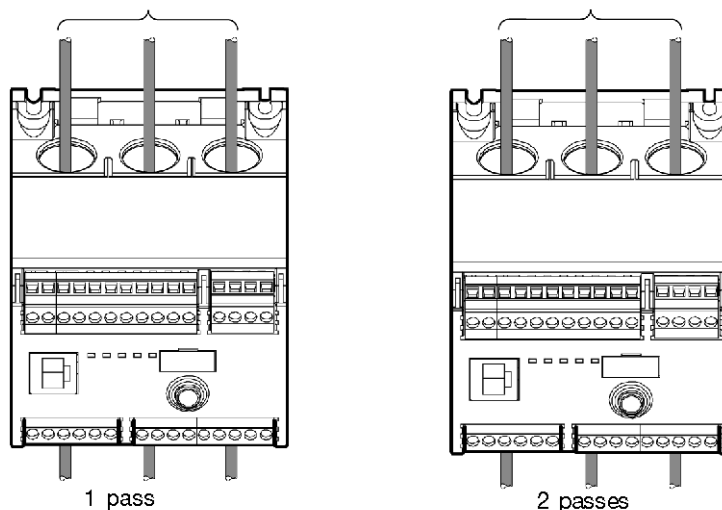
- 1 LTMCU Control Operator Unit
- 2 RJ45 cable (LTM9CU30, in this example)
- 3 LTM R controller
- 4 LTM E expansion module

Wire Current Transformers

Wire the current transformers according to the operating conditions:

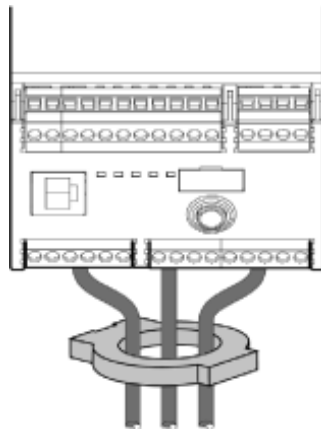
- Product range → 1.35...27 A
- Nominal motor current → 9 A

1 pass through the CT windows is sufficient in this case, although 2 passes are possible:



Wire Ground Current Sensor

Wire the ground current trip transformer:



Wire LTM R

- Wire the power supply and the I/O.
- Wire the temperature sensors.

NOTICE

LOGIC INPUTS DESTRUCTION HAZARD

- Connect the LTM R controller's inputs using the 3 Common (C) terminals connected to the A1 control voltage via an internal filter.
- Do not connect the Common (C) terminal to the A1 or A2 control voltage inputs.

Failure to follow these instructions can result in equipment damage.

Wire LTM E

The 4 logic inputs on the LTM E expansion module (I.7 - I.10) are not powered by the control voltage of the LTM R controller.

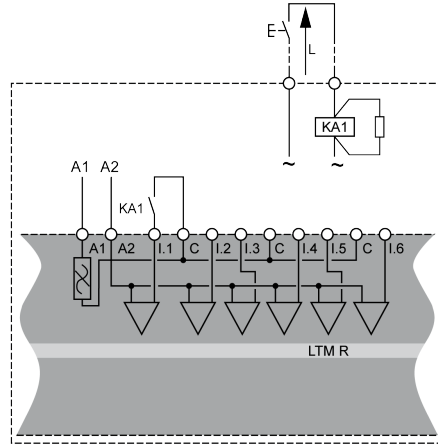
Wire the voltage transformers and the I/O on the LTM E expansion module.

Use of AC Interposing Relays

The use of an AC interposing relay is allowed only on short distances if an AC voltage is mandatory.

AC RSB1 relay voltage	24 VAC	48 VAC	120 VAC	230/240 VAC
Maximum distance for wires in parallel without metallic screening	3,000 m (10,000 ft)	1,650 m (5,500 ft)	170 m (550 ft)	50 m (165 ft)
Maximum distance for wires in parallel with metallic screening	2,620 m (8,600 ft)	930 m (3,000 ft)	96 m (315 ft)	30 m (100 ft)

The following diagram shows an example when using AC interposing relays:



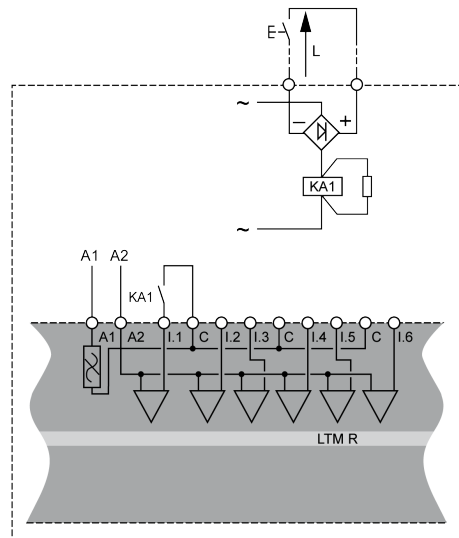
Use of AC Interposing Relays with a Rectifier

The use of AC interposing relay with a rectifier is recommended on long distances if an AC voltage is mandatory.

Add a rectifier composed of 1 A / 1000 V diodes to command an AC interposing relay. In this way, rectified AC current flows in the control cable when the switch in the continuous part is closed.

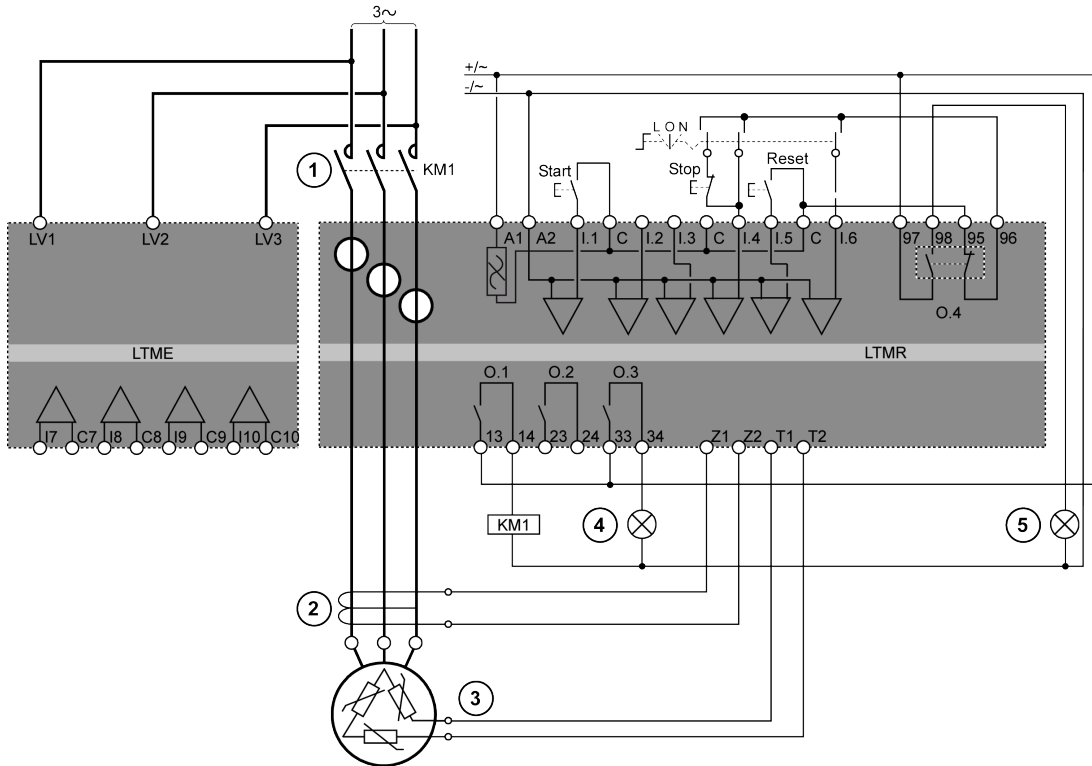
AC RSB1 relay voltage	24 VAC	48 VAC	120 VAC	230/240 VAC
Maximum distance for wires in parallel without metallic screening	3,000 m (10,000 ft)	3,000 m (10,000 ft)	3,000 m (10,000 ft)	3,000 m (10,000 ft)
Maximum distance for wires in parallel with metallic screening	3,000 m (10,000 ft)	3,000 m (10,000 ft)	3,000 m (10,000 ft)	3,000 m (10,000 ft)

The following diagram shows an example when using AC interposing relays with a rectifier:



LTM R Controller Wiring

The diagram below illustrates the main power circuit and the 3-wire (impulse) local control with network control selectable, corresponding to the application example.



1 Contactor

2 Ground current trip transformer

3 PTC binary thermistor

4 Detected alarm indication

5 Detected trip indication

L Local control

O Off

N Network control

Configuration

Overview

After the wiring connections are made, the next step is to configure parameters using SoMove software (see the SoMove chapter of the User Manual for more details).

⚠ WARNING

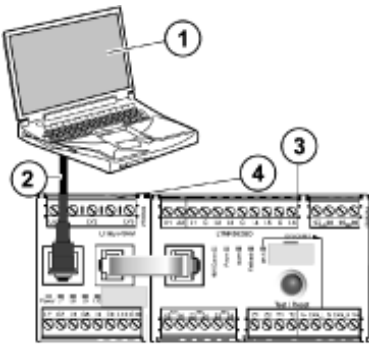
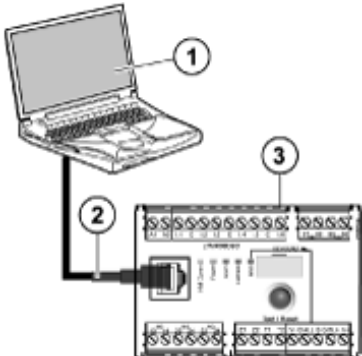
UNINTENDED EQUIPMENT OPERATION

The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise should be allowed to program and apply this product.

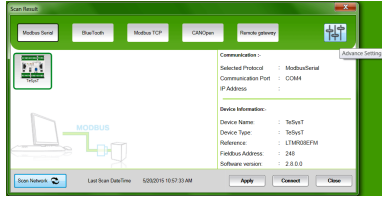
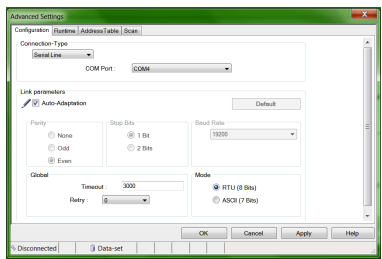
Follow all local and national safety codes and standards.

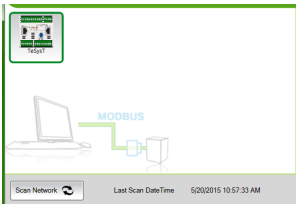
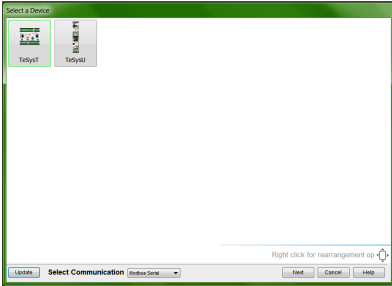
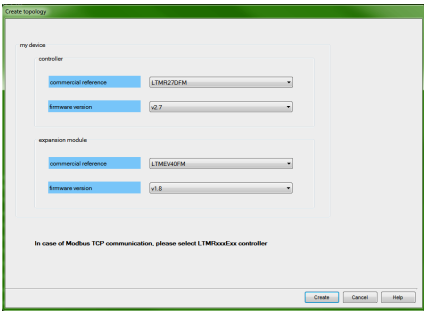
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Connect to SoMove™ Software

<p>In the application example:</p>  <p>1 PC running SoMove software 2 USB to RS485 converter TCSMCNAM3M002P 3 LTM R controller 4 LTM E expansion module</p>	<p>If you are not using the expansion module, the HMI connects directly to the controller:</p>  <p>1 PC running SoMove software 2 USB to RS485 converter TCSMCNAM3M002P 3 LTM R controller</p>
--	---

Set Parameters

Step	Action	Result
1	Start the SoMove software.	—
2	In the Main screen, select the Edit Connections button on the left side.	The Scan Result dialog box opens.
3	Select the Advanced Settings button in the upper-right corner of the window.	The Advanced Settings dialog box opens.
4	<p>In the Advanced Settings dialogue box, make the following settings:</p> <ul style="list-style-type: none"> • Connection-Type: Serial Line • COM Port: Must be set to the Com port that the USB to RS485 converter is connected. NOTE: You can check this in Windows Control Panel > Device Manager and then expanding Ports. The USB to RS485 Converter will be labeled as TSX C USB 485 (COM##) • Link parameters: The Auto-Adaptation box should be checked. 	 

Step	Action	Result
5	Confirm the selected setting and click OK .	The Scan Result dialog box appears.
6	In the Scan Result dialog box, select the Scan Network button. NOTE: The SoMove software will search for any TeSys T that is connected through the USB to RS485 converter cable.	The TeSys T unit will appear in the blank space above the Scan Network button. 
7	Once the TeSys T unit appears, click Apply .	The Main screen appears.
8	Select the Create a Project OFF-line button.	The Select a Device dialog box opens.
9	In the Select a Device dialog box, make the following selections: <ul style="list-style-type: none"> • Select the TeSys T icon • Select Communication: Modbus Serial 	
10	Confirm the selected settings and click Next .	The Create Topology dialog box opens.
11	In the Create Topology dialog box, select the controller, controller firmware version, expansion module, and expansion module firmware version. For this example, the following settings were selected: <ul style="list-style-type: none"> • Controller commercial reference: LTMR27DFM • Controller firmware version: v2.7 • Expansion module commercial reference: LTMEV40FM • Expansion module firmware version: v1.8 	
12	Confirm the selected setting and click Create .	The SoMove project landing page opens.
13	Select the parameter list tab to set up the TeSys T device. The example application parameters are set up per List of Parameter Settings, page 18.	—
14	Select File > Save to save the configuration file.	The Save As dialog box opens.
15	Enter a relevant name and click Save .	—

List of Parameter Settings


Parameter settings for the application example:

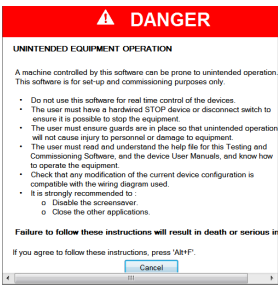
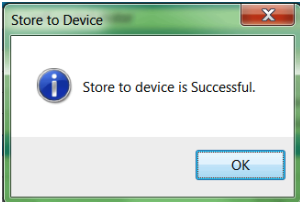
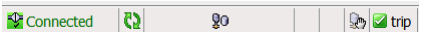
Device Information Branch	Sub-branch	Parameter	Setting
Device information	—	Current range	1.35-27 A
		Network	DeviceNet
		Control voltage	100-240 Vac

Settings Branch	Sub-branch	Parameter	Setting
Motor and Control Settings	Motor operating mode	Nominal voltage	400 V
		Nominal power	4 kW
		Operating mode	3 wire independent
		Contactor rating	9 A
		Phase	3 phase
	Motor temperature sensor	Sensor type	PTC binary
		Trip enable	Enable
		Trip level	According to motor
		Alarm level	According to motor
	Load CT	Load CT ratio	Internal
		Load CT passes	1 ⁽¹⁾
	Ground Current Sensor	Ground Current Sensor ratio	1000:1
	Control mode	Local control	Terminal trip
Thermal Settings	Thermal overload	Trip type	Inverse thermal
		Trip class	10
		FLC1 ⁽¹⁾	50 %⁽¹⁾ (equivalent to 9 A)
		Trip enable	Enable
		Alarm enable	Enable
Current Settings	Ground Current Mode	Trip enable	Enable
		Trip level	1 A
		Trip timeout	0.5 s
		Alarm enable	Enable
		Alarm level	200 mA
Voltage Settings	Undervoltage	Trip enable	Enable
		Trip level	85 %
		Trip timeout	3 s
		Alarm enable	Enable
		Alarm level	90 %

(1) See FLC (Full Load Current) Settings, page 20

Transfer the Configuration File

Step	Action	Result
1	Select File > Open Project and then navigate to the required location and select the configuration file.	–
2	Once the project file is loaded, select Communication > Connect .	The Connect dialog box opens. 

Step	Action	Result
3	Select Store to Device and Connect .	The SoMove software connects to the TeSys T and the Danger dialog box appears. 
4	Read the alarm on the Danger screen and follow the instructions to accept.	The SoMove software loads the current settings from the TeSys T and displays the landing page.
5	The SoMove software downloads the configuration file and displays the Store to Device dialog box when complete.	
6	Select OK to go online with the device.	The SoMove will confirm that it is connected and it is indicated at the bottom-left corner of the landing page. 
7	The product is now ready to use.	—

FLC (Full Load Current) Settings

FLC Basics

NOTE: Before setting the FLC, you must first set the Contactor rating and Load CT ratio.

- **Load CT ratio** = Load CT primary / (Load CT secondary * Passes)
- **Current sensor max** = Current range max * Load CT ratio
- **Current range max** is determined by the LTM R controller commercial reference. It is stored in units of 0.1 A and has one of the following values: 8.0, 27.0, or 100.0 A.
- **Contactor rating** is stored in units of 0.1 A and is set by the user between 1.0 and 1000.0 A.
- **FLCmax** is defined as the lower of the Current sensor max and the Contactor rating values.
- **FLCmin** = Current sensor max / 20 (rounded to the nearest 0.01 A.). FLCmin is stored internally in units of 0.01 A.

NOTE: Do not set the FLC below the FLCmin.

Conversion of Amperes to FLC Settings

FLC values are stored as a percentage of FLCmax

$$\text{FLC (in \%)} = \text{FLC (in A)} / \text{FLCmax}$$

NOTE: FLC values must be expressed as a percentage of FLCmax (resolution of 1 %). If you enter an unauthorized value, the LTM R will round it up to the nearest authorized value. For example, on a 0.4-8 A unit, the step between FLCs is 0.08 A. If you try to set an FLC of 0.43 A, the LTM R will round it up to 0.4 A.

Example (No External CTs)

Data:

- FLC (in A) = 9 A
- Current range max = 27.0 A
- Load CT primary = 1
- Load CT secondary = 1
- Passes = 1 or 2
- Contactor rating = 18.0 A

Calculated parameters with 1 pass:

- Load CT ratio = Load CT primary / (Load CT secondary * passes) = 1 / (1 * 1) = 1.0
- Current sensor max = Current range max * Load CT ratio = 27.0 * 1.0 = 27.0 A
- FLCmax = min (Current sensor max, Contactor rating) = min (27.0, 18.0) = 18.0 A
- FLCmin = Current sensor max / 20 = 27.0 / 20 = 1.35 A
- FLC (in %) = FLC (in A) / FLCmax = 9.0 / 18.0 = 50 %

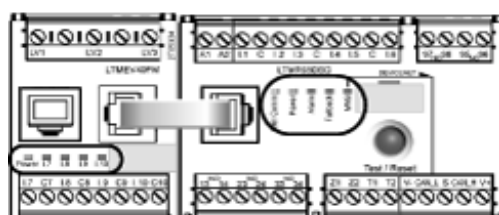
Calculated parameters with 2 passes:

- Load CT ratio = 1 / (1 * 2) = 0.5
- Current sensor max = 27.0 * 0.5 = 13.5 A
- FLCmax = min (13.5, 18.0) = 13.5 A
- FLCmin = Current sensor max / 20 = 13.5 / 20 = 0.67 A
- FLC (in %) = FLC (in A) / FLCmax = 9.0 / 13.5 = 66 %

Diagnostic

LTM R and LTM E LEDs

As the application example uses the LTM R and LTM E, you must check the LEDs on both components:



LEDs

Use the 5 LEDs on the face of the LTM R controller to monitor its state, as follows:

LTM R LEDs	Color	Describes	Indicates
HMI Comm	Yellow	Communication activity between LTM R controller and LTM E expansion module	<ul style="list-style-type: none"> Flashing yellow = communication Off = no communication
Power	Green	LTM R controller power or internal trip condition	<ul style="list-style-type: none"> Solid green = power on, no internal trips, and motor off Flashing green = power on, no internal trips, and motor on Off = power off, or internal trips exist.
Alarm	Red	Protection trip or alarm, or internal trip condition	<ul style="list-style-type: none"> Solid red = internal or protection trip Flashing red (2 x per second) = alarm Flashing red (5 x per second) = load shed or rapid cycle condition Off = no trips, alarms, load shed or rapid cycle (when power is On)
Fallback	Red	Communication connection between LTM R controller and network module	<ul style="list-style-type: none"> Solid red = in fallback Off = not in fallback (no power)
MNS	Yellow	Communication activity on the network bus	<ul style="list-style-type: none"> Flashing yellow (0.2 s on, 1.0 s off) = network bus communication Off = no network bus communication

Use the 5 LEDs on the face of the LTM E expansion module to monitor its state:

LTM E LEDs	Color	Describes	Indicates
Power	Green or red	Module power or internal trip condition	<ul style="list-style-type: none"> Solid green = power on with no internal trips Solid red = power on with internal trips Off = power off
Digital Inputs I.7, I.8, I.9 and I.10	Yellow	State of input	<ul style="list-style-type: none"> On = input activated Off = input not activated

Use with TeSys T LTMCU Control Operator Unit

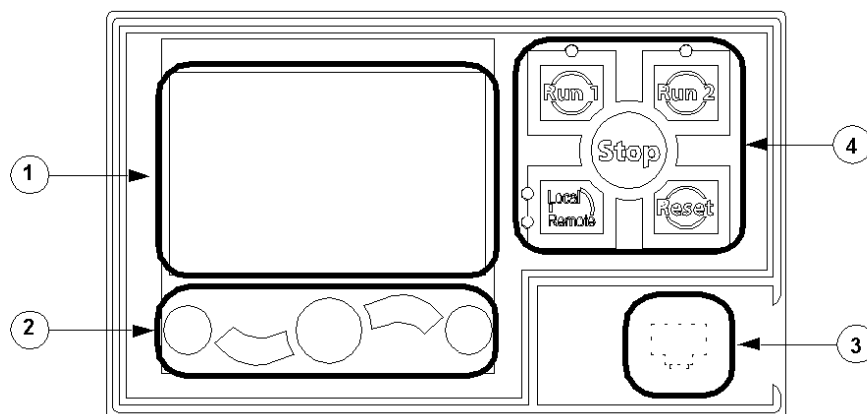
Available Functions

Once connected to the LTM R, the LTMCU can be used to:

- configure parameters for the LTM R controller,
- display information about the LTM R controller configuration and operation,
- monitor trips and alarms generated by the controller,
- control the motor locally using the local control interface.

LTM CU Front Face

The LTMCU front face is shown below:



1 LCD display

2 Contextual navigation keys

3 Front face RJ45 port for PC connection (covered)

4 Local control interface, including 5 control keys and 4 LEDs

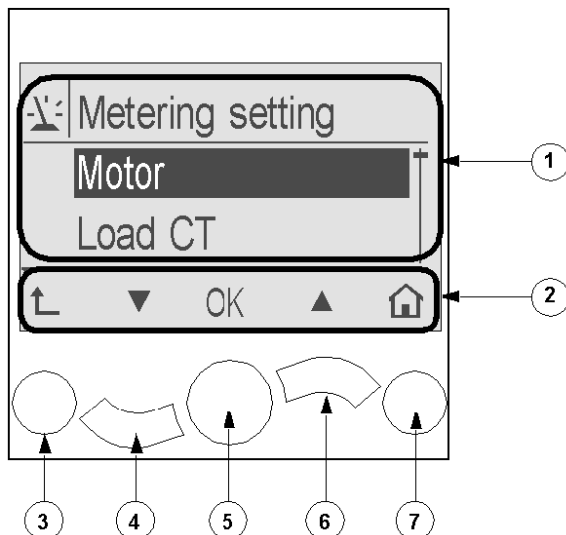
Navigation Keys

The LTMCU navigation keys are contextual, that is, their function depends on the associated icons shown on the LCD display. These icons change for different displays, so the navigation key functions also change.

The navigation keys can be used to:

- navigate menus and sub-menus,
- scroll within a value list,
- select a setting in a value list,
- exit a value list without making a selection,
- return to the main (first-level) menu,
- switch between manual and automatic presentation mode in Quick View display.

The diagram below shows an example of the different functions of each of the navigation keys associated with an icon on the LCD display:



- 1 Information area of the LCD display
- 2 Contextual navigation icons area of the LCD display
- 3 Move up to the next higher-level menu
- 4 Move down to the next item in the menu
- 5 Select an item
- 6 Move up to the previous item in the menu
- 7 Return to the main menu

LCD Displays








The LTMCU presents 3 different LCD displays:

LCD display	Functionality
Menu	<ul style="list-style-type: none"> • Displaying and editing the configuration settings required for configuring the LTM R (metering, protection, control and services settings) • Displaying diagnostic and history data
Quick View	<ul style="list-style-type: none"> • Displaying real-time metering of pre-selected parameters by automatic or manual scrolling
Detected Trips and Alarms	<ul style="list-style-type: none"> • Displaying the most recent detected trip or alarm

Contextual Navigation Icons

















The following table describes the icons used with the contextual navigation buttons on the LTMCU:

Icon	Description	Icon	Description
	Enables access to the main menu from a sub-menu or from Quick View		Enables access to Quick View from the main menu or a sub-menu
	Scroll down		Enables access to manual scroll mode (when Quick View is in automatic scroll mode)

Icon	Description	Icon	Description
	Scroll up		Enables access to automatic scroll mode (when Quick View is in manual scroll mode)
	Validates a setting or value and enables access to a sub-menu when a menu is selected		Used to increment a setting in menu mode
	Move up to the next higher-level menu		Used to decrement a setting in menu mode
	When a menu item is password-protected, this icon enables access to the Enter Password screen		

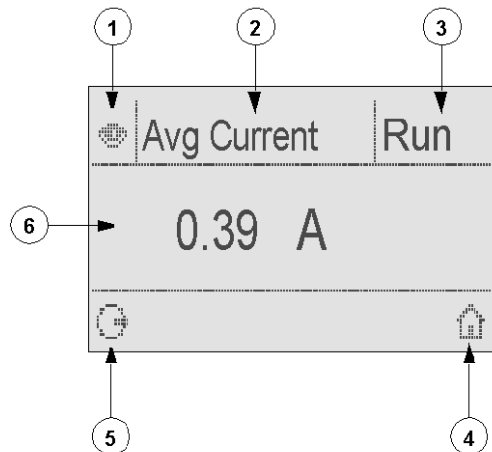
Information Icons

The following table describes the icons provided as information in the information area of the LCD display. They indicate, among others, the selected menu or parameter:

Icon	Description	Icon	Description
	Main menu		Indicates that the present display is Quick View
	Metering setting menu		Indicates that a detected alarm has occurred
	Protection setting menu		Indicates that a detected error has been detected
	Control setting menu		Information
	Services menu		Check box selected
	Language selection menu		Check box unselected
	Radio button selected		Item has been selected (for inclusion in Quick View display)
	Radio button unselected		LTM R in Configuration mode

Example of an HMI Display

Here is an example of HMI LCD displaying an average current of 0.39 A in local control, run mode:

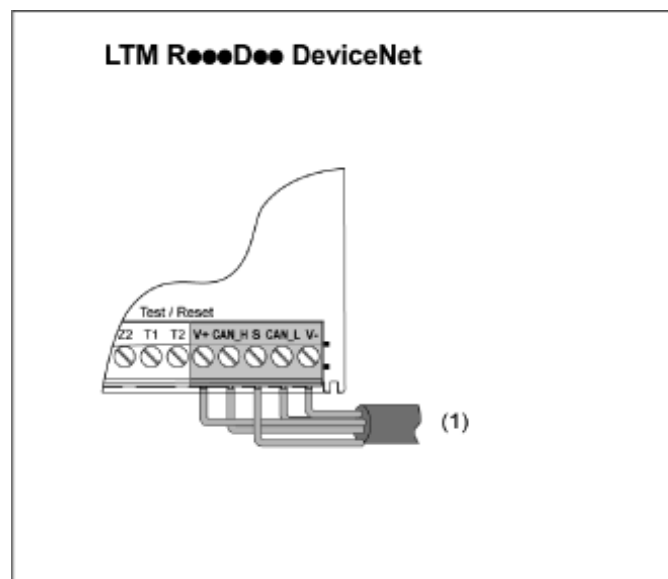


- 1 Quick View display icon
- 2 Name of the setting currently displayed
- 3 Motor state
- 4 Short cut key to main menu
- 5 Manual scroll mode icon; pressing the associated contextual navigation key switches to manual scroll mode
- 6 Value of the setting currently displayed

Network Communication on DeviceNet™

Wire the Communication Port

This procedure is shown on the Instruction sheets provided with the LTM R and the LTM E, and described in the Installation chapter of the User Manual:



(1) Thin cable

Set the Parameters

For the application example, set the following parameters using SoMove™ software:

Settings Branch	Sub-branch	Parameter	Setting
Device information	–	Network	DeviceNet™
Communication	Network port	Address	1
		Baud Rate	Autobaud
		Configuration via Network port	Disabled

You can set Baud Rate to Autobaud only if at least 1 secondary is configured with a specific Baud Rate.

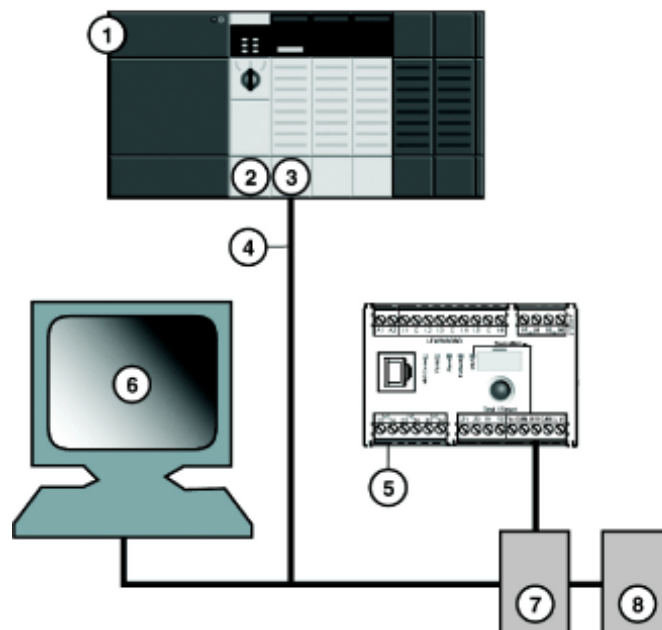
Network Port Comm Loss parameter is enabled by default. If this is not suitable, you can disable this parameter.

Messaging

The connection types are:

- I/O messaging**
 I/O messages contain application-specific data. They are communicated across single and multicast connections between an application producer and its corresponding consuming application.
- Explicit messaging connections**
 Explicit messaging connections provide multipurpose point-to-point communication paths between two particular devices. Explicit messages are used to command the performance of a particular task and to report the results of performing the task. Use explicit messaging connections to configure nodes and diagnose conditions.

Communication Architecture



- 1 1756-A7 Allen-Bradley ControlLogix chassis with 7 slots
- 2 1756-PA72 Allen-Bradley ControlLogix power supply 120–240 Vac
- 3 1756-L71 Allen-Bradley ControlLogix controller, revision 24
- 4 1756-DNB Allen-Bradley ControlLogix DeviceNet™ scanner
- 5 LTMR27DFM LTM R controller communicating over DeviceNet™
- 6 LTMEV40FM LTM E Expansion module
- 7 Power tap
- 8 Power supply (24 Vdc)

Software Tools

Reference Number	Freeware	Description
9357-DNETL3	–	RSNetWorx for DeviceNet™ application for configuring and monitoring DeviceNet™ networks and configuring connected devices.
9324-RLD300ENE	–	RSLogix Designer configuring and programming software for the Allen-Bradley Logix5000 family of controller.
–	TeSys T MMC L	A TeSys® T Motor Management Controller system without an expansion module, configurable via the HMI port. This variant enables you to preserve your local configuration.
–	TeSys T MMC L EV40	A TeSys® T Motor Management Controller system with expansion module, configurable via the HMI port. This variant enables you to preserve your local configuration.
–	TeSys T MMC R	A TeSys® T Motor Management Controller system without expansion module configurable via the network.
–	TeSys T MMC R EV40	A TeSys® T Motor Management Controller system with expansion module configurable via the network.

Assemble the Physical Network

To construct a physical DeviceNet™ network:

Step	Action
1	Install the DeviceNet scanner module in the desired PLC slot.
2	Check that the desired DeviceNet network node address and baud rate have been correctly set in SoMove.
3	Make connections with DeviceNet™ network cable and end connectors, manufactured in accordance with ODVA specifications.
4	Place the system on the network by connecting the PLC to the LTM R controller with the DeviceNet™ cable.
5	Connect the RSNetWorx PC to the processor.

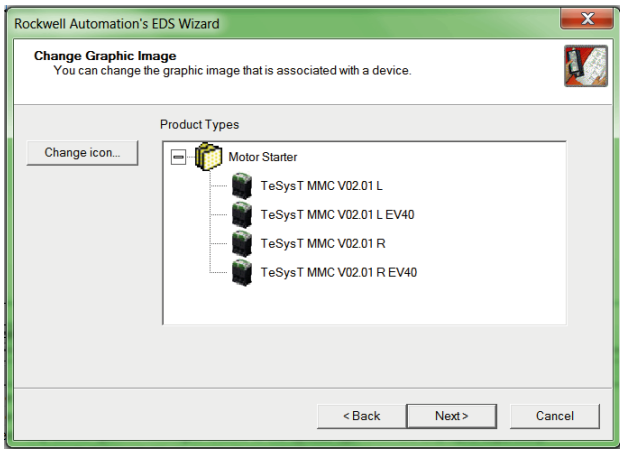
Software Network Configuration

To configure the DeviceNet™ network:

Step	Action	Comment
1	Register the Controller's EDS, page 29	Action in RSNetWorx.
2	Offline Controller Configuration, page 29	
3	Scanner Configuration, page 32	
4	PLC Configuration in Studio 5000, page 33	Action in Studio 5000.
5	DeviceNet Communication Test, page 35	

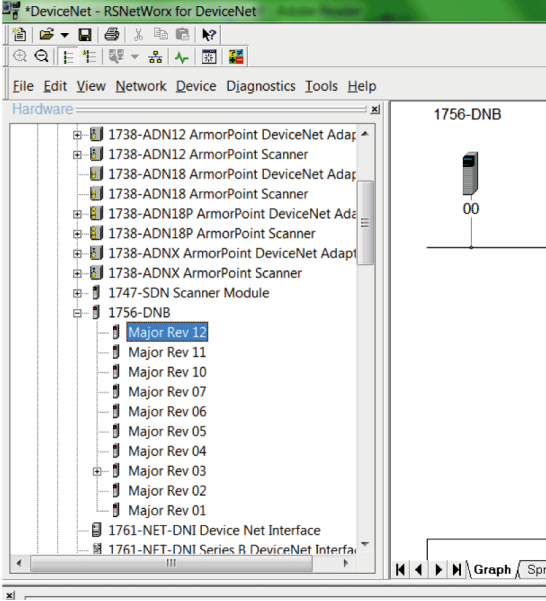
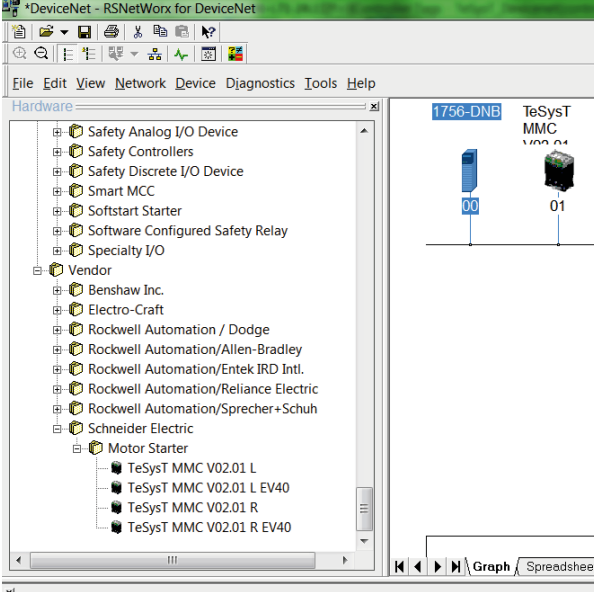
Register the Controller's EDS

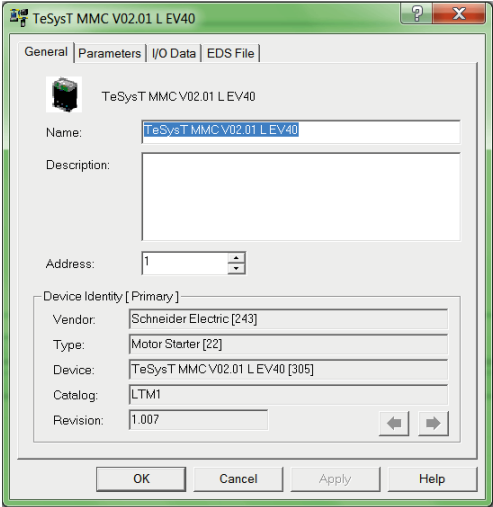
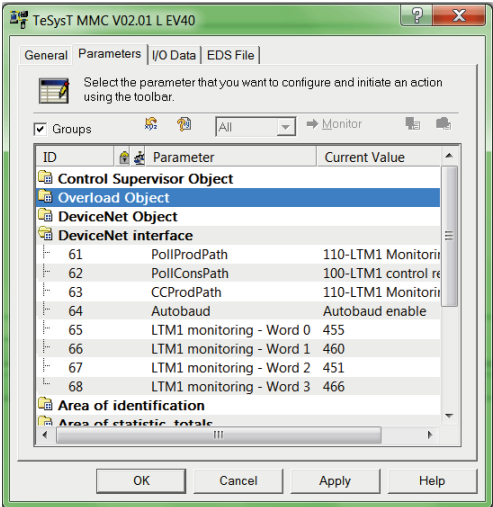
To register the controller's EDS in RSNetWorx's EDS library:

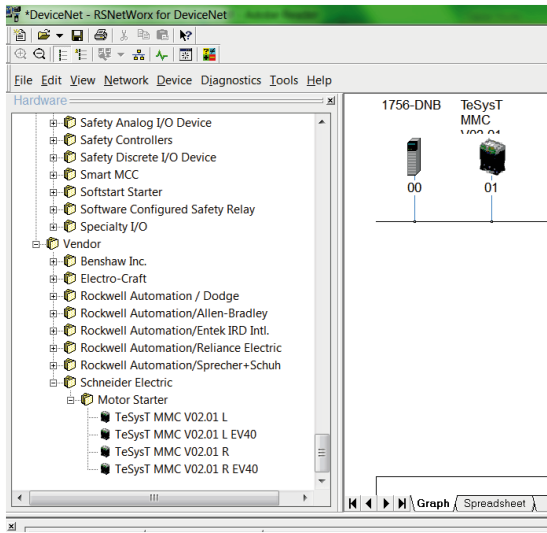
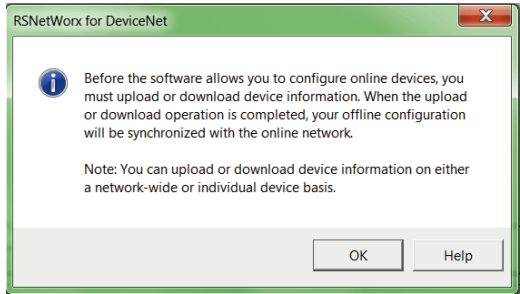
Step	Action	Result
1	From the RSNetWorx Tools menu, select EDS Wizard .	The wizard's welcome screen appears.
2	Click Next .	The Options screen appears.
3	Select Register an EDS file(s) and click Next .	The Registration screen appears.
4	Select Register a directory of EDS files and browse to the controller's EDS file. NOTE: You must have already unzipped the zip file containing the EDS files and corresponding icons into a single directory.	—
5	Click Next .	The EDS File Installation Test Results screen appears.
6	Click Next .	The Change Graphic Image screen appears. The controller should be listed in the Product Types field as a Motor Starter . 
7	Click Next .	The Final Task Summary screen appears.
8	Verify that the controller is to be registered and click Next .	The Completion screen appears.

Offline Controller Configuration

To add devices to your network when the configuration tool is offline:

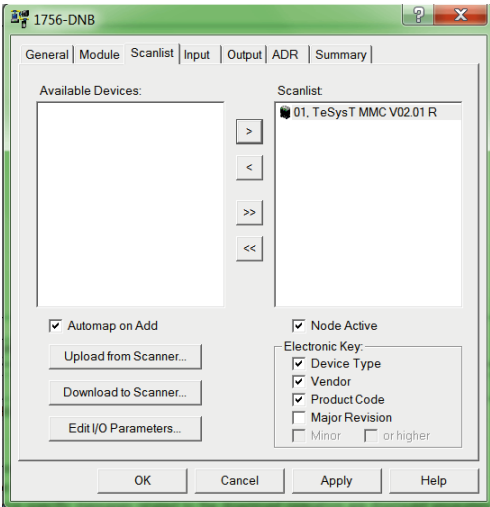
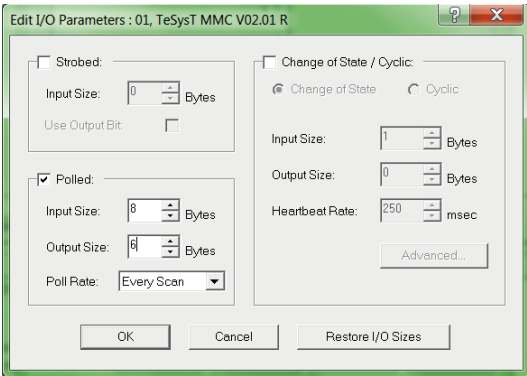
Step	Action	Result
1	From the hardware list, double-click on 1756-DNB Major Rev 12 under Rockwell Automation/communication adapter .	<p>The scanner appears in the Project view with address 0.</p> 
2	From the hardware list, double-click on the controller EDS named TeSys T MMC V02.01 L EV40 under Schneider Automation, Inc.\Motor Starter .	<p>The new device appears in the Project view. The lowest available MAC ID has been assigned to it, even if that ID is inappropriate.</p> 
3	Double-click on the controller graphic.	The controller's properties window appears.

Step	Action	Result
4	<p>Change the MAC ID in the Address text field to match the address set in the TeSys T.</p>	<p>1 is the MAC ID used throughout this example.</p> 
5	<p>Click Parameters tab to select the data you want to exchange (Instance)</p> <p>NOTE: Check the Groups box.</p>	<p>For our example, select the following two instances:</p> <ul style="list-style-type: none"> • Input assembly data size (produced by the controller) <ul style="list-style-type: none"> 110 - LTM R Monitoring Registers (with dynamic configuration) <ul style="list-style-type: none"> Instance length = 8 bytes Select register 455 (System status), 460 (Alarm code), 451 (Trip code), 466 (Average current ratio (%FLC)). • Output assembly data size (consumed by the controller) <ul style="list-style-type: none"> 100 - LTM R Control Registers <ul style="list-style-type: none"> Instance length = 6 bytes 

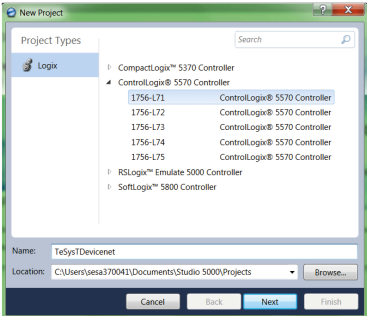
Step	Action	Result
6	Click OK .	
7	From the RSNetWorx Tool menu, select Online .	The Browse for Network screen appears.
8	Click OK .	A notice appears on the screen which notifies you to upload or download configuration to the network. 
9	Right-click and select Download to device .	Configuration is downloaded to the device.

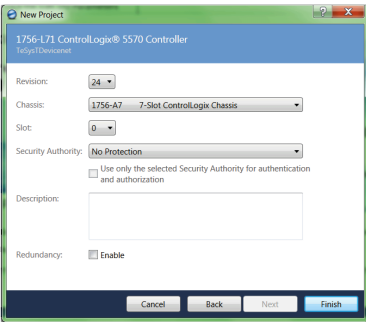
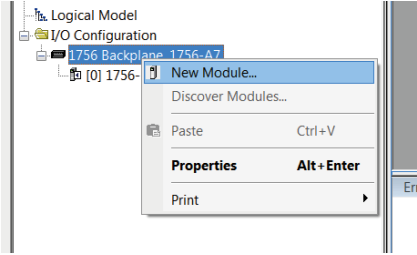
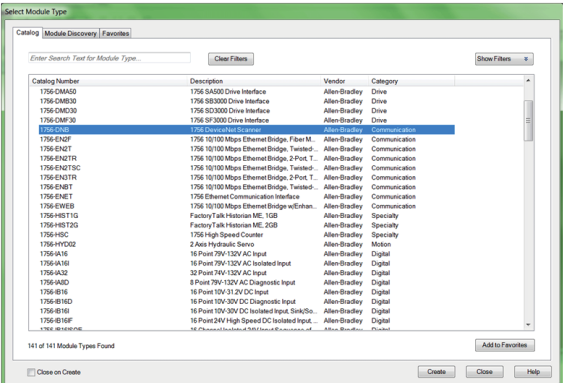
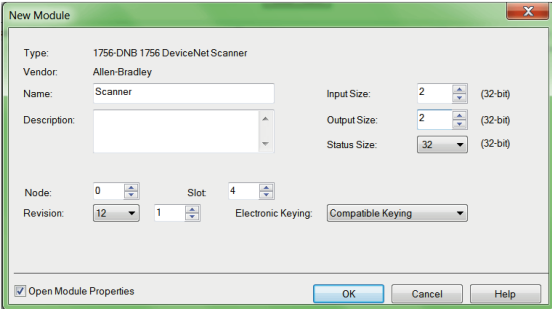
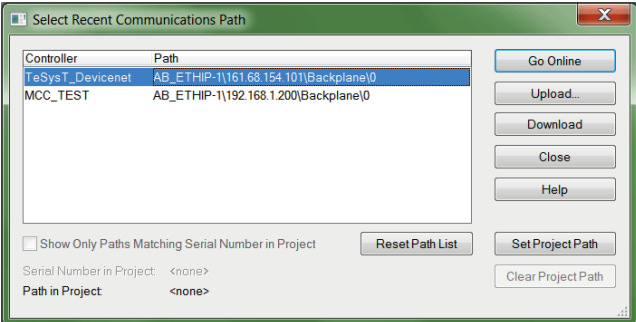
Scanner Configuration

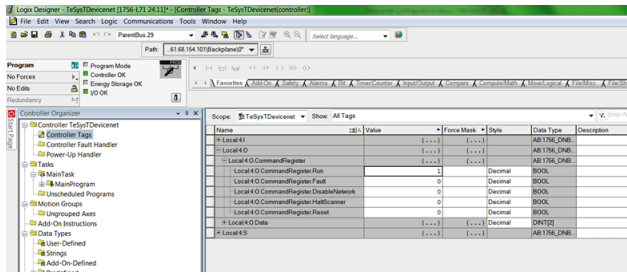
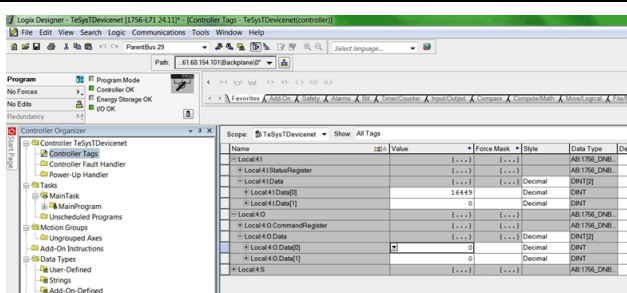
Step	Action	Result
1	From the Project view, double-click the scanner icon.	The scanner configuration screen appears.
2	Select the Scanlist tab.	The Scanner Configuration Applet screen appears.

Step	Action	Result
3	At the Scanlist tab, highlight the controller (at MAC ID 1) in the Available Devices list, and click the right arrow.	The controller now appears in the Scanlist . 
4	With the controller selected, click the Edit I/O Parameters button.	The Edit I/O Parameters window appears.
5	Check Polled and enter 8 in the Input Size text field and 6 in the Output Size text field. Click OK .	Default data sizes are 1 (Input Size) and 1 (Output Size). 
6	Click Download to scanner .	The Downloading Scanlist from Scanner window appears.
7	Click Download .	Wait for the Downloading to Scanner timer to finish.
8	Click OK .	The scanner properties window closes.
9	Click Offline and select the project path. Click File > Save to save the global configuration to the PC.	The global configuration can be saved only offline.

PLC Configuration in Studio 5000

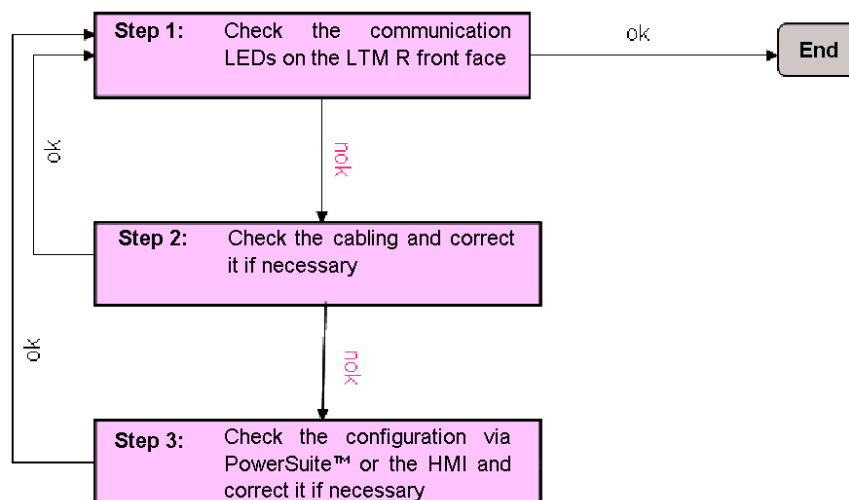
Step	Action	Result
1	In Studio 5000, select File > New .	—
2	Select the type of controller.	

Step	Action	Result
3	Select the chassis.	
4	Select I/O configuration. Right-click and select New Module...	
5	Select the Scanner in the list (1756-DNB).	
6	<p>The module properties appear. Select the input/output sizes in word:</p> <ul style="list-style-type: none"> • Input size = 8 bytes → two 32-bit words • Output size = 6 bytes → two 32-bit words <p>Select the slot (1756-DNB) in the Chassis. Slot 4 in our example.</p> <p>Click Finish to close the configuration.</p>	
7	Select Communication > Recent Path . Click the appropriate path and select Go Online .	
8	Download the application to the controller.	—

Step	Action	Result
9	Select Controller Tags to run the scanner, then set CommandRegister.Run .	
10	Select Controller Tags to see the data being returned from TeSys T.	

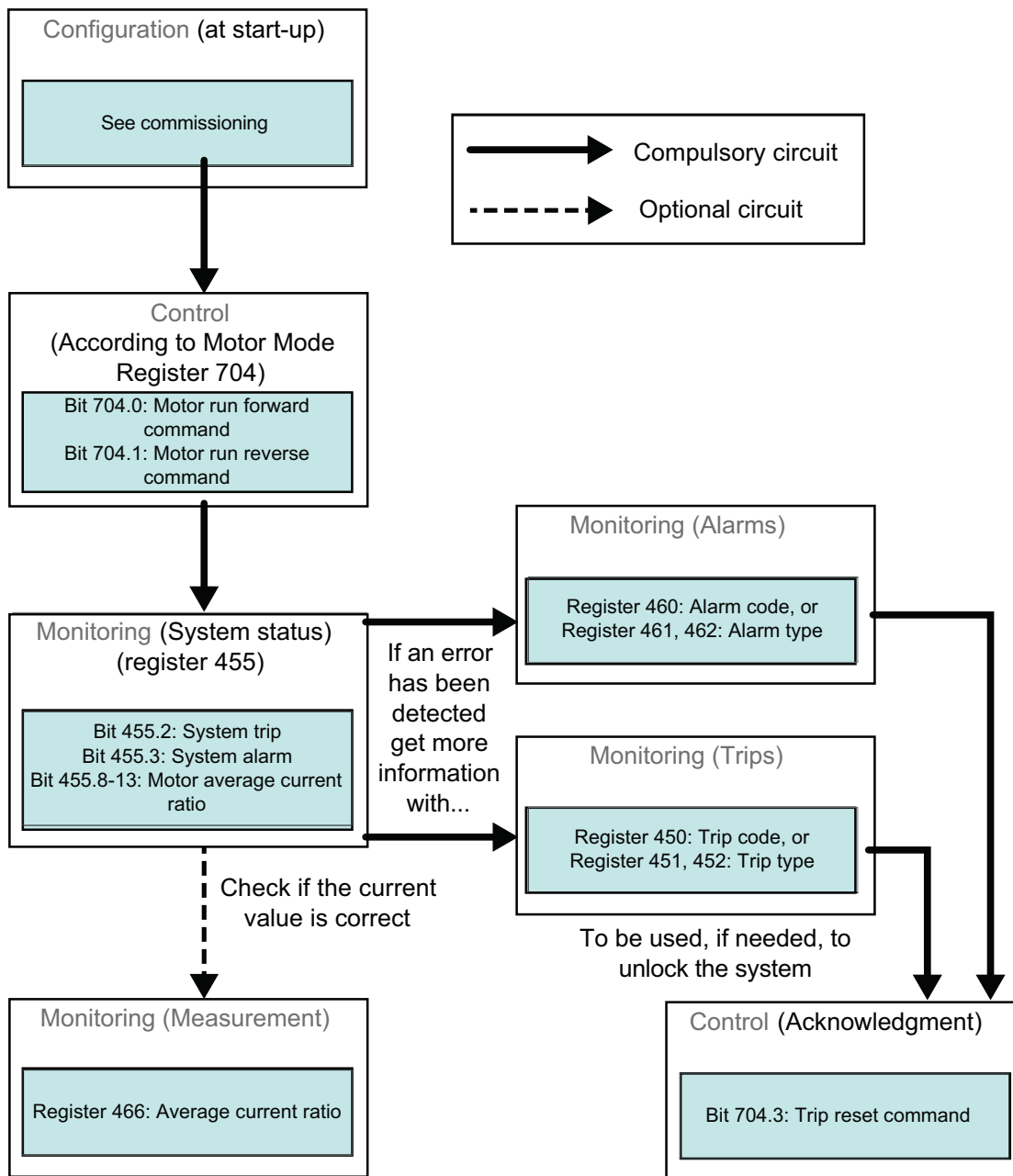
DeviceNet Communication Test

The DeviceNet communication verification sequence is as follows:



Registers for Simplified Operation

Basic setup information using configuration, control and monitoring registers applies to all applications:



Command Variables 700-704

Instance 100: LTM R Control Registers:

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
path 6C : 01 : 05 (Register 704)		path 6C : 01 : 04 (Register 703)		path 6C : 01 : 01 (Register 700)	
LSB (least significant bit)	MSB (most significant bit)	LSB	MSB	LSB	MSB

Command variables 700-704 are described below:

Register	DeviceNet Address	Variable Type	Read / Write Variables
700	6C : 01 : 01	Word	Register available to remotely write commands that can be processed in a specific custom logic
701-703	6C : 01 : 02 - 6C : 01 : 04		<i>(Reserved)</i>
704	6C : 01 : 05	Word	Control register 1
			bit 0 Motor run forward command (1)
			bit 1 Motor run reverse command (1)
			bit 2 <i>(Reserved)</i>
			bit 3 Trip reset command
			bit 4 <i>(Reserved)</i>
			bit 5 Self test command
			bit 6 Motor low speed command
			bits 7-15 <i>(Reserved)</i>
(1) Even in Overload mode, bits 0 and 1 of register 704 can be used to remotely control LO1 and LO2.			

Monitoring Variables 451, 455, 460, 466

Instance 110: LTM R Monitoring Registers (with dynamic configuration)

This assembly contains several monitoring registers commonly used with an LTM R device. You can choose registers by setting attributes 5-8 of the DeviceNet interface object:

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Register pointed using path C6 : 01 : 05 <i>(Register 455)</i>		Register pointed using path C6: 01 : 06 <i>(Register 460)</i>		Register pointed using path C6 : 01 : 07 <i>(Register 451)</i>		Register pointed using path C6 : 01 : 08 <i>(Register 466)</i>	
LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB

Monitoring variables 451, 455, 460, and 466 are described below:

Register	DeviceNet Address	Variable Type	Read-only Variables
451	68 : 01 : 02	UInt	Trip code (code of the last trip, or of the trip that takes priority)
455	68 : 01 : 06	Word	System status register 1
			bit 0 System ready
			bit 1 System on
			bit 2 System trip
			bit 3 System alarm
			bit 4 System tripped
			bit 5 Trip reset authorized
			bit 6 Controller power
			bit 7 Motor running (with detection of a current, if greater than 10% FLC)
			bits 8-13 Motor average current ratio 32 = 100 % FLC - 63 = 200 % FLC
			bit 14 In remote
			bit 15 Motor starting (start in progress) 0 = descending current is less than 150 % FLC 1 = ascending current is greater than 10 % FLC
460	68 : 01 : 0B	UInt	Alarm code
466	68 : 01 : 11	UInt	Average current ratio (% FLC)

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