

TeSys™ T LTMR Modbus

Motor Management Controller

Quick Start Guide

1639572EN-01
04/2024



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Table of Contents

About the Book.....	7
Quick Start Guide.....	8
Overview of the Application Example	8
Presentation of the TeSys T Motor Management System	9
Installation	11
Configuration	15
FLC (Full Load Current) Settings	18
Diagnostic.....	19
Use with TeSys T LTM CU Control Operator Unit.....	20
Network Communication on Modbus.....	24

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.

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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 Modbus 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
TeSys T LTMCU Instruction Sheet	This document describes the mounting and connection of the TeSys T LTMCU control unit	AAV6665701

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 help 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 help 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 PowerSuite 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: Modbus
- address: 4
- baud rate: 19,200
- parity: even

Components Used

The application example uses the following components:

Item	Component Description	Reference Number
1	LTM R 100-240 Vac Modbus motor management controller (1.35...27 A FLC)	LTMR27MFM
2	LTM E 24 Vdc expansion module	LTMEV40BD
3	LTM R to LTM E RJ45 connection cable	LTMCC004
4	PowerSuite cable kit	VW3A8106
5	PowerSuite software on CD-ROM, version ≥ 2.5	PowerSuite
6	External ground current sensor	TA30
7	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.

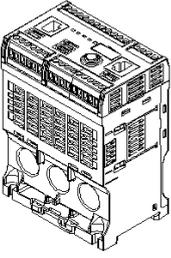
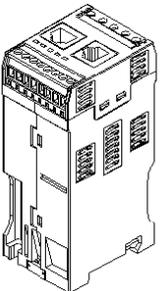
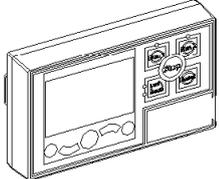
The system offers diagnostic and statistics functions and configurable alarms and trips, allowing better prediction of component maintenance, and provides data to continuously improve the entire system.

The 2 main hardware components of the system are:

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

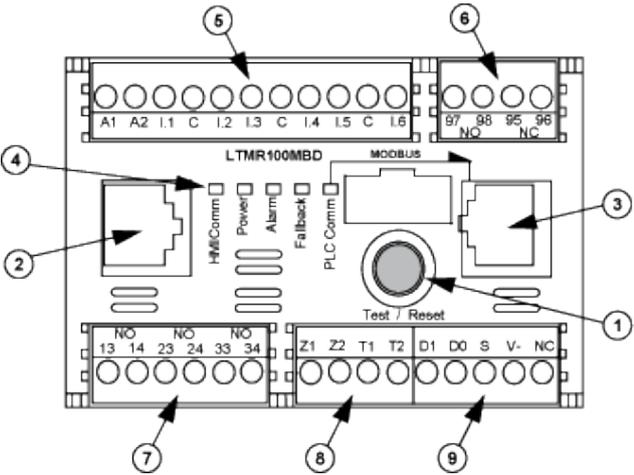
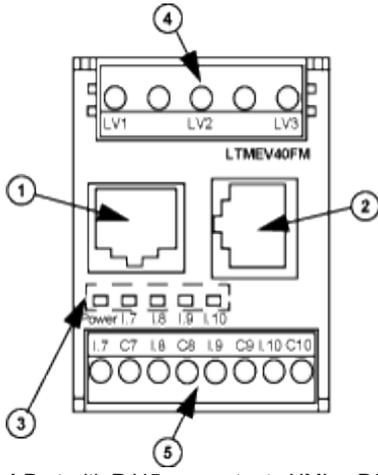
System Presentation

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 	LTMR08MBD (24 Vdc, 0.4...8 A FLC)
		LTMR27MBD (24 Vdc, 1.35...27 A FLC)
		LTMR100MBD (24 Vdc, 5...100 A FLC)
		LTMR08MFM (100...240 Vac, 0.4...8 A FLC)
		LTMR27MFM (100...240 Vac, 1.35...27 A FLC)
		LTMR100MFM (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)
PowerSuite Software	Functional Description	Reference Number
	<ul style="list-style-type: none"> configure the system through menu entries display parameters, alarms and trips control the motor <p>Additional components required for PowerSuite software:</p> <ul style="list-style-type: none"> a PC separate power source LTM R/LTM E to PC communication cable 	PowerSuite ≥ v 2.5
		VW3A8106 (PowerSuite cable kit)
LTM CU Control Operator Unit	Functional Description	Reference Number
	<ul style="list-style-type: none"> configure the system through menu entries display parameters, 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 	LTM CU
		VW3A1104R.0 (HMI communication cable)
		VW3A8106 (PowerSuite cable kit)
		LTM9KCU Kit for portable LTM CU

LTM R and LTM E Description

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

LTM R Controller	LTM E Expansion Module
 <p>1 Test / Reset button</p> <p>2 HMI port with RJ45 connector connecting the LTM R controller to an HMI, PC, or LTM E expansion module</p> <p>3 Network port with RJ45 connector connecting the LTM R controller to a Modbus PLC</p> <p>4 LTM R status-indicating LEDs</p> <p>5 Plug-in terminal: control power, and internally powered logic inputs and commons</p> <p>6 Plug-in terminal: double pole/single throw (DPST) output relay</p> <p>7 Plug-in terminal output relay</p> <p>8 Plug-in terminal: ground current trip input and temperature sensor input</p> <p>9 Plug-in terminal: Modbus network</p>	 <p>1 Port with RJ45 connector to HMI or PC</p> <p>2 Port with RJ45 connector to LTM R controller</p> <p>3 Status-indicating LEDs</p> <p>4 Plug-in terminal: voltage inputs</p> <p>5 Plug-in terminal: logic inputs and common</p>

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

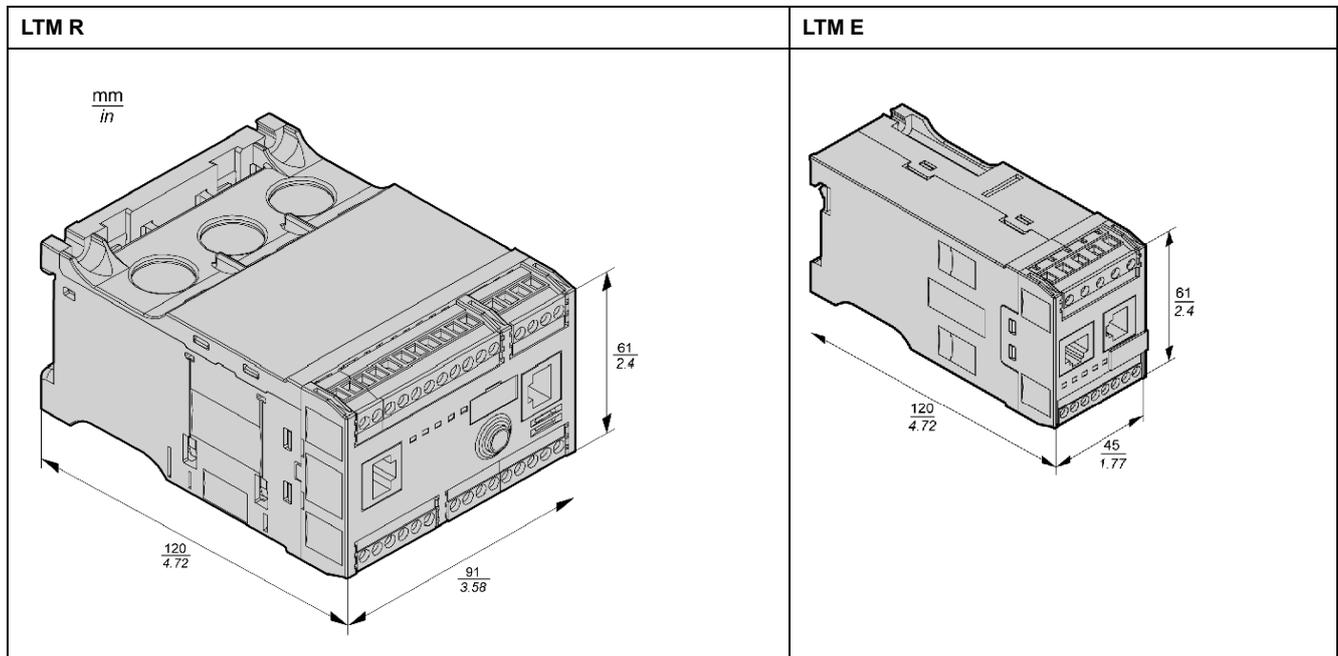
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

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

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

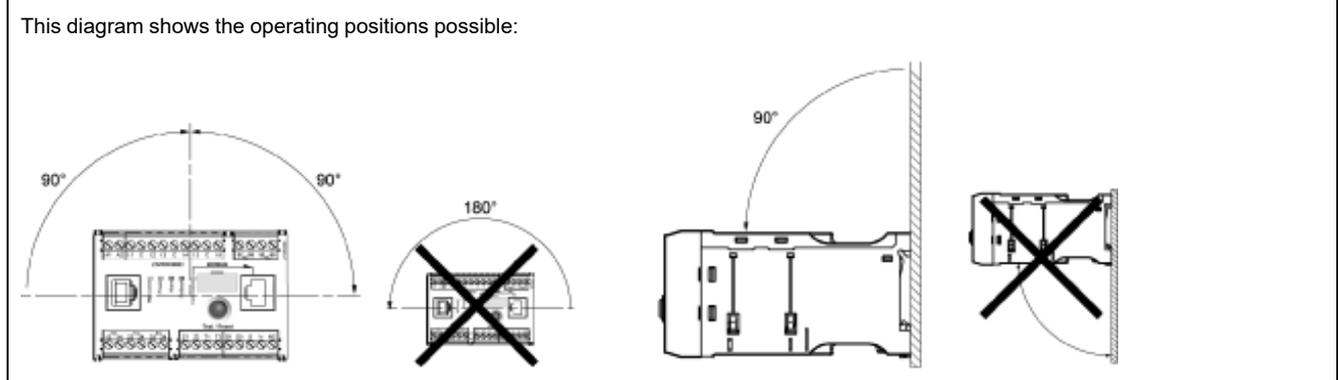
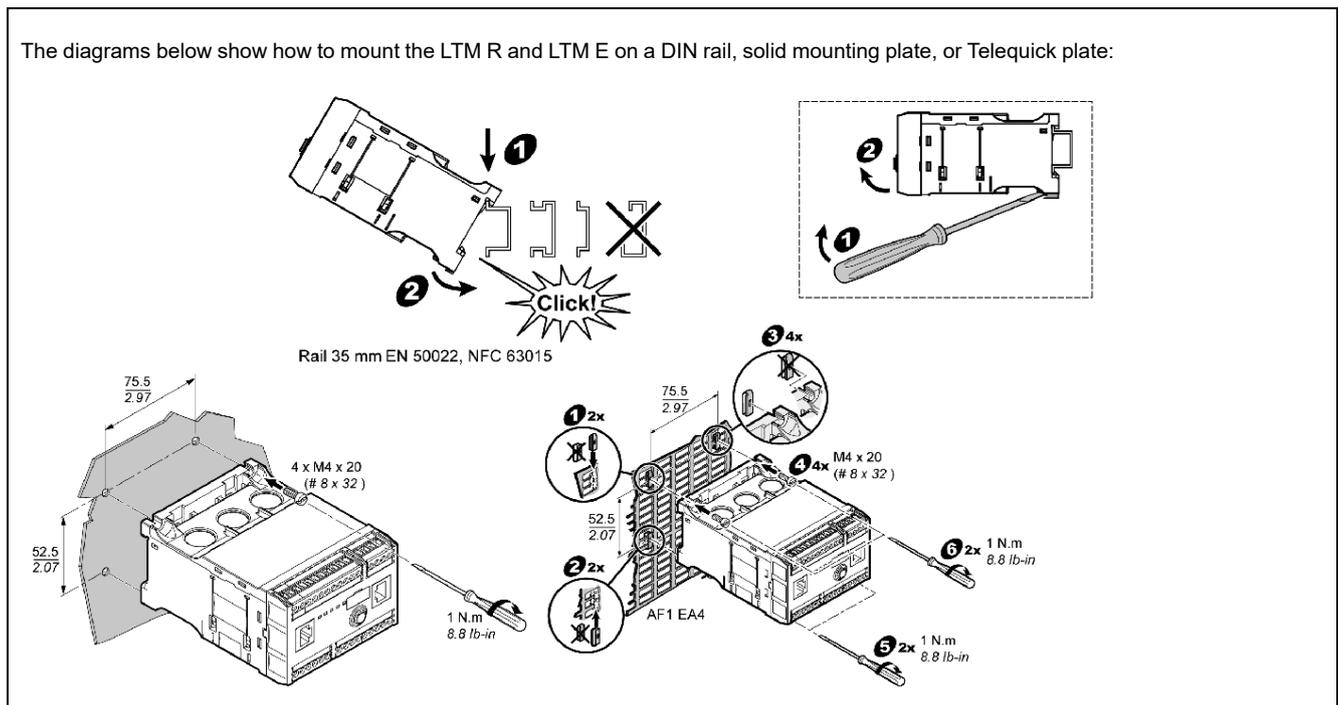
Failure to follow these instructions will result in death or serious injury.

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.

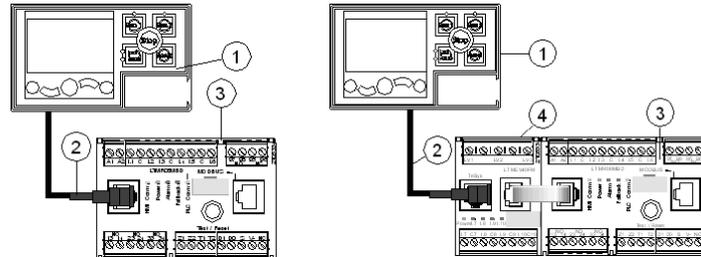


Connect LTM R to LTM E

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

Connect to a TeSys T LTM CU HMI Device (Optional)

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



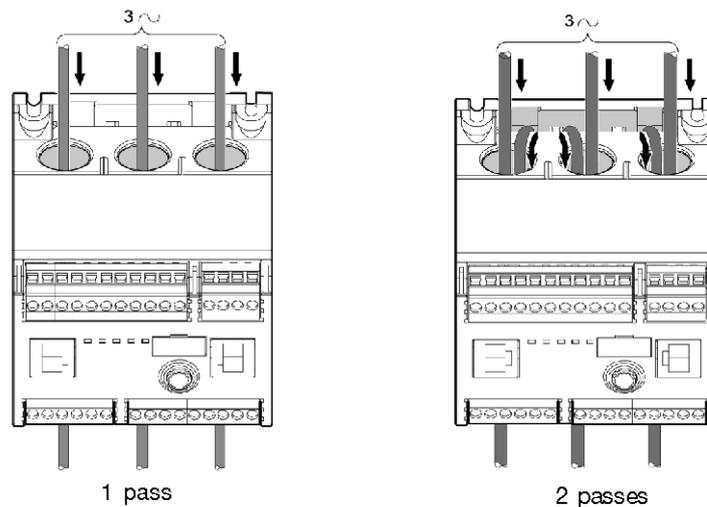
- 1 LTM CU Control Operator Unit
- 2 RJ45 cable (VW3 A1 104R30, in this example)
- 3 LTM R controller
- 4 LTM E expansion module

Wire Current Transformers

Wire the current transformers according to the operating conditions:

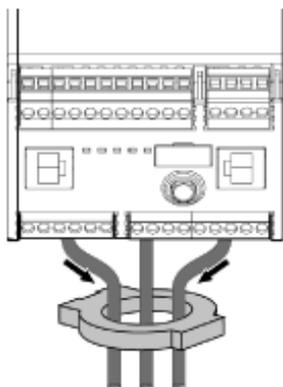
- Product range → 1.35...27 A
- Nominal motor current → 9 A

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



Wire Ground CT

Wire the ground current sensor:



Wire LTM R

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

NOTICE

RISK OF DESTROYING THE INPUTS

Connect the LTM R controller's inputs using the 3 Common (C) terminals connected to the A1 control voltage via an internal filter.

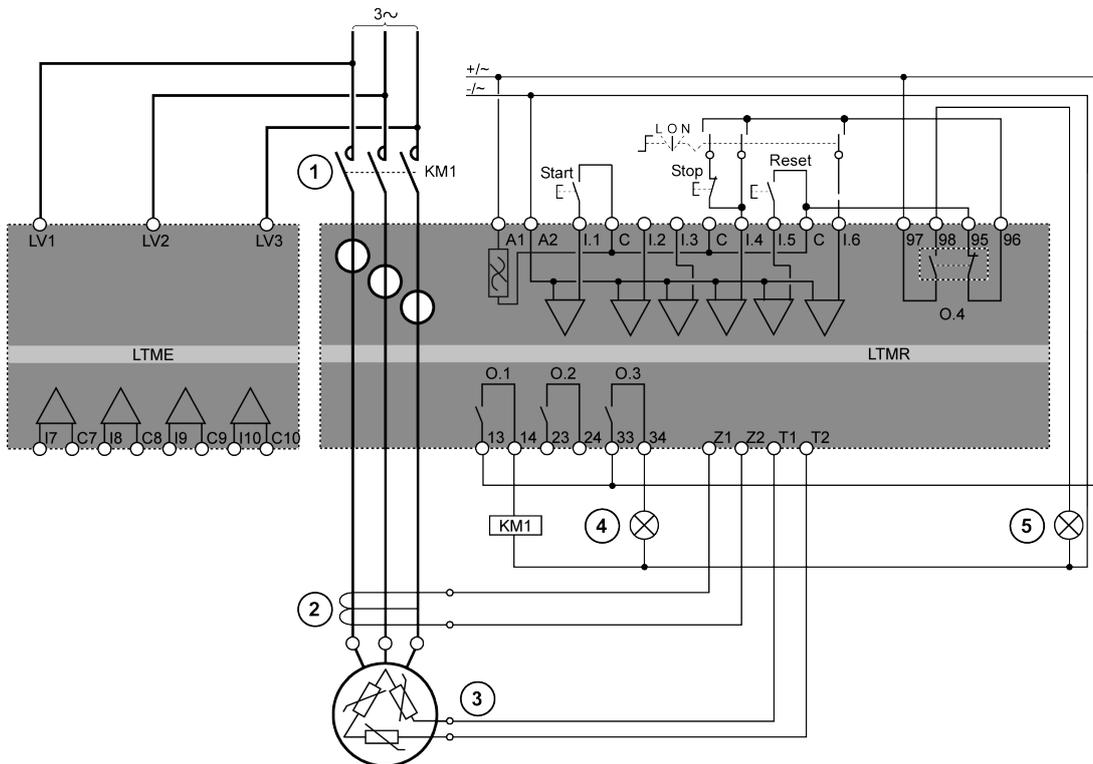
Failure to follow these instructions can result in equipment damage.

Wire LTM E

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

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 sensor
- 3 PTC binary thermistor
- 4 Alarm indication
- 5 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 PowerSuite software (see the PowerSuite chapter of the User Manual).

⚠ 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.

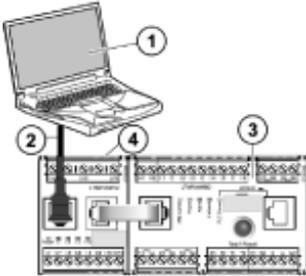
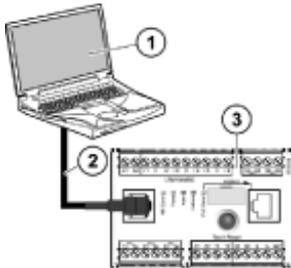
Follow all local and national safety codes and standards.

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

Install Software

Step	Description
1	Place the installation disk into your PC's CD/DVD drive.
2	Navigate to and click on the setup.exe file. The setup wizard begins.
3	Follow the instructions in the setup wizard.

Connect to PowerSuite™ Software

<p>In the application example:</p>  <p>1 PC running PowerSuite software 2 PowerSuite cable kit VW3 A8 106 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 PowerSuite software 2 PowerSuite cable kit VW3 A8 106 3 LTM R controller</p>
---	--

Set Parameters

Step	Description
1	Start up the PowerSuite software.
2	In the Load Configuration screen, select and open a configuration file with factory default settings.
3	Open the Device Information branch of the tree control and set the Operating parameter settings.
4	Open the Settings branch of the tree control.
5	Locate and set the Operating parameter settings in the Motor and Control sub-branch.
6	Repeat step 5 for all other setting item sub-branches.
7	Save a copy of the completed configuration settings to a new configuration file.

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	Modbus	
		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 CT	Ground CT 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 18.

Transfer the Configuration File

Step	Description
1	Open the configuration file to be transferred. <ul style="list-style-type: none"> Be sure the file is in the Main window.
2	Connect your PC to the LTM R controller. <ul style="list-style-type: none"> Check the task bar to see whether your PC is connected to the LTM R controller.
3	Transfer the configuration file: <ul style="list-style-type: none"> Select PC to Device, in either the Link > File Transfer sub-menu or the icon bar. In the Upload Configuration dialog, click Continue. A progress bar briefly appears. To confirm the success of the transfer, check the results in the Output window, which opens automatically at the bottom of the Main window. <p>Result: The product is now ready to use.</p>

FLC (Full Load Current) Settings

FLC Basics

NOTE: Before setting the FLC, 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 %

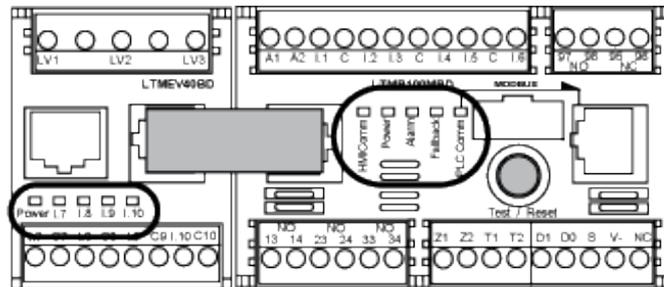
Calculated parameters with 2 passes:

- 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, check the LEDs on both components:



LEDs

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

LTM R LED	Color	Describes	Indicates
HMI Comm	Yellow	Communication activity between LTM R controller and 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.

LTM R LED	Color	Describes	Indicates
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)
PLC Comm	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 five LEDs on the face of the LTM E expansion module to monitor its state:

LTM E LED	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 LTM CU Control Operator Unit

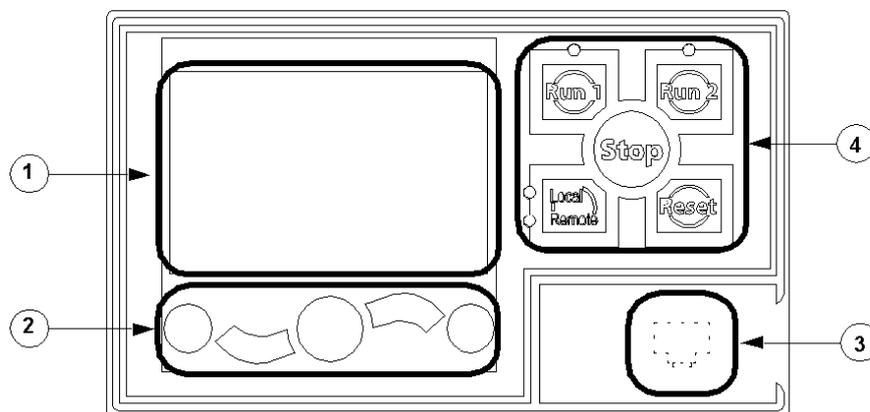
Available Functions

Once connected to the LTM R, the LTM CU 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 LTM CU 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

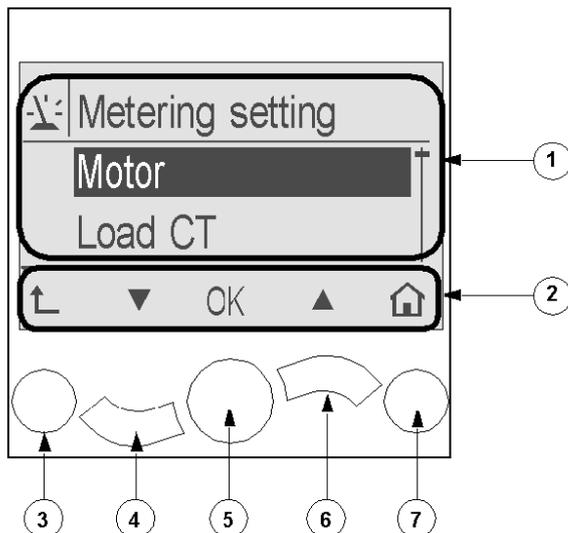
Navigation Keys

The LTM CU 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 LTM CU 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 LTM CU:

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		

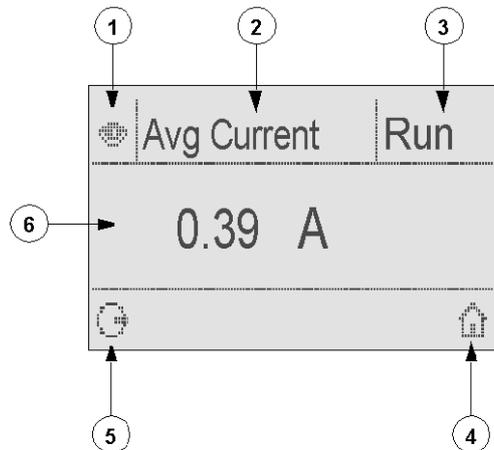
Information Icons

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 or detected failure 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:

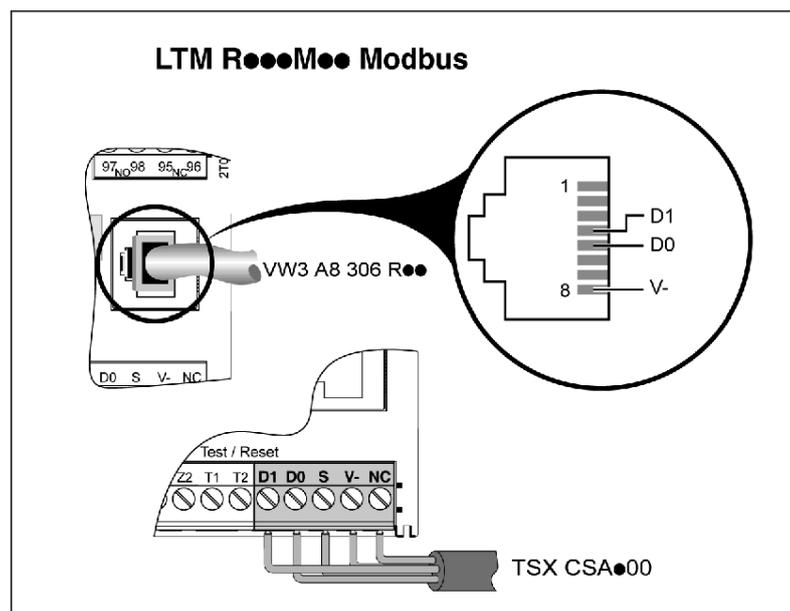


- 1 Quick View display icon
- 2 Name of the setting currently displayed
- 3 Motor state
- 4 Short key to main menu
- 5 Manual scroll mode icon; pressing the associated contextual navigation key switches to manual scroll mode
- 6 Value of the setting currently displayed

Network Communication on Modbus

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:



Set the Parameters

For the application example, set the following parameters:

Settings Branch	Sub-branch	Parameter	Setting
Device information	–	Network	Modbus
Communication	Network port	Address	4
		Baud rate	19 200
		Parity	Even

Network Port Comm Loss Timeout parameter is enabled by default, with a 60 s timeout. If this is not suitable, you can disable this parameter or set another timeout value.

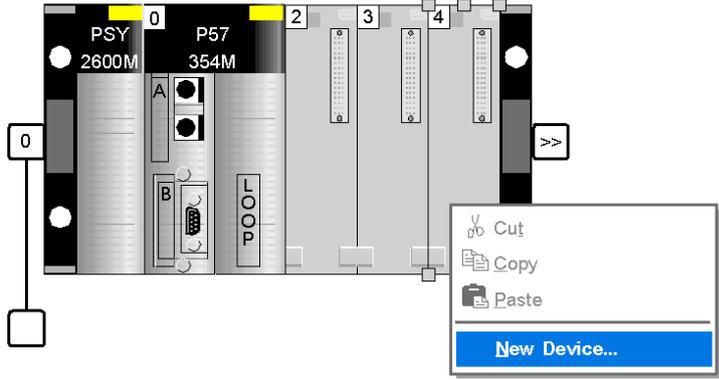
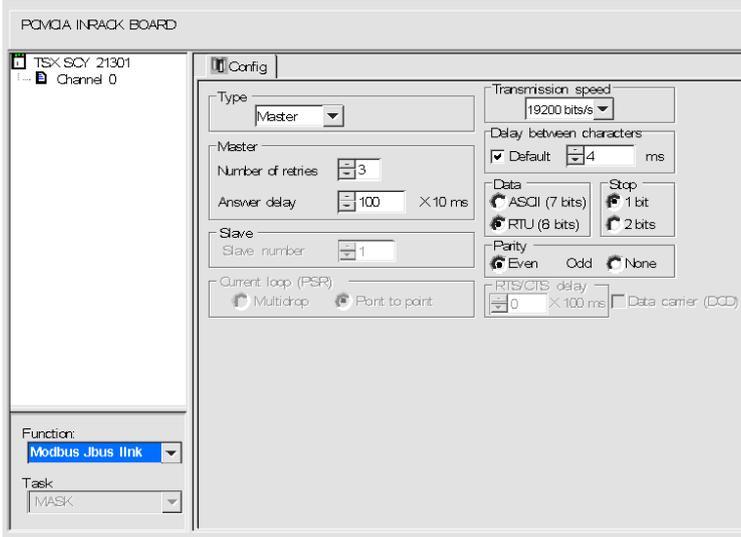
Set up the PLC Communication

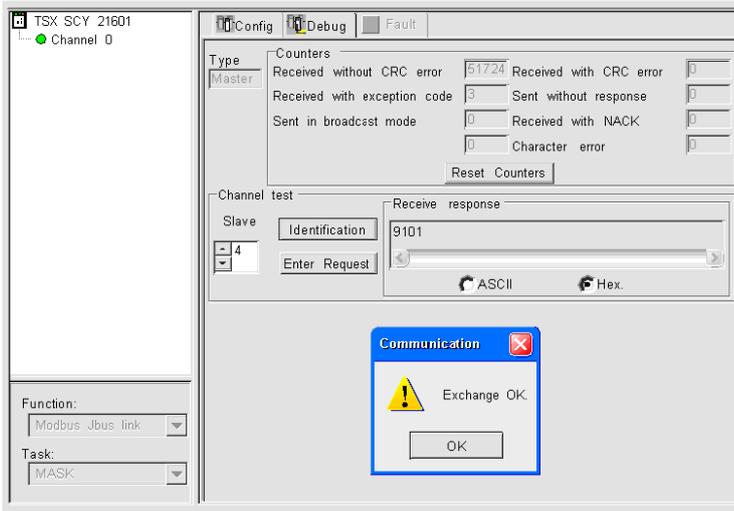
Set up communication between a PLC and the LTM R controller:

Step	Description
1	Declare the Modbus module in the PLC.
2	Configure the Modbus module in the PLC software.
3	Save and transfer the configuration to the PLC.
4	Test via the debug screen or the application program.

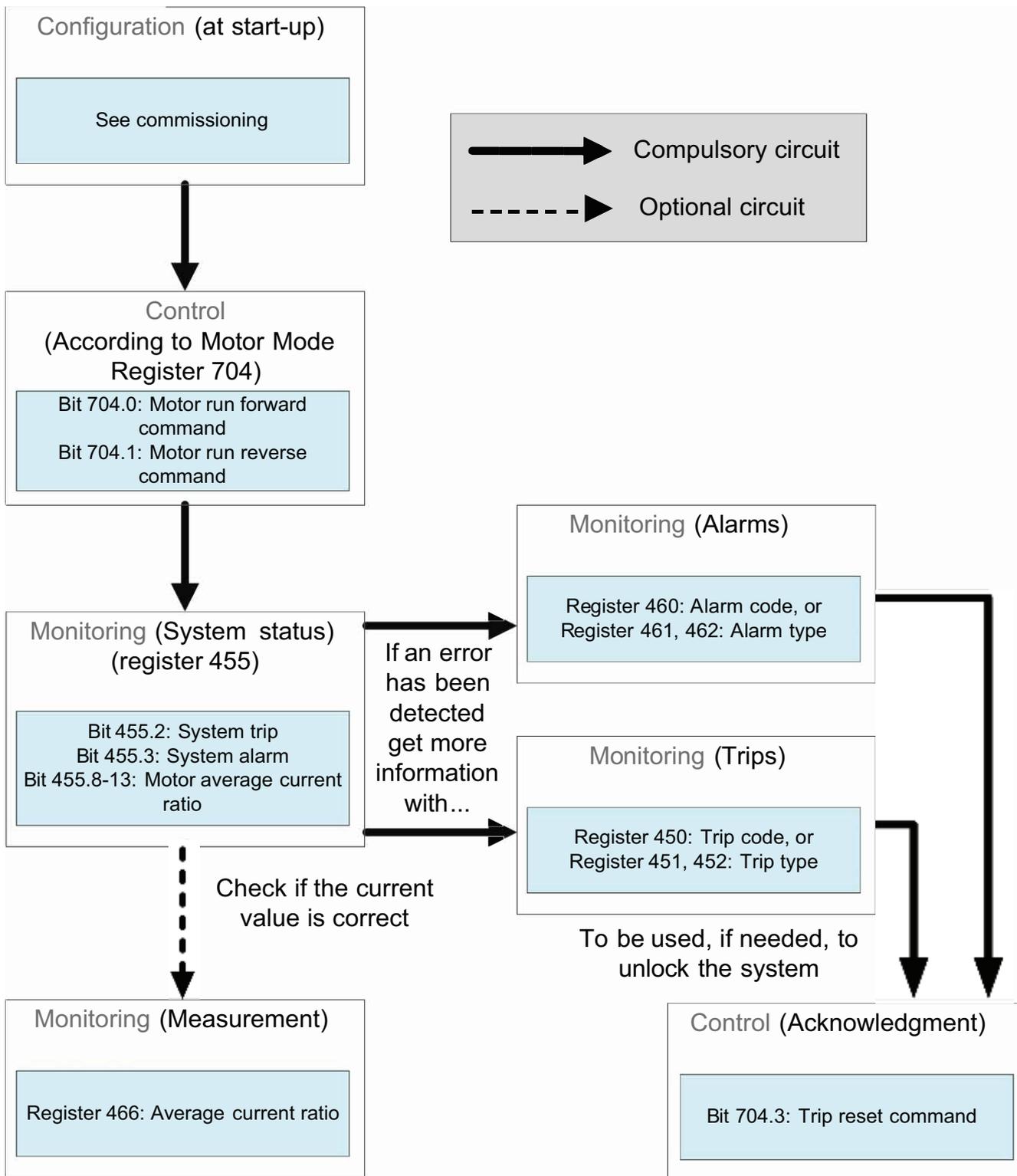
Configure the Communication

This example describes how to configure communication between a Premium PLC running Unity software and an LTM R controller:

Step	Description
<p>1</p>	<p>Declare the Modbus module in the Unity software:</p> <ul style="list-style-type: none"> Right-click on the slot where the module is to be declared and add the module.  <ul style="list-style-type: none"> Select TSXSCY 21601 in the Communication family and click OK to confirm.
<p>2</p>	<p>Configure the Modbus module in the Unity software:</p> <ul style="list-style-type: none"> On channel 0, select MODBUS/JBUS LINK for the communication protocol. Select Master mode for the PLC. Set the transmission speed 19200 and the data format RTU. This is the data format supported by the LTM R controller. Set the parity to Even. 
<p>3</p>	<p>Save and transfer the configuration to the PLC.</p>

Step	Description
<p>4</p>	<p>Verify the communication operation via the debug screen:</p> <ul style="list-style-type: none"> • Turn power OFF and ON successively to activate the automatic recognition of transmission speed and data format. • Select the slave address 4 and press the Identification button to activate the identification request transmission. • Wait a few seconds for recognition. Depending on the character format and speed transmission, it may be necessary to press the Identification button twice. 
<p>5</p>	<p>Develop and load the application program, then test it.</p>

Registers for Simplified Operation



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

Standard Requests on a PLC Platform

1) Example of a Read Operation (Modbus Request Code 3)

The example below describes a READ_VAR request, within a TSX Micro or Premium platform, in order to read the LTM R states at address 4 (secondary n° 4) contained in internal word MW0:

Syntax with PL7 software:

```
IF %M0 AND NOT %MW100:X0 THEN READ_VAR(ADR#3.0.4, '%MW', 455, 1, %MW0:1, %MW100:4) :RESET %M0;
EN_IF;
```

- 1 Address of the device with which you wish to communicate: 3 (device address), 0 (channel), 4 (device address on the bus)
- 2 Type of PL7 objects to be read: MW (internal word)
- 3 Address of the first register to be read: 455
- 4 Number of consecutive registers to be read: 1
- 5 Word table containing the value of the objects read: MW0:1
- 6 Read report: MW100:4

Variant with Unity Pro software:

```
IF %M0 AND NOT %MW100.0 THEN
READ_VAR(ADDR('0.3.0.4'), '%MW', 455, 1, %MW100:4, %MW0:1);RESET(%M0);
END_IF;
```

2) Example of a Write Operation (Modbus Request Code 16)

The example below describes a WRITE_VAR request, within a TSX Micro or Premium platform, in order to control an LTM R by sending the contents of internal word MW502:

Syntax with PL7 software:

```
IF %M0 AND NOT %MW200:X0 THEN WRITE_VAR(ADR#3.0.4, '%MW', 704, 1, %MW502:1, %MW200:4) :RESET %M10;
EN_IF;
```

- 1 Address of the device with which you wish to communicate: 3 (device address), 0 (channel), 4 (device address on the bus)
- 2 Type of PL7 objects to be written: MW (internal word)
- 3 Address of the first register to be written: 704
- 4 Number of consecutive registers to be written: 1
- 5 Word table containing the value of the objects to be sent: MW502:1
- 6 Write report: MW200:4

Variant with Unity Pro software:

```
IF %M0 AND NOT %MW200.0 THEN
WRITE_VAR(ADDR('0.3.0.4'), '%MW', 704, 1, %MW502:1, %MW200:4);RESET(%M0);
END_IF;
```


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1639572EN-01