

# TeSys U AS-interface

## Quick Start Guide

12/2009



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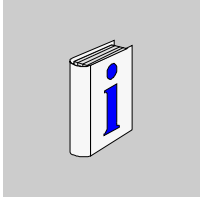
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## About the Book

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### At a Glance

#### Document Scope

The Quick Start Guide uses an application example to describe the different steps to quickly install, configure, and control TeSys U motor starters. With this Quick Start Guide, you can easily set up an AS-interface communication network, provided that you have a basic knowledge in PLCs and application software (TwidoSoft, Unity Pro). You do not need any other document to perform this task.

For more details about other capabilities of TeSys U motor starters, consult the related documents listed below.

#### Validity Note

The information described in this Quick Start Guide is valid for the hardware and software used in the application example provided. The same procedures can be used with different versions of the hardware and software given provided that compatible versions are used.

#### Related Documents

Title of Documentation	Reference Number
TeSys U ASILUFC5-ASILUFC51 AS-i Communication Module - User Manual	1639093
LUB/LUS TeSys U Starters - Instruction Sheet	1629984
LUFC• - ASILUF - LULC• - Instruction Sheet	1743239

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# Introduction

# 1

## What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation of the Application	5
The Schneider Electric Solution with Tesys U Motor Starter	6

## Presentation of the Application

### Introduction

The application example helps you to define Direct On Line (D.O.L.) motor starters step by step, in order to:

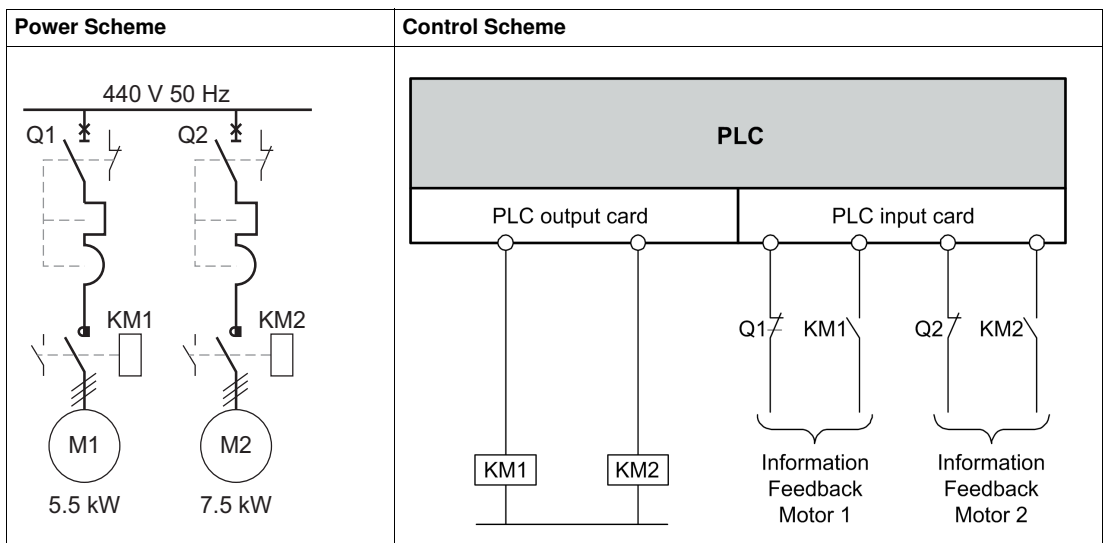
- provide thermal magnetic protection,
- control the motor, and
- obtain contactor feedback and circuit breaker trip feedback.

### Description of the Application

- Motor 1 (M1):  
3-phase motor, class 10, 5.5 kW (7.4 hp) at 440 V, 50 Hz, rated current  $I_n = 10.5$  A, D.O.L.
- Motor 2 (M2):  
3-phase motor, class 20, 7.5 kW (10.1 hp) at 440 V, 50 Hz, rated current  $I_n = 14.7$  A, D.O.L. with remote monitoring of motor load.

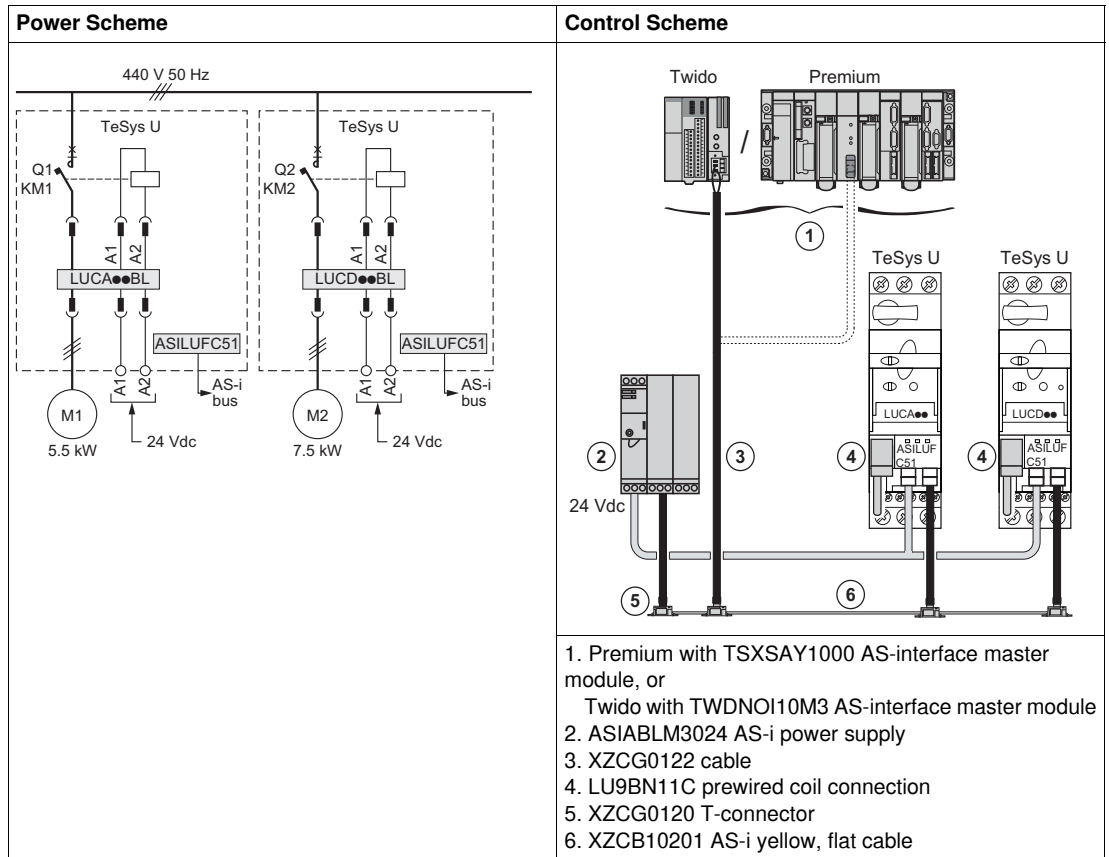
### Traditional Solution

The scheme below shows wiring in the traditional solution: all control and feedback information is wired through a PLC.



## The Schneider Electric Solution with Tesys U Motor Starter

### Power and Control Schemes in the Schneider Electric Solution



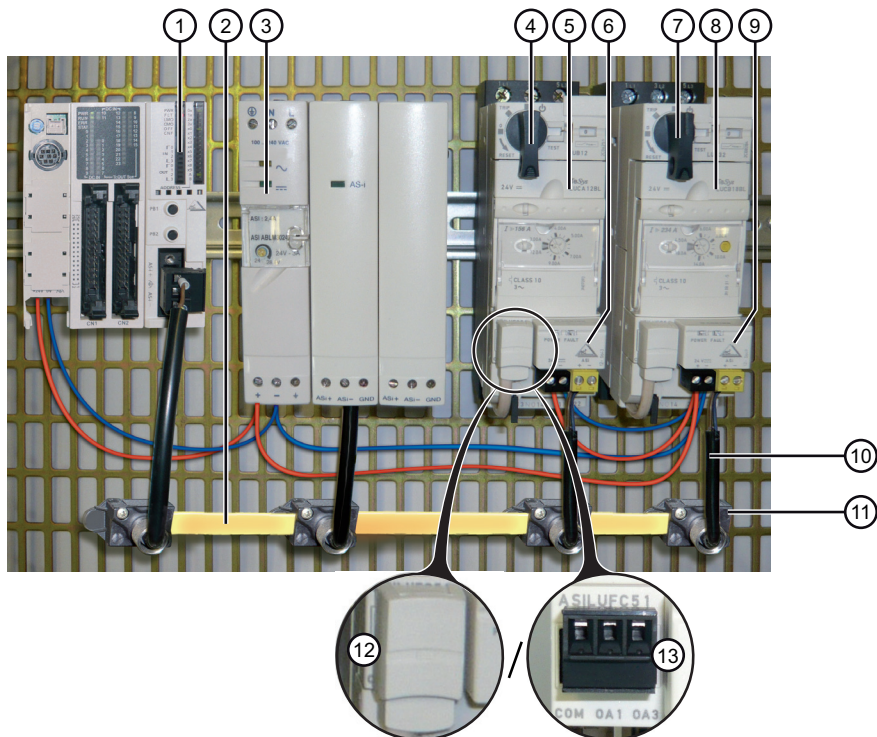
### Control Units Used in the Schneider Electric Solution

The Schneider Electric solution presented in this Quick Start Guide uses TeSys U to meet different client needs.

- LUCA12BL is a standard control unit used with motor 1 for basic needs:
  - Control a motor remotely (start/stop).
  - Provide status information (ready, running, fault condition).
- LUCD18BL is an advanced control unit used with motor 2 for the same needs as the standard ones, and has a test button simulating tripping on thermal overload.

## Architecture of the TeSys U System

The following architecture presents the main components of the TeSys U system mounted on a plate:



Legend	Commercial Reference	Description
1	Twido	Programmable Logic Controller (PLC)
	Premium	
2	XZCB10201	AS-interface flat cable, yellow, maximum 20 m (65.6 ft), to be cut according to the network size
3	ASIABLM3024	AS-interface power supply providing: <ul style="list-style-type: none"> <li>● 24 V DC, 3 A, 72 W for the auxiliary, and</li> <li>● 30 V DC, 2.4 A, 72 W for AS-i</li> </ul>
4	LUB12	TeSys U power base
5	LUCA12BL	Standard control unit
6, 9	ASILUFC51	AS-interface communication module
7	LUB32	TeSys U power base
8	LUCD18BL	Advanced control unit
10	XZCG0122	2 m (6.6 ft) cable with screw-on connector for connection to the flat cable and a stripped end for electrical connection
11	XZCG0120	T-connector for connection to the flat cable for AS-interface
12	LU9BN11C	Prewired coil connection (optional), or
13	Standard connection supplied with ASILUFC51	Plug-in terminal block for wire-to-wire control of A1/A2 terminals

## Software Tools

The following software tools must be used to set the applications. Their use requires a basic knowledge.

Commercial Reference	Description	
TWDSPU1002V10M	TwidoSoft V3.2	Programming software for Twido PLC
TWD BTF U10M	TwidoSuite V2.0	
UNY SPU EFP CD40	Unity Pro Extra Large V4.0 programming software for Premium PLC	

## Network Conditions

**Protocol:** AS-interface

**Addresses:**

- 1A for TeSys U motor 1
- 2A for TeSys U motor 2

# 2

## Setting Up TeSys U

### What's in this Chapter?

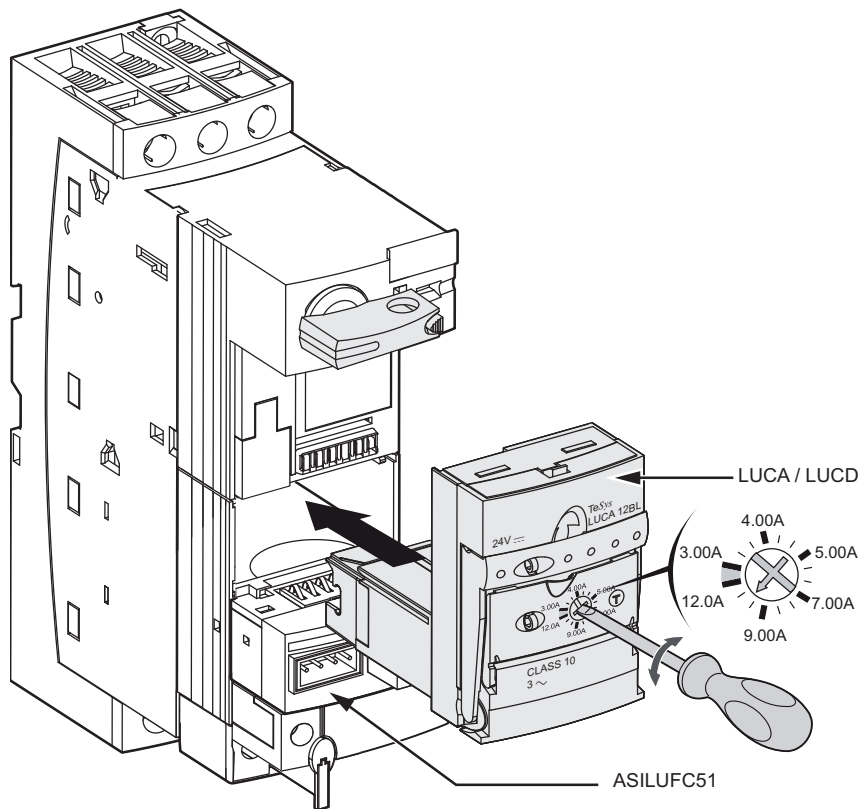
This chapter contains the following topics:

Topic	Page
LUCA12BL and LUCD18BL Settings	8
ASILUFC51 Connectors and Address Settings	9

### LUCA12BL and LUCD18BL Settings

#### Setting Current on the Control Units

The figure below shows how to set current on the control unit using a screwdriver (LUCA12BL here):



#### Current Setting Values

The table below shows the settings for LUCA12BL (Standard Control Unit) and LUCD18BL (Advanced Control Unit):

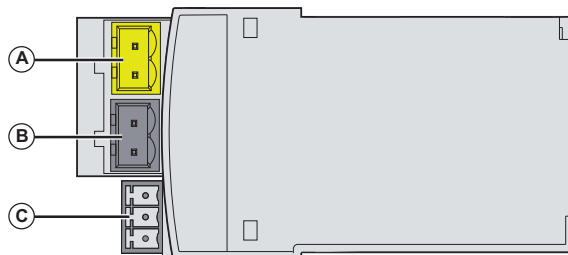
Control Unit	Motor	Current Setting Range	Motor Nominal Power	Current Setting Value = Motor Rated Current
LUCA12BL	M1	3...12 A	5.5 kW (7.5 hp)	10.5 A
LUCD18BL	M2	4.4...18 A	7.5 kW (10 hp)	14.7 A



## ASILUFC51 Connectors and Address Settings

### Presentation

The connectors under the ASILUFC51 communication module are as follows:



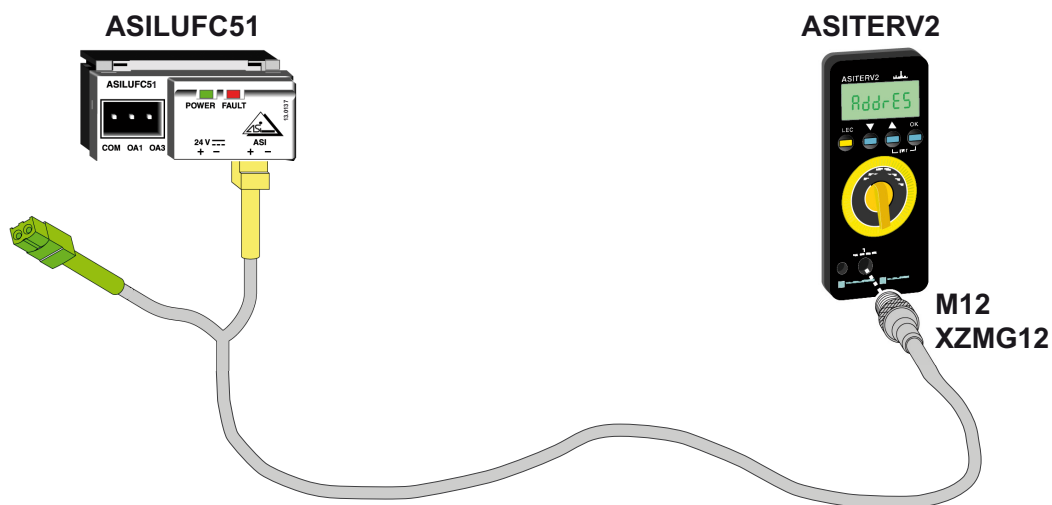
- A** Yellow connector for connection to AS-interface network or to ASITERV2 addressing terminal
- B** Black connector for connection to 24 V DC auxiliary
- C** Outputs to control the controller-starter

### Address

Assign an address from 1A to 31A and from 1B to 31B using the ASITERV2 addressing terminal. Address 0 (zero) is not allowed and is considered an invalid configuration.

To assign the addresses 1A and 2A proceed as follows:

Step	Action
1	Connect and screw in the male M12 connector of the XZMG12 cable to the M12 connector of the ASITERV2 addressing terminal.
2	Connect the yellow plug-in connector of the XZMG12 cable to the yellow AS-i bus connector on the ASILUFC51. See figure below. <b>NOTE:</b> The green plug-in connector of the XZMG12 cable is not used.
3	On the ASITERV2, turn the rotary switch to the <b>ADDR</b> position and then press the OK button. During initialization <b>SEArCh</b> displays. <b>Result:</b> The address of the connected slave appears on the display. The default address is 0.
4	Press the up and down arrows to set the address to 1. <b>NOTE:</b> An A appears on the display after the address to indicate the channel assignment because the slave has advanced addressing.
5	Press <b>OK</b> to apply the setting. During transmission <b>ProG</b> displays. <b>Result:</b> The slave address 1A displays permanently.
6	To set address 2A, press the <b>ESC</b> button and resume the process at step 4, setting the address to 2 instead of 1. <b>Result:</b> The slave address 2A displays permanently.
7	Turn the rotary switch to the OFF position and then disconnect the cables.



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# 3

## Setting Up Communication Network to a PLC

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### Introduction

This chapter describes step by step how to set communication to a PLC.

The table below indicates the software needed to set communication depending on the PLC used in the application.

PLC	Software Used to Set Communication
Twido	TwidoSoft (or TwidoSuite)
Premium	Unity Pro

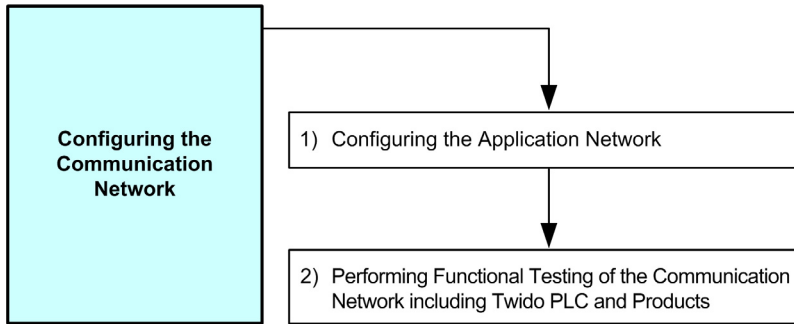
### What's in this Chapter?

This chapter contains the following topics:

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3.1 Configuring TeSys U on the AS-interface Network for a Twido PLC (with TwidoSoft)	11
3.2 Configuring TeSys U on the AS-interface Network for a Premium PLC (with Unity Pro)	14
3.3 Implementing the TeSys U Solution with AS-i	16

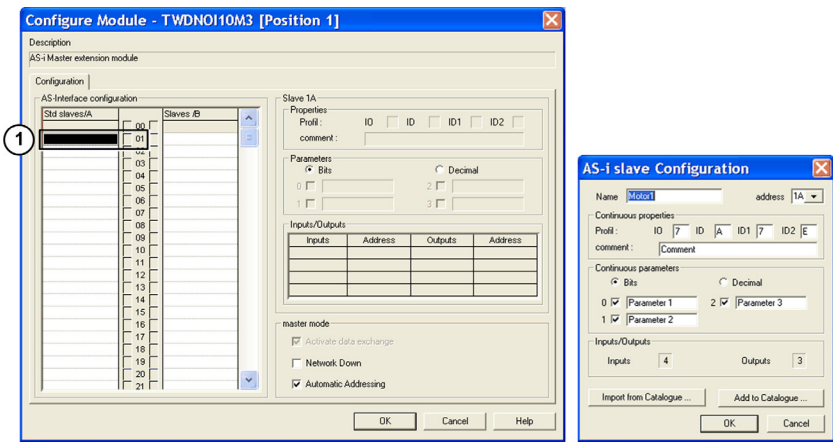
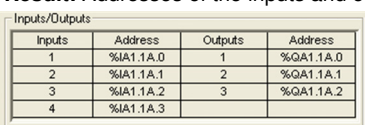
### 3.1 Configuring TeSys U on the AS-interface Network for a Twido PLC (with TwidoSoft)

#### Configuration Process for a Twido PLC



#### 1) Configuring the Application Network

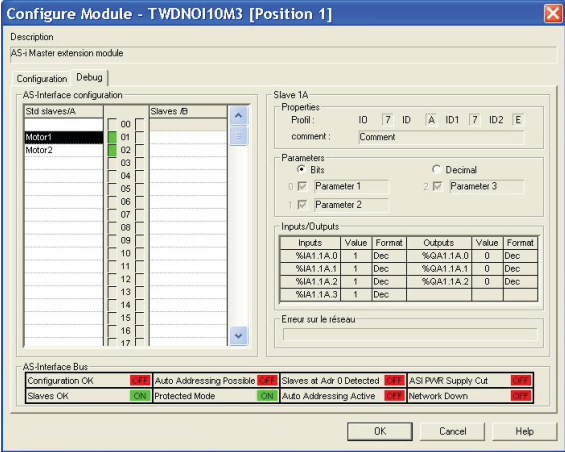
Configuration steps with **TwidoSoft** software are as follows:

Step	Action
1	Start <b>TwidoSoft</b> V3.2 software.
2	Configure the Twido PLC for AS-interface: <ul style="list-style-type: none"> <li>From the <b>File</b> menu, create a new project.</li> <li>In the <b>Functional Level Management</b> dialog box, select the automatic, highest possible level, and then click <b>OK</b>.</li> <li>Click <b>Hardware</b> → <b>Change PLC Base</b>.</li> <li>Select <b>TWDLMDA40D-K</b> in the <b>Controller</b> list of the <b>Change Base Controller</b> dialog box.</li> <li>Confirm by clicking <b>Change</b> and then <b>Done</b>.</li> <li>Select the menu command <b>Hardware</b> → <b>Expansion Bus</b> → <b>Add a module...</b></li> <li>Select <b>TWDNOI10M3</b> in the <b>Module</b> list of the <b>Add module</b> dialog box.</li> <li>Confirm by clicking <b>Add</b> and then <b>Done</b>.</li> </ul> <b>Result:</b> The application browser displays the names of the chosen controller and module.
3	To configure the slaves of the master expansion module, right-click 1 : <b>TWDNOI10M3</b> , and then select <b>Configure...</b> <b>Result:</b> The <b>Configure Module - TWDNOI10M3 [Position 1]</b> dialog box opens.
4	In the <b>Configure Module - TWDNOI10M3 [Position 1]</b> dialog box, configure the slave 1A: in the <b>STD slaves/A</b> bank, right-click the address cell <b>01</b> and then <b>New</b> to open the <b>AS-i slave Configuration</b> dialog box. 
5	In the <b>AS-i slave Configuration</b> dialog box, enter the following values and then click <b>OK</b> to confirm: <ul style="list-style-type: none"> <li>Name: <b>Motor1</b></li> <li>Address: <b>1A</b></li> <li>Profile: <b>IO = 7 , ID = A , ID1 = 7 , ID2 = E</b></li> </ul> <b>Result:</b> Addresses of the inputs and outputs display in the <b>Configuration</b> tab for <b>Motor1</b> : 

Step	Action																								
6	In the <b>STD slaves/A</b> bank, right-click the address cell <b>02</b> and then <b>New</b> to open the <b>AS-i slave Configuration</b> dialog box.																								
7	Enter or modify the following values and then click <b>OK</b> to confirm: <ul style="list-style-type: none"> <li>● Name: <b>Motor2</b></li> <li>● Address: <b>2A</b></li> <li>● Profile: IO = <b>7</b> , ID = <b>A</b> , ID1 = <b>7</b> , ID2 = <b>E</b></li> </ul> <b>Result:</b> Addresses of the inputs and outputs display in the <b>Configuration</b> tab for Motor2: <table border="1" data-bbox="499 416 858 528" style="margin-left: 20px;"> <thead> <tr> <th colspan="4" style="text-align: left;">Inputs/Outputs</th> </tr> <tr> <th>Inputs</th> <th>Address</th> <th>Outputs</th> <th>Address</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>%IA1.2A.0</td> <td>1</td> <td>%QA1.2A.0</td> </tr> <tr> <td>2</td> <td>%IA1.2A.1</td> <td>2</td> <td>%QA1.2A.1</td> </tr> <tr> <td>3</td> <td>%IA1.2A.2</td> <td>3</td> <td>%QA1.2A.2</td> </tr> <tr> <td>4</td> <td>%IA1.2A.3</td> <td></td> <td></td> </tr> </tbody> </table>	Inputs/Outputs				Inputs	Address	Outputs	Address	1	%IA1.2A.0	1	%QA1.2A.0	2	%IA1.2A.1	2	%QA1.2A.1	3	%IA1.2A.2	3	%QA1.2A.2	4	%IA1.2A.3		
Inputs/Outputs																									
Inputs	Address	Outputs	Address																						
1	%IA1.2A.0	1	%QA1.2A.0																						
2	%IA1.2A.1	2	%QA1.2A.1																						
3	%IA1.2A.2	3	%QA1.2A.2																						
4	%IA1.2A.3																								
8	Confirm the slave configuration by clicking on <b>OK</b> .																								
9	The configuration editor displays the list of the 2 slaves with their addresses.																								
10	Save your application as a <b>.twd</b> file.																								

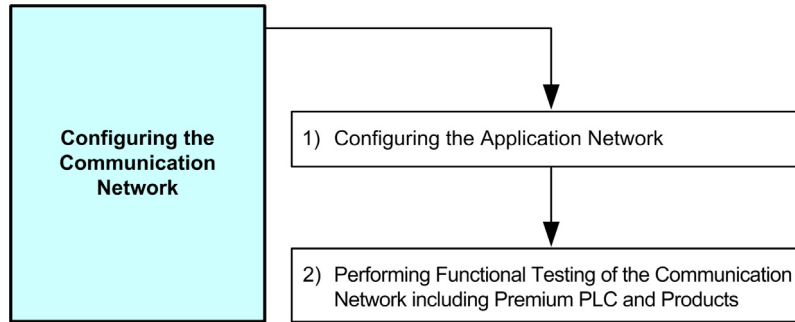
## 2) Performing Functional Testing of the Communication Network including Twido PLC and Products

To test the configuration, wiring, and communication with TwidoSoft software proceed as follows:

Step	Action
1	Connect the appropriate programming cable from your PC to the Twido PLC.
2	Power up the Twido PLC.
3	In TwidoSoft, click <b>PLC</b> → <b>Connect...</b>
4	In the connection window that opens, click the <b>PC =&gt; Controller</b> button.
5	Power up the 2 TeSys U systems. The green POWER LED on the ASILUFC51 front face blinks, and then remains constant. Communication is working correctly.
6	From the application browser in TwidoSoft, right-click <b>TWDNOI10M3</b> and then select <b>Configure</b> : the <b>Configure Module - TWDNOI10M3 [Position 1]</b> dialog box opens.
7	<p>Click on the <b>Debug</b> tab.</p>  <ul style="list-style-type: none"> <li>Under AS-interface configuration, the green indicator lamp indicates this slave is active.</li> <li>Refer to the <i>TeSys U ASILUFC5-ASILUFC51 AS-i Communication Module User Manual</i> for details on how to name the topological addresses in such a way to avoid programming with names which do not provide any information of the contents of the memory location. In the application, the input/output variables for <b>Motor1</b> are as follows: <ul style="list-style-type: none"> <li>%QA1.1A.0 output = 0 means Stop direct direction</li> <li>%QA1.1A.0 output = 1 means Run forward direction</li> <li>%IA1.1A.0 input = 0 means Not ready or in fault</li> <li>%IA1.1A.0 input = 1 means Ready</li> <li>%IA1.1A.1 input = 0 means Stopped</li> <li>%IA1.1A.1 input = 1 means Running</li> </ul> </li> <li>In the application, the input/output variables for <b>Motor2</b> are as follows: <ul style="list-style-type: none"> <li>%QA1.2A.0 output = 0 means Stop direct direction</li> <li>%QA1.2A.0 output = 1 means Run forward direction</li> <li>%IA1.2A.0 input = 0 means Not ready or in fault</li> <li>%IA1.2A.0 input = 1 means Ready</li> <li>%IA1.2A.1 input = 0 means Stopped</li> <li>%IA1.2A.1 input = 1 means Running</li> </ul> <p>The other variable bits are reserved.</p> </li> </ul>
8	Click <b>OK</b> .
9	Click <b>PLC</b> → <b>Disconnect</b> .

### 3.2 Configuring TeSys U on the AS-interface Network for a Premium PLC (with Unity Pro)

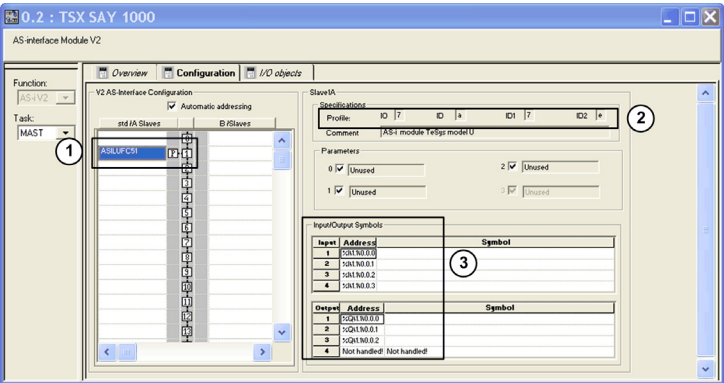
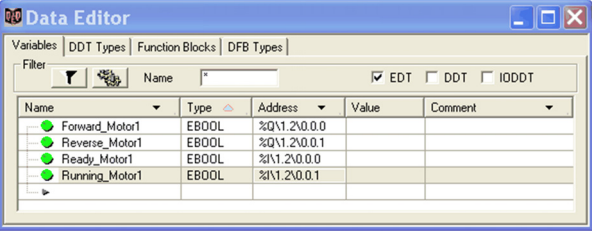
#### Configuration Process for a Premium PLC



#### 1) Configuring the Application Network

Configuration steps with **Unity Pro XL** software are as follows:

Step	Action
1	Start <b>Unity Pro XL V4.0</b> software.
2	Configure the Premium PLC for AS-interface: <ul style="list-style-type: none"> <li>From the <b>File</b> menu, create a new project.</li> <li>In the <b>New Project</b> window, expand the Premium list and select <b>TSX P57 354M</b>.</li> <li>Confirm by clicking <b>OK</b>.</li> </ul>
3	From the <b>Structural view</b> of the <b>Project Browser</b> , select <b>Configuration → 0 : X Bus → 0 : TSX RKY 6EX</b> , and then double-click to view the configuration.
4	In the <b>Hardware catalog</b> , select <b>Premium local drop → Communication → TSX SAY 1000</b> , and then drag and drop the TSX SAY 1000 module into an empty slot in the graphical configuration: <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> </div>
5	Double-click the <b>TSX SAY 1000</b> module in the <b>Structural view</b> . The <b>0.2 : TSX SAY 1000</b> screen opens in a new tab which displays a <b>Configuration</b> tab.
6	Open the <b>Associate Profile</b> dialog box by double-clicking on cell <b>1</b> of the standard A slaves.
7	To configure the TeSys U systems, select the following values: <ul style="list-style-type: none"> <li>Code <b>4 Motor-starters</b> for the AS-i profile family</li> <li><b>ASILUFC51</b> under the corresponding AS-i catalog</li> </ul> <p><b>NOTE:</b> If the TeSys U system does not appear in the list of AS-i profile families, click code <b>1 Private Family</b> and then <b>Add</b>. In the dialog box which opens, enter ASILUFC51 in the name field and the associated profile. Confirm by clicking <b>OK</b>.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> </div>
	<ul style="list-style-type: none"> <li>Confirm by clicking <b>OK</b>.</li> </ul>

Step	Action
8	<p>The <b>Configuration</b> tab displays:</p>  <p>1 Slave 2 ASILUFC51 profile (7.A.7.E) 3 Topological addresses (see Step 12 for renaming information)</p>
9	Copy and paste <b>ASILUFC51</b> from cell 1 to cell 2.
10	Select the menu command <b>Edit</b> → <b>Validate</b> , or click <input checked="" type="checkbox"/> to validate the configuration.
11	In the <b>Project Browser</b> , select <b>Project</b> → <b>Variables &amp; FB instances</b> → <b>Elementary Variables</b> to set names to the topological addresses. The <b>Data Editor</b> screen opens in a new tab.
12	<p>Name the variables in such a way to avoid programming with names which do not provide any information on the contents of the memory location. In the <b>Variables</b> tab:</p> <ul style="list-style-type: none"> <li>Enter one after the other the following name and corresponding topological address by double-clicking the empty field in the related column: <ul style="list-style-type: none"> <li>Forward_Motor1 corresponds to the %Q1.2\0.0 address</li> <li>Reverse_Motor1 corresponds to the %Q1.2\0.0.1 address</li> <li>Ready_Motor1 corresponds to the %I1.2\0.0.0 address</li> <li>Running_Motor1 corresponds to the %I1.2\0.0.1 address</li> </ul> </li> <li>Select the variable type by selecting <b>EBOOL</b> in the <b>Type</b> column.</li> </ul> 
13	Select the menu command <b>Build</b> → <b>Rebuild All Project</b> to rebuild the project. If the values are correct (no errors), the NOT BUILT state changes to BUILT.
14	Save your application as an <b>.stu</b> file.
15	Connect the appropriate programming cable from your PC to the Premium PLC.
16	Power up the Premium PLC.
17	Click <b>PLC</b> → <b>Connect</b> in Unity Pro XL.
18	Click <b>PLC</b> → <b>Transfer Project to PLC</b> .
19	In the transfer window, click the <b>Transfer</b> button.
20	Click the <b>Run</b> icon. The input and output states appear in the <b>Module AS-interface V2</b> window.

## 2) Performing Functional Testing of the Communication Network

To test the configuration, wiring, and communication with Unity Pro XL software proceed as follows:

Step	Action
1	From the <b>Structural view</b> of the <b>Project Browser</b> , select your configuration.
2	In the <b>Configuration</b> window, check that no red points appear next to the tab names <b>Module Fault</b> and <b>Debug</b> . This means the program is running correctly.
3	In the <b>Configuration</b> window, select the <b>Debug</b> tab.
4	Under <b>Channel test</b> , select the slave number 1 and click on the <b>Identification</b> button.
5	A dialog box opens and should display that the exchange is OK. The <b>COMM LED</b> of the TeSys U blinks once for each identification request received.

### 3.3 Implementing the TeSys U Solution with AS-i

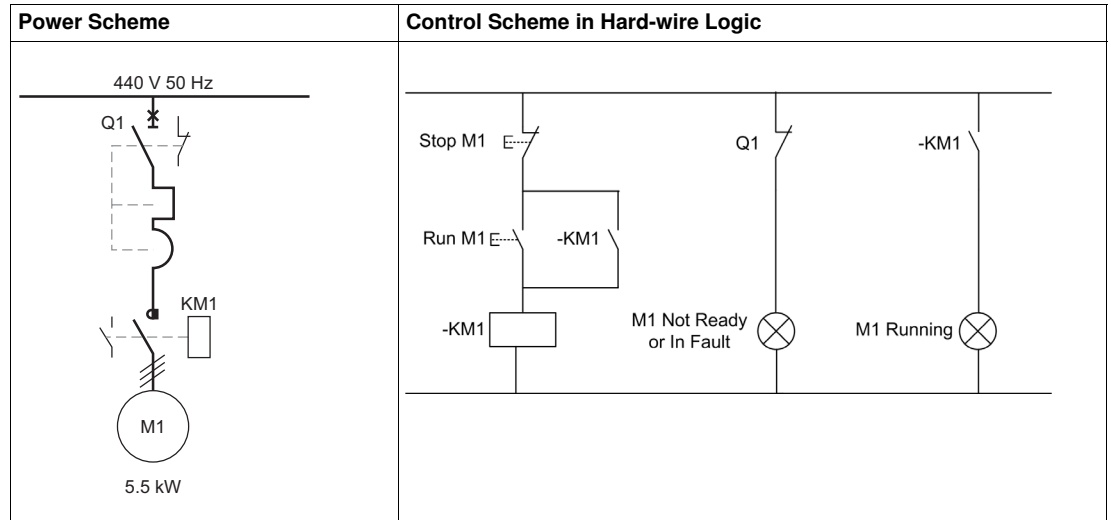
#### Introduction

The following motor-control schemes present wiring depending on the chosen solution and show the ease of programming using TeSys U with AS-i.

Only the control of motor 1 (M1) used in the application example is described.

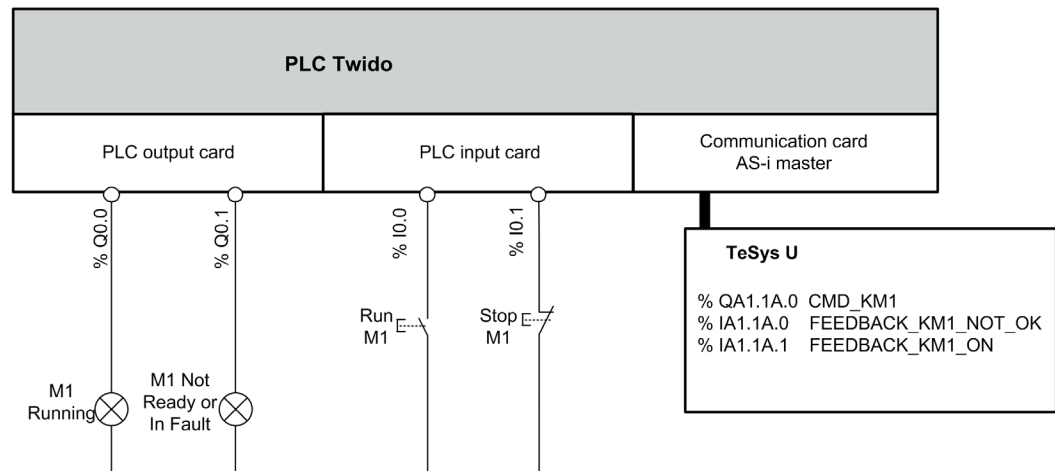
#### Traditional Solution with Hard-wire Logic

The scheme below shows hard-wire logic wiring in the traditional solution (without PLC, nor TeSys U):



#### Schneider Electric Solution with Programmable Logic

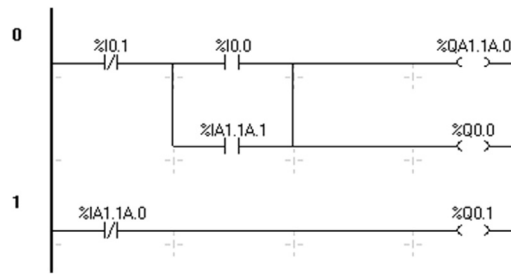
The scheme below shows programmable logic wiring using a PLC and a TeSys U starter-controller:





## TwidoSoft Programme for Controlling Motor 1

The following programme in TwidoSoft enables Motor 1 control:



The following table presents the inputs and outputs and the corresponding AS-i variables:

Symbol	Address	Description
M1_NOT_READY	%Q0.1	Indicator not ready or in fault
M1_RUNNING	%Q0.0	RUNNING indicator
STOP_M1	%I0.1	STOP push-button
RUN_M1	%I0.0	RUN push-button
CMD_KM1	%QA1.1A.0	Command of KM1 "Motor 1"
FEEDBACK_KM1_ON	%IA1.1A.1	Feedback on the terminals' position
FEEDBACK_KM1_NOT_OK	%IA1.1A.0	NOT READY or IN FAULT feedback of KM1