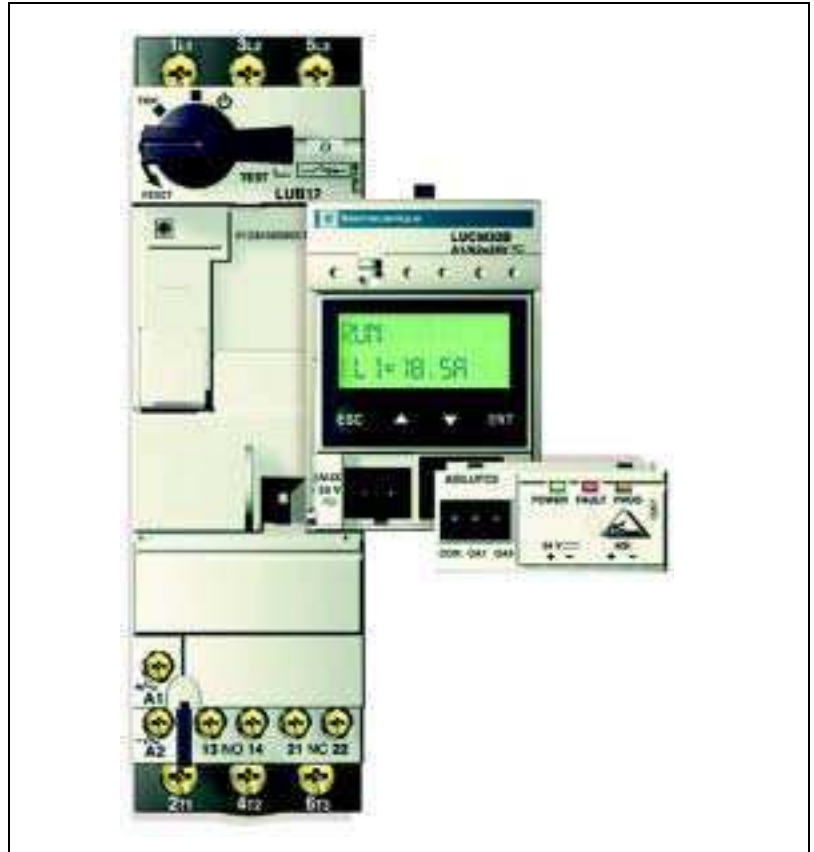


# TeSys® U-Line Motor Starters

Catalog  
**2004**

File 8502

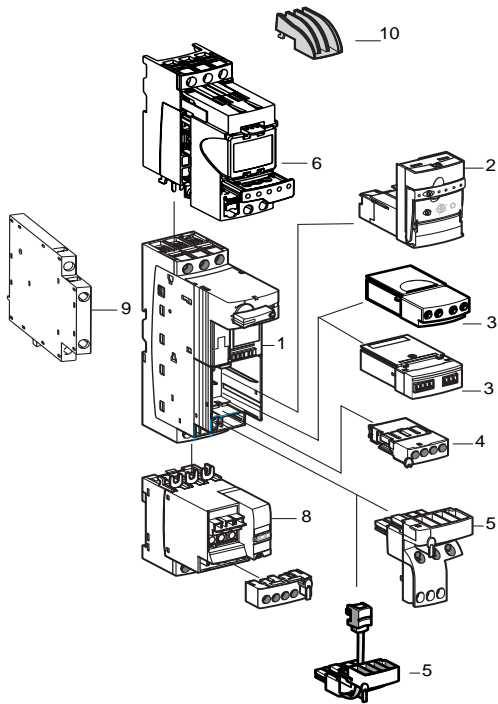


## CONTENTS

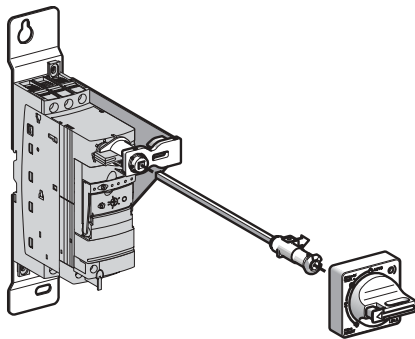
| Description                                  | Page |
|--|------|
| General Information and Selection .....      | 3    |
| Characteristics .....                        | 8    |
| Power Base Selection .....                   | 14   |
| Control Units .....                          | 19   |
| Communication and Function Modules .....     | 25   |
| Accessories .....                            | 36   |
| Altistart Soft Starts for TeSys U-Line ..... | 38   |
| Dimensions, Mounting, and Schematics .....   | 40   |
| Application Examples .....                   | 48   |
| Terms and Definitions .....                  | 57   |
| Catalog Number Index .....                   | 59   |







Examples of Various U-Line Components



Door Interlock Mounting Kit

## GENERAL INFORMATION AND SELECTION

TeSys® U-Line motor starters provide motor control for choices ranging from a basic motor starter with solid-state thermal overload protection to a sophisticated motor controller which communicates on networks and includes programmable motor protection.

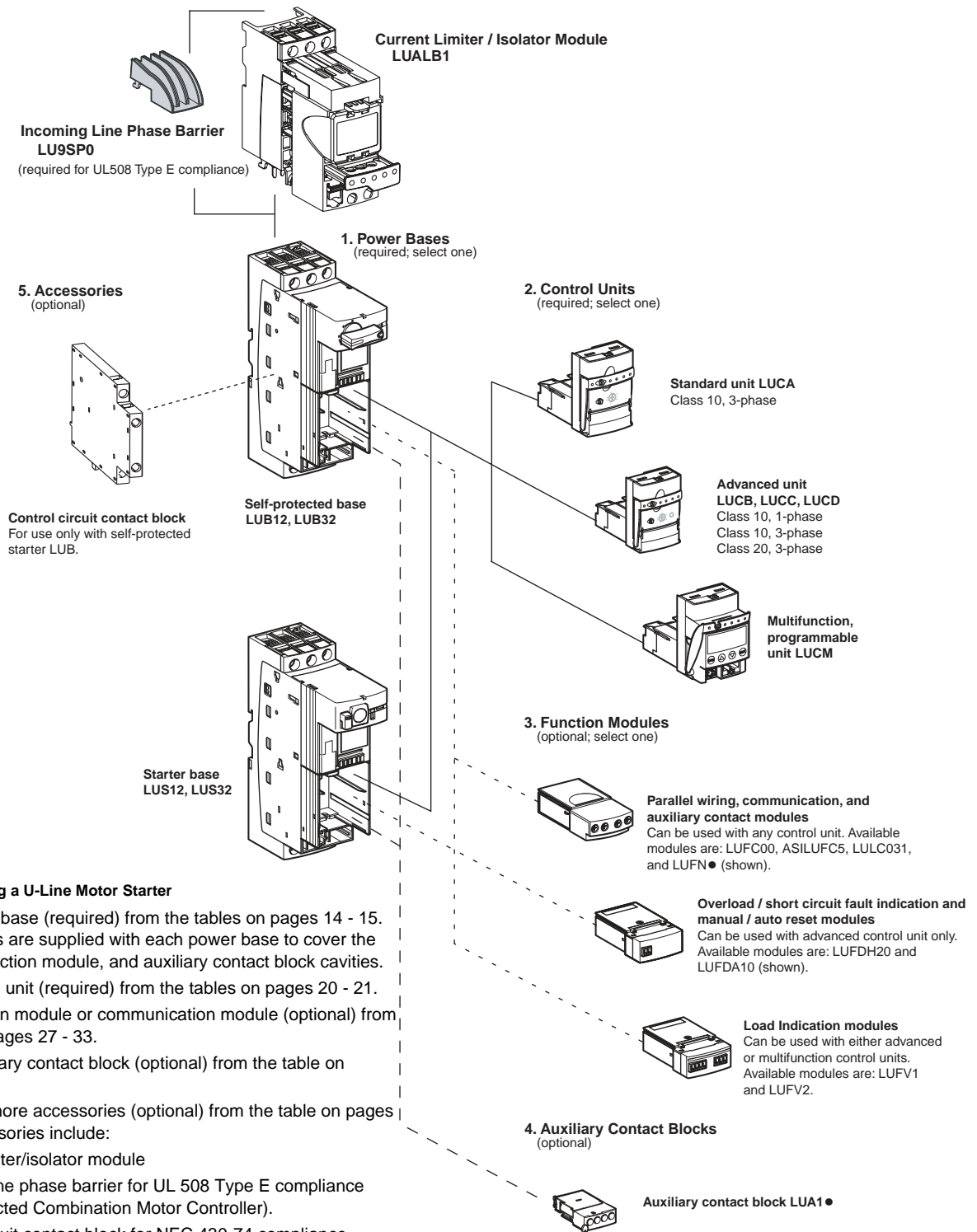
Using a plug-in modular design, the U-line starters allow maximum flexibility in motor control. Simply select the 45 mm Power Base, and mount either on a panel or on a 35 mm DIN rail. Then select and install the various plug-in components for the application. Plug-in design allows wiring to be prepared in advance of final installation or to assist in any maintenance work without unwiring.

1. Power Base—provides the main contacts (power poles) for the device.
  - Self-protected starter base (shown), 12 or 32 A (approved for group motor installations or UL508 Type E self-protected combination motor controller).
  - Starter base, 12 or 32 A (approved for group motor installations).
2. Interchangeable Control Units—provide the control and thermal overload functions for the power bases. Interchangeable, wide-range control units provide motor protection from 0.15 A to 32 A. The low consumption (low heat dissipation) control units include built-in surge protection.
  - Standard Control Unit—provides basic Class 10 trip characteristics, no communications capabilities, manual reset only.
  - Advanced Control Unit—provides a choice of Class 10 or Class 20 trip characteristics and allows for network communications, and manual/auto reset when used with appropriate function modules.
  - Multifunction Control Unit—provides a wider range of programmable protection with built-in Modbus® communication capabilities.
3. Function Modules—each power base includes a blanking cover which can be replaced by one of the following function modules:
  - Parallel wiring module allows for connection to PLC I/O modules without need for tools and powers the power base control circuit without need for hard wiring.
  - Communication modules allow either parallel or serial communication via Modbus or AS-i networks. Other communications protocols are possible via gateways.
  - Auxiliary contact function modules provide a hard contact to monitor status of the power poles. Modules are available in three configurations (2 N.O., 1 N.O./1 N.C., and 2 N.C). This contacts indicate the status of the power poles and provide a fault signal as traditional hard-wired contacts.
  - Other function modules provide alarm indications, fault indication (overload or short circuit) manual or automatic reset on overload trip and indication of motor load (Amps).
4. Auxiliary Contact Blocks—provides indication of power pole status, “ready” position of the control handle and fault signalling.
5. Control Circuit Pre-Wiring Connectors—allows simple, plug-on connection to be made to other units (such as the reversing block).
6. Current Limiter/Isolator Module—mounts directly to the self-protected power bases and provides increased short circuit breaking capacity (up to 130 kA at 480 V and 65 kA at 600 V). Also, provides visible circuit isolation from the main power with provisions for padlocking.

Other options include a reversing block (8), control circuit contact block (9), incoming line phase barrier “required for UL 508 Type E self-protected combination motor controller applications” (10), and door interlock mounting kit for through-the-door operation of the self-protected (LUB) power base.

# TeSys® U-Line Motor Starters

## General Information and Selection

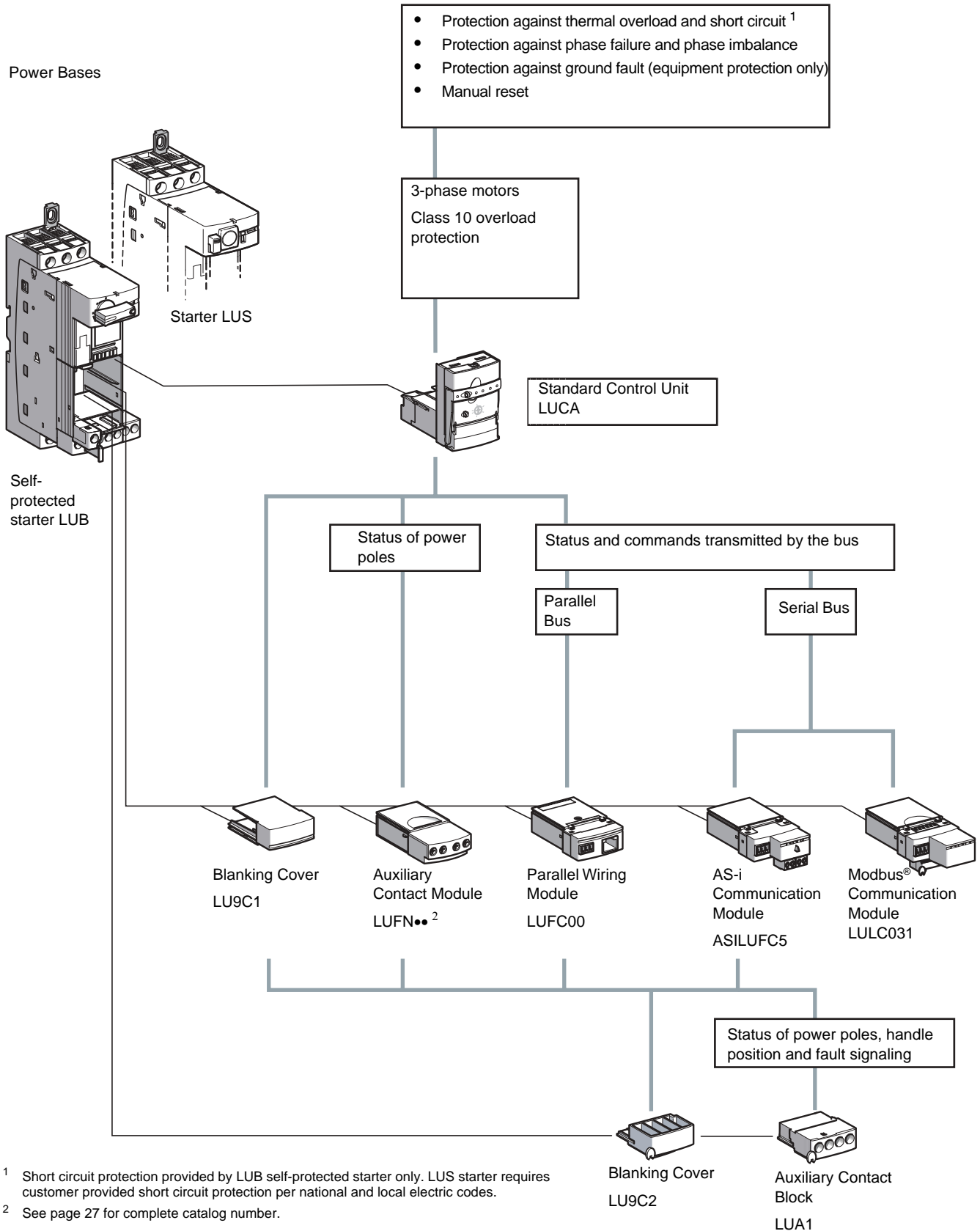


### Steps for Configuring a U-Line Motor Starter

1. Select a power base (required) from the tables on pages 14 - 15. Blanking covers are supplied with each power base to cover the control unit, function module, and auxiliary contact block cavities.
2. Select a control unit (required) from the tables on pages 20 - 21.
3. Select a function module or communication module (optional) from the tables on pages 27 - 33.
4. Select an auxiliary contact block (optional) from the table on page 26.
5. Select one or more accessories (optional) from the table on pages 36 & 39. Accessories include:
  - Current limiter/isolator module
  - Incoming line phase barrier for UL 508 Type E compliance (Self-Protected Combination Motor Controller).
  - Control circuit contact block for NEC 430-74 compliance (disconnection of motor control circuits).
  - Reversing blocks
  - Plug-in terminal blocks
  - Control circuit pre-wiring blocks
  - Soft Start modules

# TeSys® U-Line Motor Starters

## General Information and Selection

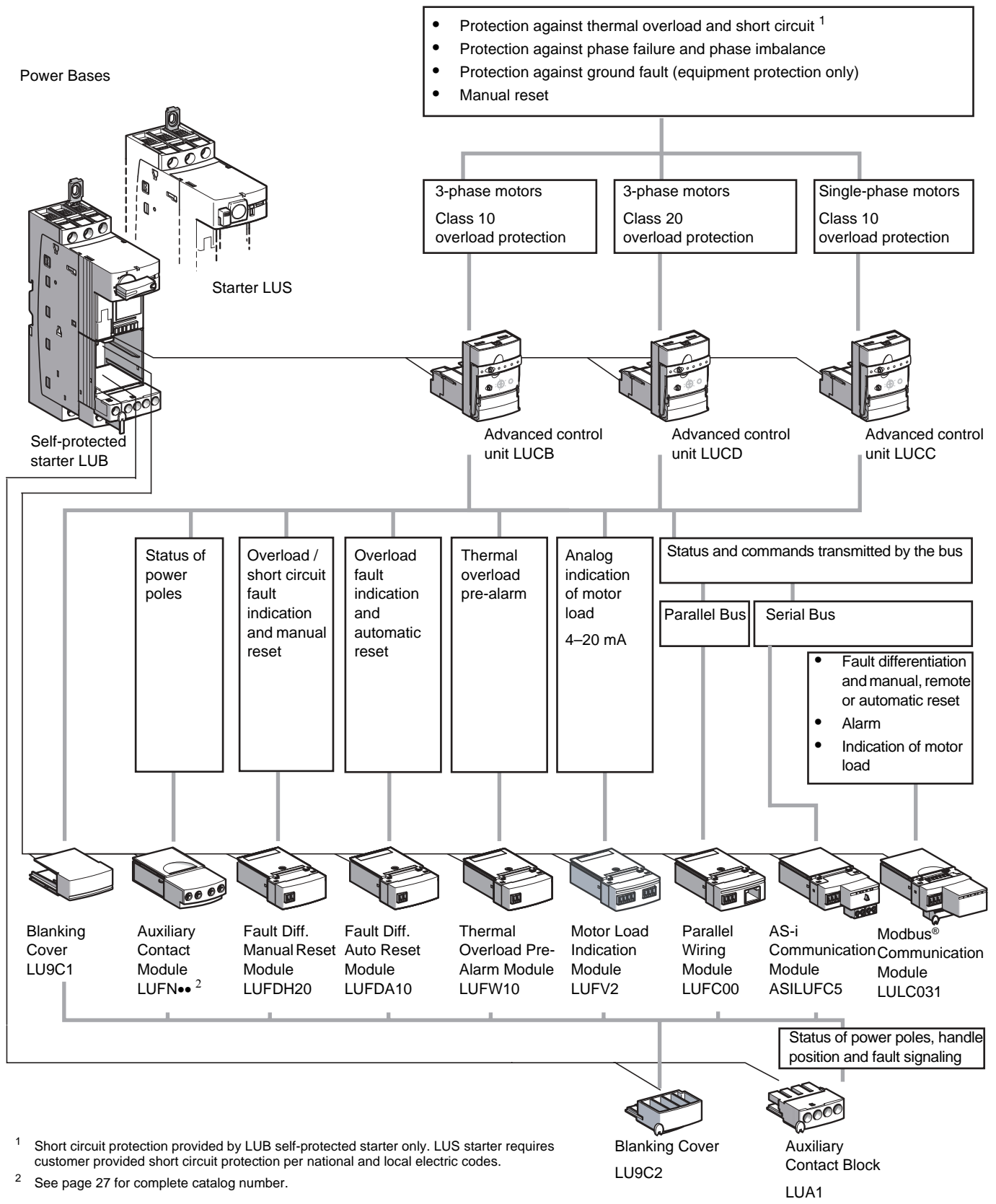


<sup>1</sup> Short circuit protection provided by LUB self-protected starter only. LUS starter requires customer provided short circuit protection per national and local electric codes.

<sup>2</sup> See page 27 for complete catalog number.

# TeSys® U-Line Motor Starters

## General Information and Selection



<sup>1</sup> Short circuit protection provided by LUB self-protected starter only. LUS starter requires customer provided short circuit protection per national and local electric codes.

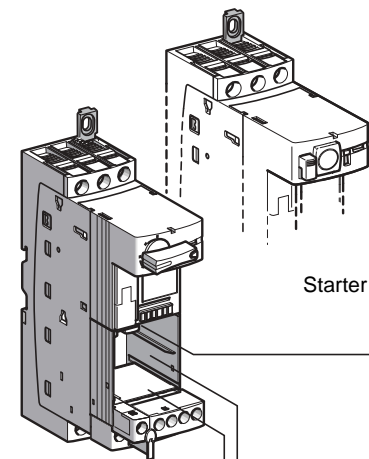
<sup>2</sup> See page 27 for complete catalog number.

# TeSys® U-Line Motor Starters

## General Information and Selection

- Protection against thermal overloads and short circuit <sup>1</sup>
- Programming of trip level and trip times, alarm levels and reset times for the following:
  - Phase loss and phase imbalance
  - Thermal overload and thermal overload pre-alarm
  - Ground fault detection (equipment protection only)
  - Overtorque (jam), underload, long-start
- Manual, automatic or remote reset
- Indication, programming and monitoring of all run, trip and alarm parameters via:
  - Built-in LCD and keypad
  - Modbus® RS-485 port to remote terminal or personal computer and Pocket PC
- “Log” function of last 5 faults
- Fault differentiation

Power Bases

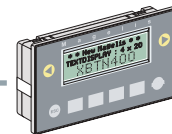


Starter LUS

Self-Protected Starter LUB

Single or 3-phase motors  
Class 5 to 30 overload protection

Multifunction Control Unit  
LUCM



Magelis™ remote terminal XBTH400



VW3A8104  
PowerSuite™ software for personal computer and Pocket PC

Status of power poles

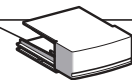
Analog indication of motor load  
4–20 mA

Status and commands transmitted by the bus

Parallel Bus

Serial Bus

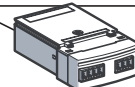
Remote programming and monitoring of all functions



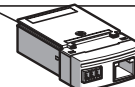
Blanking Cover  
LU9C1



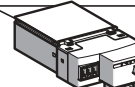
Auxiliary Contact Module  
LUFN<sup>2</sup>



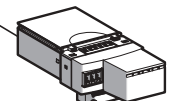
Motor Load Indication Module  
LUFV2



Parallel Wiring Module  
LUFVC00



AS-i Communication Module  
ASILUFC5

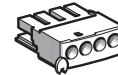


Modbus Communication Module  
LULC031

Status of power poles, handle position and fault signaling



Blanking Cover  
LU9C2






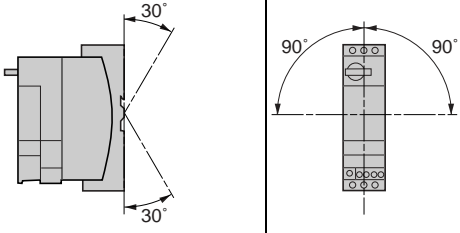
Auxiliary Contact Block  
LUA1

<sup>1</sup> Short circuit protection provided by LUB self-protected starter only. LUS starter requires customer provided short circuit protection per national and local electric codes.

<sup>2</sup> See page 27 for complete catalog number.

# TeSys® U-Line Motor Starters

## CHARACTERISTICS

| Environment                                      |  |  |   |
|--|--|--|---|
| Approvals  | <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  E164871 NKJH<br/>E164862 NLDX, NLDX2<br/>E164862 NLDX                 </div> <div style="width: 45%;">                     LU•B12, LU•B32<br/>LU•S12, LU•S32 and Accessories<br/>LUALB1                 </div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  LR43364 3211-08<br/>LR43364 3211-04<br/>LR43364 3211-08                 </div> <div style="width: 45%;">                     LU•B12, LU•B32 and Accessories<br/>LU•S12, LU•S32<br/>LUALB1                 </div> </div> |  |   |
| Conforming to standards                          | <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  meets the essential requirements of the LV and EMC directives.                 </div> <div style="width: 45%;">                     IEC/EN 60947-6-2, CSA C22-2 no. 14, Type E UL 508 Type E:<br/>(LUiB12, LUiB32 with LU9SP0 incoming line phase barrier)                 </div> </div>  |  |   |
| Rated insulation voltage (Ui)                    | Conforming to IEC/EN 60947-1, over voltage category III, degree of pollution: 3  | 690 V  |   |
|  | UL508, CSA C22-2 no. 14  | 600 V  |   |
| Rated impulse withstand voltage (Uimp)           | Conforming to IEC/EN 60947-6-2   | 6 kV   |   |
| Safety separation of circuits SELV               | Conforming to IEC/EN 60947-1 appendix N  | Between the control or auxiliary circuit and the main circuit: 400 V<br>Between the control and auxiliary circuits: 400 V  |   |
|  | Degree of protection:<br>Conforming to IEC/EN 60947-1 (protection against direct finger contact)   | Front panel outside connection zone<br>Front panel and wired terminals<br>Other faces  | IP 40 (Protection against direct contact with a 1 mm diameter wire)<br>IP 20 (Protection against direct finger contact)<br>IP 20 (Protection against direct finger contact) |
| Protective treatment                             | Conforming to IEC/EN 60068   | "TH" (fungus resistant)  |   |
|  | Conforming to IEC/EN 60068-2-30  | 12 cycles  |   |
|  | Conforming to IEC/EN 60068-2-11  | 48 h   |   |
| Ambient air temperature around the device        | Storage  | -40 to +185 °F (-40 to +85 °C)   |   |
|  | Operation  | Power bases with standard and advanced control units: -13 to +158 °F (-25 to +70 °C)<br><br>Power bases with multifunction control units:<br>At temperatures from -13 to +113 °F (-25 to +45 °C), gap not required between products.<br>At temperatures from 113 °F (45 °C) to 131 °F (55 °C), allow a minimum gap of 9 mm between products.<br>At temperatures from 131 °F (55 °C) up to 140 °F (60 °C), allow a minimum gap of 0.79" (20 mm) between products. |   |
| Maximum operating altitude                       | 6560 ft (2000 m)   |  |   |
| Operating positions                              | In relation to normal vertical mounting plane (Vac and Vdc control)  |    |   |
| Flame resistance                                 | Conforming to UL 94  | V2   |   |
|  | Conforming to IEC/EN 60695-2-12  | 1760 °F (960 °C) (parts supporting live components)<br>1200 °F (650 °C)  |   |
| Environmental restrictions                       | Cadmium-free and silicone-free, recyclable   |  |   |
| Shock resistance<br>1/2 sine wave = 11 ms        | Conforming to IEC/EN 60068-2-27  | Power poles open: 10 gn<br>Power poles closed: 15 gn   |   |
| Vibration resistance<br>5 to 300 Hz              | Conforming to IEC/EN 60068-2-6   | Power poles open: 2 gn<br>Power poles closed: 4 gn   |   |
| Immunity to electrostatic discharge              | Conforming to IEC/EN 61000-4-2   | In open air: 8 kV—Level 3<br>On contact: 8 kV—Level 4  |   |
| Immunity to radiated high-frequency disturbance  | Conforming to IEC/EN 61000-4-3   | 10 V/m—Level 3   |   |
| Immunity to fast transient currents              | Conforming to IEC/EN 61000-4-4   | All circuits except for serial link: 4 kV—Level 4<br>Serial link: 2 kV—Level 3   |   |
|  | Conforming to IEC/EN 61000-4-5   | <b>Common mode</b>   | <b>Serial mode</b>  |
| Immunity to dissipated shock waves               | Uc > 200 V   | 4 kV   | 2 kV  |
|  | Uc < 200 V   | 2 kV   | 1 kV  |
|  | Uc = 24 Vdc  | 2 kV   | 0.5 kV  |
| Immunity to conducted high-frequency disturbance | Conforming to IEC/EN 61000-4-6   | 10 kV  |   |



# TeSys® U-Line Motor Starters Characteristics

|  |                                     |  |   |                          |                          |                           |       |       |   |
|--|-------------------------------------|--|---|--------------------------|--------------------------|---------------------------|-------|-------|---|
| Power Base and Control Unit Type                   |                                     | LUB12, LUS12<br>+ LUCA or LUCB or<br>LUCC or LUCD            | LUB32, LUS32<br>+ LUCA or LUCB<br>or LUCC or LUCD | LUB12, LUS12<br>+ LUCM   | LUB32, LUS32<br>+ LUCM   | LU2M<br>LU6M              |       |       |   |
| <b>Power Circuit Connection Characteristics</b>    |                                     |  |   |                          |                          |                           |       |       |   |
| Screw Clamp Terminals - AWG Conductor Size         |                                     | 16–8 AWG (1–6 mm <sup>2</sup> ) one or two conductors        |   |                          |                          |                           |       |       |   |
| Stranded cable<br>without cable end                | 1 conductor                         | 14–6 AWG (1.5–10 mm <sup>2</sup> )                           |   |                          |                          |                           |       |       |   |
|  | 2 conductors                        | 14–8 AWG (1.5–6 mm <sup>2</sup> )                            |   |                          |                          |                           |       |       |   |
| Stranded cable<br>with cable end                   | 1 conductor                         | 16–8 AWG (1–6 mm <sup>2</sup> )                              |   |                          |                          |                           |       |       |   |
|  | 2 conductors                        | 16–8 AWG (1–6 mm <sup>2</sup> )                              |   |                          |                          |                           |       |       |   |
| Solid cable<br>without cable end                   | 1 conductor                         | 16–6 AWG (1–10 mm <sup>2</sup> )                             |   |                          |                          |                           |       |       |   |
|  | 2 conductors                        | 16–8 AWG (1–6 mm <sup>2</sup> )                              |   |                          |                          |                           |       |       |   |
| Screwdriver  |                                     | Phillips no. 2 or 1/4" slotted screwdriver                   |   |                          |                          |                           |       |       |   |
| Tightening torque                                  |                                     | 15 lb-in (1.7 N•m)   |   |                          |                          |                           |       |       |   |
| <b>Control Circuit Connection Characteristics</b>  |                                     |  |   |                          |                          |                           |       |       |   |
| Screw Clamp Terminals - AWG Conductor Size         |                                     | 18–14 AWG (0.75–1.5 mm <sup>2</sup> ) one or two conductors) |   |                          |                          |                           |       |       |   |
| Stranded cable<br>without cable end                | 1 conductor                         | 18–14 AWG (0.75–1.5 mm <sup>2</sup> )                        |   |                          |                          |                           |       |       |   |
|  | 2 conductors                        | 18–14 AWG (0.75–1.5 mm <sup>2</sup> )                        |   |                          |                          |                           |       |       |   |
| Stranded cable<br>with cable end                   | 1 conductor                         | 22–14 AWG (0.34–1.5 mm <sup>2</sup> )                        |   |                          |                          |                           |       |       |   |
|  | 2 conductors                        | 22–14 AWG (0.34–1.5 mm <sup>2</sup> )                        |   |                          |                          |                           |       |       |   |
| Solid cable<br>without cable end                   | 1 conductor                         | 18–14 AWG (0.75–1.5 mm <sup>2</sup> )                        |   |                          |                          |                           |       |       |   |
|  | 2 conductors                        | 18–14 AWG (0.75–1.5 mm <sup>2</sup> )                        |   |                          |                          |                           |       |       |   |
| Screwdriver  |                                     | Phillips no. 1 or 3/16" slotted screwdriver                  |   |                          |                          |                           |       |       |   |
| Tightening torque                                  |                                     | 7 lb-in (0.8 N•m)  |   |                          |                          |                           |       |       |   |
| <b>Control Circuit Characteristics</b>             |                                     |  |   |                          |                          |                           |       |       |   |
| Rated voltage<br>of control circuit                | 50/60 Hz                            | 24–240 Vac   |   | –                        | –                        | –                         |       |       |   |
|  | –                                   | 24–240 Vdc   |   | 24 Vdc                   |                          | –                         |       |       |   |
| Voltage limits                                     | Operation                           | 24 Vdc   | 20–27 Vdc   |                          | 20–28 Vdc                |                           | –     |       |   |
|  |                                     | 24 Vac   | 20–26.5 Vac                                       |                          | –                        | –                         | –     |       |   |
|  |                                     | 48–72 Vac/dc   | 38.5–72 Vac / 38.5–93 Vdc                         |                          | –                        | –                         | –     |       |   |
|  |                                     | 110–240 Vac/dc   | 88–264 Vac/dc                                     |                          | –                        | –                         | –     |       |   |
|  | Drop-out                            | 24 Vdc   | 14.5 Vdc  |                          | –                        | –                         | –     |       |   |
|  |                                     | 24 Vac   | 14.5 Vac  |                          | –                        | –                         | –     |       |   |
|  |                                     | 48–72 Vac/dc   | 29 Vac/dc   |                          | –                        | –                         | –     |       |   |
|  |                                     | 110–240 Vac/dc   | 55 Vac/dc   |                          | –                        | –                         | –     |       |   |
| Typical consumption                                | I max Inrush                        | 24 Vdc   | 130 mA  | 220 mA                   | 150 mA                   | 200 mA                    | –     |       |   |
|  |                                     | 24 Vac   | 140 mA  | 220 mA                   | –                        | –                         | –     |       |   |
|  |                                     | 48–72 Vac/dc   | 280 mA  |                          | –                        | –                         | –     |       |   |
|  |                                     | 110–240 Vac/dc   | 280 mA  |                          | –                        | –                         | –     |       |   |
|  | I rms sealed                        | 24 Vdc   | 55 mA   | 70 mA                    | 70 mA                    | 75 mA                     | –     |       |   |
|  |                                     | 24 Vac   | 70 mA   | 90 mA                    | –                        | –                         | –     |       |   |
|  |                                     | 48–72 Vac/dc   | 35 mA   | 45 mA                    | –                        | –                         | –     |       |   |
|  |                                     | 110–240 Vac/dc   | 30 mA   | 20 mA                    | –                        | –                         | –     |       |   |
| Heat dissipation                                   |                                     | 2 W  | 3 W   | 1.7 W                    | 1.8 W                    | –                         |       |       |   |
| Operating time                                     | Closing                             | 24 V: 70 ms / 48 V: 60 ms / ≥ 72 V: 50 ms                    |   | 75 ms                    | 65 ms                    | –                         |       |       |   |
|  | Opening                             | 35 ms  |   |                          |                          |                           |       |       |   |
| Resistance to micro-breaks                         |                                     | 3 ms   |   |                          |                          |                           |       |       |   |
| Resistance to voltage drops                        |                                     | IEC/EN 61000-4-11  | At least 70% of U <sub>c</sub> for 500 ms         |                          |                          |                           | –     |       |   |
| Mechanical durability                              |                                     | In millions of operating cycles                              | 15  |                          |                          |                           | –     |       |   |
| Maximum operating rate                             |                                     | In operating cycles per hour                                 | 3600  |                          |                          |                           | –     |       |   |
| <b>Main Pole Characteristics</b>                   |                                     |  |   |                          |                          |                           |       |       |   |
| Number of poles                                    |                                     | 3  |   |                          |                          |                           | –     |       |   |
| Isolation function<br>to IEC/EN 60947-1            | Possible                            | Yes  |   |                          |                          |                           | –     |       |   |
|  | Padlocking                          | 1 padlock with Ø 1/4" (7 mm) shank                           |   |                          |                          |                           | –     |       |   |
| Rated thermal current                              |                                     | 12 A   | 32 A  | 12 A                     | 32 A                     | –                         |       |       |   |
| Rated operating current<br>(U <sub>e</sub> ≤ 440V) | To IEC/<br>EN 60947-6-2             | In cat. AC-41  | 0 ≤ 158 °F (70 °C): 12 A                          | 0 ≤ 158 °F (70 °C): 32 A | 0 ≤ 131 °F (55 °C): 12 A | 0 ≤ 131 °F (55 °C): 3 2 A | –     |       |   |
|  |                                     | In cat. AC-43  | 0 ≤ 158 °F (70 °C): 12 A                          | 0 ≤ 158 °F (70 °C): 32 A | 0 ≤ 131 °F (55 °C): 12 A | 0 ≤ 131 °F (55 °C): 32 A  | –     |       |   |
| Rated operating voltage                            |                                     | 690 V  |   |                          |                          |                           | –     |       |   |
| Frequency limits                                   |                                     | Of the operating current<br>40–60 Hz                         |   |                          |                          |                           | –     |       |   |
| Power dissipated in<br>the power circuits          | Operating current                   | 3 A  | 6 A   | 9 A                      | 12 A                     | 18 A                      | 25 A  | 32 A  | – |
|  | Power dissipated in all three poles | 0.1 W  | 0.3 W   | 0.6 W                    | 1.1 W                    | 2.4 W                     | 4.6 W | 7.5 W | – |
| Rated breaking capacity on short-circuit—60 Hz     |                                     | 230 V  | 440 V   | 480 V                    | 500 V                    | 690 V                     | –     |       |   |
|  |                                     | 50 kA  | 50 kA   | 42 kA                    | 15kA                     | 4                         | –     |       |   |
| Total breaking time                                |                                     | 2 ms   | 2 ms  | 2 ms                     | –                        |                           |       |       |   |
| Thermal stress limit                               |                                     | With I <sub>sc</sub> max on 440 V                            | 90 kA <sup>2</sup> s                              | 120 kA <sup>2</sup> s    | 90 kA <sup>2</sup> s     | 120 kA <sup>2</sup> s     | –     |       |   |

# TeSys® U-Line Motor Starters

## Characteristics

### Specific Characteristics of Power Bases LU2B or LU2S and Reverser Blocks LU2M or LU6M

|                        |                             |        |
|------------------------|-----------------------------|--------|
| Maximum operating time | Without change of direction | 75 ms  |
|                        | With change of direction    | 150 ms |

### General Characteristics of all Auxiliary Contacts

|   |   |   |      |
|---|---|---|------|
| Conventional rated thermal current (I <sub>th</sub> ) | For ambient temperature $\theta < 158^\circ\text{F}$ (70°C) | 5 A   |      |
| Frequency of the operating current                    |   | Up to 400 Hz                                  |      |
| Minimum switching capacity $\lambda = 10^{-8}$        | U min   | 17 V  |      |
|   | I min   | 5 mA  |      |
| Short-circuit protection                              | Conforming to IEC/EN 60947-5-1                              | gL fuse: 4 A                                  |      |
| Short-time rating                                     | Permissible for   | 1 s   | 30 A |
|   |   | 500 ms  | 40 A |
|   |   | 100 ms  | 50 A |
| Insulation resistance                                 |   | 10 mΩ   |      |
| Non-overlap time                                      | Guaranteed between N.C. and N.O. contacts                   | 2 ms (on energization and on de-energization) |      |

### Specific Characteristics of Auxiliary Contact Built into the Power Base LU9BN

|  |   |   |
|--|---|---|
| Linked contacts                            | Conforming to IEC/EN 60947-4-1              | Each power base has 1 N.O. contact and 1 N.C. contact which are mechanically linked                     |
| Mirror contact                             | Conforming to draft standard IEC/EN 60947-1 | The N.C. contact in each power base reliably represents the state of the power contacts (safety scheme) |
| Rated operating voltage (U <sub>e</sub> )  |   | Up to 690 Vac; 250 Vdc  |
| Rated insulation voltage (U <sub>i</sub> ) | Conforming to IEC/EN 60947-5-1              | 690 V   |
|  | Conforming to UL, CSA                       | 600 V   |

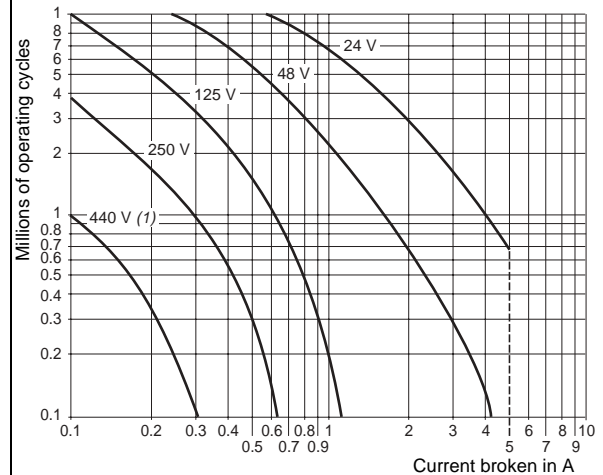
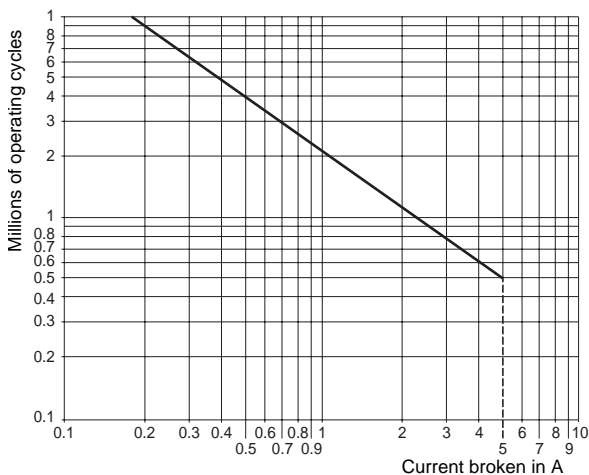
### Specific Characteristics of Auxiliary Contacts in Modules LUFN, Auxiliary Contacts LUA1 and Reverser Blocks LU2M and LU6M

|  |                                |                        |
|--|--------------------------------|------------------------|
| Rated operating voltage (U <sub>e</sub> )  |                                | Up to 250 Vac; 250 Vdc |
| Rated insulation voltage (U <sub>i</sub> ) | Conforming to IEC/EN 60947-5-1 | 250 V                  |
|  | Conforming to UL, CSA          | 250 V                  |

### Operational power of contacts LUFN, LUA1, LU2M, LU6M

Conforming to IEC/EN 60947-5-1

|  | AC supply, categories AC-14 and AC-15 |        |        |        |        |         |         | DC supply, category DC-13   |      |       |       |
|--|---------------------------------------|--------|--------|--------|--------|---------|---------|---|------|-------|-------|
|  | 24 V                                  | 48 V   | 115 V  | 230 V  | 400 V  | 440 V   | 600 V   | 24 V  | 48 V | 125 V | 250 V |
| Electrical durability up to 3600 operating cycles/hour on an inductive load such as the coil of an electromagnet: making power (cos φ 0.7) = 10 times the power broken (cos φ = 0.4) |                                       |        |        |        |        |         |         | Electrical durability (up to 1200 operating cycles/hour) on an inductive load such as the coil of an electromagnet, without economy resistor, the time constant increasing with the load. |      |       |       |
| 1 million operating cycles   | 60 VA                                 | 120 VA | 280 VA | 560 VA | 960 VA | 1050 VA | 1440 VA | 120 W   | 90 W | 75 W  | 68 W  |
| 3 million operating cycles   | 16 VA                                 | 32 VA  | 80 VA  | 160 VA | 280 VA | 300 VA  | 420 VA  | 70 W  | 50 W | 38 W  | 33 W  |
| 10 million operating cycles  | 4 VA                                  | 8 VA   | 20 VA  | 40 VA  | 70 VA  | 80 VA   | 100 VA  | 25 W  | 18 W | 14 W  | 12 W  |



# TeSys® U-Line Motor Starters Characteristics

## Characteristics of Standard Control Units LUCA

|                          |   |  |
|--------------------------|---|--|
| Protection               | Motor type  | 3-phase                                    |
|                          | Conforming to standard                                | IEC/EN 60947-6-2, UL 508, CSA C22-2 no. 14 |
| Overload protection      | Tripping class conforming to UL 508, IEC/EN 60947-6-2 | 10   |
|                          | Frequency limits of the operating current             | 40–60 Hz                                   |
|                          | Ambient temperature range                             | -13 to +158 °F ( - 25 to + 70 °C )         |
|                          | Protection against phase imbalance                    | 30 %                                       |
| Short-circuit protection | Tripping threshold                                    | 14.2 x the setting current                 |
|                          | Tripping tolerance                                    | ± 20 %                                     |

## Characteristics of Advanced Control Units LUCB, LUCC and LUCD

|                          |   |  |              |         |
|--------------------------|---|--|--------------|---------|
| Control unit type        |   | LUCB                                       | LUCC         | LUCD    |
| Protection               | Motor type  | 3-phase                                    | Single-phase | 3-phase |
|                          | Conforming to standard                                | IEC/EN 60947-6-2, UL 508, CSA C22-2 no. 14 |              |         |
| Overload protection      | Tripping class conforming to UL 508, IEC/EN 60947-6-2 | 10   |              | 20      |
|                          | Frequency limits of the operating current             | 40–60 Hz                                   |              |         |
|                          | Ambient temperature range                             | -13 to +158 °F ( - 25 to + 70 °C )         |              |         |
|                          | Protection against phase imbalance                    | 30 %                                       | –            | 30 %    |
| Short-circuit protection | Tripping threshold                                    | 14.2 x the setting current                 |              |         |
|                          | Tripping tolerance                                    | ± 20 %                                     |              |         |

## Characteristics of Multifunction Control Units LUCM

|  |   |  |
|--|---|--|
| Protection   | Motor type  | Selectable: single-phase or 3-phase  |
|  | Conforming to standard                                | IEC/EN 60947-6-2, UL 508   |
| Overload protection                                    | Tripping class conforming to UL 508, IEC/EN 60947-6-2 | 5, 10, 15, 20, 25, 30 (selectable)   |
|  | Frequency limits of the operating current             | 40–60 Hz   |
|  | Ambient temperature range                             | Power bases with multifunction control units:<br>At temperatures from -13 to +113 °F (-25 to +45 °C), gap not required between products.<br>At temperatures from 113 °F (45 °C) to 131 °F (55 °C), allow a minimum gap of 9 mm between products.<br>At temperatures from 131 °F (55 °C) up to 140 °F (60 °C), allow a minimum gap of 0.79" (20 mm) between products. |
| Communication interface for terminal on enclosure door | Physical interface                                    | RS-485 multi-drop  |
|  | Connector   | RJ45 on front panel  |
|  | Protocol  | Modbus® RTU  |
|  | Maximum transmission speed                            | 19,200 bit/s (self-configuration up to this value)   |
| Display  | Maximum return time                                   | 200 ms (from PLC to LULC031 communication module to LUCM control unit back to LULC031 and back to PLC)   |
|  | Type  | LCD, 2 lines of 12 characters  |
|  | Language version                                      | Multilanguage (English, French, German, Italian, Spanish)  |
|  | Accuracy  | ± 5 %  |
| Auxiliary supply                                       | Resolution  | 1 % of I <sub>r</sub>  |
|  | External type   | 24 Vdc (maximum range of 0.90 to 1.10 of nominal voltage)  |
|  | Heat dissipation                                      | 0.8 W  |

## Configuration Table for Protection Devices and Alarms on Multifunction Control Units LUCM

|                            | Tripping               | Alarm           | Adjustment of tripping threshold |                        | Adjustment of time before tripping |               | Adjustment of alarm threshold |                        |
|----------------------------|------------------------|-----------------|----------------------------------|------------------------|------------------------------------|---------------|-------------------------------|------------------------|
|                            | Factory setting        | Factory setting | Range                            | Default value          | Range                              | Default value | Range                         | Default value          |
| <b>Overcurrent</b>         | Activated <sup>1</sup> | –               | 3–17 I <sub>r</sub>              | 14.2                   | –                                  | –             | –                             | –                      |
| <b>Overload</b>            | Activated <sup>1</sup> | Activated       | 0.15–32 A <sup>2</sup>           | I <sub>r</sub> min     | Class: 5–30                        | 5             | 10–100 % thermal state        | 85 %                   |
| <b>Ground fault</b>        | Activated              | Activated       | 0.2–5 I <sub>r</sub> min         | 0.3 I <sub>r</sub> min | 0.1–1.2 s                          | 0.1 s         | 0.2–5 I <sub>r</sub> min      | 0.3 I <sub>r</sub> min |
| <b>Phase imbalance</b>     | Activated              | Activated       | 10–30 %                          | 10 %                   | 0.2–20 s                           | 5 s           | 10–30 %                       | 10 %                   |
| <b>Over torque (Jam)</b>   | Deactivated            | Deactivated     | 1–8 I <sub>r</sub>               | 2 I <sub>r</sub>       | 1–30 s                             | 5 s           | 1–8 I <sub>r</sub>            | 2 I <sub>r</sub>       |
| <b>Underload</b>           | Deactivated            | Deactivated     | 0.3–1 I <sub>r</sub>             | 0.5 I <sub>r</sub>     | 1–200 s                            | 10 s          | 0.3–1 I <sub>r</sub>          | 0.5 I <sub>r</sub>     |
| <b>Long starting times</b> | Deactivated            | Deactivated     | 1–8 I <sub>r</sub>               | I <sub>r</sub>         | 1–200 s                            | 10 s          | 1–8 I <sub>r</sub>            | I <sub>r</sub>         |

<sup>1</sup> This function cannot be deactivated.

<sup>2</sup> The setting range depends on the rating of the control unit used.

## Configuration of additional functions on Multifunction Control Units LUCM

|                          |                 |  |
|--------------------------|-----------------|--|
|                          | Factory setting | Setting range  |
| <b>Reset</b>             | Manual          | Manual, automatic or remote  |
| <b>Time before reset</b> | 120 s           | 1–1000 s   |
| <b>Type of load</b>      | Motor type      | 3-phase motor, single-phase motor  |
|                          | Self-cooled     | Self-cooled, auxiliary cooling fan   |
| <b>Language</b>          | English         | English, French, German, Italian, Spanish  |
| <b>Display</b>           | Average current | Average current, thermal state of motor, current in phase 1 / 2 / 3, ground fault current, phase imbalance, cause of last 5 faults |

# TeSys® U-Line Motor Starters

## Characteristics

### Characteristics of Limiter Isolator Module LUALB1

|  |              |  |
|--|--------------|--|
| Rated insulation voltage (Ui) conforming to standard IEC/EN 60947-1            |              | 690 V  |
| Conventional rated thermal current (Ith) conforming to standard IEC/EN 60947-1 |              | 32 A   |
| Operating threshold  | I rms        | 50 kA  |
| Breaking capacity  |              | 440/480 wye 600 wye<br>130 kA 65 kA                            |
| Mounting   |              | Directly on the upstream terminals of the LUB, LU2B power base |
| Screw Clamp Terminals - AWG conductor size                                     |              | 16-8 AWG (1-6 mm <sup>2</sup> ) one or two conductors          |
| Stranded cable without cable end   | 1 conductor  | 16-6 AWG (1-10 mm <sup>2</sup> )                               |
|  | 2 conductors | 16-8 AWG (1-6 mm <sup>2</sup> )                                |
| Stranded cable with cable end  | 1 conductor  | 16-8 AWG (1-6 mm <sup>2</sup> )                                |
|  | 2 conductors | 16-8 AWG (1-6 mm <sup>2</sup> )                                |
| Solid cable  | 1 conductor  | 14-8 AWG (1.5-10 mm <sup>2</sup> )                             |
|  | 2 conductors | 14-8 AWG (1.5-6 mm <sup>2</sup> )                              |
| Screwdriver  |              | Phillips no. 2 or 1/4" slotted screwdriver                     |
| Tightening torque  |              | 15 lb-in (1.7 N•m)   |

### Characteristics of Control Circuit Contact Block LUA8E20

|  |                             |                           |
|--|-----------------------------|---------------------------|
| Rated operating voltage (Ue)   |                             | Up to 600 Vac, 125 Vdc    |
| Rated insulation voltage (Ui) conforming to standard IEC/EN 60947-5-1 conforming to UL and CSA |                             | 690 V<br>600 V            |
| Conventional thermal current (Ith)   | Ambient temperature ≤ 70° C | 5 A                       |
| Minimum switching capacity   |                             | 2 Watts (83 mA at 24 Vdc) |

## Characteristics of Thermal Overload Pre-alarm Function Module LUFW10

|   |  |  |
|---|--|--|
| Activation threshold                            | Fixed at 88% of the thermal tripping state |  |
| Hysteresis between activation and switching off | 5 %  |  |
| Display   | By LED on front panel                      |  |
| Supply  | Powered by the control unit                |  |
| Digital output characteristics                  | Type                                       | N.O. contact                               |
|   | AC-15                                      | 230 V max; 400 VA 100,000 operating cycles |
|   | DC-13                                      | 24 V; 50 W 100,000 operating cycles        |

## Characteristics of Motor Load Indication Function Module LUFV2

|  |  |           |
|--|--|-----------|
| Analog output  | 4–20 mA  |           |
| Signal delivered                                       | Value of I average/Ir ratio within the range of 0 to 2 |           |
| Load impedance   | Minimum  | –         |
|  | Maximum  | 500 Ω     |
|  | Typical  | 100 Ω     |
| Signal characteristics with advanced control unit      | Accuracy   | ± 6 %     |
| Signal characteristics with multifunction control unit | Accuracy   | ± 10 %    |
|  | Resolution   | 1 % of Ir |
| Supply   | External 24 Vdc  |           |

## Characteristics of AS-i Communication Module ASILUFC5

|   |   |                         |
|---|---|-------------------------|
| Approval                                      | AS-i V2.1 no. (pending)                               |                         |
| AS-i profile                                  | 7.D.F.0   |                         |
| Ambient air temperature                       | Operation -13 to +158 °F (-25 to +70 °C)              |                         |
| AS-i supply                                   | 29.5–31.5 V   |                         |
| Current consumption                           | By the AS-i system                                    | Normal operation: 25 mA |
|   |   | Fault condition: 30 mA  |
| Auxiliary supply                              | 24 Vdc ± 30 %   |                         |
| Current consumption                           | On 24 V supply for the outputs                        | 200 mA                  |
| Number of outputs                             | 2 dedicated to power base coil operation              |                         |
| Switching capacity of the solid state outputs | 0.5 A/24 V (outputs protected against short-circuits) |                         |
| Indication/diagnostics                        | By 2 LEDs on front panel                              |                         |

## Characteristics of Modbus® Communication Module LULC031

|   |  |        |
|---|--|--------|
| Physical interface                            | RS-485 multi-drop  |        |
| Connector                                     | RJ45 on front panel                                      |        |
| Protocol                                      | Modbus RTU   |        |
| Maximum transmission speed                    | 19,200 bit/s (self-configuration up to this value)       |        |
| Maximum return time                           | 30 ms (from LULC031 to PLC and back to LULC031)          |        |
| Addressing (Modbus drop numbers)              | By switches: from 0–31                                   |        |
| Ambient air temperature                       | Operation -13 to +131 °F (-25 to +55 °C)                 |        |
| Supply for the outputs                        | 24 Vdc   |        |
| Current consumption                           | On 24 V supply for the outputs                           | 200 mA |
| Number of outputs                             | 3, of which 2 are dedicated to power base coil operation |        |
| Switching capacity of the solid state outputs | 0.5 A/24 V   |        |
| Indication/diagnostics                        |  |        |

## Connection Characteristics of Function and Communication Modules

| Module type                                |                           | LUFW10                              | LUFV2                      | ASILUFC5                  |                            | LULC031                    | LUFV00                     |
|--|---------------------------|-------------------------------------|----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|
|  |                           |                                     |                            | Inputs and 24 V auxiliary | Outputs                    |                            |                            |
| Connectors                                 | Pitch                     | 5.08 mm                             | 3.81 mm                    | 5.08 mm                   | 3.81 mm                    | 3.81 mm                    | 3.81 mm                    |
| Flexible cable without cable end           | 1 conductor               | 0.2–1.5 mm <sup>2</sup>             | 0.14–1 mm <sup>2</sup>     | 0.2–1.5 mm <sup>2</sup>   | 0.14–1 mm <sup>2</sup>     | 0.14–1 mm <sup>2</sup>     | 0.14–1 mm <sup>2</sup>     |
|  | 2 identical conductors    | 0.2–1 mm <sup>2</sup>               | 0.14–0.75 mm <sup>2</sup>  | 0.2–1 mm <sup>2</sup>     | 0.14–0.75 mm <sup>2</sup>  | 0.14–0.75 mm <sup>2</sup>  | 0.14–0.75 mm <sup>2</sup>  |
| Flexible cable with cable end              | Without insulated ferrule | 1 conductor                         | 0.25–1.5 mm <sup>2</sup>   | 0.25–1 mm <sup>2</sup>    | 0.25–1.5 mm <sup>2</sup>   | 0.25–1 mm <sup>2</sup>     | 0.25–1 mm <sup>2</sup>     |
|  |                           | 2 identical conductors              | 0.25–1 mm <sup>2</sup>     | 0.25–0.34 mm <sup>2</sup> | 0.25–1 mm <sup>2</sup>     | 0.25–0.34 mm <sup>2</sup>  | 0.25–0.34 mm <sup>2</sup>  |
|  | With insulated ferrule    | 1 conductor                         | 0.25–1.5 mm <sup>2</sup>   | 0.25–0.5 mm <sup>2</sup>  | 0.25–1.5 mm <sup>2</sup>   | 0.25–0.5 mm <sup>2</sup>   | 0.25–0.5 mm <sup>2</sup>   |
|  |                           | 2 identical conductors <sup>1</sup> | 0.5–1.5 mm <sup>2</sup>    | 0.5 mm <sup>2</sup>       | 0.5–1.5 mm <sup>2</sup>    | 0.5 mm <sup>2</sup>        | 0.5 mm <sup>2</sup>        |
| Solid cable without cable end              | 1 conductor               | 0.2–1.5 mm <sup>2</sup>             | 0.14–1 mm <sup>2</sup>     | 0.2–1.5 mm <sup>2</sup>   | 0.14–1 mm <sup>2</sup>     | 0.14–1 mm <sup>2</sup>     | 0.14–1 mm <sup>2</sup>     |
|  | 2 identical conductors    | 0.2–1 mm <sup>2</sup>               | 0.14–0.5 mm <sup>2</sup>   | 0.2–1 mm <sup>2</sup>     | 0.14–0.5 mm <sup>2</sup>   | 0.14–0.5 mm <sup>2</sup>   | 0.14–0.5 mm <sup>2</sup>   |
| AWG conductor size (one or two conductors) |                           | 12–24 AWG                           | 16–28 AWG                  | 12–24 AWG                 | 16–28 AWG                  | 16–28 AWG                  | 16–28 AWG                  |
| Tightening torque                          |                           | 5 lb-in<br>(0.5–0.6 N•m)            | 2 lb-in<br>(0.22–0.25 N•m) | 5 lb-in<br>(0.5–0.6 N•m)  | 2 lb-in<br>(0.22–0.25 N•m) | 2 lb-in<br>(0.22–0.25 N•m) | 2 lb-in<br>(0.22–0.25 N•m) |
| Slotted screwdriver                        |                           | 1/8 in                              | 3/32 in                    | 1/8 in                    | 3/32 in                    | 3/32 in                    | 1/8 in                     |

<sup>1</sup> Use a double cable end.

# TeSys® U-Line Motor Starters



LUB•2



LUB•20

## POWER BASE SELECTION

The U-Line motor starter consists of one power base (selected from this page) and one control unit (select from page 20 or 21) as a minimum. The power bases are available in two control circuit methods:

- With screw clamp terminals
- Without screw clamp terminals

Each power base with control circuit screw clamp terminals includes one N.O. and one N.C. auxiliary contact to indicate the open or closed position of the power contacts.

When ordering power bases without control circuit screw clamp terminals (i.e., when building a reversing unit or pre-wiring the low voltage control), the terminal assemblies must be ordered separately.

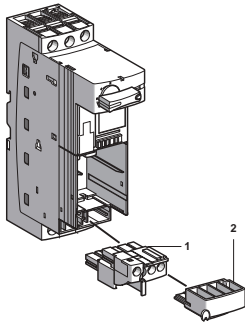
### Full Voltage, Non-Reversing for Standard Applications

| Control Connection                | Max. Current (Amps) | Three Phase (hp max.) |           |       |           | Single Phase (hp max.) |       | Self-Protected Starter Base<br>Catalog Number | Starter Base<br>Catalog Number | Weight<br>lb (kg) |
|-----------------------------------|---------------------|-----------------------|-----------|-------|-----------|------------------------|-------|---|--------------------------------|-------------------|
|                                   |                     | 200/208 V             | 220/240 V | 460 V | 575/600 V | 120 V                  | 240 V |   |                                |                   |
| With screw terminations           | 12                  | 3                     | 3         | 7.5   | 10        | 1/2                    | 2     | LUB12   | LUS12                          | 1.98 (0.900)      |
|                                   | 32                  | 10                    | 10        | 20    | 25        | 2                      | 5     | LUB32   | LUS32                          | 1.98 (0.900)      |
| Without <sup>1</sup> terminations | 12                  | 3                     | 3         | 7.5   | 10        | 1 1/2                  | 2     | LUB120  | LUS120                         | 1.90 (0.865)      |
|                                   | 32                  | 10                    | 10        | 20    | 25        | 2                      | 5     | LUB320  | LUS320                         | 1.90 (0.865)      |

<sup>1</sup> Must order LU9BN11, LU9BN11C, LU9MRC or LU9MR1C.

### Terminal Blocks for Non-Reversing Power Bases LUB••0, LUS••0 without Terminations

| Control Connection      | For Use On                     | Item  | Catalog Number | Weight<br>lb (kg) |
|-------------------------|--------------------------------|-------|----------------|-------------------|
| With screw terminations | LUB120/LUB320<br>LUS120/LUS320 | 1 + 2 | LU9BN11        | 0.10 (0.45)       |



# TeSys® U-Line Motor Starters Power Base Selection



LU2B-2

## Full Voltage, Reversing for Standard Applications

| Control Connection      | Max. Current (Amps) | Three Phase (hp max.) |           |       |           | Single Phase (hp max.) |       | Self-Protected Starter Base <sup>1</sup> | Starter Base Catalog No. | Weight lb (kg) |
|-------------------------|---------------------|-----------------------|-----------|-------|-----------|------------------------|-------|--|--------------------------|----------------|
|                         |                     | 200/208 V             | 220/240 V | 460 V | 575/600 V | 120 V                  | 240 V |  |                          |                |
| With screw terminations | 12                  | 3                     | 3         | 7.5   | 10        | 1/2                    | 2     | LU2B12**                                 | LU2S12**                 | 2.80 (1.270)   |
|                         | 32                  | 10                    | 10        | 20    | 25        | 2                      | 5     | LU2B32**                                 | LU2S32**                 | 2.80 (1.270)   |
| Without terminations    | 12                  | 3                     | 3         | 7.5   | 10        | 1 1/2                  | 2     | LU2BA0**                                 | LU2SA0**                 | 2.75 (1.250)   |
|                         | 32                  | 10                    | 10        | 20    | 25        | 2                      | 5     | LU2BB0**                                 | LU2SB0**                 | 2.75 (1.250)   |

<sup>1</sup> Complete the catalog number by selecting the proper voltage code from the table below.

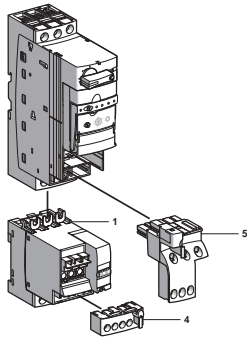
### Voltage Codes

| Volts    | 24                | 48-72           | 110-240 |
|----------|-------------------|-----------------|---------|
| DC       | BL <sup>1 2</sup> | -               | -       |
| AC       | B                 | -               | -       |
| DC or AC | -                 | ES <sup>3</sup> | FU      |

<sup>1</sup> Voltage code to use for a power base with a communication module.

<sup>2</sup> DC voltage with range of 0.90 to 1.10 of nominal.

<sup>3</sup> 48-72 Vdc; 48 Vac



### Reversing blocks for assembly by the customer

Reversing blocks can be mounted directly to the power bases (LUB\*\* or LUS\*\*) using LU2MB0\*\* or mounted separately using LU6MB0\*\* to provide the reversing function. The design and operation of the reversing blocks provide mechanical interlocking internally. The reversing blocks latch in one direction or the other and remain latched in position even after a loss of power. The reversing block will not change state until given a control signal to change direction.

When directly mounted to the power base, control wiring and electrical interlocking is provided by the pre-wired connector (LU9MR1C) which uses the standard auxiliary contacts of the power base. When using the pre-wired connector, the power base auxiliary contacts at terminals 13-14 and 21-22 are not available for customer use. Customers can provide the electrical control and interlock functions themselves with the control terminal blocks LU9M1 and LU9MR1.

The reversing blocks have additional contacts (2 N.O. Form C contacts) at terminals 81-82-84, which signal the direction of the motor. These contacts maintain their status (even after loss of power) and change condition only when the reversing block changes direction.

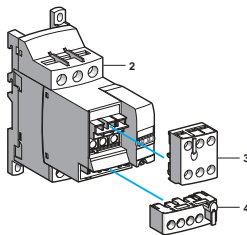
Refer to the connection diagrams on page 42 and the application examples on pages 54 - 56 for more details.

| Reversing block 32 A  | Connection   |                     | Item           | Catalog Number <sup>1</sup> | Weight lb (kg) |
|---|--------------|---------------------|----------------|-----------------------------|----------------|
|   | Power        | Control             |                |                             |                |
| For mounting directly beneath the power base LUB, LUS                                   | Screw clamps | Without connections | 1 <sup>2</sup> | LU2MB0**                    | 0.88 (0.400)   |
| For mounting separately from the power base LUB, LUS (screw or 35 mm DIN rail mounting) | Screw clamps | Without connections | 2 <sup>3</sup> | LU6MB0**                    | 0.94 (0.425)   |

<sup>1</sup> Complete the catalog number by selecting the proper voltage code from the table above.

<sup>2</sup> Must order reversing pre-wiring connector LU9MR1C. Must order control terminal block LU9M1 or pre-wired coil connector LU9MRC.

<sup>3</sup> Must order control terminal block LU9MR1. Must order control terminal block LU9M1 or pre-wired coil connector LU9MRC.



### Control Terminal Blocks

| Description   | Application  | Item | Catalog Number | Weight lb (kg) |
|---------------|--|------|----------------|----------------|
| Coil terminal | Reversing power base, without connections LU2BA0** or B0**       | 4    | LU9M1          | 0.05 (0.025)   |
|               | Reversing block LU2MB0** for direct mounting beneath power base  | 4    | LU9M1          | 0.05 (0.025)   |
|               | Reversing block LU6MB0** for mounting separately from power base | 4    | LU9M1          | 0.05 (0.025)   |
| Control block | Reversing block LU6MB0** for mounting separately from power base | 3    | LU9MR1         | 0.06 (0.030)   |

### Pre-wired Control Connection Accessories

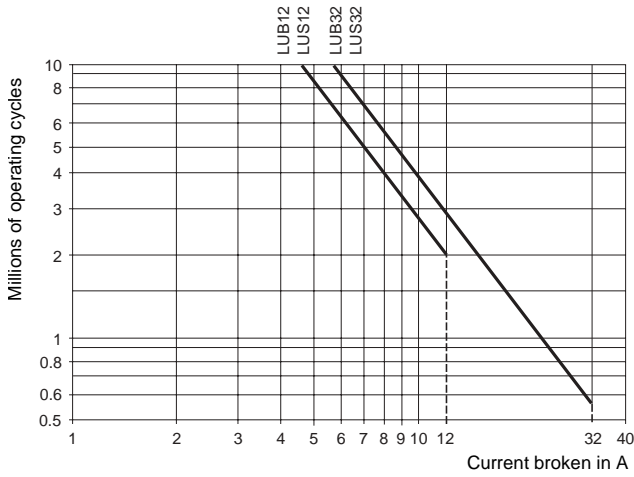
For control connections between a power base and a direct mount reversing block.

| Description                   | Item | Catalog Number | Weight lb (kg) |
|-------------------------------|------|----------------|----------------|
| Reversing prewiring connector | 5    | LU9MR1C        | 0.08 (0.035)   |

# TeSys® U-Line Motor Starters

## Power Base Selection

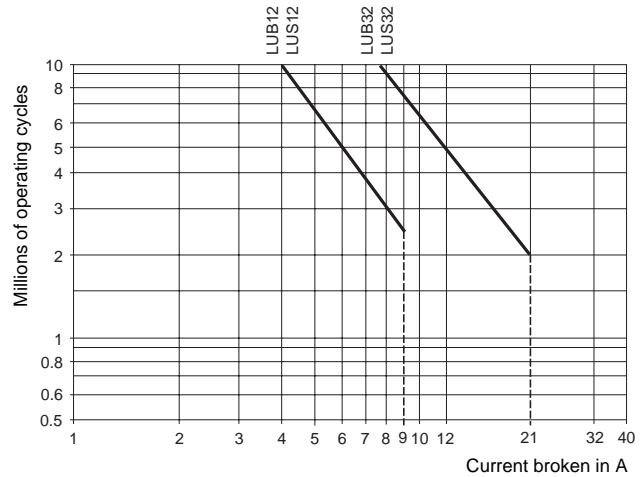
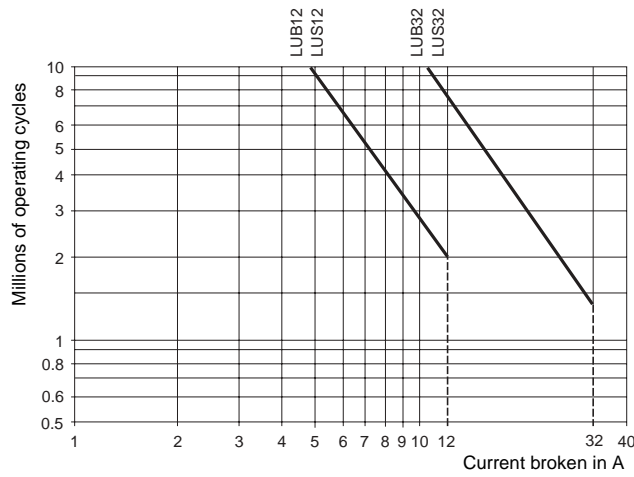
Use in Category AC-41 per IEC 60947 (previously IEC 947 AC-1)



Use in Category AC-43 per IEC 60947 (previously IEC 947 AC-3)

U<sub>e</sub> ≤ 440 V

U<sub>e</sub> = 690 V



| Voltage (V) | 0.55 kW | 0.75 kW | 1.5 kW | 2.2 kW | 4 kW | 5.5 kW | 7.5 kW | 11 kW | 15 kW |
|-------------|---------|---------|--------|--------|------|--------|--------|-------|-------|
| 230 V       |         |         |        |        |      |        |        |       |       |
| 400 V       |         |         |        |        |      |        |        |       |       |
| 440 V       |         |         |        |        |      |        |        |       |       |

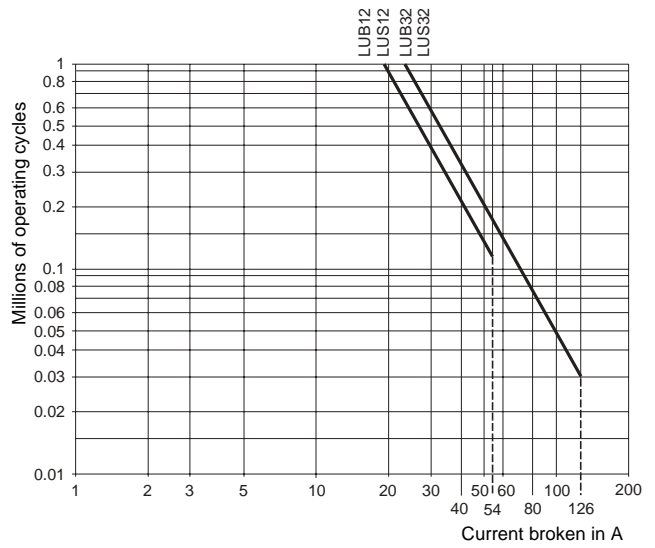
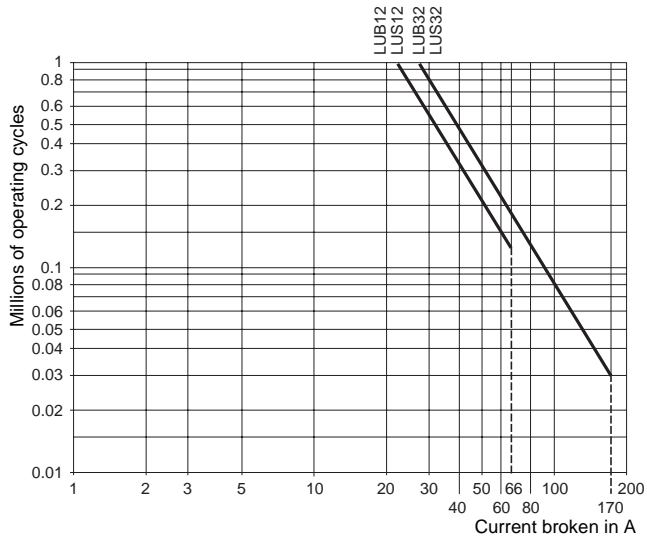


# TeSys® U-Line Motor Starters Power Base Selection

Use in Category AC-44 per IEC 60947 (previously IEC 947 AC-4)

Ue ≤ 440 V

Ue = 690 V

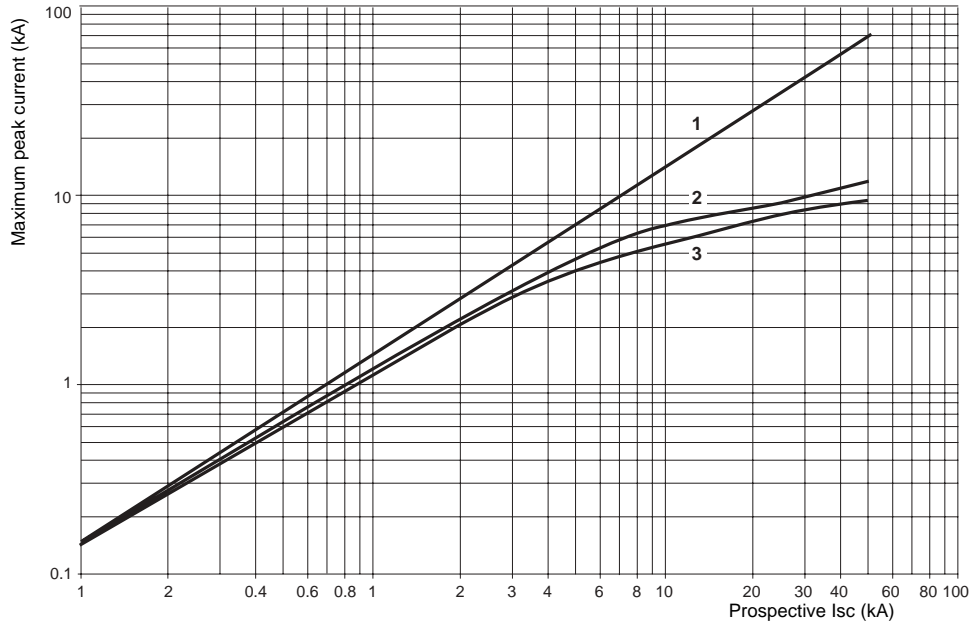


# TeSys® U-Line Motor Starters

## Power Base Selection

### Short-Circuit Ratings for Power Base LUB

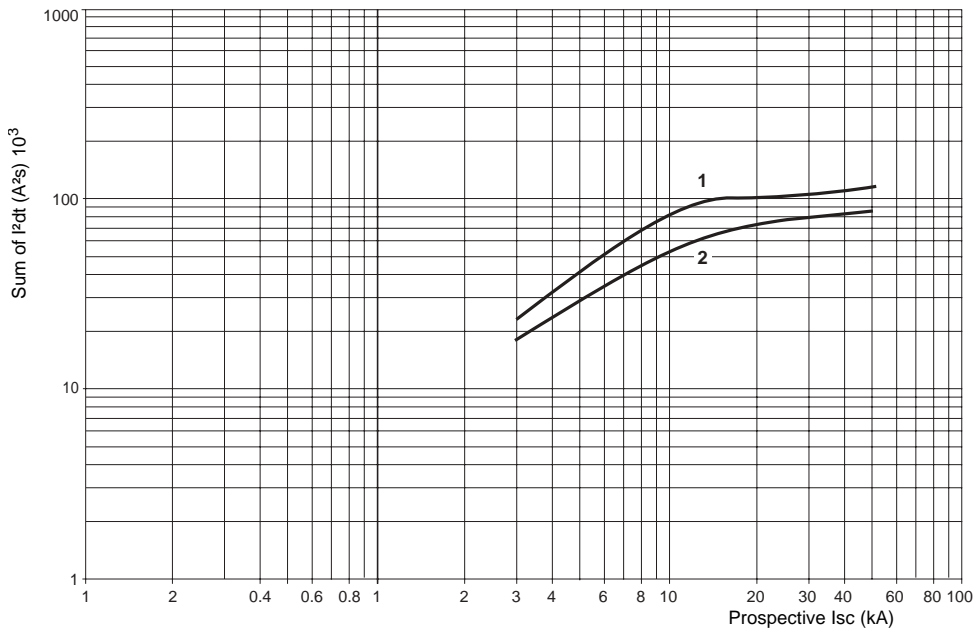
$U_n = 460\text{ V}$



1. Maximum peak current
2. 32 A power base LUB32
3. 12 A power base LUB12

### Thermal Limit on Short-Circuit for Power Base LUB

$U_n = 460\text{ V}$



1. 32 A power base LUB32
2. 12 A power base LUB12

CONTROL UNITS

Function Characteristics

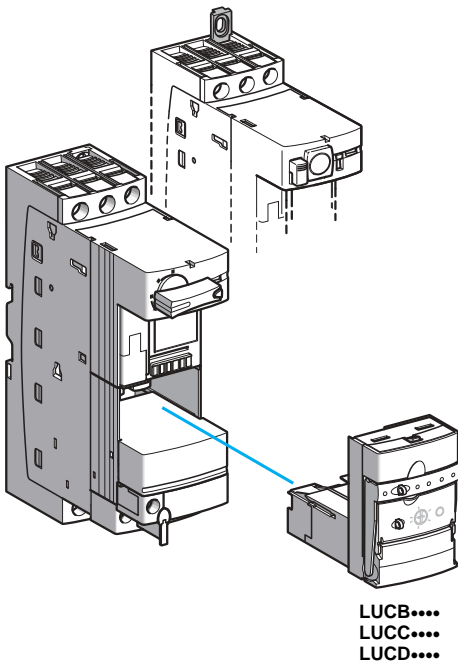
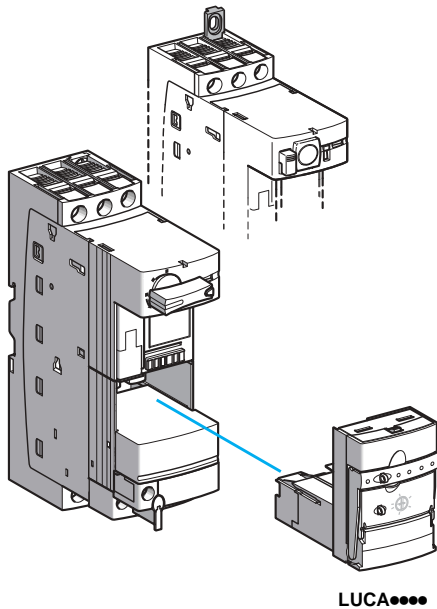
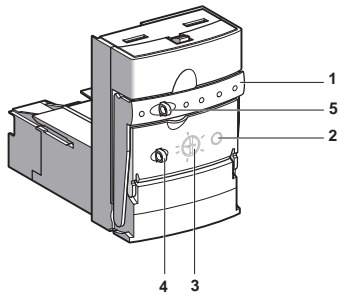
| Control Units  | Standard   |      |     |      | Advanced   |      |      |   | Multifunction  |
|--|--|------|-----|------|--|------|------|---|--|
|  | LUCA   | LUCB | LUC | LUCD | LUC  | LUCE | LUCF | LUCG  | LUCM   |
| Overload Protection  | 1  |      |     |      |  |      |      |   |  |
| Magnetic Trip Overcurrent Protection   | 14.2 x the FLA setting 1                           |      |     |      |  |      |      |   | 3 to 17 x the FLA setting 1  |
| Short-Circuit Protection 2   | 14.2 x maximum rated current of the control unit 1 |      |     |      |  |      |      |   |  |
| Phase Loss Protection  | 1  |      |     |      | -  |      |      |   | 1  |
| Phase Imbalance Protection   | 1  |      |     |      | -  |      |      |   | 1  |
| Ground Fault Detection (equipment protection only)                                 | -  |      |     |      | -  |      |      |   | 1  |
| Overload Trip Class  | 10 1   |      |     | 10 1 | 20 1   |      |      | 5 to 30 1   |  |
| Motor Type (AC only)   | 3-phase 1  |      |     |      | Single-phase 1   |      |      |   | Single-phase and 3-phase 1   |
| Test Function  | -  |      |     |      | 1  |      |      |   |  |
| Overtorque (Jam)   | -  |      |     |      | -  |      |      |   | 1  |
| Underload  | -  |      |     |      | -  |      |      |   | 1  |
| Long Starting Times  | -  |      |     |      | -  |      |      |   | 1  |
| Reset Modes  | Manual   | 1    |     |      | 1  |      |      | Parameters can be set via integrated LCD and keypad, communication module LUFDA10 or LULC031, network 1, or PowerSuite™ Software. |  |
|  | Automatic or Remote                                | -    |     |      | With function module LUFDA10 or LULC031                                  |      |      | LUFDA10 or LULC031, network 1, or PowerSuite™ Software.   |  |
| Alarm  | -  |      |     |      | With function module LUFW10, or communication module LULC031             |      |      |   | Possible for each type of fault. Indication via integrated LCD and keypad, via remote terminal, via PowerSuite Software. 1<br>With function module LUFW10, or communication module LULC031 |
| “Log” Function   | -  |      |     |      | -  |      |      |   | Log of the last 5 trips includes number of starts, number of trips, number of operating hours. 1   |
| “Monitoring” Function  | -  |      |     |      | -  |      |      |   | Indication on integrated LCD and keypad, via remote terminal or PowerSuite Software. 1   |
| <b>With Function Modules 3</b>   |  |      |     |      |  |      |      |   |  |
| Thermal Overload Pre-alarm   | -  |      |     |      | With function module LUFW 1  |      |      |   | -  |
| Fault Differentiation and Manual Reset   | -  |      |     |      | With function module LUFDH20 1   |      |      |   | -  |
| Fault Differentiation and Automatic or Remote Reset                                | -  |      |     |      | With function module LUFDA10 1   |      |      |   | -  |
| Indication of Motor Load (analog signal) 0–10 V or 4–20 mA                         | -  |      |     |      | With function module LUFV 1  |      |      |   | -  |
| <b>With Communication Module or via RS-485 Modbus® port on LUCM control unit 3</b> |  |      |     |      |  |      |      |   |  |
| Starter Status (ready, run, trip)  | With communication module ASILUFC5 or LULC031      |      |     |      |  |      |      |   |  |
| Reset Mode   | -  |      |     |      | Parameters can be set via the bus.                                       |      |      |   |  |
| Alarm  | -  |      |     |      | -  |      |      |   | With Modbus communication module LULC031 and RS-485 Modbus port on the LUCM control unit (alarm possible for all types of fault) 1   |
| Remote Reset via the Bus   | -  |      |     |      | With Modbus communication module LULC031 (thermal overload alarm only) 1 |      |      |   |  |
| Indication of Motor Load   | -  |      |     |      | -  |      |      |   |  |
| Fault Differentiation  | -  |      |     |      | -  |      |      |   |  |
| Remote Programming and Monitoring of all Functions                                 | -  |      |     |      | -  |      |      |   | With Modbus communication module LULC031 and RS-485 Modbus port on the LUCM control unit 1   |
| “Log” Function   | -  |      |     |      | -  |      |      |   | With Modbus communication module LULC031 and RS-485 Modbus® port on the LUCM control unit 1  |
| “Monitoring” Function  | -  |      |     |      | -  |      |      |   | With Modbus communication module LULC031 and RS-485 Modbus port on the LUCM control unit 1   |

1 Built-in function

2 LUS and LU2S require customer provided supplemental short circuit protection (fuses or circuit breaker) per national and local electric codes.

3 Mounting possibilities: 1 function module or 1 communication module.

# TeSys® U-Line Motor Starters Control Units



## Standard and Advanced Control Units

| Description |  |
|-------------|--|
| 1           | Extraction and locking handle                        |
| 2           | Test button (on advanced control unit only)          |
| 3           | Adjustable Full Load Amps (FLA) dial                 |
| 4           | Locking of settings by sealing the transparent cover |
| 5           | Sealing of locking handle                            |

### Standard, 3-Phase, Class 10 Overload Protection

| Setting Range (Amps) | Used with power bases          | Catalog Number      | Weight lb (kg) |
|----------------------|--------------------------------|---------------------|----------------|
| 0.15–0.6             | LU•B12, LU•B32, LU•S12, LU•S32 | LUCAX6 <sup>1</sup> | 0.30 (0.135)   |
| 0.3–1.4              | LU•B12, LU•B32, LU•S12, LU•S32 | LUCA1X <sup>1</sup> | 0.30 (0.135)   |
| 1.25–5.0             | LU•B12, LU•B32, LU•S12, LU•S32 | LUCA05 <sup>1</sup> | 0.30 (0.135)   |
| 3–12                 | LU•B12, LU•B32, LU•S12, LU•S32 | LUCA12 <sup>1</sup> | 0.30 (0.135)   |
| 4.5–18               | LU•B32, LU•S32                 | LUCA18 <sup>1</sup> | 0.30 (0.135)   |
| 8–32                 | LU•B32, LU•S32                 | LUCA32 <sup>1</sup> | 0.30 (0.135)   |

<sup>1</sup> Complete the catalog number by selecting the proper voltage code from the table below.

### Advanced, 3-Phase, Class 10 Overload Protection

| Setting Range (Amps) | Used with power bases          | Catalog Number      | Weight lb (kg) |
|----------------------|--------------------------------|---------------------|----------------|
| 0.15–0.6             | LU•B12, LU•B32, LU•S12, LU•S32 | LUCBX6 <sup>1</sup> | 0.31 (0.140)   |
| 0.3–1.4              | LU•B12, LU•B32, LU•S12, LU•S32 | LUCB1X <sup>1</sup> | 0.31 (0.140)   |
| 1.25–5.0             | LU•B12, LU•B32, LU•S12, LU•S32 | LUCB05 <sup>1</sup> | 0.31 (0.140)   |
| 3–12                 | LU•B12, LU•B32, LU•S12, LU•S32 | LUCB12 <sup>1</sup> | 0.31 (0.140)   |
| 4.5–18               | LU•B32, LU•S32                 | LUCB18 <sup>1</sup> | 0.31 (0.140)   |
| 8–32                 | LU•B32, LU•S32                 | LUCB32 <sup>1</sup> | 0.31 (0.140)   |

<sup>1</sup> Complete the catalog number by selecting the proper voltage code from the table below.

### Advanced, Single Phase, Class 10 Overload Protection

| Setting Range (Amps) | Used with power bases          | Catalog Number      | Weight lb (kg) |
|----------------------|--------------------------------|---------------------|----------------|
| 0.15–0.6             | LU•B12, LU•B32, LU•S12, LU•S32 | LUCCX6 <sup>1</sup> | 0.31 (0.140)   |
| 0.3–1.4              | LU•B12, LU•B32, LU•S12, LU•S32 | LUC1X <sup>1</sup>  | 0.31 (0.140)   |
| 1.25–5.0             | LU•B12, LU•B32, LU•S12, LU•S32 | LUC05 <sup>1</sup>  | 0.31 (0.140)   |
| 3–12                 | LU•B12, LU•B32, LU•S12, LU•S32 | LUC12 <sup>1</sup>  | 0.31 (0.140)   |
| 4.5–18               | LU•B32, LU•S32                 | LUC18 <sup>1</sup>  | 0.31 (0.140)   |
| 8–32                 | LU•B32, LU•S32                 | LUC32 <sup>1</sup>  | 0.31 (0.140)   |

<sup>1</sup> Complete the catalog number by selecting the proper voltage code from the table below.

### Advanced, 3-Phase, Class 20 Overload Protection

| Setting Range (Amps) | Used with power bases          | Catalog Number      | Weight lb (kg) |
|----------------------|--------------------------------|---------------------|----------------|
| 0.15–0.6             | LU•B12, LU•B32, LU•S12, LU•S32 | LUCDX6 <sup>1</sup> | 0.31 (0.140)   |
| 0.3–1.4              | LU•B12, LU•B32, LU•S12, LU•S32 | LUCD1X <sup>1</sup> | 0.31 (0.140)   |
| 1.25–5.0             | LU•B12, LU•B32, LU•S12, LU•S32 | LUCD05 <sup>1</sup> | 0.31 (0.140)   |
| 3–12                 | LU•B12, LU•B32, LU•S12, LU•S32 | LUCD12 <sup>1</sup> | 0.31 (0.140)   |
| 4.5–18               | LU•B32, LU•S32                 | LUCD18 <sup>1</sup> | 0.31 (0.140)   |
| 8–32                 | LU•B32, LU•S32                 | LUCD32 <sup>1</sup> | 0.31 (0.140)   |

<sup>1</sup> Complete the catalog number by selecting the proper voltage code from the table below.

### Voltage Codes

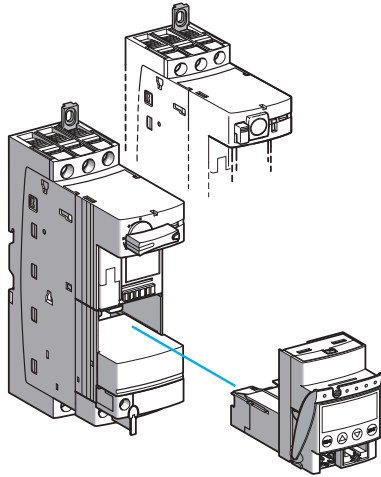
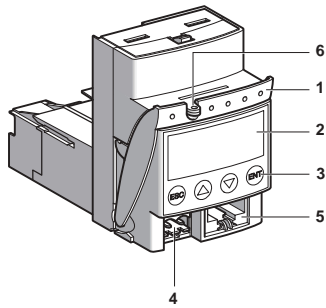
| Volts    | 24                | 48–72           | 110–240 |
|----------|-------------------|-----------------|---------|
| DC       | BL <sup>1 2</sup> | –               | –       |
| AC       | B                 | –               | –       |
| DC or AC | –                 | ES <sup>3</sup> | FU      |

<sup>1</sup> Voltage code to use for a power base with a communication module.

<sup>2</sup> DC voltage with range of 0.90 to 1.10 of nominal.

<sup>3</sup> 48–72 Vdc; 48 Vac

# TeSys® U-Line Motor Starters Control Units



LUCM••BL

## Multifunction

| Description |   |
|-------------|---|
| 1           | Extraction and locking handle                                     |
| 2           | Built in display window (2 lines, 12 characters)                  |
| 3           | 4-button keypad   |
| 4           | 24 Vdc auxiliary power input                                      |
| 5           | RS-485 external communication port. Connection by RJ45 connector. |
| 6           | Sealing of locking handle   |

The display window and keypad allow:

- In configuration mode: local configuration of protection functions and alarms
- In run mode: display of parameter values and events

The RS-485 Modbus® communication port is used to connect:

- An operator terminal XBTNU400 on an enclosure door
- Personal computer with Windows™ 95 or higher and with PowerSuite™ V2.0 software
- Pocket PC (PPC) with an Intel Xscale™ processor and Windows™ 2003 for PPC and PowerSuite™ V2.0 software.

## Multifunction Control Units

Programming of motor protection parameters, monitoring of motor load values and consultation of faults/statistics by:

- Front panel using the integrated LCD and keypad
- Remote terminal XBTNU400 via Modbus communication bus
- Personal computer or Pocket PC with PowerSuite™ software VW3A8104.
- Remotely via a Modbus communication bus to a PLC

Multifunction control units must be connected to a 24 Vdc auxiliary power supply for programming.

## Multifunction Programmable Units

Built-in Modbus communication port, 24 Vdc only

| Setting Range (Amps) | Used with power bases          | Catalog Number <sup>1</sup> | Weight lb (kg) |
|----------------------|--------------------------------|-----------------------------|----------------|
| 0.15–0.6             | LU•B12, LU•B32, LU•S12, LU•S32 | LUCMX6BL                    | 0.38 (0.175)   |
| 0.3–1.4              | LU•B12, LU•B32, LU•S12, LU•S32 | LUCM1XBL                    | 0.38 (0.175)   |
| 1.25–5.0             | LU•B12, LU•B32, LU•S12, LU•S32 | LUCM05BL                    | 0.38 (0.175)   |
| 3–12                 | LU•B12, LU•B32, LU•S12, LU•S32 | LUCM12BL                    | 0.38 (0.175)   |
| 4.5–18               | LU•B32, LU•S32                 | LUCM18BL                    | 0.38 (0.175)   |
| 8–32                 | LU•B32, LU•S32                 | LUCM32BL                    | 0.38 (0.175)   |

<sup>1</sup> Standard voltages. These control units can operate only on 24 Vdc supply. DC voltage with a range of 0.90 to 1.10 of nominal.

## User's Manual

| Application  | Languages                   | Catalog Number | Weight lb (kg) |
|--|-----------------------------|----------------|----------------|
| TeSys® U-Line User's manual on CD-ROM <sup>1</sup> | Multi-language <sup>2</sup> | LU9CD1         | 0.05 (0.022)   |

<sup>1</sup> The CD-ROM contains user manuals for the AS-i and Modbus communication modules, multifunction control units and gateway modules, and ABC Configurator gateway programming software.

<sup>2</sup> English, French, German, Spanish, Italian.

## Operator Terminal

This compact Magelis™ terminal enables the parameters of multifunction control unit LUCM to be read and modified. Requires XBTZ938 connector cable.

It is supplied pre-configured to provide dialogue with a quantity of 8 LUCM control units (Modbus protocol, application pages and alarm pages loaded).

Power base alarm and fault management takes priority.

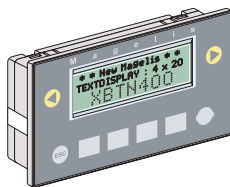
| Language                    | Display Window           | Supply Voltage | Catalog Number | Weight lb (kg) |
|-----------------------------|--------------------------|----------------|----------------|----------------|
| Multi-language <sup>1</sup> | 4 lines of 20 characters | 24 Vdc         | XBTNU400       | 0.32 (0.150)   |

<sup>1</sup> English, French, German, Spanish, Italian.

## Connecting Cable <sup>1</sup>

| Function   | Length           | Type                     | Catalog Number | Weight lb (kg) |
|--|------------------|--------------------------|----------------|----------------|
| Connects terminal XBTNU400 to LUCM multifunction control unit. | 8.20 ft. (2.5 m) | SUB-D 25-way female—RJ45 | XBTZ938        | 0.43 (0.200)   |

<sup>1</sup> If a terminal is used with several control units, this cable can be connected to a Modbus hub LU9GC3 or to T-junctions VW3A8306TF.

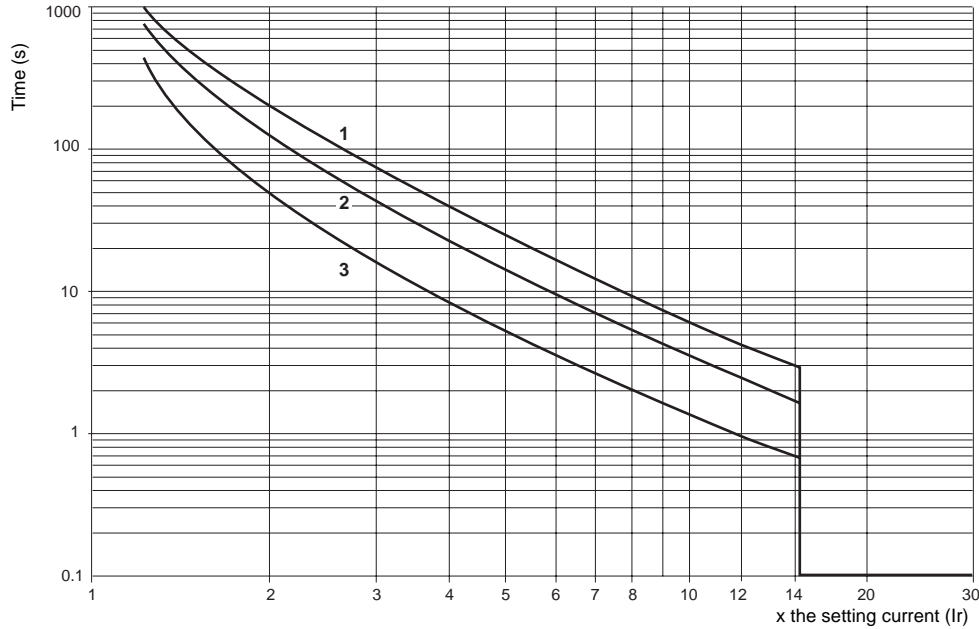


XBTNU400

# TeSys® U-Line Motor Starters Control Units

## Tripping Curves for Control Units LUCA, LUCB, LUCD

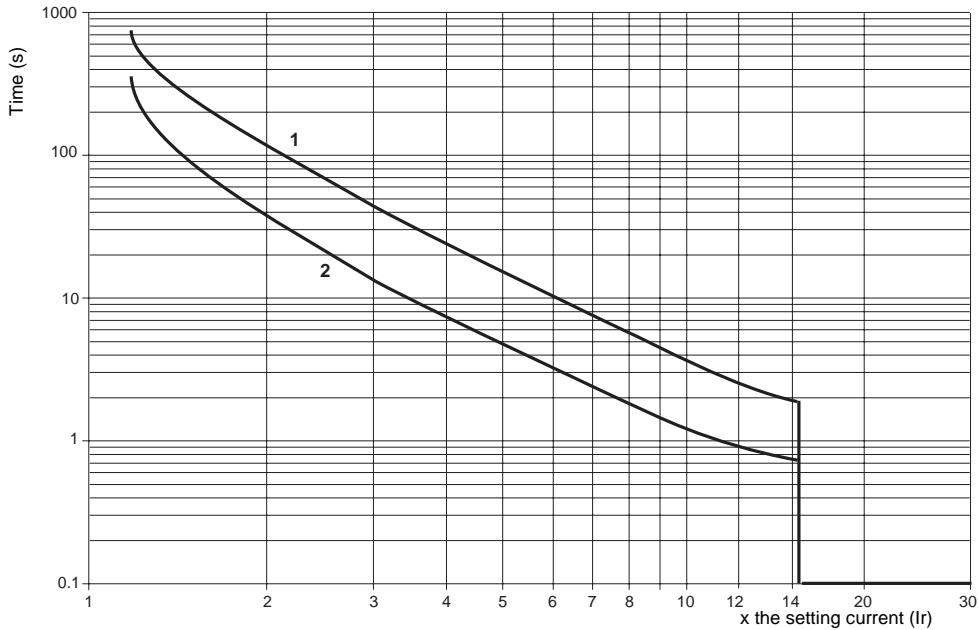
Average operating times at 70 °F ( 20 °C ) according to multiples of the setting current, tolerance:  $\pm 20\%$ .



1. LUCD, 3 poles from cold state, class 20.
2. LUCA, LUCB, 3 poles from cold state, class 10.
3. LUCA, LUCB, LUCD, 3 poles from hot state.

## Tripping Curves for Control Unit LUCC

Average operating times at 70 °F ( 20 °C ) according to multiples of the setting current, tolerance:  $\pm 20\%$ .

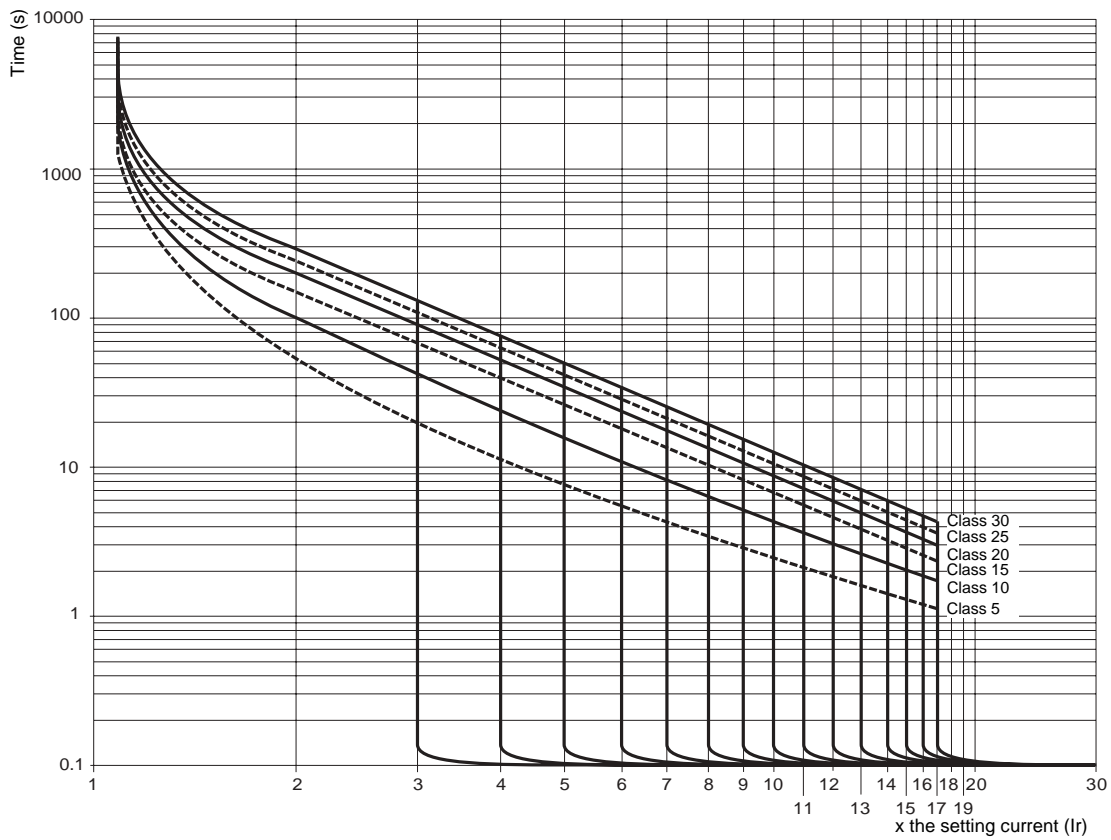


1. LUCC, single-phase, cold state.
2. LUCC, single-phase, hot state.

Tripping curves for control unit LUCM

Cold state curves

Average operating times at 70 °F ( 20 °C) according to multiples of the setting current, tolerance:  $\pm 20\%$ .

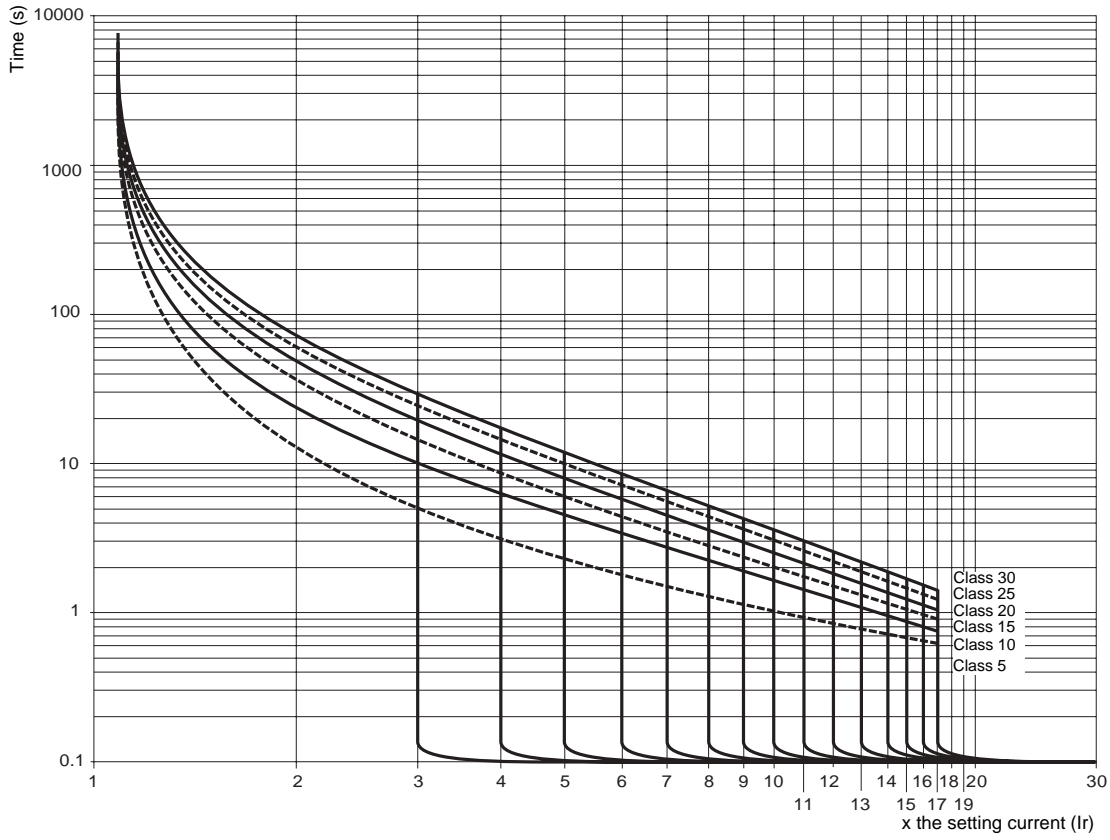


# TeSys® U-Line Motor Starters Control Units

## Tripping Curves for Control Unit LUCM

Hot state curves

Average operating times at 70 °F ( 20 °C ) according to multiples of the setting current, tolerance: ± 20 %





## COMMUNICATION AND FUNCTION MODULES

### PowerSuite™ Software

PowerSuite™ software is a Windows™ -based program providing an intuitive, graphical user interface for the TeSys® U-Line LUCM multifunction control units, Altivar® 11 (ATV11), Altivar® 28 (ATV28), and Altivar® 58 (ATV58) drive controllers, and Altistart® 48 (ATS48) soft start controllers. The software is designed to run on:

- Any PC using the Microsoft® Windows™ 95, Windows™ 98, Windows NT® V4.0, or Windows XP® operating system
- Pocket PC (PPC) with an Intel Xscale™ processor and Windows™ 2003 for PPC and PowerSuite™ V2.0 software.

The PowerSuite™ commissioning software allows you to:

- Create, modify and store multi-function control unit configurations
- Transfer data to and from the multi-function control unit
- Print a hard copy of the multi-function control unit configuration for reference
- Operate the multi-function control unit to verify proper commissioning
- Display and view run time data
- Display and view faults and fault history



| Catalog Number | Description   |
|----------------|---|
| VW3A8104       | PowerSuite2™ commissioning software on CD   |
|                | PC connection kit. Includes the following to connect a PC to a TeSys U-line LUCM control unit, ATV11, ATV28, ATV31, ATV58 or ATS48 controller:  |
| VW3A8106       | <ul style="list-style-type: none"> <li>• 1 m cable with RJ45 connectors</li> <li>• RS-232 to RS-485 adapter with RJ45 and DB9 female connectors</li> <li>• RJ45 to DB9 adapter for use with an ATV58 controller</li> <li>• Cable adapter for use with an ATV11 controller, VW3A11301</li> </ul>   |
|                | Pocket PC connection kit. Includes the following to connect a Jornada or iPAQ PPC to a TeSys U-line LUCM control unit, ATV11, ATV28, ATV31, ATV58 or ATS48 controller:  |
| VW3A8111       | <ul style="list-style-type: none"> <li>• 1/2 m cable with RJ45 connectors</li> <li>• RS-232 to RS-485 adapter with RJ45 and DB9 male connectors</li> <li>• RJ45 to DB9 adapter for use with an ATV58 controller</li> <li>• Cable adapter for use with an ATV11 controller, VW3A11301</li> <li>• Cable to connect the serial port on the PPC to the DB9 connector on the RS-232 to RS-485 adapter</li> </ul> |
|                | PowerSuite™ upgrade CD.   |
| VW3A8105       | <ul style="list-style-type: none"> <li>• For current owners of PowerSuite™ versions 1.0, 1.4, or 1.5.</li> <li>• Software for PC and Pocket PC</li> <li>• Includes technical documentation and ABC Configurator gateway programming software.</li> </ul>  |

# TeSys® U-Line Motor Starters

## Communication and Function Modules

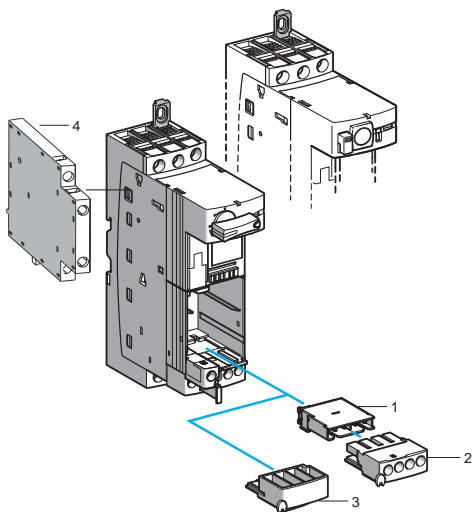
| Terminals                      | Contact Indicates | Contact Normal Status | Auxiliary Contact State for Each Power Base Mode <sup>1</sup> |       |     |                    |                              |  | Catalog Number |
|--------------------------------|-------------------|-----------------------|---|-------|-----|--------------------|------------------------------|--|----------------|
|                                |                   |                       | Off   | Ready | Run | Short Circuit Trip | Overload Trip (Manual Reset) | Overload Trip (Remote/Auto Reset) <sup>2</sup> |                |
| Screw                          | Ready condition   | N.O.                  | O   | I     | I   | O                  | O                            | I  | LUA1C11        |
|                                | Fault condition   | N.C.                  | I   | I     | I   | O                  | O                            | I  |                |
| Without terminals <sup>3</sup> | Ready condition   | N.O.                  | O   | I     | I   | O                  | O                            | I  | LUA1C110       |
|                                | Fault condition   | N.C.                  | I   | I     | I   | O                  | O                            | I  |                |
| Screw                          | Ready condition   | N.O.                  | O   | I     | I   | O                  | O                            | I  | LUA1C20        |
|                                | Fault condition   | N.O.                  | O   | O     | O   | I                  | I                            | O  |                |
| Without terminals <sup>4</sup> | Ready condition   | N.O.                  | O   | I     | I   | O                  | O                            | I  | LUA1C200       |
|                                | Fault condition   | N.O.                  | O   | O     | O   | I                  | I                            | O  |                |

<sup>1</sup> I—indicates closed contact; O—indicates open contact

<sup>2</sup> Must order LU9BN11, LU9BN11C, LU9MRC or LU9MR1C.

<sup>3</sup> Requires multifunction or advanced control unit plus fault indication function module LUFDDA10.

<sup>4</sup> Requires multifunction or advanced control unit plus fault indication function module LUFDDA10.



### Auxiliary Contact Blocks

| Status and Fault Indication   | Connection          | Item  | Catalog Number | Weight lb (kg) |
|---|---------------------|-------|----------------|----------------|
| 1 N.O. contact indicating that control handle is in "ready" position and 1 N.C. fault signaling contact | Screw clamps        | 1 + 2 | LUA1C11        | 0.07 (0.030)   |
|   | Without connections | 1     | LUA1C110       | 0.03 (0.012)   |
| 1 N.O. contact indicating that control handle is in "ready" position and 1 N.O. fault signaling contact | Screw clamps        | 1 + 2 | LUA1C20        | 0.07 (0.030)   |
|   | Without connections | 1     | LUA1C200       | 0.03 (0.012)   |

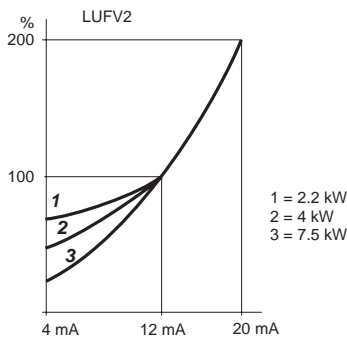
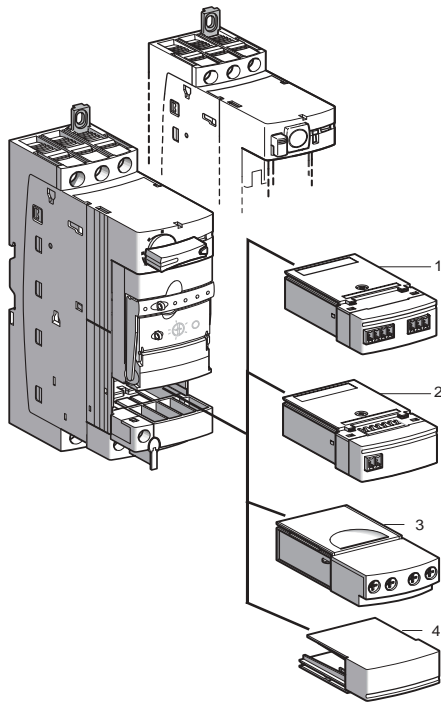
### Accessories

| Description                                | For use on                       | Item | Catalog Number       | Weight lb (kg) |
|--|----------------------------------|------|----------------------|----------------|
| Screw clamp terminal blocks                | LUA1D110                         | 2    | LU9BD11              | 0.05 (0.022)   |
|  | LUA1C110                         | 2    | LU9BC11              | 0.05 (0.022)   |
|  | LUA1C200                         | 2    | LU9BC20              | 0.05 (0.022)   |
| Blanking cover <sup>1</sup>                | for auxiliary contact block slot | 3    | LU9C2                | 0.02 (0.010)   |
| Control circuit contact block <sup>2</sup> | LUB, LU2B                        | 4    | LUA8E20 <sup>2</sup> |                |

<sup>1</sup> Blanking cover is included with every power base and starter only base.

<sup>2</sup> For use only with LUB, LU2B power bases. Not for use with LUS power bases. For compliance with NEC 430-74 disconnection of motor control circuits.

# TeSys® U-Line Motor Starters Communication and Function Modules



## Function Modules

| Output | Application | Item | Catalog Number | Weight lb (kg) |
|--------|-------------|------|----------------|----------------|
|--------|-------------|------|----------------|----------------|

### Motor Load Indication Function Module

Provides a signal proportional to the average currents in the three phases, divided by the FLA setting.

The value of the output signal 4-20 mA corresponds to a load status of 0 to 2 x FLA (0 to 3 x FLA for single-phase motor load).

The LUFV2 function module can be used with LUCB, LUCC, LUCD or LUCM control units. The LUFV2 function module requires a 24 Vdc auxiliary power supply. Includes removable screw terminal (not shown).

|           |   |   |       |              |
|-----------|---|---|-------|--------------|
| 4 - 20 mA | - | 1 | LUFV2 | 0.11 (0.050) |
|-----------|---|---|-------|--------------|

### Overload / Short-Circuit Fault and Manual Reset Function Module

Includes an overload fault contact and a short-circuit fault contact.

It can only be used with an advanced control unit, from which it takes its power supply.

The control unit is forced to manual reset mode. Includes removable screw terminal (not shown).

|                 |                      |   |         |              |
|-----------------|----------------------|---|---------|--------------|
| 2 N.O. Contacts | 24 to 250 Vac or Vdc | 2 | LUFDH20 | 0.13 (0.060) |
|-----------------|----------------------|---|---------|--------------|

### Overload Fault and Automatic Reset Function Module

Includes overload fault contact. Short-circuit signaling can be obtained by using an add-on fault signaling contact LUA1 (see page 26).

The module can only be used with an advanced control unit from which it takes its power supply.

The control unit is forced to automatic reset mode. Includes removable screw terminal (not shown).

|                |                      |   |         |              |
|----------------|----------------------|---|---------|--------------|
| 1 N.O. Contact | 24 to 250 Vac or Vdc | 2 | LUFDA10 | 0.12 (0.055) |
|----------------|----------------------|---|---------|--------------|

### Thermal Overload Pre-Alarm Function Module

Through load shedding, this module makes it possible to avoid stoppages in operation due to overload tripping.

Imminent overload tripping is displayed as soon as the current drawn by the load exceeds 1.05 x FLA.

Signaling is possible via an LED on the front panel of the module and externally by a N.O. relay output.

The module can only be used with an advanced control unit from which it takes its power supply. Includes removable screw terminal (not shown).

|                |                      |   |        |              |
|----------------|----------------------|---|--------|--------------|
| 1 N.O. Contact | 24 to 250 Vac or Vdc | 2 | LUFW10 | 0.12 (0.055) |
|----------------|----------------------|---|--------|--------------|

### Auxiliary Contact Function Modules

Module with 2 contacts indicating state of LUB or LUS power base power poles.

For use with: 24 to 250 Vac or Vdc, 5 A.

| Connection              | Application          | Item | Catalog Number | Weight lb (kg) |
|-------------------------|----------------------|------|----------------|----------------|
| 2 N.O. Contacts         | 24 to 250 Vac or Vdc | 3    | LUFN20         | 0.11 (0.050)   |
| 1 N.O., 1 N.C. Contacts | 24 to 250 Vac or Vdc | 3    | LUFN11         | 0.11 (0.050)   |
| 2 N.C. Contacts         | 24 to 250 Vac or Vdc | 3    | LUFN02         | 0.11 (0.050)   |

### Accessories

| Description                 | For use on           | Item | Catalog Number | Weight lb (kg) |
|-----------------------------|----------------------|------|----------------|----------------|
| Blanking cover <sup>1</sup> | Function module slot | 4    | LU9C1          | 0.04 (0.020)   |

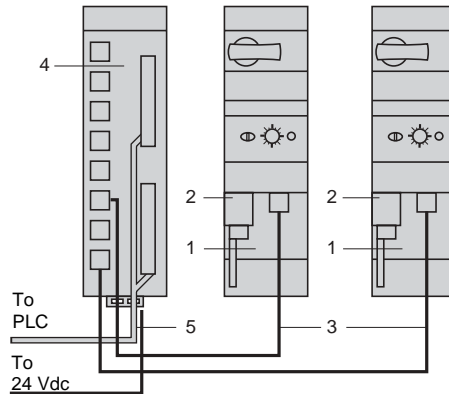
<sup>1</sup> Blanking cover is included with every power base.

# TeSys® U-Line Motor Starters

## Communication and Function Modules

### Parallel Wiring Module

#### Architecture



1. Parallel wiring module LUFC00.
2. Pre-wired coil connection LU9BN11C.
3. Connection cable LU9R• with one RJ45 connector at each end.
4. Splitter box LU9G02 for 8 motor starters with channel connections on the PLC side by 2 HE 10 connectors and on the power base side by 8 RJ45 connectors.
5. Connection cable TSXCDP••• with one HE 10 connector at each end.

The parallel wiring system makes it possible to connect power bases to the PLC I/O modules quickly and without any need for tools. It replaces traditional screw terminal and hard-wired connections.

The parallel wiring module allows for energization of the coil circuit of each power base, and an output signal from a PLC. Provides a "Run" and "Fault" status of each power base to the PLC.

Requires a 24 Vdc control unit, LUC•••BL.

The splitter box distributes information from the PLC I/O modules to each of the power bases connected to it.



| Description  | Item | Catalog Number | Weight<br>lb (kg) |
|--|------|----------------|-------------------|
| Parallel wiring module                               | 1    | LUFC00         | 0.10 (0.045)      |
| Outputs for starter commands                         | 6    | -              | -                 |
| RJ45 connector for connecting to splitter box LU9G02 | 7    | -              | -                 |

# TeSys® U-Line Motor Starters Communication and Function Modules

## Connection of Parallel Wiring Module Output Terminals to the Power Base Coil Terminals

By pre-wired connector or removable screw terminal:

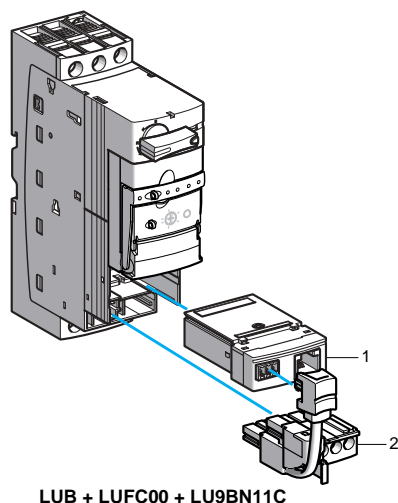
- Pre-wired connector:

Pre-wired components simplify wiring and reduce wiring errors. The use of a power base without screw terminal connections is recommended when using LU9BN11C or LU9MRC pre-wired connectors.

| Description               | For use with power base | Item | Catalog Number | Weight lb (kg) |
|---------------------------|-------------------------|------|----------------|----------------|
| Pre-wired coil connectors | LUB••                   | 2    | LU9BN11C       | 0.099 (0.045)  |
|                           | LUS••                   |      |                |                |
|                           | LU2B••                  | 8    | LU9MRC         | 0.066 (0.030)  |
|                           | LU2S••                  |      |                |                |

- Removable screw terminal:

Allows insertion, for example, of an emergency stop control or a voltage interface. This type of connection must be used for a reversing power base assembled using an LU6M reversing block for separate mounting. When reversing block LU6M and the power base are mounted side-by-side, a pre-wired connector LU9MRC may be used.



LUB + LUFC00 + LU9BN11C

## Connection of Parallel Wiring Module to the PLC

No tools are required to connect the parallel wiring module to the PLC. Connection is via a splitter box which allows up to 8 power bases to be connected; a maximum of 4 reversing starters per splitter box is allowed.

The splitter box requires a 24 Vdc power supply.

### Parallel Wiring Splitter Boxes

| PLC Connection (16/120)               | Power Base Connection | Item | Catalog Number      | Weight lb (kg) |
|---------------------------------------|-----------------------|------|---------------------|----------------|
| Cable with two HE 1020-way connectors | Eight RJ45 ports      | 4    | LU9G02 <sup>1</sup> | 0.573 (0.260)  |

<sup>1</sup> Allows "run" and "fault" status of each power base to be fed back to the PLC and transmits commands

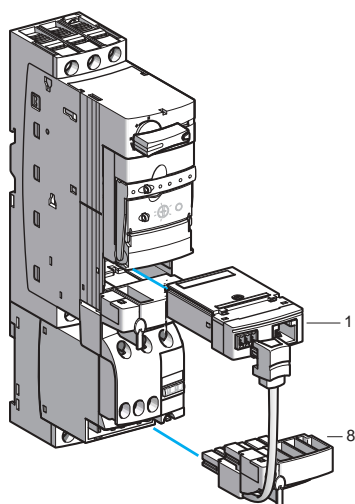
### Connection Cables from Splitter Box to Parallel Wiring Modules

| Item  | Length ft. (m) | Catalog Number | Weight lb (kg) |
|---|----------------|----------------|----------------|
| Cable with two RJ45 connectors <sup>1</sup> | 0.98 (0.3)     | LU9R03         | 0.099 (0.045)  |
|   | 3.28 (1)       | LU9R10         | 0.143(0.065)   |
|   | 9.84 (3)       | LU9R30         | 0.275 (0.125)  |

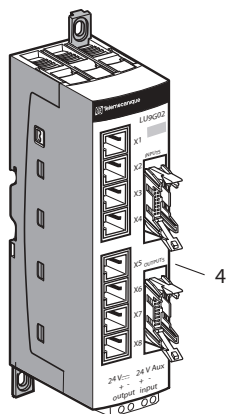
<sup>1</sup> For connection from parallel wiring module LUFC00 to parallel wiring splitter box LU9G02.

### Connection Cables from Splitter Box to PLC

| PLC Connection | Splitter Box Connection | Gauge AWG | mm <sup>2</sup> | Length ft. (m) | Catalog Number | Weight lb (kg) |
|----------------|-------------------------|-----------|-----------------|----------------|----------------|----------------|
| HE 10 20-way   | HE 10 20-way            | 22        | 0.324           | 1.64 (0.5)     | TSXCDP053      | 0.187 (0.085)  |
|                |                         |           |                 | 3.28 (1)       | TSXCDP103      | 0.330 (0.150)  |
|                |                         |           |                 | 6.56 (2)       | TSXCDP203      | 0.617 (0.280)  |
|                |                         |           |                 | 9.84 (3)       | TSXCDP303      | 0.903 (0.410)  |
|                |                         |           |                 | 16.4 (5)       | TSXCDP503      | 1.47 (0.670)   |
|                |                         |           |                 | 3.28 (1)       | ABFH20H100     | 0.176 (0.080)  |
| Bare wires     | HE 10 20-way            | 22        | 0.324           | 6.56 (2)       | ABFH20H200     | 0.308 (0.140)  |
|                |                         |           |                 | 9.84 (3)       | ABFH20H300     | 0.462 (0.210)  |
|                |                         |           |                 | 9.84 (3)       | TSXCDP301      | 0.881 (0.400)  |
|                |                         |           |                 | 16.4 (5)       | TSXCDP501      | 1.45 (0.660)   |



LU2B + LUFC00 + LU9MRC



LU9G02

# TeSys® U-Line Motor Starters

## Communication and Function Modules

### AS-i Communication Module

#### Serial Type Connection

The AS-i communication module makes it easy to connect power bases to the AS-i wiring system, allowing remote control and command of these power bases.

The operating states of the module (AS-i voltage present, communication fault, addressing fault,...) are indicated on the front panel by 2 LEDs (green and red).

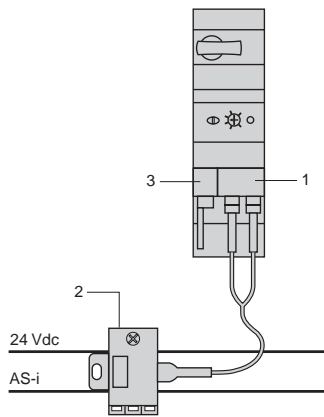
Operation of the module is continuously monitored by auto-testing, in a way that is totally transparent to the user.

The incorporation of AS-i V.2 functions allows diagnostics to be performed on the module, either remotely via the bus or locally via the ASITERV2 addressing terminal.

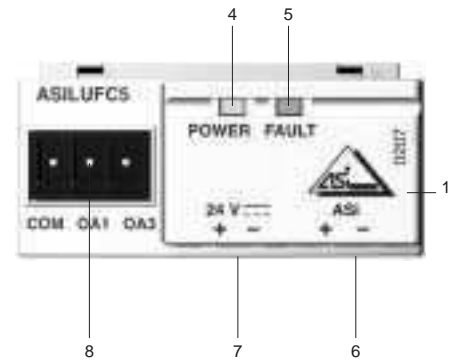
The communication module must have a 24 Vdc supply and must be used in conjunction with a 24 Vdc control unit, LUC•••BL.

The product is supplied with a yellow connector (6) for connection to the AS-i system, a black connector (7) for connection to the 24 Vdc auxiliary supply and a black connector (8) for connection of the outputs.

#### Architecture

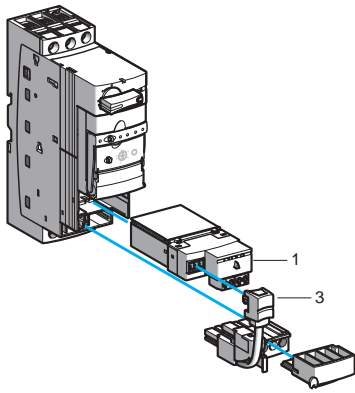


1. Communication module ASILUFC5
2. Tap-off XZCG0142
3. Pre-wired coil connection LU9BN11C
4. Green LED: AS-i voltage present
5. Red LED: AS-i or module fault
6. Yellow connector for connection to the AS-i system
7. Black connector for connection to a 24 Vdc auxiliary supply
8. Outputs for starter commands

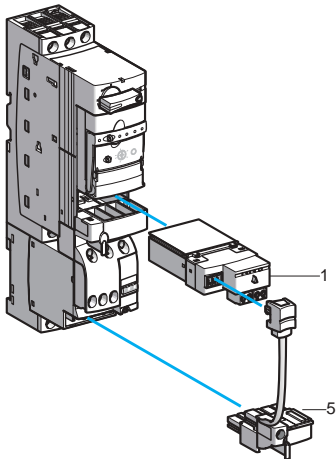


| AS-i profile               | 7.D.F.0        |                       |                           |
|----------------------------|----------------|-----------------------|---------------------------|
|                            | Bit value      | = 0                   | = 1                       |
| <b>Data bits (command)</b> | Command D0 (O) | Stop forward          | Forward running           |
|                            | Command D1 (O) | Stop reverse          | Reverse running           |
|                            | Command D2 (O) | Not used              | Not used                  |
|                            | Command D3 (O) | Not used              | Not used                  |
|                            | Bit value      | = 0                   | = 1                       |
| <b>Data bits (status)</b>  | Status D0 (I)  | Not ready or fault    | Ready                     |
|                            | Status D1 (I)  | Stopped               | Running                   |
|                            | Status D2 (I)  | Not used              | Not used                  |
|                            | Status D3 (I)  | Not used              | Not used                  |
| <b>Description</b>         | <b>Item</b>    | <b>Catalog Number</b> | <b>Weight<br/>lb (kg)</b> |
| AS-i Communication Module  | 1              | ASILUFC5              | 0.143 (0.065)             |

# TeSys® U-Line Motor Starters Communication and Function Modules



LUB + ASILUF C5 + LU9BN11C



LU2B + ASILUF C5 + LU9MRC



XZMC11



ASITERV2

## Connection of AS-i Communication Module Output Terminals to the Power Base Coil Terminals

By pre-wired connector or removable screw terminal:

- Pre-wired connector:

Pre-wired components simplify wiring and reduce wiring errors. The use of a power base without screw terminal control circuit connections is recommended when using LU9BN11C or LU9MRC pre-wired connectors.

| Description               | For use with power base | Item | Catalog Number | Weight lb (kg) |
|---------------------------|-------------------------|------|----------------|----------------|
| Pre-wired coil connectors | LUB••                   | 3    | LU9BN11C       | 0.099 (0.045)  |
|                           | LUS••                   |      |                |                |
|                           | LU2B••                  | 5    | LU9MRC         | 0.066 (0.030)  |
|                           | LU2S••                  |      |                |                |

- Removable screw terminal (included with ASILUFC5):

Allows insertion, for example, of an emergency stop control or a voltage interface. This type of connection must be used for a reversing power base assembled using an LU6M reversing block for separate mounting. When reversing block LU6M and the power base are mounted side-by-side, a pre-wired connector LU9MRC may be used.

## Connection of the Communication Module on the Serial Bus <sup>1</sup>

Achieved by using a tap-off for connection to 2 ribbon cables:

- 1 for AS-i (yellow)
- 1 for separate 24 Vdc supply (black).

| Description | Length ft. (m) | Catalog Number | Weight lb (kg) |
|-------------|----------------|----------------|----------------|
| Tap-off     | 6.56 (2)       | XZCG0142       | 0.584 (0.265)  |

## Consoles and Cable Adapters

| Description   | Catalog Number | Weight lb (kg) |
|---|----------------|----------------|
| <b>Addressing console</b><br>Battery operated. Battery charger supplied AS-i V.1 and V.2.1 compatible.                            | XZMC11US       | 1.21 (0.550)   |
| <b>Adjustment and diagnostics console</b><br>Runs on LR6 batteries.<br>Allows addressing of AS-i V.2.1 interfaces and diagnostics | ASITERV2       | 1.10 (0.500)   |
| <b>Cable adapter</b><br>For console XZMC11  | XZMG12US       | 0.154 (0.070)  |

## Software Set-Up

AS-i configuration is carried out using PL7 Micro/Junior/Pro software. From the module declaration screen, it is possible to configure all the slave devices corresponding to all the AS-i I/O.

Configuration is carried out by following the instructions on the screen.

## TeSys® U-Line User's Manual <sup>1</sup>

| Application             | Language                    | Catalog Number | Weight lb (kg) |
|-------------------------|-----------------------------|----------------|----------------|
| User's Manual On CD-ROM | Multi-language <sup>2</sup> | LU9CD1         | 0.048 (0.022)  |

<sup>1</sup> The CD-ROM contains user's manuals for the AS-i and Modbus® communication modules, multifunction control units, gateway modules, and ACB Configurator gateway programming software.

<sup>2</sup> English, French, German, Italian, Spanish.



Configuration example with Premium TSXSAY100/1000 module

<sup>1</sup> Degree of protection IP 54. Connection by 4 x 0.34 mm<sup>2</sup> wires.  
Black wire: +24 V                      Blue wire: AS-i (-)  
White wire: 0 V                         Brown wire: AS-i (+)

# TeSys® U-Line Motor Starters

## Communication and Function Modules

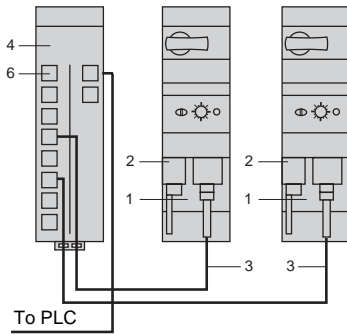
### Modbus® Communication Module

#### Series Type Connection

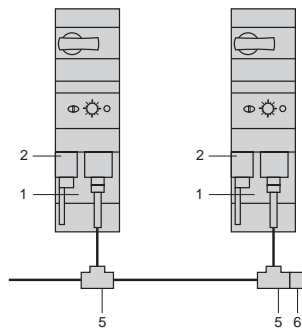
Communication module LULC031 enables the U-Line power base to be connected to the Modbus network. It must have a 24 Vdc supply and must be used in conjunction with a 24 Vdc control unit, LUC•••BL. It incorporates a 0.5 A, 24 Vdc digital output for local command requirements.

#### Architecture

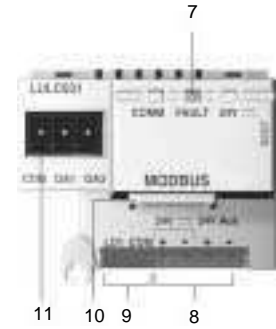
##### Stare topology



##### Bus topology



1. Communication module LULC031
2. Pre-wired coil connection LU9BN11C
3. Connection cable with one RJ45 connector at each end VW3A8306R••
4. Modbus hub LU9GC3 with channel connections to PLC and to power base with RJ45 connectors
5. T-junction VW3A8306TF••
6. Line terminator VW3A8306R
7. Module status signaling LED
8. 24 Vdc supply connection
9. RJ45 connector RS-485 for Modbus link
10. Programmable digital output
11. Outputs for starter commands (stop - forward start - reverse start)



Information carried by the bus depends on the type of control unit used.

| Control Unit                                       | Standard | Advanced | Multifunction |
|--|----------|----------|---------------|
| Starter status (ready, running, fault)             | √        | √        | √             |
| Alarms (over current)                              |          |          | √             |
| Thermal overload alarm                             |          | √        | √             |
| Remote reset via the bus                           |          | √        | √             |
| Indication of motor load                           |          | √        | √             |
| Fault differentiation                              |          | √        | √             |
| Remote programming and monitoring of all functions |          |          | √             |
| "Log" function                                     |          |          | √             |
| "Monitoring" function                              |          |          | √             |
| Start and Stop commands                            | √        | √        | √             |
| Functions performed √                              |          |          |               |

| Description                 | Item | Catalog Number | Weight lb (kg) |
|-----------------------------|------|----------------|----------------|
| Modbus Communication Module | 1    | LULC031        | 0.176 (0.080)  |

For more detailed information, please refer to TeSys® U-Line User's Manual LU9CD1, on CD-ROM.



# TeSys® U-Line Motor Starters Communication and Function Modules

## Connection of Modbus® Communication Module Output Terminals to the Power Base Coil Terminals

By pre-wired connector or removable screw terminal:

- Pre-wired connector:

Pre-wired components simplify wiring and reduce wiring errors. The use of a power base without screw terminal control circuit connections is recommended when using LU9BN11 or LU9MRC pre-wired connectors.

| Description               | For use with power base | Item | Catalog Number | Weight lb (kg) |
|---------------------------|-------------------------|------|----------------|----------------|
| Pre-wired coil connectors | LUB**                   | 2    | LU9BN11C       | 0.099 (0.045)  |
|                           | LUS**                   |      |                |                |
|                           | LU2B**                  | 7    | LU9MRC         | 0.066 (0.030)  |
|                           | LU2S**                  |      |                |                |

- Removable screw terminal (included with LULC031):

Allows insertion, for example, of an emergency stop control or a voltage interface. This type of connection must be used for a reversing power base assembled using an LU6M reversing block for separate mounting. When reversing block LU6M and the power base are mounted side-by-side, a pre-wired connector LU9MRC may be used.

## Connection of the Communication Modules on the Serial Bus

Achieved either by means of a Modbus hub or using T-junctions.

| Description                                  | Length ft. (m) | Item | Catalog Number | Weight lb (kg) |
|--|----------------|------|----------------|----------------|
| Modbus hub for 8 slaves                      | –              | 4    | LU9GC3         | 0.573 (0.260)  |
| Cables with two RJ45 connectors <sup>1</sup> | 0.98 (0.3)     | 3    | VW3A8306R03    | 0.099 (0.045)  |
|  | 3.28 (1)       | 3    | VW3A8306R10    | 0.143 (0.065)  |
|  | 9.84 (3)       | 3    | VW3A8306R30    | 0.275 (0.125)  |
| T-junctions <sup>2</sup>                     | 0.98 (0.3)     | 5    | VW3A8306TF03   | 0.07 (0.032)   |
|  | 3.28 (1)       | 5    | VW3A8306TF10   | 0.07 (0.032)   |
| RS-485 line terminator <sup>3</sup>          | –              | 6    | VW3A8306RC     | 0.026 (0.012)  |

<sup>1</sup> For connection from Modbus hub LU9GC3 to Modbus communication module LULC031.

<sup>2</sup> Includes 2 RJ45 female connectors (bus side) and a 0.3 m or 1 m cable supplied with an RJ45 male connector (station side).

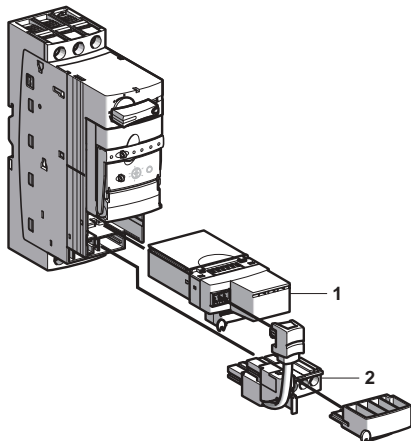
<sup>3</sup> Required at end of Modbus serial bus.

## TeSys® U-Line User's Manual<sup>1</sup>

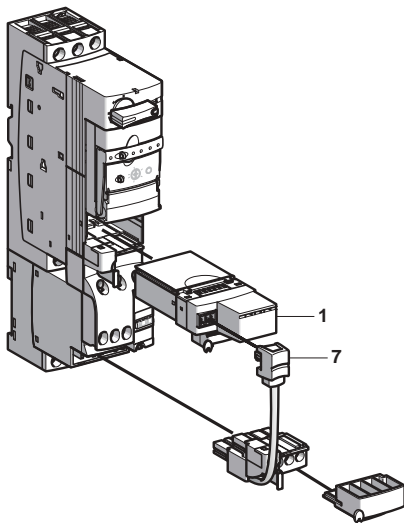
| Application             | Language                    | Catalog Number | Weight lb (kg) |
|-------------------------|-----------------------------|----------------|----------------|
| User's Manual on CD-ROM | Multi-language <sup>2</sup> | LU9CD1         | 0.048 (0.022)  |

<sup>1</sup> The CD-ROM contains user's manuals for the AS-i and Modbus communication modules, multifunction control units and gateway modules, and ABC Configurator gateway programming software.

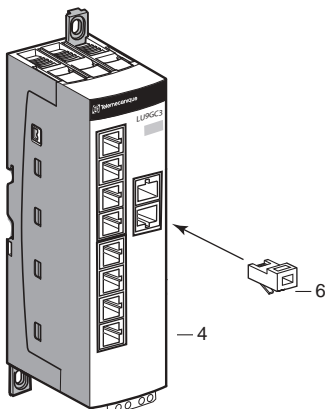
<sup>2</sup> English, French, German, Italian, Spanish



LUB + LUL C031 + LU9B



LU2B + LUL C031 + LU9M



LU9GC3

# TeSys® U-Line Motor Starters

## Communication and Function Modules

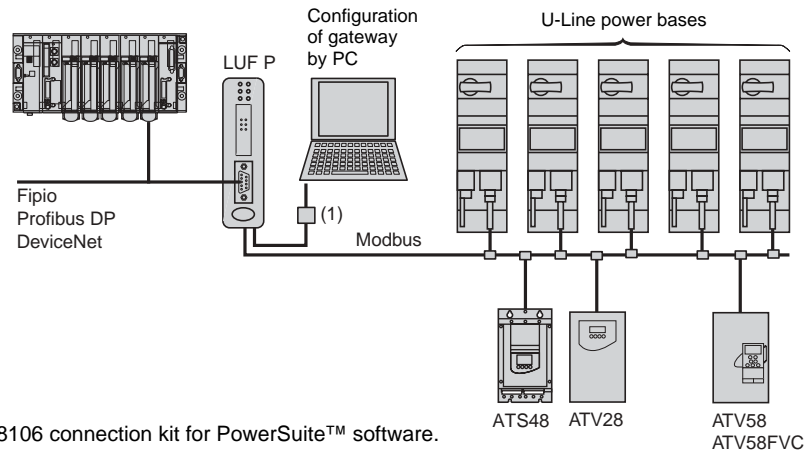
### Communication Gateways

LUF P communication gateway allows connection between Modbus® and field buses such as Fipio, Profibus DP or DeviceNet.

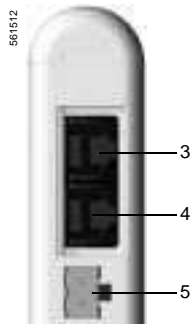
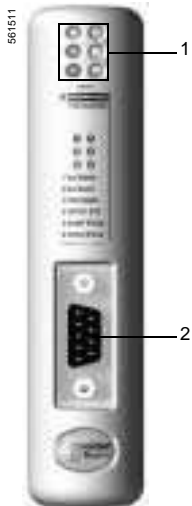
After configuration, these gateways manage information which can be accessed by the Modbus network and make this information available for read/write functions (command, monitoring, configuration and adjustment) on the field buses.

An LUF P communication gateway can be clipped onto a 35 mm DIN rail, allowing connection of up to 8 slaves to the Modbus bus.

#### Example of Architecture



(1) VW3A8106 connection kit for PowerSuite™ software.



#### Description

##### Front panel of the product

1. LED indicates:
  - communication status of the Modbus buses
  - gateway status
  - communication status of the Fipio, Profibus DP or DeviceNet bus
2. Connectors for connection to Fipio, Profibus DP or DeviceNet buses
3. RJ45 connector for connection on the Modbus bus
4. RJ45 connector for link to a PC
5. 24 Vdc power supply

#### Software Set-Up

For the Fipio bus, software set-up of the gateway is performed using either PL7 Micro/Junior/Pro software or ABC Configuration software.

For the Profibus DP and DeviceNet buses, software set-up is performed using the ABC Configurator.

This software is included:

- In the PowerSuite™ software workshop for PC (see VW3A8104)
- In the TeSys® U-Line user's manual LU9CD1 on CD-ROM.

# TeSys® U-Line Motor Starters Communication and Function Modules

## Communication Gateway Specifications



|  |                              |  |                                |                                    |
|--|------------------------------|--|--------------------------------|------------------------------------|
| <b>Bus Type</b>  |                              | <b>Fipio</b>   | <b>Profibus DP</b>             | <b>DeviceNet</b>                   |
| <b>Environment</b>                                     | Conforming to IEC 60664      | Degree of pollution: 2   |                                |                                    |
| <b>Ambient air temperature</b>                         | Around the device            | 40 to 122 °F (+ 5 to + 50 °C)                                      |                                |                                    |
| <b>Degree of protection</b>                            |                              | IP 20  |                                |                                    |
| <b>Electromagnetic compatibility</b>                   | Emission                     | Conforming to IEC 50081-2: 1993                                    |                                |                                    |
|  | Immunity                     | Conforming to IEC 61000-6-2: 1999                                  |                                |                                    |
| <b>Number of Modbus® slaves which can be connected</b> |                              | < 8  |                                |                                    |
| <b>Connection</b>                                      | Modbus                       | By RJ45 connector conforming to Schneider Electric RS-485 standard |                                |                                    |
|  | To a PC                      | By RJ45 connector, with PowerSuite™ connection kit                 |                                |                                    |
|  | Field bus                    | By SUB-D9 pin female connector                                     | By SUB-D9 pin female connector | By 5-way removable screw connector |
| <b>Supply</b>  |                              | External supply, 24 Vdc ± 10 %                                     |                                |                                    |
| <b>Consumption</b>                                     | Max.                         | 280 mA   |                                |                                    |
|  | Typical                      | 100 mA   |                                |                                    |
| <b>Indication/diagnostics</b>                          |                              | By LED on front panel  |                                |                                    |
| <b>Services</b>  | Profile                      | FED C32 or FED C32P  | –                              | –                                  |
|  | Command                      | 26 configurable words <sup>1</sup>                                 | 122 configurable words         | 256 configurable words             |
|  | Monitoring                   | 26 configurable words <sup>1</sup>                                 | 122 configurable words         | 256 configurable words             |
|  | Configuration and adjustment | By gateway mini messaging facility (PKW)                           |                                |                                    |

<sup>1</sup> If the gateway is configured using PL7 software and not the ABC Configurator, the I/O capacity is limited to a total of 26 words.

## Communication Gateways

| Description            | For use with  | With bus type      | Catalog Number | Weight lb (kg) |
|------------------------|---|--------------------|----------------|----------------|
| Communication gateways | TeSys U-Line power bases, Altistar® 48, Altivar® 28, 58 and 58FVC | Fipio/Modbus       | LUFP1          | 0.54 (0.245)   |
|                        |   | Profibus DP/Modbus | LUFP7          | 0.54 (0.245)   |
|                        |   | DeviceNet/Modbus   | LUFP9          | 0.54 (0.245)   |

## Connection Accessories

| Description   | For use with      | Length ft. (m) | Connectors  | Catalog Number | Weight lb (kg) |
|---|-------------------|----------------|---|----------------|----------------|
|   |                   |                |   |                |                |
| <br><b>TSXFPACC12</b>   | Modbus            | 9.84 (3)       | 1 RJ45 type connector and one end with stripped wires | VW3A8306D30    | 0.330 (0.150)  |
|   |                   | 0.98 (0.3)     | 2 RJ45 type connectors                                | VW3A8306R03    | 0.110 (0.050)  |
|   |                   | 3.28 (1)       | 2 RJ45 type connectors                                | VW3A8306R10    | 0.110 (0.050)  |
|   |                   | 9.84 (3)       | 2 RJ45 type connectors                                | VW3A8306R30    | 0.330 (0.150)  |
| <br><b>490NAD91103</b> | Fipio             | –              | 1 SUB-D 9 pin male connector                          | TSXFPACC12     | 0.088 (0.040)  |
|   | Profibus mid line | –              | 1 SUB-D 9 pin male connector                          | 490NAD91104    | –              |
|   | Profibus line end | –              | 1 SUB-D 9 pin male connector                          | 490NAD91103    | –              |

## TeSys U-Line User's Manual

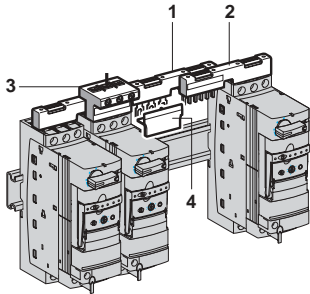
| Description                          | Medium | Language  | Catalog Number | Weight lb (kg) |
|--------------------------------------|--------|---|----------------|----------------|
| User's manual on CD ROM <sup>1</sup> | CD-ROM | Multilingual: English, French, German, Italian, Spanish | LU9CD1         | 0.048 (0.022)  |

<sup>1</sup> This CD-ROM contains user's manuals for AS-i and Modbus communication modules, multifunction control units and gateways, and ABC Configurator gateway programming software.

## ACCESSORIES

### Pre-wired System for Power Connections up to 63 A

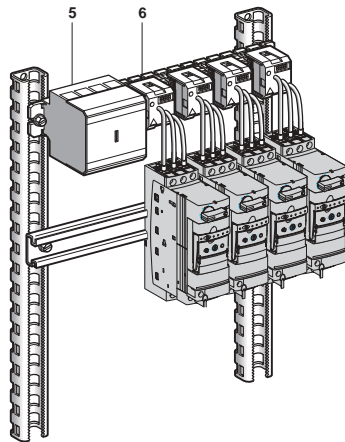
Suitable for group motor installations only



| Description  | Application               | Pitch inches (mm) | Item | Sold in lots of | Catalog Number | Weight lb (kg) |
|--|---------------------------|-------------------|------|-----------------|----------------|----------------|
| Set of 3-pole 63 A busbars                           | 2 power bases             | 1.77 (45)         | 2    | 1               | GV2G245        | 0.080 (0.036)  |
|  |                           | 2.12 (54)         | –    | 1               | GV2G254        | 0.083 (0.038)  |
|  | 3 power bases             | 1.77 (45)         | –    | 1               | GV2G345        | 0.127 (0.058)  |
|  |                           | 2.12 (54)         | –    | 1               | GV2G354        | 0.132 (0.060)  |
|  | 4 power bases             | 1.77 (45)         | 1    | 1               | GV2G445        | 0.169 (0.077)  |
|  | 2.12 (54)                 | –                 | 1    | GV2G454         | 0.187 (0.085)  |                |
|  | 5 power bases             | 2.12 (54)         | –    | 1               | GV2G554        | 0.220 (0.100)  |
| Protective end cover                                 | For unused busbar outlets | –                 | 4    | 5               | GV1G10         | 0.011 (0.005)  |
| Terminal block for supply to one or more busbar sets | Connection from the top   | –                 | 3    | 1               | GV1G09         | 0.088 (0.040)  |

### Pre-wired System for Power Connections up to 160 A

The busbar system can be screw-mounted to any type of support



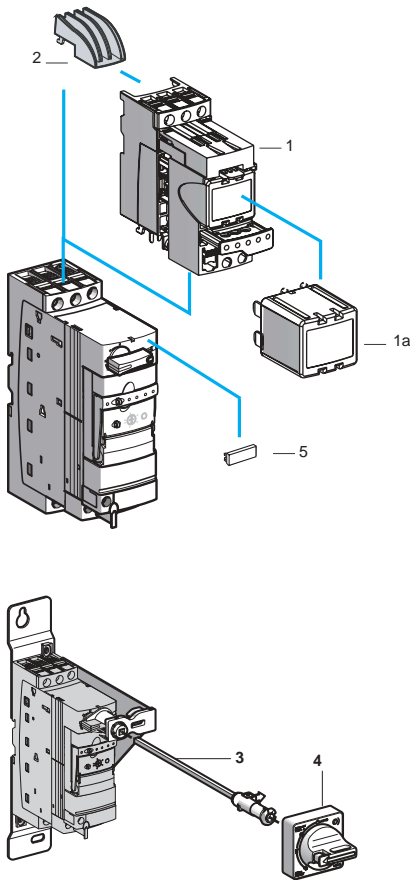
#### 4 Pole Busbar Set: 3-Phase + Neutral or 3-Phase + Common

| Number of Tap-offs at 0.71" (18 mm) Intervals | Length inches (mm) | For Mounting in Enclosure Width mm | Item | Catalog Number | Weight lb (kg) |
|---|--------------------|------------------------------------|------|----------------|----------------|
| 18  | 17.8 (452)         | 800                                | 5    | AK5JB144       | 1.98 (0.900)   |

#### Removable 3-Phase Power Sockets

| Number of Points used on the Busbar System | Thermal Current | Cable Length inches (mm) | Item | Sold in lots of | Catalog Number | Weight lb (kg) |
|--|-----------------|--------------------------|------|-----------------|----------------|----------------|
| 2  | 16              | 7.87 (200)               | 6    | 6               | AK5PC13        | 0.088 (0.040)  |
|  |                 | 9.84 (250)               | 6    | 6               | AK5PC33        | 0.099 (0.045)  |
|  |                 | 39.4 (1000)              | –    | 6               | AK5PC33L       | 0.132 (0.060)  |

# TeSys® U-Line Motor Starters Accessories



## Current Limiter - Isolator Module

| Description                                  | Breaking Capacity Iq |             | For Use With | Item | Catalog Number      | Weight lb (kg) |
|--|----------------------|-------------|--------------|------|---------------------|----------------|
|  | 480 V<br>kA          | 600 V<br>kA |              |      |                     |                |
| Current limiter-isolator module <sup>3</sup> | 130                  | 65          | LUB; LU2B    | 1    | LUALB1 <sup>1</sup> | 0.683 (0.310)  |
| Replacement limiter cartridge                | –                    | –           | LUALB1       | 1a   | LUALF1              | 0.297 (0.135)  |

## UL508 Type E Phase Barrier for use with LUB•• and LU2B••

Phase barrier LU9SP0 is required to create a UL 508 Type E self-protected combination motor controller. Without the phase barrier, the LUB/LU2B power base is a UL 508 motor starter.

| Description                 | Application   | Mounting                       | Item | Catalog Number | Weight lb (kg) |
|-----------------------------|---|--------------------------------|------|----------------|----------------|
| Incoming line phase barrier | LUB or LU2B 12 or 120<br>LUB or LU2B 32 or 320<br>LUA LB1 | Direct on terminals L1, L2, L3 | 2    | LU9SP0         | 0.066 (0.030)  |

## Door Interlock Mounting Kit and Handles for use with LUB•• and LU2B••

| Description                             | Item | Catalog Number | Weight lb (kg) |
|---|------|----------------|----------------|
| Mounting Kit <sup>2</sup>               | 3    | LU9AP00        | 1.080 (0.490)  |
| Handle kit (black/blue) NEMA Type 12/3R | 4    | LU9AP11        | 0.330 (0.150)  |
| Handle kit (red/yellow) NEMA Type 12/3R | 4    | LU9AP12        | 0.330 (0.150)  |

## Other Accessories

| Description                       | Item | Catalog Number     | Weight lb (kg) |
|-----------------------------------|------|--------------------|----------------|
| Clip-on identification markers    | –    | –                  | –              |
| Power bases, and reversing blocks | 5    | LAD90 <sup>3</sup> | 0.002 (0.001)  |

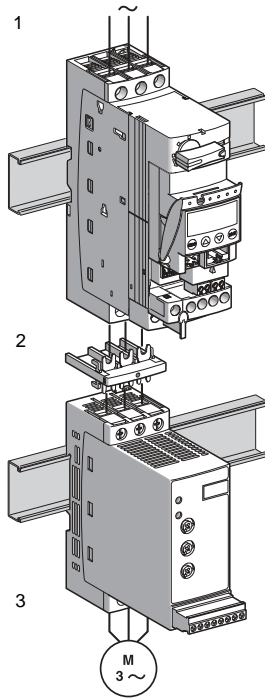
<sup>1</sup> LUALB1 supplied with LUALF1 limiter cartridge. LUB, LU2B power bases are rated for 480 V/60 Hz/42 kA short circuit breaking capacity. For applications requiring higher short circuit breaking capacity, add the LUALB1 current limiter-isolator module which provides capacity at 480 V/60 Hz/130 kA, 600 V/60 Hz/65 kA and 690 V/60 Hz/70 kA. LUALB1 is required for all 600 V / 690 V motor load applications.

<sup>2</sup> For enclosures with 7.5" to 20" (190.5 mm to 508 mm) mounting depth.

<sup>3</sup> Sold in lots of 100.

## ALTISTART® SOFT STARTS FOR TESYS® U-LINE

### Overview



While Altistart 01 soft starts can be used with almost any motor starter, it now adds soft start and soft stop motor control to the TeSys U-Line family of motor starters.

When either an ATS01•••LU/QN/RT or an ATSU01•••LT model (3) is combined with the TeSys U-Line motor starter (1) by means of a power connector (2), the result is a unique, innovative motor starting solution. A low power soft start installation now has access to all of the benefits of the TeSys U-Line motor starter:

- Modular design with a standard 45 mm width
- Short circuit and multi-class overload protection
- Phase loss, phase imbalance, ground fault, jam, under load, and long-start protection
- Fault history
- PC and PDA based programming software
- Optional LCD display
- Networking capabilities: Modbus®, AS-i, DeviceNet, Ethernet TCP/IP, Profibus DP
  - Monitoring of motor status
  - Remote starting and fault reset
- Electronic Reversing

The ATSU01•••LT soft start is optimized for installations offering 24 Vdc control power.

The ATS01•••LU/QN/RT soft start is self-powered from the AC line supply and is compatible with all other control power schemes.

The panel space required to install the ATS01 soft start and the TeSys U-Line motor starter is minimal with a standard 45 mm product width and side by side mounting.

The Altistart 01 soft start enhances the starting performance of asynchronous motors by allowing them to start gradually, smoothly, and in a controlled manner. It is ideal for applications that do not require high starting torque. The ATS01 limits starting torque and reduces the current inrush experienced with other motor starting methods.

The transitionless starting method of the Altistart 01 soft start avoids the torque surges associated with other reduced voltage starting methods.

Using the Altistart 01 soft start avoids the damage and expense associated with full voltage starting:

- wear and tear to motors, shafts, bearings, clutches, belts and other attached machinery
- damage to product being moved due to sudden starts and stops
- production downtime and material waste
- maintenance labor and replacement equipment cost

The Altistart 01 soft start is designed for the following simple applications:

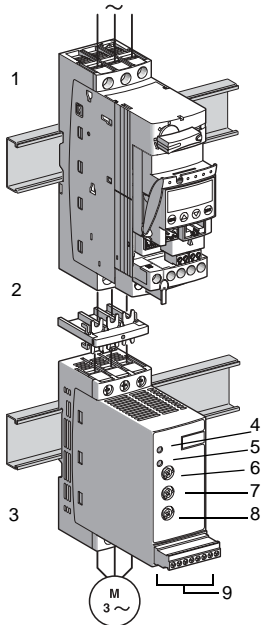
- material handling conveyors
- belt-driven machinery
- fans and pumps
- small compressors
- automatic doors and gates
- process machinery (grinders, mixers, agitators, etc.)
- filling lines
- people movers
- any other application that can benefit from the pluses of stepless reduced voltage starting

The Altistart 01 low power mini soft start is compact, easy to install, and complies with the following international standards: IEC/EN 60947-4-2, UL, CSA, CCC, C-Tick and CE

Altistart 01 low power mini soft starts:

- control two phases of the AC voltage supplying the motor to limit starting torque and current
- have a motor power ratings range of 1 to 20 HP (0.75 to 15 kW), three-phase only
- have a motor voltage range of 208 to 460V

## Description



The Altistart® 01 soft start is equipped with:

- 1 green LED (4) to indicate that soft start power is ON
- 1 yellow LED (5) that will illuminate 10 seconds after a start command has been given indicating that the soft start's voltage ramp is complete, the internal shorting contactor has closed, and the motor is up to speed
- a potentiometer to set the starting time (6)
- a potentiometer to set the initial voltage applied to the motor when starting begins (7)
- a potentiometer to set the stopping time (8)
- a removable I/O terminal block (9) that includes:
  - 2 logic or control inputs for Run and Stop commands
  - 1 logic or control input for the BOOST or Kickstart function
  - 1 "open collector" logic or signal output to indicate that the soft start ramp is complete and the motor is up to speed
  - 1 normally open relay contact that is:
    - closed when the soft start is running the motor
    - open if the soft start is faulted or if the motor has stopped

**NOTE:** For additional information refer to catalog 8637CT0401.

### Altistart 01 Soft Start and TeSys U-Line Motor Starter Combinations

| Motor Power <sup>1</sup> |      |     | ATS01 Rated Current | 24 Vdc Control Power |                             |          | Motor Power <sup>1</sup> |      |     | ATS01 Rated Current | 110–240 Vac Control Power |                             |          |
|--------------------------|------|-----|---------------------|----------------------|-----------------------------|----------|--------------------------|------|-----|---------------------|---------------------------|-----------------------------|----------|
| Voltage                  | kW   | HP  |                     | ATSU01 Soft Start    | TeSys U-Line                |          | Voltage                  | kW   | HP  |                     | ATS01 Soft Start          | TeSys U-Line                |          |
|                          |      |     | Amps                | Power Base           | Control Module <sup>2</sup> |          |                          |      |     |                     | Power Base                | Control Module <sup>2</sup> |          |
| 230 V                    | 0.75 | 1   | 6                   | ATSU01N206LT         | LUB12                       | LUCp05BL | 230 V                    | 0.75 | 1   | 6                   | ATS01N206LU               | LUB12                       | LUCp05FU |
|                          | 1.1  | 1.5 | 6                   | ATSU01N206LT         | LUB12                       | LUCp12BL |                          | 1.1  | 1.5 | 6                   | ATS01N206LU               | LUB12                       | LUCp12FU |
|                          | 1.5  | 2   | 9                   | ATSU01N209LT         | LUB12                       | LUCp12BL |                          | 1.5  | 2   | 9                   | ATS01N209LU               | LUB12                       | LUCp12FU |
|                          | 2.2  | 3   | 12                  | ATSU01N212LT         | LUB12                       | LUCp12BL |                          | 2.2  | 3   | 12                  | ATS01N212LU               | LUB12                       | LUCp12FU |
|                          | 3    | –   | 12                  | ATSU01N212LT         | LUB32                       | LUCp18BL |                          | 3    | –   | 12                  | ATS01N212LU               | LUB32                       | LUCp18FU |
|                          | 4    | 5   | 22                  | ATSU01N222LT         | LUB32                       | LUCp18BL |                          | 4    | 5   | 22                  | ATS01N222LU               | LUB32                       | LUCp18FU |
|                          | 5.5  | 7.5 | 22                  | ATSU01N222LT         | LUB32                       | LUCp32BL |                          | 5.5  | 7.5 | 22                  | ATS01N222LU               | LUB32                       | LUCp32FU |
|                          | 7.5  | 10  | 32                  | ATSU01N232LT         | LUB32                       | LUCp32BL |                          | 7.5  | 10  | 32                  | ATS01N232LU               | LUB32                       | LUCp32FU |
| 400 V                    | 1.5  | –   | 6                   | ATSU01N206LT         | LUB12                       | LUCp05BL | 400 V                    | 1.5  | –   | 6                   | ATS01N206QN               | LUB12                       | LUCp05FU |
|                          | 2.2  | –   | 6                   | ATSU01N206LT         | LUB12                       | LUCp12BL |                          | 2.2  | –   | 6                   | ATS01N206QN               | LUB12                       | LUCp12FU |
|                          | 3    | –   | 9                   | ATSU01N209LT         | LUB12                       | LUCp12BL |                          | 3    | –   | 9                   | ATS01N209QN               | LUB12                       | LUCp12FU |
|                          | 4    | –   | 9                   | ATSU01N209LT         | LUB12                       | LUCp12BL |                          | 4    | –   | 9                   | ATS01N209QN               | LUB12                       | LUCp12FU |
|                          | 5.5  | –   | 12                  | ATSU01N212LT         | LUB32                       | LUCp32BL |                          | 5.5  | –   | 12                  | ATS01N212QN               | LUB32                       | LUCp32FU |
|                          | 7.5  | –   | 22                  | ATSU01N222LT         | LUB32                       | LUCp32BL |                          | 7.5  | –   | 22                  | ATS01N222QN               | LUB32                       | LUCp32FU |
|                          | 11   | –   | 22                  | ATSU01N222LT         | LUB32                       | LUCp32BL |                          | 11   | –   | 22                  | ATS01N222QN               | LUB32                       | LUCp32FU |
|                          | 15   | –   | 32                  | ATSU01N232LT         | LUB32                       | LUCp32BL |                          | 15   | –   | 32                  | ATS01N232QN               | LUB32                       | LUCp32FU |
| 460 V                    | 2    | 6   | 6                   | ATSU01N206LT         | LUB12                       | LUCp05BL | 460 V                    | 2    | 6   | 6                   | ATS01N206RT               | LUB12                       | LUCp05FU |
|                          | 3    | 6   | 6                   | ATSU01N206LT         | LUB12                       | LUCp12BL |                          | 3    | 6   | 6                   | ATS01N206RT               | LUB12                       | LUCp12FU |
|                          | 5    | 9   | 9                   | ATSU01N209LT         | LUB12                       | LUCp12BL |                          | 5    | 9   | 9                   | ATS01N209RT               | LUB12                       | LUCp12FU |
|                          | 7.5  | 12  | 12                  | ATSU01N212LT         | LUB32                       | LUCp18BL |                          | 7.5  | 12  | 12                  | ATS01N212RT               | LUB32                       | LUCp18FU |
|                          | 10   | 22  | 22                  | ATSU01N222LT         | LUB32                       | LUCp18BL |                          | 10   | 22  | 22                  | ATS01N222RT               | LUB32                       | LUCp18FU |
|                          | 15   | 32  | 32                  | ATSU01N222LT         | LUB32                       | LUCp32BL |                          | 15   | 32  | 32                  | ATS01N222RT               | LUB32                       | LUCp32FU |
|                          | 20   | 32  | 32                  | ATSU01N232LT         | LUB32                       | LUCp32BL |                          | 20   | 32  | 32                  | ATS01N232RT               | LUB32                       | LUCp32FU |

<sup>1</sup> Standard power rating according to UL508.

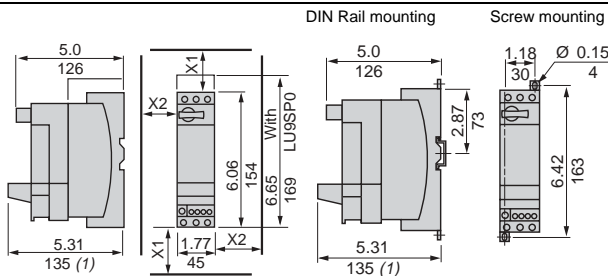
<sup>2</sup> Depending on the configuration of the selected TeSys U-Line motor starter, replace the p with A for standard control unit, B for advanced control unit, and M for multifunction control unit.

# TeSys® U-Line Motor Starters

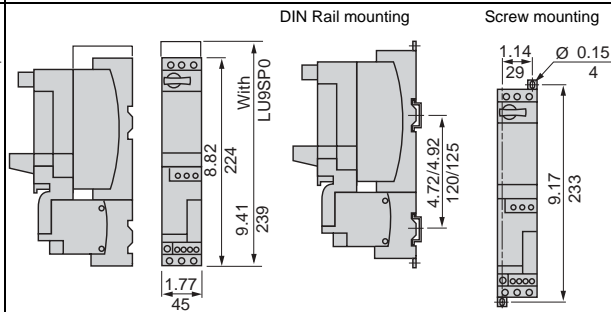
## DIMENSIONS, MOUNTING, AND SCHEMATICS

### Power Bases

#### Non-Reversing LUB12, LUB32, LUS12, LUS32



#### Reversing LU2B12, LU2B32, LU2S12, LU2S32



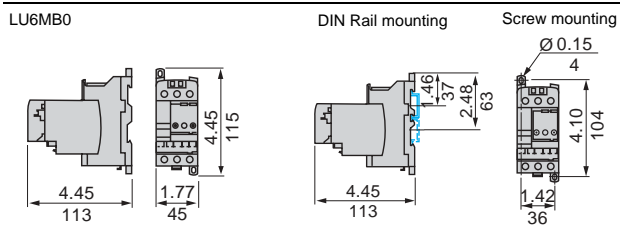
Minimum electrical clearance:

X1 = 1.38" (35 mm) for Ue = 440 V and 2.76" (70 mm) for Ue = 480, 600 and 690 V

X2 = 0

(1) Maximum depth (with Modbus® communication module)

#### Reversing Block for Mounting Separately from Power Base

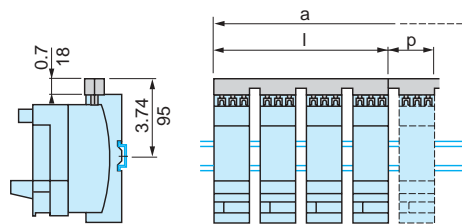


#### Operation in High Ambient Temperatures

| Operating ambient temp         | Mounting Dimension a |
|--------------------------------|----------------------|
| ≤ 113 °F (45 °C)               | 0 in (0 mm)          |
| 113 to 131 °F (45 °C to 55 °C) | 0.35 in (9 mm)       |
| 131 to 140 °F (55 to 60 °C)    | 0.78 in (20 mm)      |

### Sets of Busbars and Plug-In Power Sockets

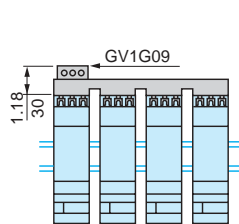
#### GV2G445 and GV2G454



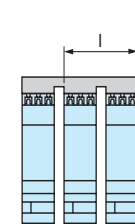
| Dimensions in (mm) | l          | P         |
|--------------------|------------|-----------|
| GV2G445 (2 x 45)   | 7.04 (179) | 1.77 (45) |
| GV2G454 (2 x 54)   | 8.11 (206) | 2.12 (54) |

| Dimensions in (mm) | a           |             |             |             |
|--------------------|-------------|-------------|-------------|-------------|
| Number of tap-offs | 0.19 (5)    | 0.23 (6)    | 0.27 (7)    | 0.31 (8)    |
| GV2G445 (2 x 45)   | 8.81 (224)  | 10.59 (269) | 12.36 (314) | 14.13 (359) |
| GV2G454 (2 x 54)   | 10.23 (260) | 12.36 (314) | 14.48 (368) | 16.61 (422) |

#### GV2G... with terminal block GV1G09

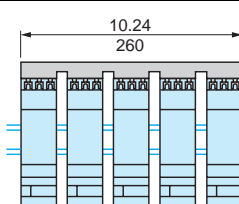


#### GV2G245 and G254

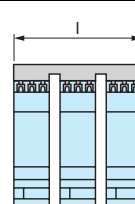


| Dimensions in (mm) | l         |
|--------------------|-----------|
| GV2G245 (2 x 45)   | 3.50 (89) |
| GV2G254 (2 x 54)   | 3.85 (98) |

#### GV2G554

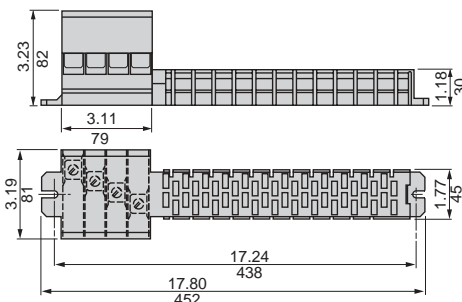


#### GV2G345 and G354

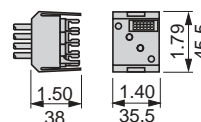


| Dimensions in (mm) | l          |
|--------------------|------------|
| GV2G345 (2 x 45)   | 5.27 (134) |
| GV2G354 (2 x 54)   | 5.98 (152) |

#### AK5B144



#### AK5PC13, PC33, PC33L



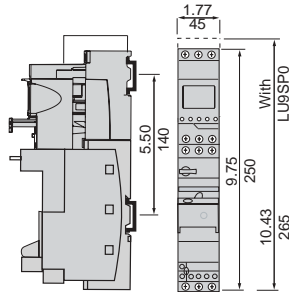
inches  
mm



# TeSys® U-Line Motor Starters Dimensions, Mounting, and Schematics

## Current Limiter Isolator Module

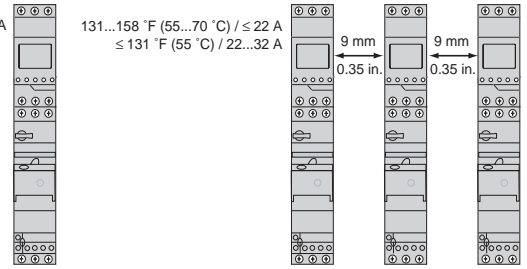
LUALB1 and LUB••



Operation in High Ambient Temperatures  
LU•B12, LU•B32 + LUALB1

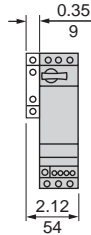
≤ 158 °F (70 °C) / ≤ 32 A

131...158 °F (55...70 °C) / ≤ 22 A  
≤ 131 °F (55 °C) / 22...32 A



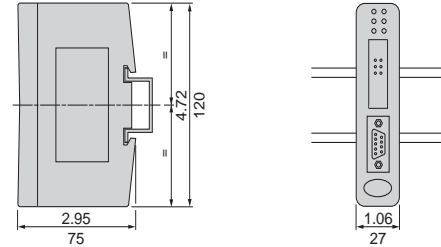
## Control Circuit Contact Block

LUA8E20



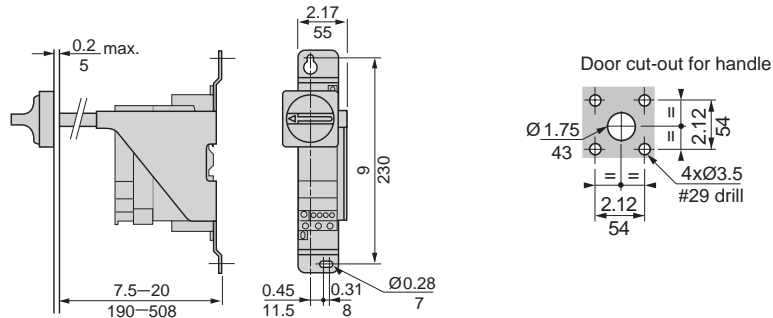
## Communication Gateways

LUPF



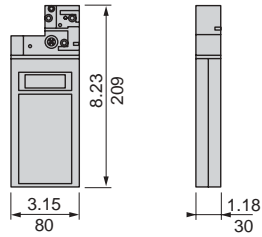
## Door Interlock Mounting Kit

LU9AP00 / LU9AP11 / LU9AP12

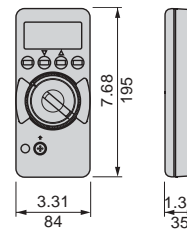


## AS-i Addressing Consoles

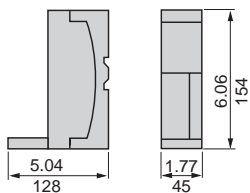
XZMC11



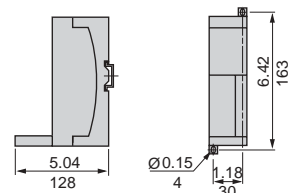
ASITERV2



## Modbus® Hub LU9CG3



## Parallel Wiring Splitter Box LU9G02



inches  
mm

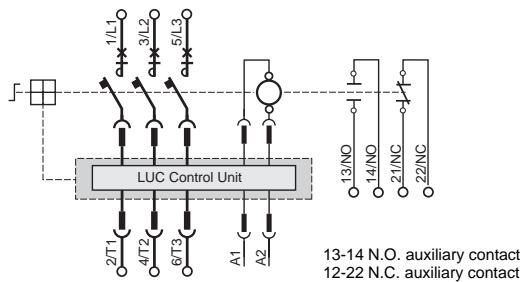
# TeSys® U-Line Motor Starters

## Dimensions, Mounting, and Schematics

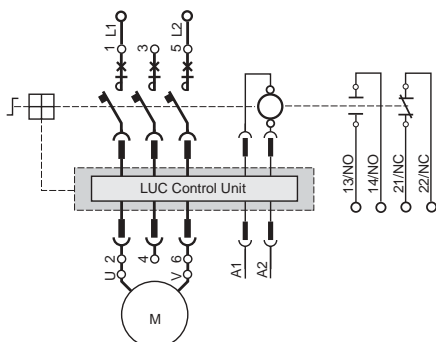
### Power Bases, 12 or 32 A

For additional wiring information refer to pages 53 - 56.

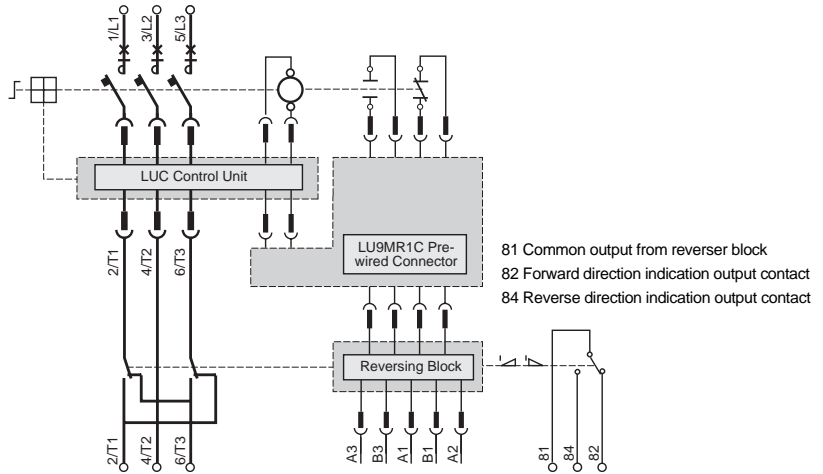
#### Non-reversing 3-phase motor LUB/LUS



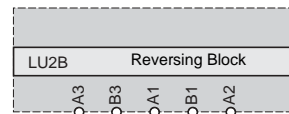
#### With control unit LUCC or LUCM Single-phase motor LUB/LUS



#### Reversing 3-phase motor LU2B/LU2S



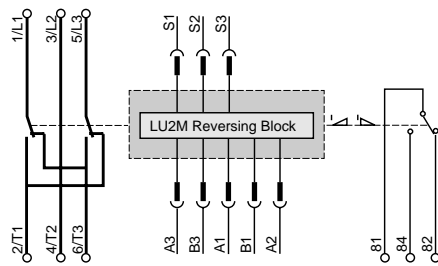
#### Control terminal block



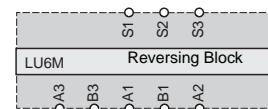
- A1 Forward direction start input (+ Vdc)
- A2 Common input (- Vdc)
- A3 Reverse direction start input (+ Vdc)
- B1 Holding circuit for A1 (direction 1)
- B3 Holding circuit for A3 (direction 2)

### Reverser Blocks

#### LU2M

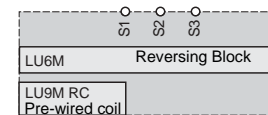


#### LU6M—Control terminal blocks



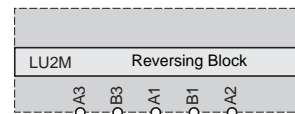
- A1 Forward direction start input (+ Vdc)
- A2 Common input (- Vdc)
- A3 Reverse direction start input (+ Vdc)
- B1 Holding circuit for A1 (direction 1)
- B3 Holding circuit for A3 (direction 2)
- S1 Momentary input to A1 coil terminal on power base
- S2 N.O. holding circuit for A1 to auxiliary contact terminals 13
- S3 N.C. reverser electrical interlock to auxiliary contact terminals 21

#### LU6M with pre-wired connector LU9MRC



- S1 Momentary input to A1 coil
- S2 N.O. holding circuit for A1
- S3 N.C. reverser electrical interlock

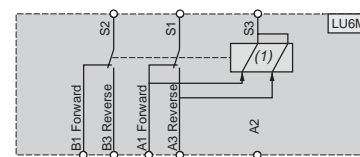
#### Control terminal block



- A1 Forward direction start input (+ Vdc)
- A2 Common input (- Vdc)
- A3 Reverse direction start input (+ Vdc)

- B1 Holding circuit for A1
- B3 Holding circuit for A3

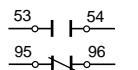
#### LU6M Basic internal scheme



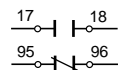
- A1 Forward direction start input (+ Vdc)
- A2 Common input (- Vdc)
- A3 Reverse direction start input (+ Vdc)
- B1 Holding circuit for A1
- B3 Holding circuit for A3
- S1 Momentary input to A1 coil terminal on power base
- S2 N.O. holding circuit for A1 to auxiliary terminals 13
- S3 N.C. reverser electrical interlock to auxiliary terminals 21

### Auxiliary Contact Blocks

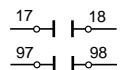
#### LUA1D11



#### LUA1C11

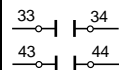


#### LUA1C20

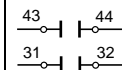


### Auxiliary Contact Function Modules

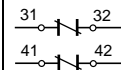
#### LUFN20



#### LUFN11



#### LUFN02



# TeSys® U-Line Motor Starters

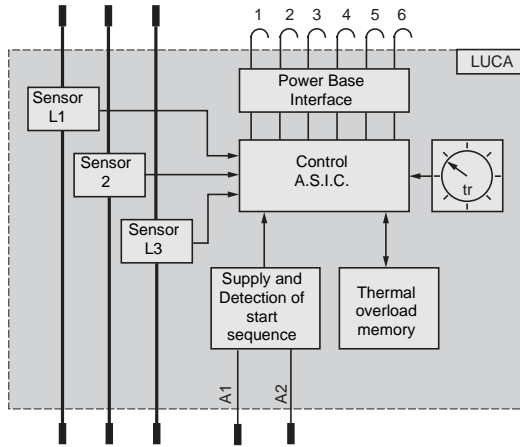
## Dimensions, Mounting, and Schematics

### Control units

For additional wiring information refer to pages 53 - 56.

#### Standard control unit LUCA

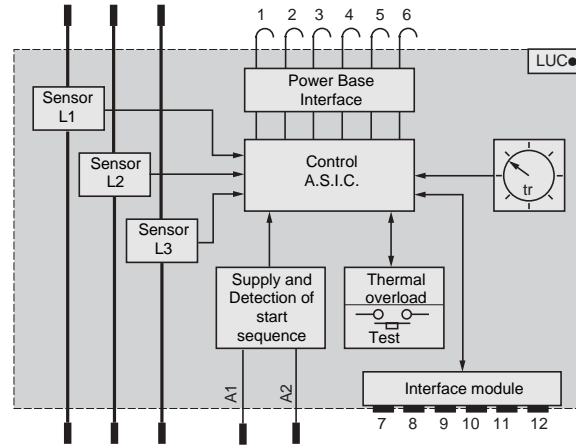
##### Basic internal scheme



- |         |                   |
|---------|-------------------|
| 1 and 2 | Trips             |
| 3 and 4 | Coil bobbin       |
| 5       | Power base rating |
| 6       | N.C.              |

#### Advanced control unit LUCB, LUCC, LUCD

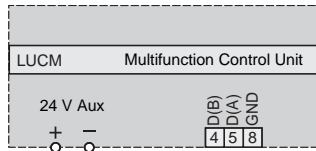
##### Basic internal scheme



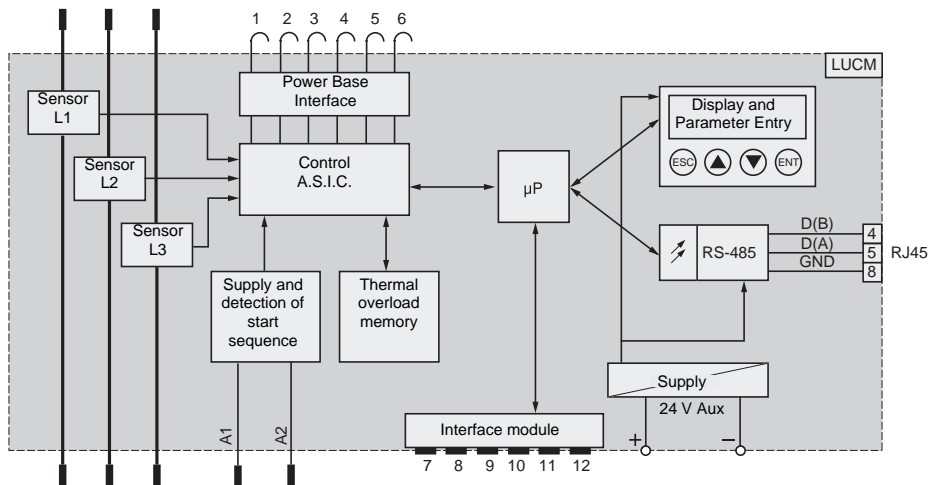
- |         |                   |    |  |
|---------|-------------------|----|--|
| 1 and 2 | Trips             | 8  | Thermal status/Set                           |
| 3 and 4 | Coil bobbin       | 9  | Reset mode/Reset                             |
| 5       | Power base rating | 10 | (Im/Ir) - average current versus FLA setting |
| 6       | N.C.              | 11 | Vc2 - auto-reset signal to function modules  |
| 7       | Ground            | 12 | Vc1 - auxiliary power to function modules    |

#### Multifunction control unit LUCM

##### Control terminal block



##### Basic internal scheme



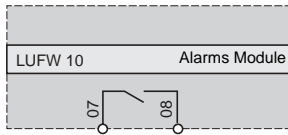
- |         |                   |    |  |
|---------|-------------------|----|--|
| 1 and 2 | Trips             | 8  | N.C.   |
| 3 and 4 | Coil bobbin       | 9  | Ground   |
| 5       | Power base rating | 10 | (Im/Ir) - average current versus FLA setting             |
| 6       | N.C.              | 11 | Rx/Tx - transmit - receive link to communication modules |
| 7       | Ground            | 12 | Vc1 - auxiliary power to function modules                |

# TeSys® U-Line Motor Starters

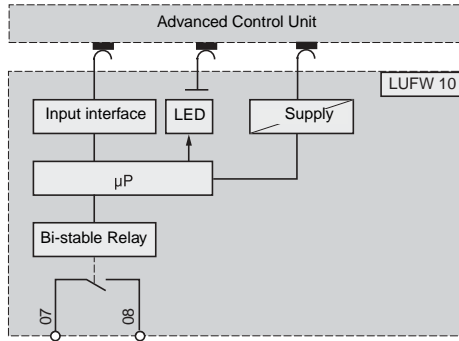
## Dimensions, Mounting, and Schematics

For additional wiring information refer to pages 53 - 56.

### Thermal Overload Pre-Alarm Function Module LUFW10



#### Basic internal scheme

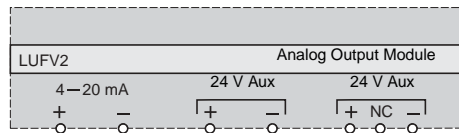


250 Vac, 2A  
24 Vdc, 2 A

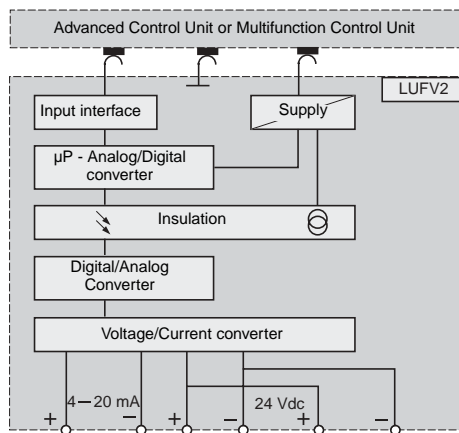
### Motor Load Indication Module

#### LUFV2

4-20 mA output



#### Basic internal scheme



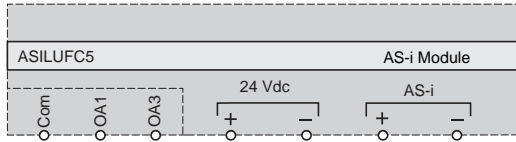
100 Ω < load < 500 Ω 30 Vdc max and 40 mA min

### Communication Modules

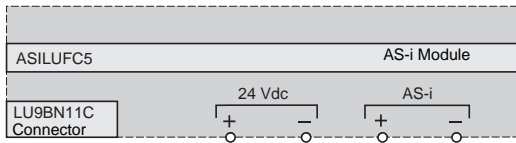
For additional wiring information refer to pages 53 - 56.

#### Communication module ASILUFC5

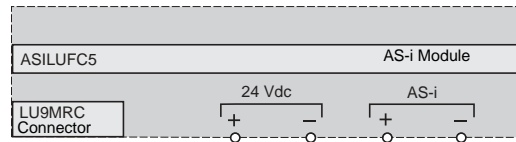
Without pre-wired coil connector



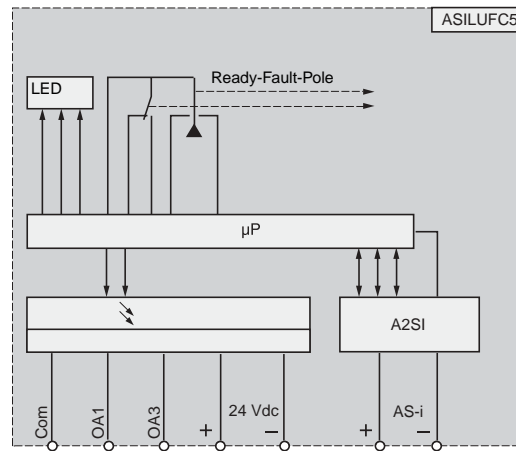
With pre-wired coil connector LU9BN11C



With pre-wired coil connector LU9MRC

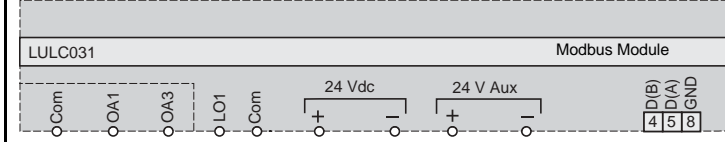


#### Basic Internal Scheme

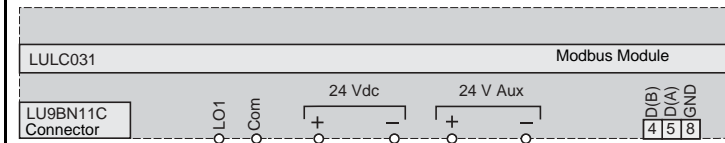


#### Modbus® communication module LULC031

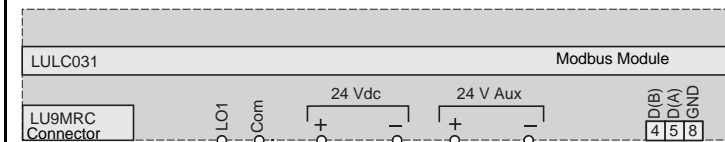
Without pre-wired coil connector



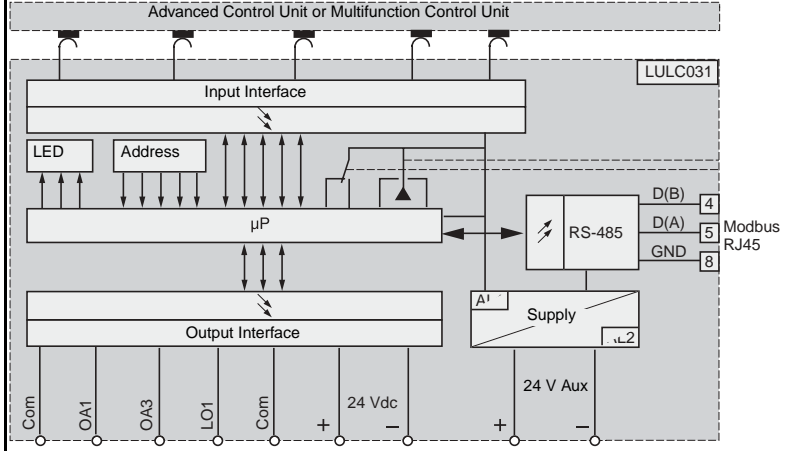
With pre-wired coil connector LU9BN11C



With pre-wired coil connector LU9MRC



#### Basic Internal Scheme



Com Common output (- Vdc)  
 OA1 Forward direction output  
 OA3 Reverse direction output  
 LO1 Programmable output

# TeSys® U-Line Motor Starters

## Dimensions, Mounting, and Schematics

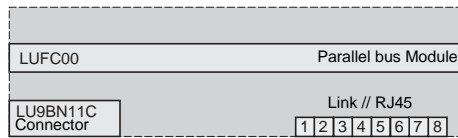
### Communication Modules

#### Parallel wiring module

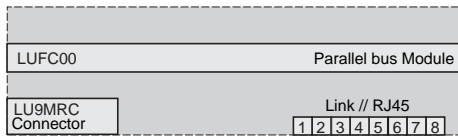
Without pre-wired coil connector



With pre-wired coil connector LU9BN11C



With pre-wired coil connector LU9MRC



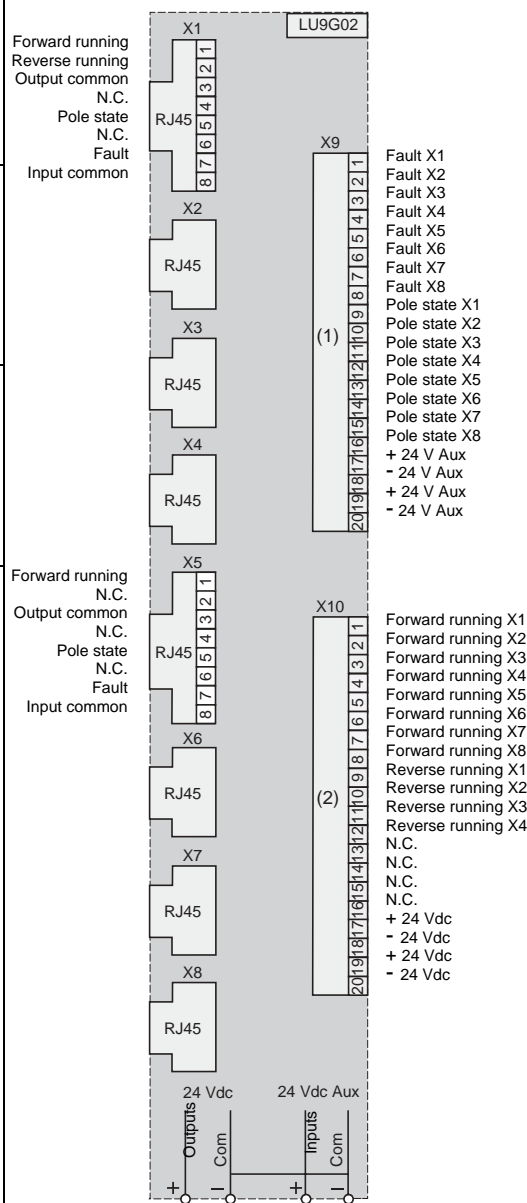
#### Basic scheme



1. Forward running
2. Reverse running
3. Output common
4. Selector in "Ready" position  $\uparrow$
5. Pole state
6. Reserved
7. Fault
8. Input common

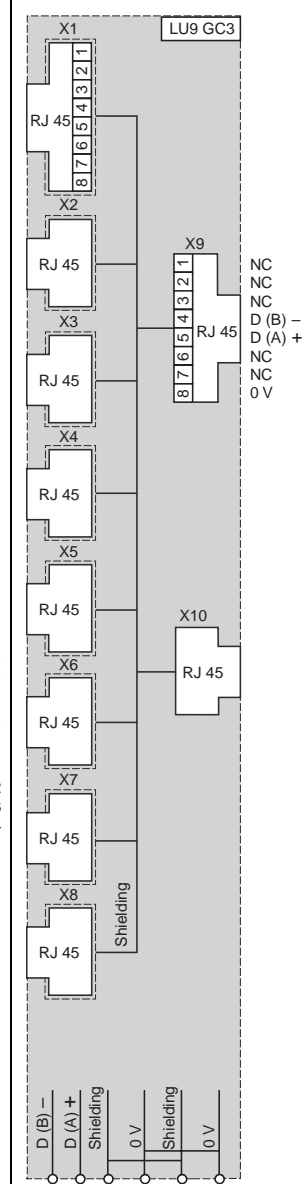
Com Common output (-Vdc)  
 OA1 Forward direction output  
 OA3 Reverse direction output

#### Parallel wiring splitter box LU9G02



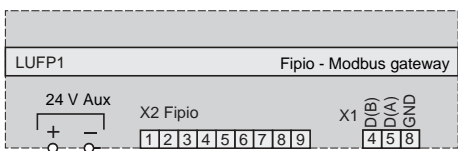
- (1) 20-way HE10 input connector  
 (2) 20-way HE10 output connector

#### Modbus® hub LU9GC3

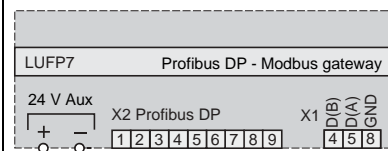


### Gateways

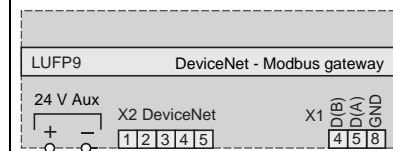
#### LUFPP1



#### LUFPP7



#### LUFPP9



# TeSys® U-Line Motor Starters

## Dimensions, Mounting, and Schematics

| Data Profile under AS-i |  |    |                        | Control Units |          |               |
|-------------------------|--|----|------------------------|---------------|----------|---------------|
| Control Unit            |  |    |                        | Standard      | Advanced | Multifunction |
| Status                  |  | D0 | Ready (available)      | √             | √        | √             |
|                         |  | D1 | Poles closed (running) | √             | √        | √             |
| Commands                |  | D0 | Forward running        | √             | √        | √             |
|                         |  | D1 | Reverse running        | √             | √        | √             |

| Register Addresses Accessible under Modbus® |                           |            |   | Control Units |          |               |
|---|---------------------------|------------|---|---------------|----------|---------------|
| Control Unit                                |                           |            |   | Standard      | Advanced | Multifunction |
| Identification                              | Register 0–Register 99    | Words–Bits | Commercial reference, serial number, software version   | √             | √        | √             |
| Log   | Register 100–Register 450 | Words–Bits | Fault log, operating log, log of last 5 trips   |               |          | √             |
| Status                                      | Register 451–Register 464 | Words–Bits | Alarm signaling (bits), fault signaling (bits)  | √             | √        | √             |
| Values                                      | Register 465–Register 473 | Words      | Irms phase 1, phase 2, phase 3. Motor load, thermal status of ground fault current. Phase imbalance and phase failure |               | √        | √             |
|   | Register 474–Register 599 | Words–Bits | Reserved  |               |          |               |
| Configuration                               | Register 600–Register 699 | Words–Bits | Protection and alarm thresholds, fallback mode and reset mode   |               | √        | √             |
| Commands                                    | Register 700–Register 714 | Words–Bits | Commands  | √             | √        | √             |

|                   |              |                          |                               |   |   |   |
|-------------------|--------------|--------------------------|-------------------------------|---|---|---|
| Status and values | Register 452 | Bit 0                    | Short-circuit fault           |   | √ | √ |
|                   |              | Bit 1                    | Overcurrent fault             |   | √ | √ |
|                   |              | Bit 2                    | Thermal overload fault        |   | √ | √ |
|                   | Register 455 | Bit 0                    | Ready (available)             | √ | √ | √ |
|                   |              | Bit 1                    | Poles closed                  | √ | √ | √ |
|                   |              | Bit 2                    | Fault                         | √ | √ | √ |
|                   |              | Bit 3                    | Alarms                        |   | √ | √ |
|                   |              | Bit 4                    | Tripped ("TRIP" position)     |   |   |   |
|                   |              | Bit 5                    | Fault acknowledgement allowed |   |   | √ |
|                   |              | Bit 6                    | Reserved                      |   |   |   |
|                   |              | Bit 7                    | Motor running                 |   | √ | √ |
|                   |              | Bit 8                    | Motor current % (bit 0)       |   | √ | √ |
|                   |              | Bit 9                    | Motor current % (bit 1)       |   | √ | √ |
|                   |              | Bit 10                   | Motor current % (bit 2)       |   | √ | √ |
|                   |              | Bit 11                   | Motor current % (bit 3)       |   | √ | √ |
|                   |              | Bit 12                   | Motor current % (bit 4)       |   | √ | √ |
|                   |              | Bit 13                   | Motor current % (bit 5)       |   | √ | √ |
|                   |              | Bit 14                   | Reserved                      |   |   |   |
|                   | Bit 15       | Motor starting           |                               |   | √ |   |
|                   | Register 461 | Bit 3                    | Thermal overload alarm        |   | √ | √ |
| Register 465      | Word         | Thermal status value     |                               | √ | √ |   |
| Register 466      | Word         | Motor load value (Im/Ir) |                               | √ | √ |   |

|               |              |   |   |   |   |   |
|---------------|--------------|---|---|---|---|---|
| Configuration | Register 602 | Bit 0                                     | Manual reset on thermal overload fault                                      |   | √ | √ |
|               |              | Bit 1                                     | Remote reset on thermal overload fault                                      |   | √ | √ |
|               |              | Bit 2                                     | Automatic reset on thermal overload fault                                   |   | √ | √ |
|               | Register 682 | Value 0                                   | Fallback mode validation  | √ | √ | √ |
|               |              | Value 1                                   | Outputs OA1 and OA3 unchanged   | √ | √ | √ |
|               |              | Value 2                                   | Outputs OA1 and OA3 forced to 0   | √ | √ | √ |
|               |              | Value 3                                   | Outputs OA1 and OA3 unchanged, signaling existence of communication failure | √ | √ | √ |
| Value 4       |              | Outputs OA1 forced to 1 and OA3 unchanged | √   | √ | √ |   |
|               | Value 5      | Outputs OA3 forced to 1 and OA1 unchanged | √   | √ | √ |   |
| Commands      | Register 700 | Bit 0                                     | LO1 output command  | √ | √ | √ |
|               | Register 704 | Bit 0                                     | OA1 output command  | √ | √ | √ |
|               |              | Bit 1                                     | OA3 output command  | √ | √ | √ |
|               |              | Bit 2                                     | Reserved  |   |   |   |
|               |              | Bit 3                                     | Fault acknowledgement   |   | √ | √ |
|               |              | Bit 4                                     | Reserved  |   |   |   |
|               |              | Bit 5                                     | Trip test   |   | √ | √ |
|               |              | Bit 6–15                                  | Reserved  |   |   |   |

Data Accessible √



## APPLICATION EXAMPLES

### Application

Control and protection of a motor (pump, fan, etc.)

### Operating Conditions

- Power: 5 hp at 480 V
- FLA: 7.5 A
- Class 10 overload protection
- Utilization category: AC-43
- 3-wire control:
  - Start button
  - Stop button
- Control circuit voltage: 120 Vac

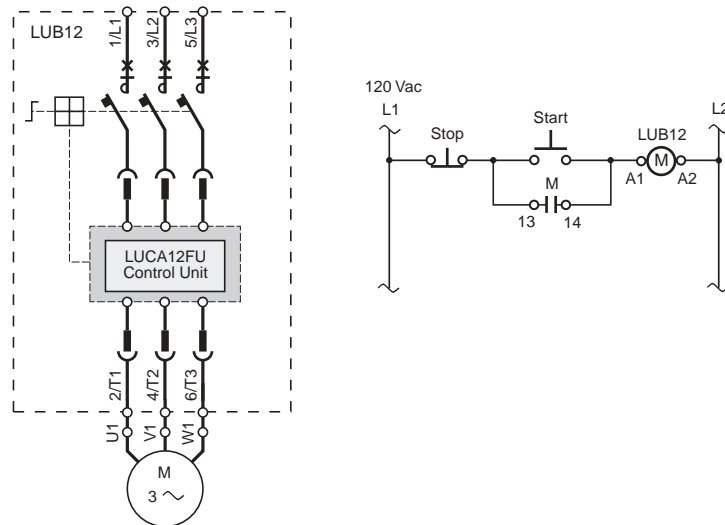
### Functions Performed

- Short-circuit protection with level of protection of 42 kA at 480 V wye (10 kA at 600 V wye).
- Type 2 total coordination of protection devices conforming to EN 60947-6-2 (continuity of service) in case of a short-circuit.
- Electronic protection against thermal overloads with an adjustment current range of 4.
- Load switching (2 million operating cycles in category AC-43).
- Indication of motor status by N.C. or N.O. contact.
- Interlock between the motor starter control and the handle position; not possible to start motor when the handle is in the OFF position.

### Products Used

|  | Item | Quantity | Catalog Number |
|--|------|----------|----------------|
| Power base 12 A with screw clamp control connections | 1    | 1        | LUB12          |
| Standard control unit                                | 2    | 1        | LUCA12FU       |

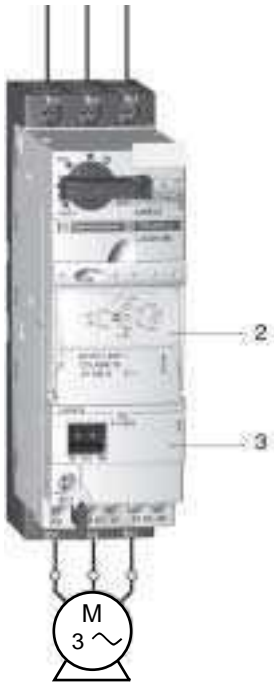
### Wiring Diagram





# TeSys® U-Line Motor Starters

## Application Examples



### Application

Upgrading of an existing installation (from previous page) to meet the operating conditions described below.

### Operating Conditions

Monitor the status of the motor and obtain alarm signaling by an integrated mechanical contact, in order to improve operation of the pump and anticipate any problems.

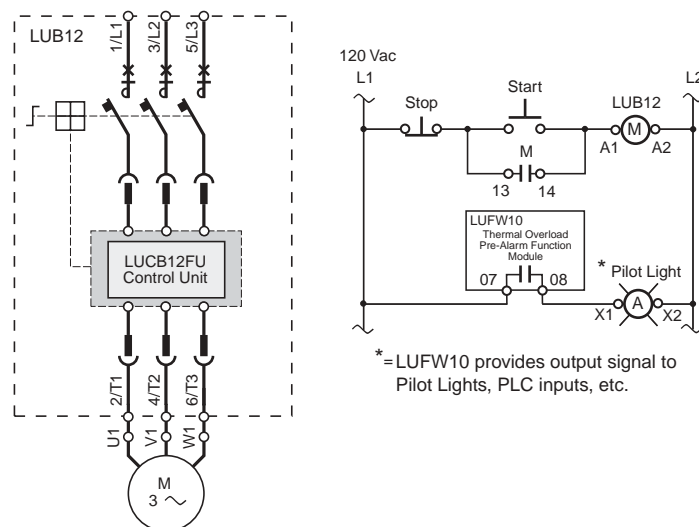
### Functions Performed

Alarm information is generated by the advanced control unit and is processed by the thermal overload pre-alarm function module. The advanced control unit includes a thermal trip test button.

### Products Used

|   | Item | Quantity | Catalog Number |
|---|------|----------|----------------|
| Replace the standard control unit with an advanced control unit and insert a thermal alarm function module. |      |          |                |
| Advanced control unit   | 2    | 1        | LUCB12FU       |
| Thermal overload pre-alarm function module  | 3    | 1        | LUFW10         |

### Wiring Diagrams



### Other Functions

The advanced control unit provides other functions depending on the type of function modules used (instead of the LUFW10 module described above):

- fault differentiation with function module LUFDA10 or LUFDH20,
- indication of motor load with function modules LUFV which delivers a 0–10 V or 4–20 mA, analog signal which is proportional to the average 3-phase current drawn by the motor. Can be used with a customer provided analog ammeter. Allows the load current to be monitored and provides access to other application functions using this value, or allows predictive or preventive maintenance information (replacement of the motor before it breaks down).

# TeSys® U-Line Motor Starters

## Application Examples



### Application

Control and protection of a packing machine conveyor belt.

### Operating Conditions

- Power: 0.5 hp at 480 V
- FLA: 1.0 A
- Utilization category: AC-43
- Two wire control
  - Maintained emergency stop push button
  - Limit switch
- Control circuit voltage: 24 Vdc
- Control and command by the AS-i wiring system.

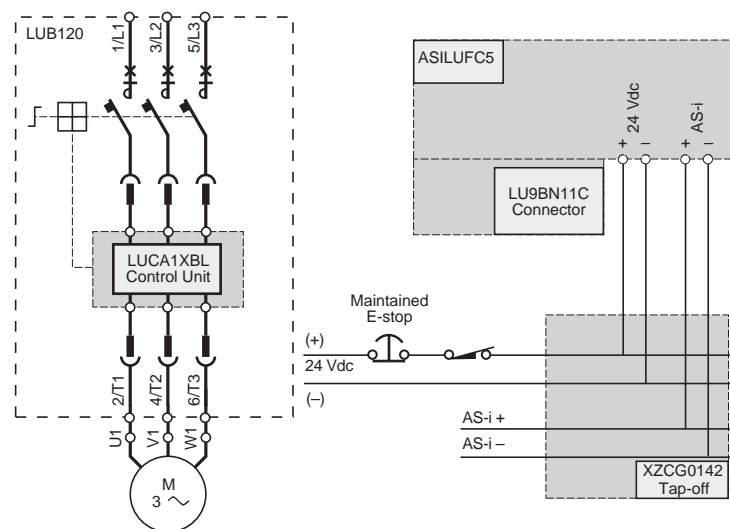
### Functions Performed

- Short-circuit protection with level of protection of 42 kA at 480 V delta.
- Total coordination of protection devices conforming to IEC/EN 60947-6-2 (continuity of service) in the event of a short-circuit.
- Solid-state protection against thermal overloads with an adjustment current range of 4.
- Load switching (2 million operating cycles in category AC-43).
- Motor status signaling by N.C. or N.O. contact
- Interlock between the motor starter control and the handle position; not possible to start motor when the handle is in the OFF position.
- Start/Stop commands and Ready, Run and Stop motor states are transmitted by the bus. The AS-i 7.DE profile of the new AS-i V2 protocol, implemented in the starter-controller, ensures total compatibility with that of the LF enclosed starter range.
- Indication of module operation and communication status by 2 LEDs on the front panel of the communication module.
- Addressing of the module is achieved via an infrared link, using adjustment console ASITERV2 or console XZMC11. Using pre-wired terminal block LU9BN11C avoids having to wire the control connections. However, easy access to the control connector on the front panel of the starter allows any control scheme required by the user to be included in the line (local controls, emergency stop, safety contact.)

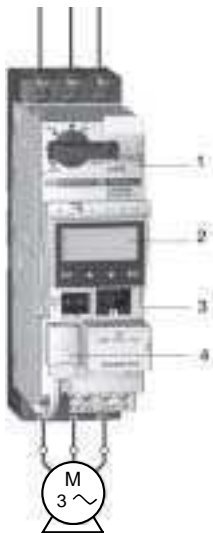
### Products Used

|   | Item | Quantity | Catalog Number  |
|---|------|----------|-----------------|
| <b>Power base</b> 12 A without screw clamp control terminals  | 1    | 1        | <b>LUB120</b>   |
| <b>Standard control unit</b>  | 2    | 1        | <b>LUCA1XBL</b> |
| <b>AS-i communication module</b>  | 3    | 1        | <b>ASILUF5</b>  |
| <b>Tap-off</b> for connecting the communication module to the serial bus  | –    | 1        | <b>XZCG0142</b> |
| <b>Pre-wired coil connector</b> for connecting the AS-i communication module output terminals to the power base coil terminals. | 4    | 1        | <b>LU9BN11C</b> |
| <b>Adjustment console</b> , infrared  | –    | 1        | <b>ASITERV2</b> |

### Wiring Diagrams



# TeSys® U-Line Motor Starters Application Examples



## Application

Monitoring operation of a surface pump in a water treatment plant to avoid running empty which could lead to destruction of the pump.

## Operating Conditions

- Power: 20 hp at 480 V
- FLA: 27 A
- Utilization category: AC-43
- Control circuit voltage: 24 Vdc
- Control-command by PLC and serial link using Modbus® network.

## Functions Performed

- Short-circuit protection with level of protection of 42 kA at 480 V wye.
- Total coordination of protection devices conforming to IEC/EN 60947-6-2 (continuity of service) in the case of a short-circuit.
- Electronic protection against thermal overloads with an adjustment current range of 4.
- Load switching (2 million operating cycles in category AC-43 at In).
- Measurement of load current and undercurrent detection by the multifunction control unit.
- Interlock between the motor starter control and the handle position; not possible to start motor when the handle is in the OFF position.
- No load or underload. To use this function, the following parameters must be entered:
  - trip: enable or disable underload protection,
  - time before tripping: the time period during which the value of the current must be below the tripping threshold in order to cause tripping (adjustable from 1 to 200 s),
  - tripping threshold: value as a percent of the load current ratio in relation to the setting current. If the ratio remains below this threshold for the time specified in the previous parameter, the product trips (adjustable from 30 to 100 %).
- Indication of the various motor starter states and currents.

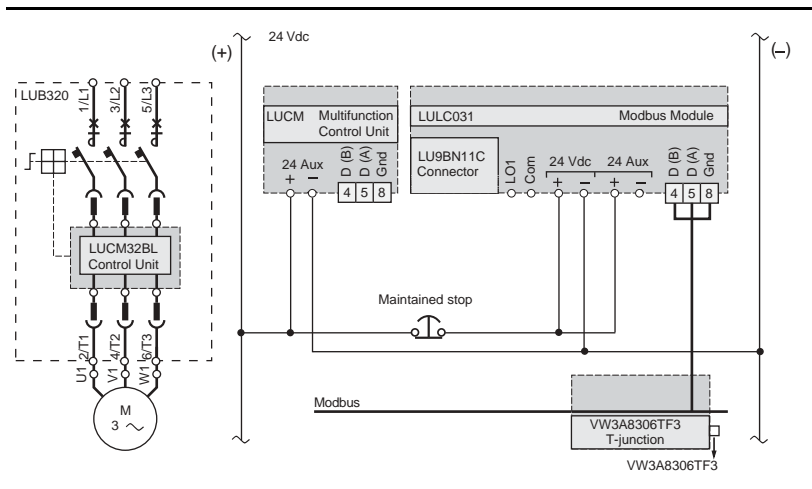
## Products Used

|  | Item | Quantity | Catalog Number     |
|--|------|----------|--------------------|
| <b>Power base</b> 32 A without screw clamp control connections   | 1    | 1        | <b>LUB320</b>      |
| <b>Multifunction control unit</b>  | 2    | 1        | <b>LUCM32BL</b>    |
| <b>ModBus communication module</b>   | 3    | 1        | <b>LULC031</b>     |
| <b>Pre-wired coil connector</b> for connecting the communication module output terminals to the coil terminals | 4    | 1        | <b>LU9BN11C</b>    |
| <b>T-junction</b> for connection from communication module   | -    | 1        | <b>VW3A8306TF3</b> |
| <b>RS-485 line terminator</b> required at end of modbus serial bus   | -    | 1        | <b>VW3A8306RC</b>  |

## Modbus profile IEC 64915

| Commands (Register 704) | Bit    | Status (Register 455)   |
|-------------------------|--------|-------------------------|
| Forward running         | Bit 0  | Ready (available)       |
| Reverse running         | Bit 1  | Poles closed            |
| Reserved                | Bit 2  | Fault                   |
| Reset                   | Bit 3  | Alarms                  |
| Reserved                | Bit 4  | Reserved                |
| Connection test         | Bit 5  | Reserved                |
| Reserved                | Bit 6  | Reserved                |
| Reserved                | Bit 7  | Motor running           |
| Reserved                | Bit 8  | Motor current % (bit 0) |
| Reserved                | Bit 9  | Motor current % (bit 1) |
| Reserved                | Bit 10 | Motor current % (bit 2) |
| Reserved                | Bit 11 | Motor current % (bit 3) |
| Reserved                | Bit 12 | Motor current % (bit 4) |
| Reserved                | Bit 13 | Motor current % (bit 5) |
| Reserved                | Bit 14 | Reserved                |
| Reserved                | Bit 15 | Motor starting          |

## Wiring Diagram



# TeSys® U-Line Motor Starters

## Application Examples



### Application

Control and protection of a reversing motor (Example: 2-position turntable).

### Operating Conditions

- Power: 5 hp at 480 V
- FLA: 7.5 A
- Maximum of 1 class 10 start per minute
- Utilization category: AC-43
- 3-wire control:
- Push button for Forward (start direction)
- Push button for Reverse (start direction)
- Push button for emergency stop
- Stopping at the positions is achieved by limit switches.
- Control circuit voltage: 120 Vac

### Functions Performed

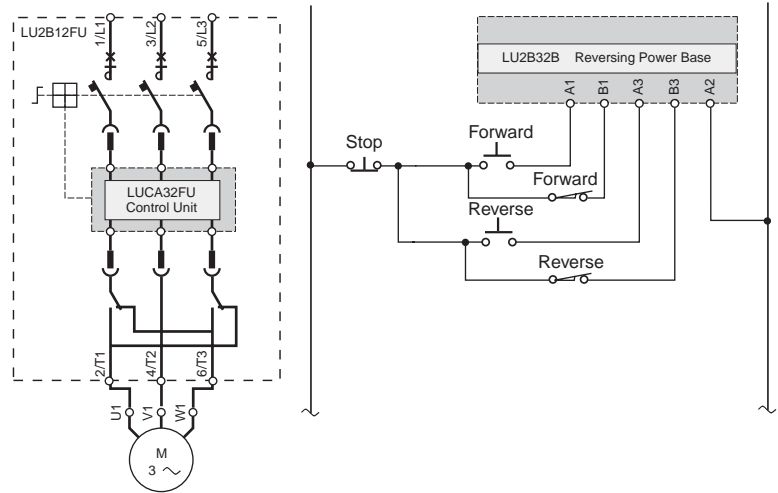
- Short-circuit protection with level of protection of 42 kA at 480 Vac.
- Total coordination of protection devices conforming to IEC/EN 60947-6-2 (continuity of service) in the case of a short-circuit.
- Electronic protection against thermal overloads with an adjustment current range of 4.
- Load switching (2 million operating cycles in category AC-43 at In).
- Motor status signaling by N.C. or N.O. contact
- Interlock between the motor starter control and the handle position: not possible to start the motor when the handle is in the OFF position.

Electrical interlocking is ensured by prewiring block LU9MRC (included on power base LU2B12). The design of the reversing power block makes mechanical interlocking unnecessary.

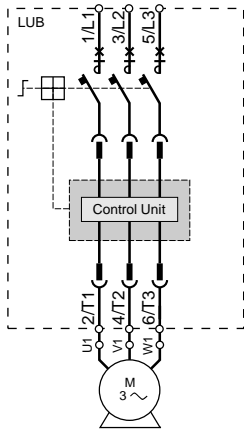
### Products Used

|  | Item | Quantity | Catalog Number |
|--|------|----------|----------------|
| Power base, reversing, 12 A with screw clamp control connections | 1    | 1        | LU2B12FU       |
| Standard control unit  | 2    | 1        | LUCA32FU       |

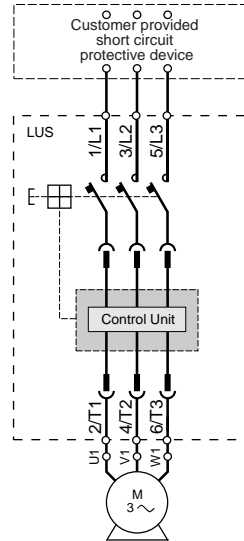
### Wiring Diagram



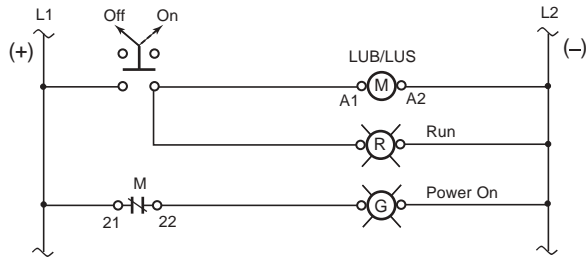
### Non-Reversing Power Base LUB



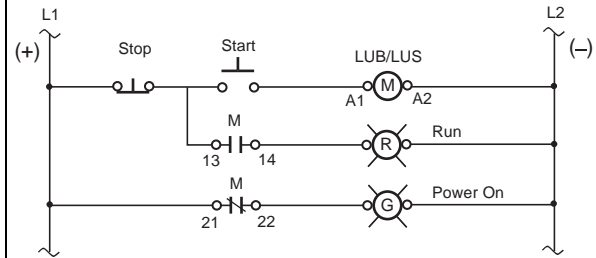
### Non-Reversing Power Base LUS



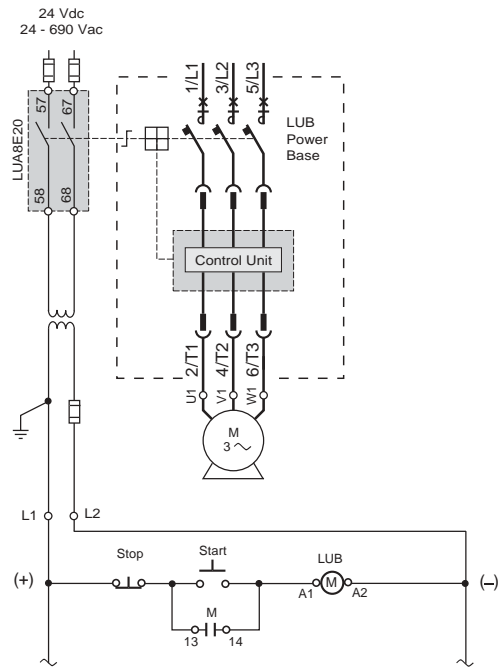
### LUB/LUS 2-Wire Control, with 2-Position Selector Switch



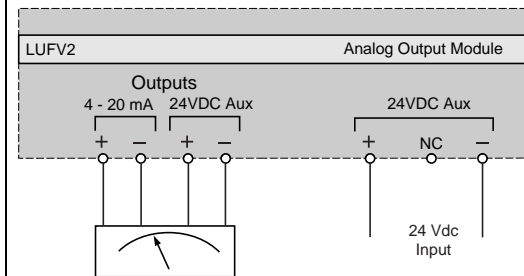
### LUB/LUS 3-Wire Control, Momentary Start Push Button with Holding Contact



### Control Circuit Contact Block LUA8E20 + Power Bases LUB or LUB2



### Motor Load Indicator Module LUFV2



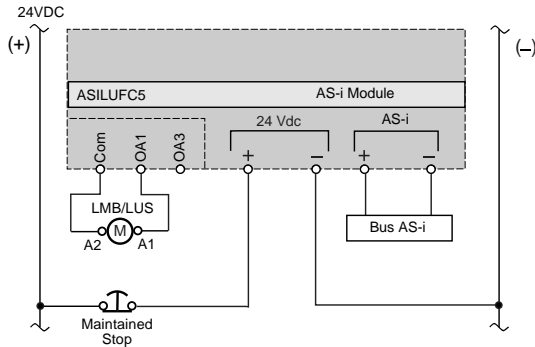
# TeSys® U-Line Motor Starters

## Application Examples

### Non-Reversing Power Bases LUB, LUS (continued)

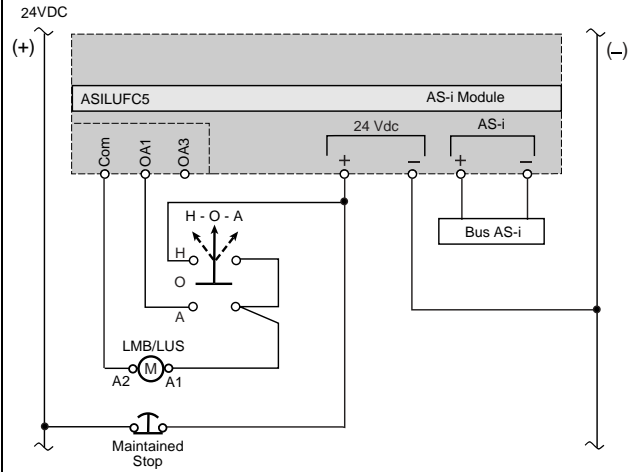
#### Control via AS-i Communication Module ASILUFC5

Without pre-wired coil connector  
With emergency stop



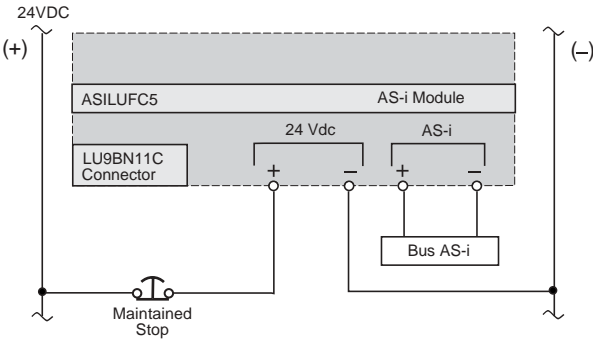
#### Control via AS-i Communication Module ASILUFC5

Without pre-wired coil connector  
With emergency stop and hand-off auto control



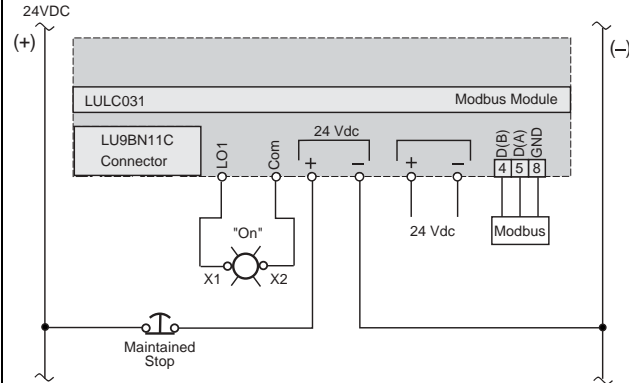
#### Control via AS-i Communication Module ASILUFC5

With pre-wired coil connector LU9BN11C  
With emergency stop



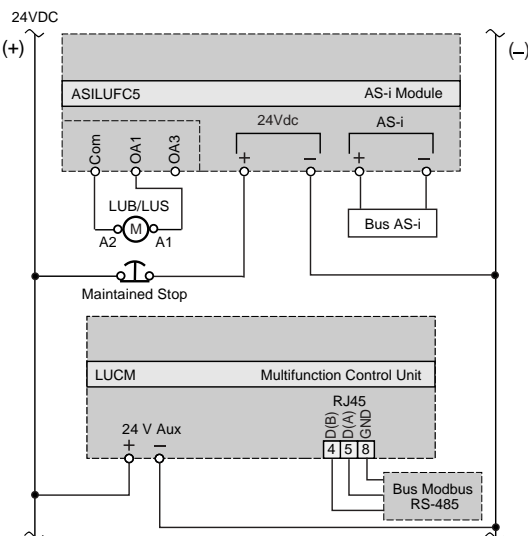
#### Control via Modbus® Communication Module LULC031

With pre-wired coil connector LU9BN11C  
With general emergency stop, local emergency stop and local control



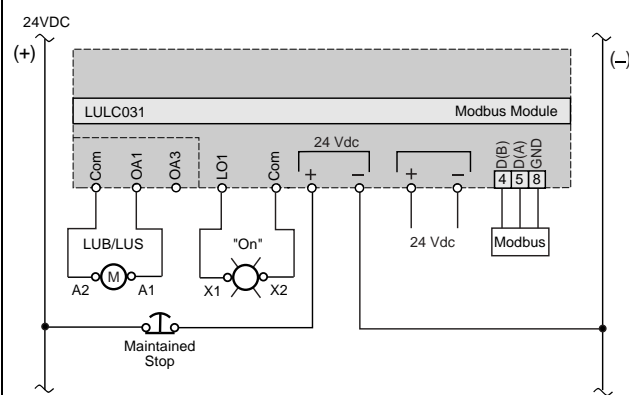
#### Control via AS-i Communication Module ASILUFC5

Without pre-wired coil connector  
With emergency stop and multifunction control unit LUCM

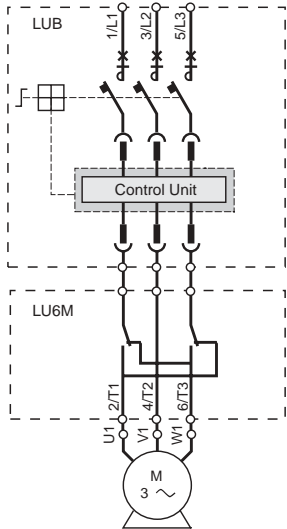


#### Control via Modbus Communication Module LULC031

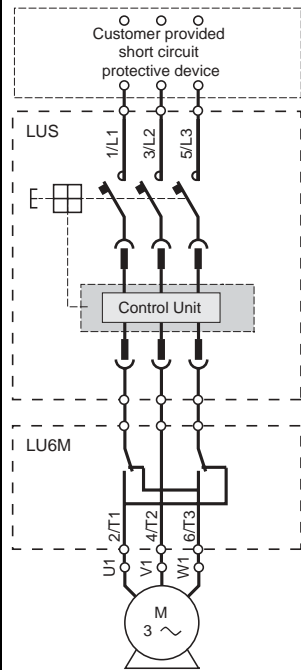
With pre-wired coil connector LU9BN11C  
With emergency stop



**Power Bases LUB + Reversing Block LU6M**

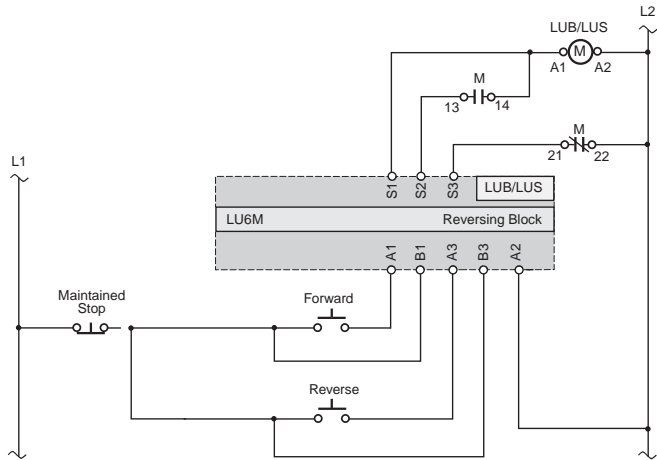


**Power Base LUS + Reversing Block LU6M**



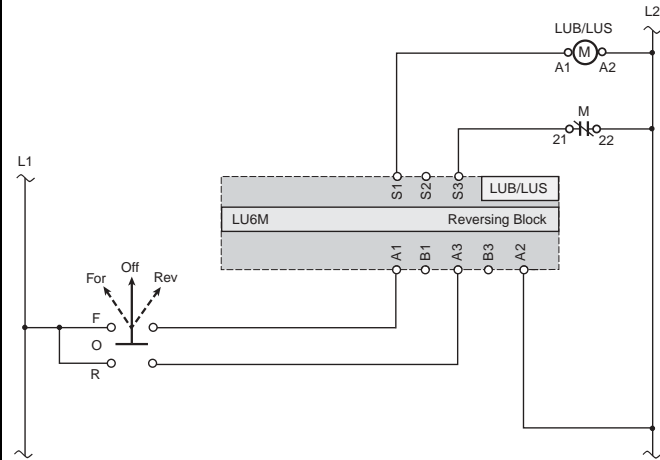
**LUB/LUS + LU6M**

**3-wire control, momentary start push button with holding contact**



**LUB/LUS + LU6M**

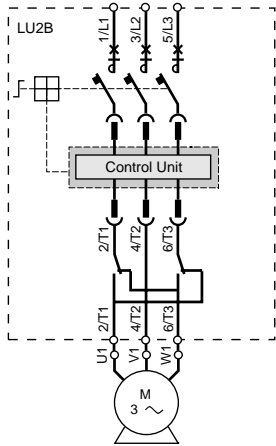
**2-wire control with 3-position "forward-stop-reverse" switch**



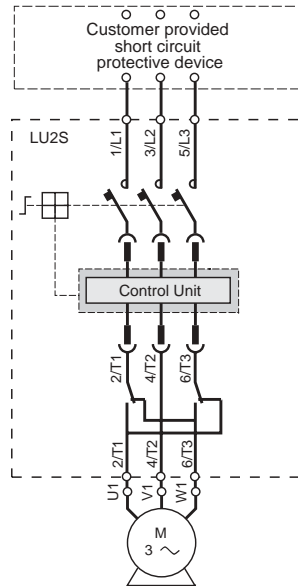
# TeSys® U-Line Motor Starters

## Application Examples

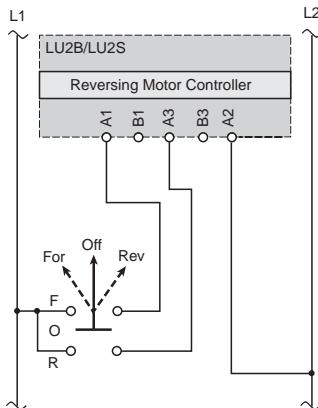
### Reversing Power Bases LU2B



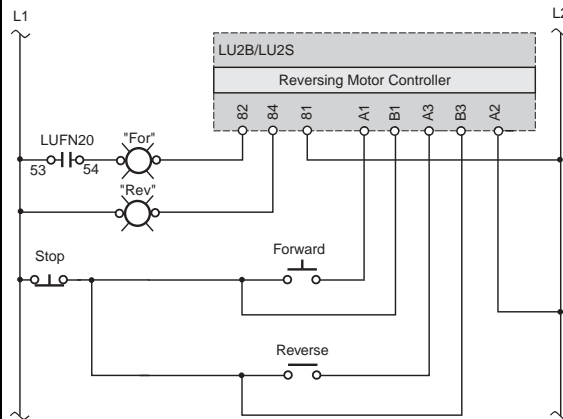
### Reversing LU2S



### LU2B/LU2S 2-wire control via 3-position switch

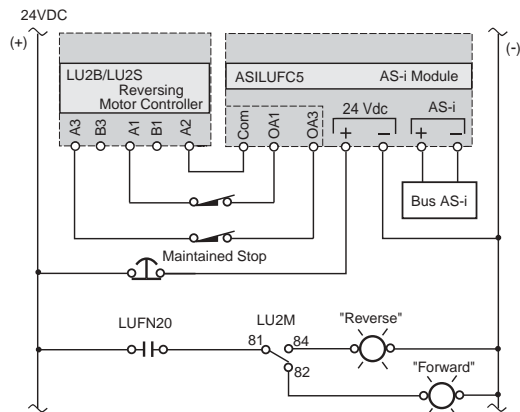


### LU2B/LU2S 3-wire control, momentary start push buttons



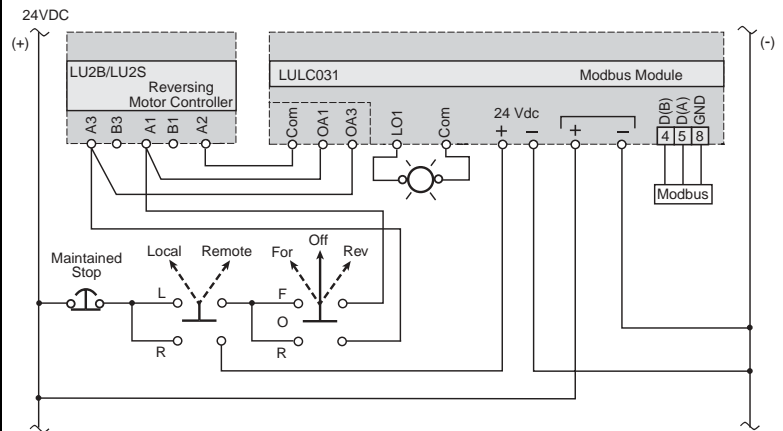
### Control via communication module ASILUFC5

Without pre-wired coil connection  
With emergency stop, running direction pilot lights and limit switches



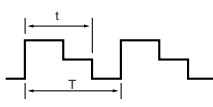
### Control via Modbus® communication module LULC031

Without pre-wired coil connection  
With emergency stop and local remote switch, "forward-off-reverse" switch and pilot light





**TERMS AND DEFINITIONS**

|  |   |                        |                        |                        |                        |
|--|---|------------------------|------------------------|------------------------|------------------------|
| <b>Altitude</b>  | The low oxygen atmosphere at high altitudes reduces the dielectric strength of the air and hence the rated operational voltage of the contactor. It also reduces the cooling effect of the air and hence the rated operational current of the contactor (unless the temperature drops at the same time).<br>No derating is necessary up to 3000 m (9,840 ft.). Derating factors to be applied above this altitude for main pole operational voltage and current (AC supply) are as follows. |                        |                        |                        |                        |
|  | Altitude  | 3500 m<br>(11,480 ft.) | 4000 m<br>(13,120 ft.) | 4500 m<br>(14,760 ft.) | 5000 m<br>(16,400 ft.) |
|  | Rated operational voltage   | 0.90                   | 0.80                   | 0.70                   | 0.60                   |
|  | Rated operational current   | 0.92                   | 0.90                   | 0.88                   | 0.86                   |
| <b>Ambient air temperature</b>                               | The temperature of the air surrounding the device, measured near to the device. The operating characteristics are given:<br>• with no restriction for temperatures between -5 and +55 °C (+23 and +131 °F)<br>• with restrictions, if necessary, for temperatures between -50 and +70 °C (-58 and +149 °F)  |                        |                        |                        |                        |
| <b>Rated operational current (Ie)</b>                        | This is defined taking into account the rated operational voltage, operating rate and duty, utilization category and ambient temperature around the device.   |                        |                        |                        |                        |
| <b>Rated conventional thermal current (Ith) <sup>1</sup></b> | The current which a closed contactor can sustain for a minimum of 8 hours without its temperature rise exceeding the limits given in the standards.   |                        |                        |                        |                        |
| <b>Permissible short time rating</b>                         | The current which a closed contactor can sustain for a short time after a period of no load, without dangerous overheating.   |                        |                        |                        |                        |
| <b>Rated operational voltage (Ue)</b>                        | The voltage value which, in conjunction with the rated operational current, determines the use of the contactor or starter, and on which the corresponding tests and the utilization category are based. For three-phase circuits it is expressed as the voltage between phases. Apart from exceptional cases such as rotor short-circuiting, the rated operational voltage $U_e$ is less than or equal to the rated insulation voltage $U_i$ .   |                        |                        |                        |                        |
| <b>Rated control circuit voltage (Uc)</b>                    | The rated value of the control circuit voltage, on which the operating characteristics are based. For AC applications, the values are given for a near sinusoidal wave form (less than 5% total harmonic distortion).   |                        |                        |                        |                        |
| <b>Rated insulation voltage (Ui)</b>                         | The voltage value used to define the insulation characteristics of a device and referred to in dielectric tests determining leakage paths and creepage distances. As the specifications are not identical for all standards, the rated value given for each of them is not necessarily the same.  |                        |                        |                        |                        |
| <b>Rated impulse withstand voltage (Uimp)</b>                | The peak value of a voltage surge which the device is able to withstand without breaking down.  |                        |                        |                        |                        |
| <b>Rated operational power (expressed in kW)</b>             | The rated power of the standard motor which can be switched by the contactor, at the stated operational voltage.  |                        |                        |                        |                        |
| <b>Rated breaking capacity <sup>2</sup></b>                  | The current value which the contactor can break in accordance with the breaking conditions specified in the IEC standard.   |                        |                        |                        |                        |
| <b>Rated making capacity <sup>2</sup></b>                    | The current value which the contactor can make in accordance with the making conditions specified in the IEC standard.  |                        |                        |                        |                        |
| <b>On-load factor (m)</b>                                    | <p>The ratio between the time the current flows (t) and the duration of the cycle (T)</p> $m = \frac{t}{T}$  <p>Cycle duration: duration of current flow + time at zero current</p>   |                        |                        |                        |                        |
| <b>Pole impedance</b>  | The impedance of one pole is the sum of the impedance of all the circuit components between the input terminal and the output terminal. The impedance comprises a resistive component (R) and an inductive component ( $X=L\omega$ ). The total impedance therefore depends on the frequency and is normally given for 50 Hz. This average value is given for the pole at its rated operational current.  |                        |                        |                        |                        |
| <b>Electrical durability</b>                                 | The average number of on-load operating cycles which the main pole contacts can perform without maintenance. The electrical durability depends on the utilization category, the rated operational current and the rated operational voltage.  |                        |                        |                        |                        |
| <b>Mechanical durability</b>                                 | The average number of on-load operating cycles (i.e. with zero current flow through the main poles) which the contactor can perform without mechanical failure  |                        |                        |                        |                        |

<sup>1</sup> Conventional thermal current, in free air, conforming to IEC standards.

<sup>2</sup> For AC applications, the breaking and making capacities are expressed by the rms value of the symmetrical component of the short-circuit current. Taking into account the maximum asymmetry which may exist in the circuit, the contacts therefore have to withstand a peak asymmetrical current which may be twice the rms symmetrical component.

NOTE: These definitions are extracted from standard IEC 60947-1.

# TeSys® U-Line Motor Starters

# TeSys® U-Line Motor Starter

## INDEX

### Numerics

490NAD91103 35  
490NAD91104 35

### A

ABFH20H100 29  
ABFH20H200 29  
ABFH20H300 29  
AK5JB144 36  
AK5PC13 36  
AK5PC33 36  
AK5PC33L 36  
ASILUFC5 30, 50  
ASITERV2 31, 50

### G

GV1G09 36  
GV1G10 36  
GV2G245 36  
GV2G254 36  
GV2G345 36  
GV2G354 36  
GV2G445 36  
GV2G454 36  
GV2G554 36

### L

LAD90 37  
LU2B12 15  
LU2B12FU 52  
LU2B32 15  
LU2BA0 15  
LU2BB0 15  
LU2MB0 15  
LU2S12 15  
LU2S32 15  
LU2SA0 15  
LU2SB0 15  
LU6MB0 15  
LU9AP00 37  
LU9AP11 37  
LU9AP12 37  
LU9BC11 26  
LU9BC20 26  
LU9BD11 26  
LU9BN11 14  
LU9BN11C 29, 31, 33, 50,  
51  
LU9C1 27  
LU9C2 26  
LU9CD1 21, 31, 33, 35  
LU9G02 29  
LU9GC3 33  
LU9M1 15  
LU9MR1 15  
LU9MR1C 15  
LU9MRC 29, 31, 33  
LU9R03 29  
LU9R10 29  
LU9R30 29  
LU9SP0 37  
LUA1C11 26

LUA1C110 26  
LUA1C20 26  
LUA1C200 26  
LUA8E20 26  
LUALB1 37  
LUALF1 37  
LUB12 14, 48  
LUB120 14, 50  
LUB32 14  
LUB320 14, 51  
LUCA05 20  
LUCA12 20  
LUCA12FU 48  
LUCA18 20  
LUCA1X 20  
LUCA1XBL 50  
LUCA32 20  
LUCA32FU 52  
LUCAX6 20  
LUCB05 20  
LUCB12 20  
LUCB12FU 49  
LUCB18 20  
LUCB1X 20  
LUCB32 20  
LUCBX6 20  
LUCC05 20  
LUCC12 20  
LUCC18 20  
LUCC1X 20  
LUCC32 20  
LUCCX6 20  
LUCD05 20  
LUCD12 20  
LUCD18 20  
LUCD1X 20  
LUCD32 20  
LUCDX6 20  
LUCM05BL 21  
LUCM12BL 21  
LUCM18BL 21  
LUCM1XBL 21  
LUCM32BL 21, 51  
LUCMX6BL 21  
LUFDA10 27  
LUFDH20 27  
LUFN02 27  
LUFN11 27  
LUFN20 27  
LUFP1 35  
LUFP7 35  
LUFP9 35  
LUFW10 27, 49  
LULC031 32, 51  
LUS12 14  
LUS120 14  
LUS32 14  
LUS320 14

### T

TSXCDP053 29  
TSXCDP103 29  
TSXCDP203 29  
TSXCDP301 29

TSXCDP303 29  
TSXCDP501 29  
TSXCDP503 29  
TSXFPACC12 35

### V

VW3A8306D30 35  
VW3A8306R03 33, 35  
VW3A8306R10 33, 35  
VW3A8306R30 33, 35  
VW3A8306RC 33, 51  
VW3A8306TF03 33  
VW3A8306TF10 33  
VW3A8306TF3 51

### X

XBTNU400 21  
XBTZ938 21  
XZCG0142 31, 50  
XZMC11US 31  
XZMG12US 31

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**09/2004**