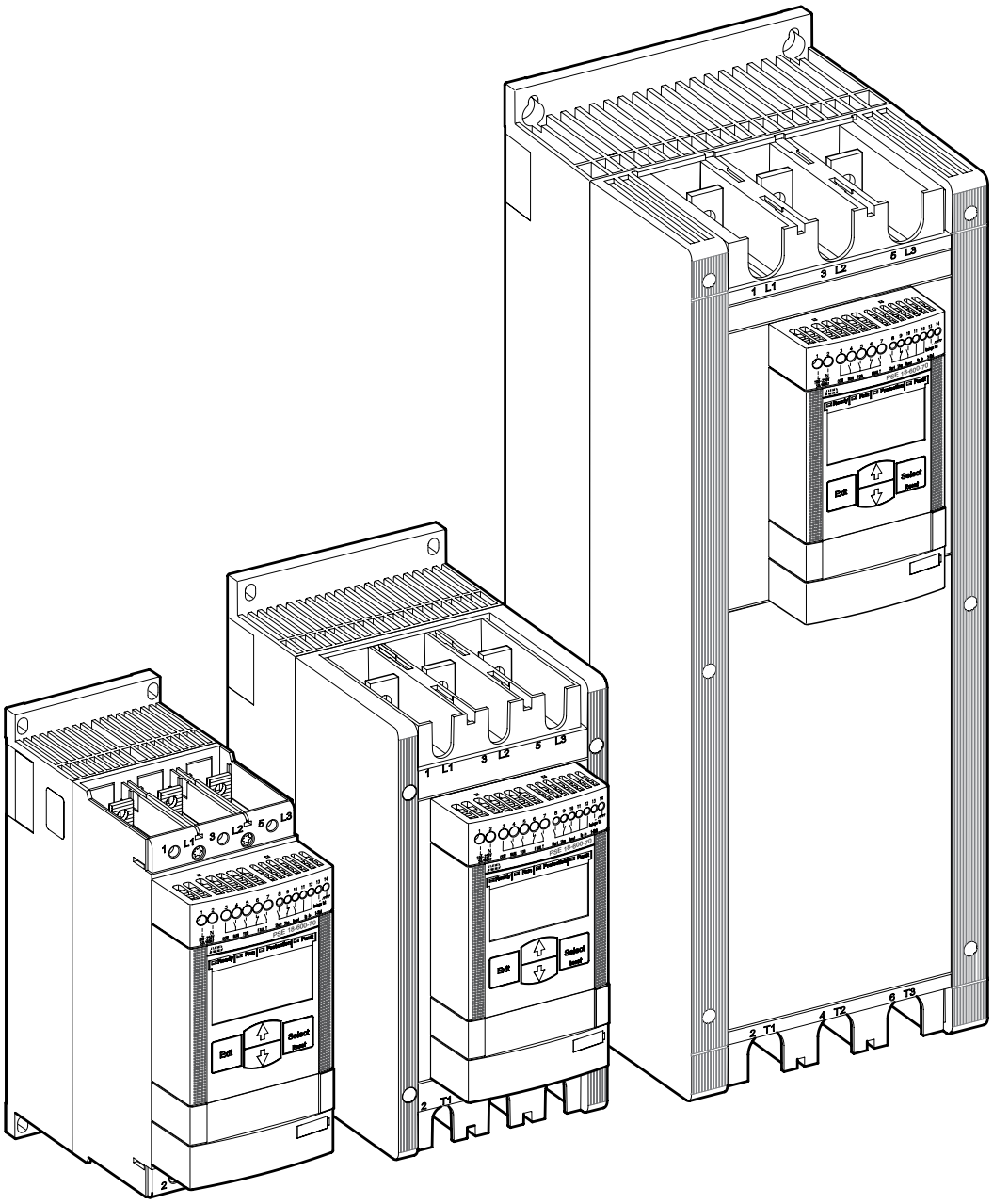
Softstarters Type PSE18...PSE370
Installation and commissioning manual



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This manual belongs to:

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Installation and Commissioning Manual

ABB Softstarters PSE18...PSE370

1 General

This is the Installation and Commissioning Manual for Softstarters Type PSE18… PSE370 based on software version 01.01.02.

Document number: 1SFC132057M0201

Revision: D

Issue date: 2011-10-03

Data subject to change without notice.

This document has been carefully checked. If the user nevertheless detects any errors, he is kindly asked to notify us as soon as possible.

The data contained in this manual is intended solely for the product description and is not to be deemed to be a statement of guaranteed properties. In the interests of our customers, we constantly seek to ensure that our products are developed to the latest technological standards.

As a result, there may be some differences between the softstarter and the information in this manual.

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2 Safety

This chapter describes warning and information signs used in this manual, which the user should pay attention to.
The softstarter shall be installed by authorized personnel only.
This manual is a part of the PSE Softstarter and should always be accessible to personnel working with this product.
The manual shall always be read through before performing any installation or commissioning tasks.

2.1 Use of signs caution, warning and information

Caution!
Caution icon indicates the presence of a hazard which could result in personal injury.

Warning!
Warning icon indicates the presence of a hazard which could result in damage to equipment or property.

Information
I*nformation sign alerts the reader to pertinent facts and conditions.*

Chapter

Notes

Chapter 1 Introduction

Chapter 1 Introduction

1.1 Documentation for PSE18...PSE370 softstarter

For the Softstarter Type PSE18...PSE370, the following manuals are available:

1SFC132059M9901 (User manual short form, printed)
1SFC132057M0201 (English version, PDF-file)

In the future, the following documents will be available as PDF-files:

1SFC132057M3401 (Swedish)
1SFC132057M0101 (German)
1SFC132057M0301 (French)
1SFC132057M0901 (Italian)
1SFC132057M0701 (Spanish)
1SFC132057M1601 (Portuguese)
1SFC132057M3101 (Dutch)
1SFC132057M4001 (Polish)
1SFC132057M1101 (Russian)
1SFC132057M1801 (Finnish)
1SFC132057M1901 (Turkish)
1SFC132057M1301 (Arabic)
1SFC132057M2001 (Chinese)

Please check: *www.abb.com/lowvoltage/.* On this site select the link Control Products and then continue to Softstarters.

1.2 Installation and Commissioning Manual

This manual contains instructions on how to install, commission and maintain the softstarter. The manual covers procedures for mechanical and electrical installation, and installation of communication devices. It also covers energizing, setting, and configuration and verifying settings.

For brief information see Softstarters Type PSE18...PSE370 User Manual short form, containing the same languages as the Installation and Commissioning Manual. Softstarters Type PSE18...PSE370 User Manual short form has document ID 1SFC132059M9901.

For quickest possible start, read Chapter 2 Quickstart or go to the short form manual (1SFC132059M9901).

A complete compilation of ABB's softstarters can be found in Main catalogue Softstarters, document ID 1SFC132005C0201.

1.2.1 Intended audience

1.2.1.1 General

The installation and commissioning manual is intended for the installation, commissioning, and maintenance personnel responsible for getting the softstarter into normal service and out of service.

1.2.1.2 Requirements

The installation personnel must have a basic knowledge in handling electric equipment. The commissioning and maintenance personnel must be well experienced in using this kind of equipment.

1.2.2 Revision notes and other documents

For latest information on revisions and other documents related to the PSE Softstarters, please check *www.abb.com/lowvoltage/.* On this site select the link Control Products and then continue to Softstarters.

1.2.3 Acronyms and abbreviations

The acronyms and abbreviations described in table 1.1 are used in this manual.

Table 1.1

Acronym/ abbre-viation	Description
BP	By-pass
DOL	Direct-on-line
EOL	Electronic overload protection for the Motor
FB	Fieldbus
FBP	FieldBusPlug
HMI	Human-Machine Interface
I_e	Rated operational current
IT	Information Technology
LCD	Liquid Crystal Display
LED	Light Emitting Diode
PCB	Printed Circuit Board
PLC	Programmable Logic Controller
PTC	Positive Temperature Coefficient
SC	Short Circuit
SCR	Silicon Controlled Rectifier (thyristor)
TOR	Top of Ramp (full voltage/Full-On)
U_C	Rated control circuit voltage *
U_e	Rated operational voltage *
U_S	Rated control supply voltage *

*) For definition see IEC 60947-1 edition 5.0

1.2.4 Explanation of concepts

The setting of current I_e is the setting for the rated operational current (main current) of the motor.

U_e = Rated operational voltage on the motor's operational current (three phase main voltage feeding the motor).
U_S = Rated control supply voltage, feeding the electronics in the softstarter.
U_C = Rated control voltage, used for controlling the softstarter.

Chapter 2 Quickstart

Chapter 2 Quickstart

This chapter is a short guide on how to connect, configure and start the softstarter in the easiest way.

This product has been carefully manufactured and tested but there is a risk that damage can occur from abnormal handling during transportation. Therefore, the procedure below should be followed during initial installation:

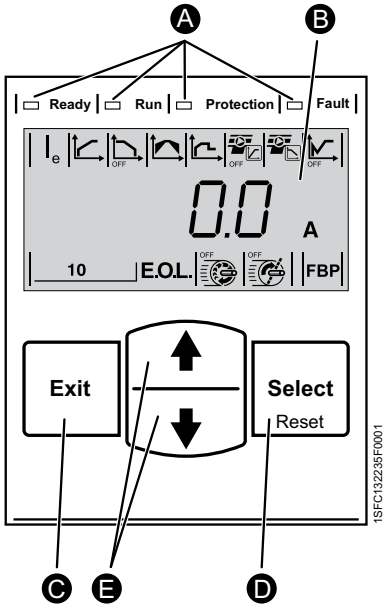

Figure 2.1:

- **A** LED status indicators.
- **B** LCD display with backlight.
- **C** Exit key for cancelling parameter edits and moving up one menu level.
- **D** Select/Reset key for changing and storing parameter values, moving down one menu level, and to reset tripping events.
- **E** Navigation keys for navigating the menu and changing parameter values. Flashing numbers or text shown in the display indicates that the menu/value can be changed or scrolled.

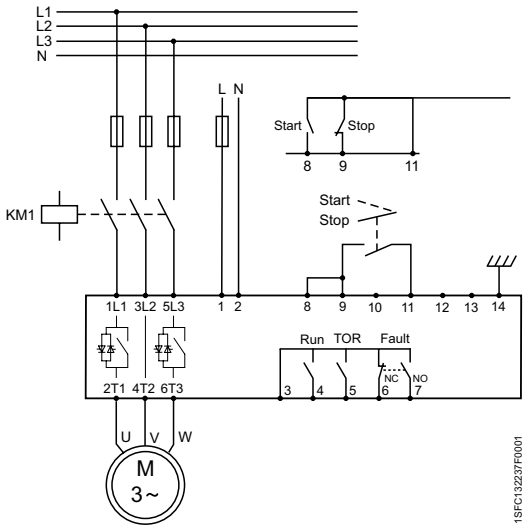

Figure 2.2: Example connection of PSE Softstarter

Warning!
Mounting, electrical connection and settings of the softstarter shall be made in accordance with existing laws and regulations and be performed by authorized personnel.

Warning!
Connecting Softstarters PSE18...PSE370 Inside Delta will cause damage to the equipment, and there is a risk of death or serious injury.

In Line *Inside Delta*

Warning!
Before connecting the Softstarters PSE size 18...PSE170 to operational supply voltage for the first time, the control supply voltage must be turned on to ensure that the by-pass relays are in the open position. This is necessary to avoid unintentional starting of the equipment during the connection.

1. Be aware of the ambient temperature. Derating is required above 40 °C (104 °F). See chapter 3.6.
2. Mount the softstarter according to Chapter 4 Mounting.

Caution!
Hazardous voltage. Will cause death or serious injury. Turn off and lock out all power supplying this device before starting work on this equipment.

3. Connect the terminals 1L1, 3L2 and 5L3 to the operational voltage on the power supply line side.
4. Connect the terminals 2T1, 4T2 and 6T3 to the motor.

Warning!
Capacitors for power factor compensation are not allowed between the softstarter and the motor, since this can cause current peaks which can damage the thyristors in the softstarter. If such capacitors are to be used, they should be connected on the line side of the softstarter.

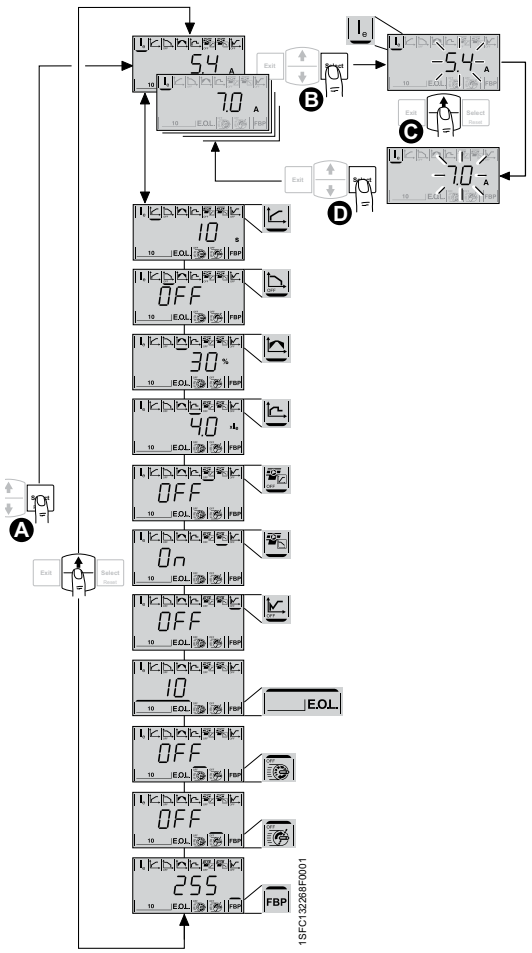

Figure 2.3:
Configuration of the parameter Rated Current.

A If disabled, press any key to activate the light in the display. Enter the application setting by pressing the Select key a second time.

B Press select again to enable editing of the I_e parameter. This is indicated by a flashing value.

C Increase or decrease the value by pressing the Up or Down keys repeatedly. Holding the key down will speed up the change. Press the Exit key to abort change.

D When the rated current of the motor is reached, press the Select key again to save.

If needed, continue to set other parameters according to the application following the same procedure.

Press the Exit key to return to the top level.

5. Connect control supply voltage to terminals 1 and 2 (100-250 V 50/60 Hz).

6. Connect the functional earth to terminal 14, with an earthing point close to the softstarter.

The earthing is not a protective earth, it is a functional earth. The earthing cable should be as short as possible. Maximum length 0.5 m. The earthing cable should be connected to the mounting plate, which should also be earthed.

7. Connect the start, stop and other control circuits including the analog out to the terminals, 8, 9, 10, 11, 12, 13 if needed. This section is using an internal 24 V DC. Do not feed with any external voltage.

Warning!
Do not connect an external voltage to the control terminals 8, 9, 10, 11, 12, 13 and 14. Failure to observe the above may damage the softstarter and the warranty may no longer be valid.

8. Connect terminals 3, 4, 5, 6 and 7 when using the signal output relays. These are potential free contacts for maximum 250 V AC, 1,5 A AC-15. Make sure you are using the same voltage level within this terminal section.

Warning!
The same external voltage (maximum 24 V DC or maximum 250 V AC) must be connected to the output relay terminals 3, 4, 5, 6 and 7. Failure to observe the above may damage the softstarter and the warranty may no longer be valid.

9. Switch ON the control supply voltage U_S, terminals 1 and 2.

10. Continue to configure parameter I_e as described in figure 2.3. Complete information about configuration is available in Chapter 6 Human-Machine Interface (HMI) and Chapter 7 Functions and configuration.

11. Switch ON the operational voltage U_e. The green “Ready” LED will turn solid.

12. Give start command to the softstarter.

Caution!
Depending on the two phase control, a connected motor terminal always carries live hazardous voltage. Do not touch terminals when voltage is applied. Output terminals will have live voltage even when the device is OFF. This can cause death or serious injury.

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Chapter 3 Description

Chapter 3 Description

This chapter describes the PSE Softstarter in general, specifications as well as available accessories and spare parts.

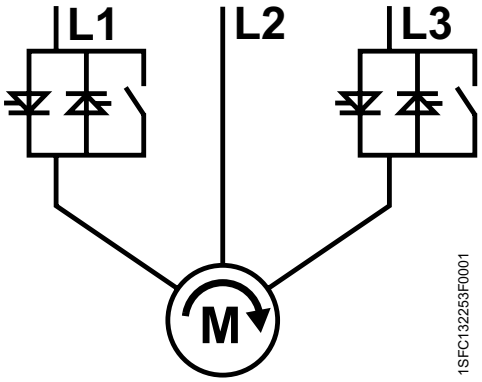

Figure 3.1: Integrated By-pass. Controlled phases 1 and 3 (L1 and L3).

Figure 3.2: Torque control is offered as standard with the PSE softstarter.

3.1 Overview

The PSE Softstarter is a microprocessor-based softstarter designed with the latest technology for soft starting and soft stopping of three-phase squirrel cage motors. The softstarter has several advanced features as standard.

- Integrated by-pass in phases L1 and L3, see figure 3.1.
- Thyristors are used on phases L1 and L3 for controlling the motor voltage. Phase L2 is directly connected to the motor, see figure 3.1.
- Select between voltage ramp or torque control during start and stop.
- Motor protection, as well as underload and locked rotor protection.

The keypad on the front is designed to be as user-friendly as possible, with a clear display showing icons.

The PSE Softstarter can be controlled in two ways:
- Hardwire inputs control
- Fieldbus communication interface

Only one type of control method can be enabled simultaneously. Default selection is hardwire inputs control.

The integrated fans for cooling are operated only during ramping (start/stop) and when the temperature of the heat sink is high. The temperature is monitored by a thermistor mounted on the heat sink.

Check that you have the correct product in regards to operational voltage, control supply voltage and rated motor data. See chapter 3.3 Type designation.

The PSE18...PSE370 Softstarters operates over wide voltage ranges.
- Rated operational voltage 208 - 600 V AC
- Rated control supply voltage 100 - 250 V AC

Warning!
The product should only be used within the specified ratings.
Be aware of the ambient temperature and altitude above sea level. Derating is required above 40 °C (104 °F) and above 1000 m (3281 ft).

3.2 Markings and connections

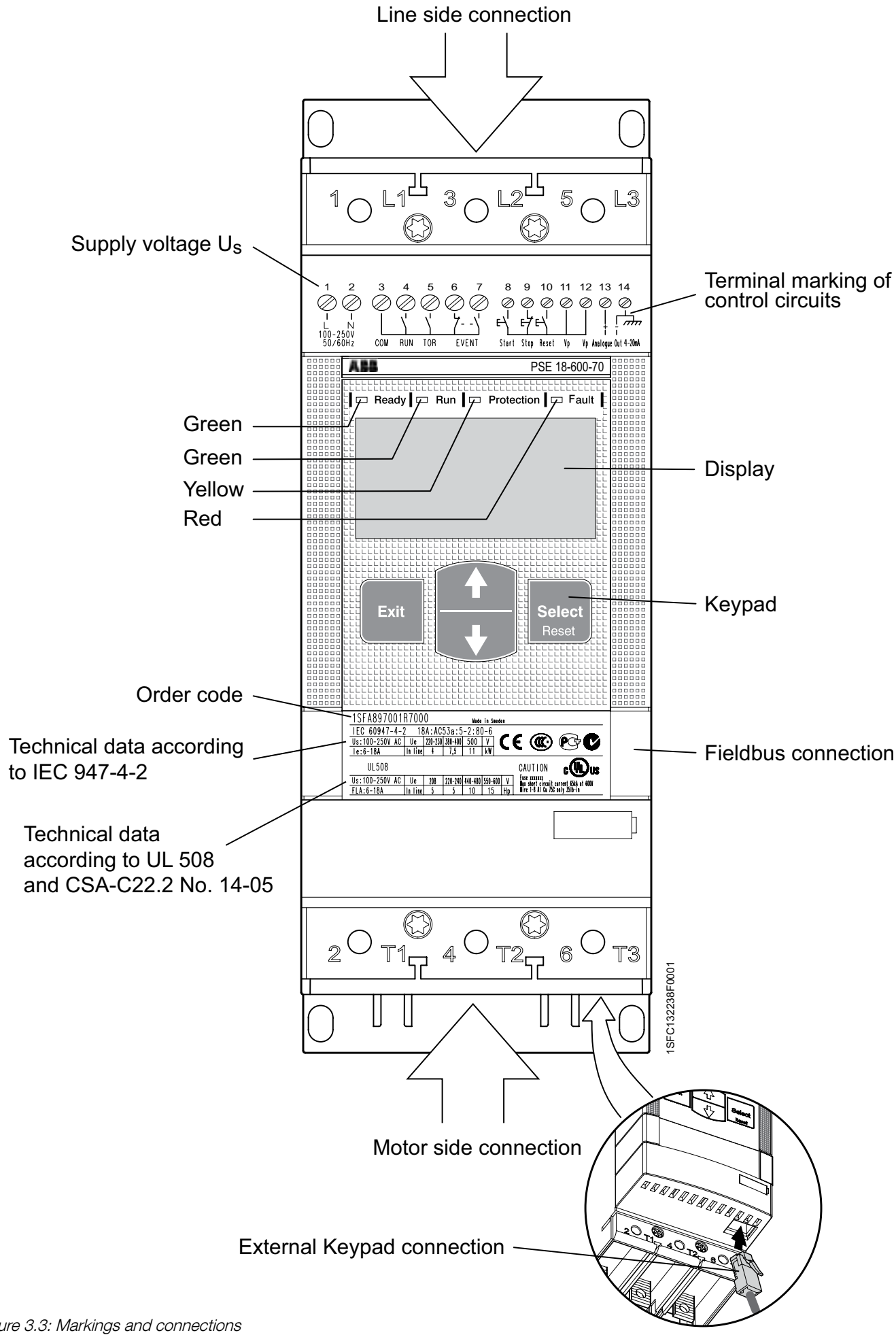

Figure 3.3: Markings and connections

3.3 Type designation

Type designation to be found on the softstarters front. See figure 3.4.

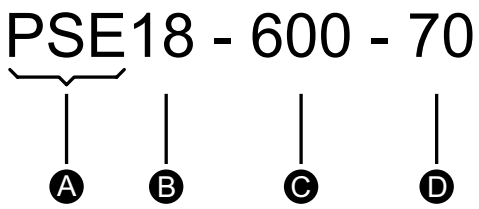

Figure 3.4: Type designation

Ⓐ Softstarter type: PSE

Ⓑ Current rating: 18 = 18 A

Ⓒ Operational voltage: 600 = 208 - 600 V 50/60 Hz

Ⓓ Control supply voltage: 70 = 100 - 250 V 50/60 Hz

3.4 Documentation

Documentation such as brochures, catalogs, certificates, and drawings included can be found at: *www.abb.com/lowvoltage.* Select the link Control Products and then continue to Softstarters.

3.5 Environmental influence

The product is designed to minimize the environmental effects during manufacturing and use of the product. Most of the materials used, are of recycle type, and shall be handled and recycled according to existing laws.

Further information regarding used material and recycling of the product can be found at: *www.abb.com/lowvoltage*

3.6 Specifications

Table 3.1

Degree of protection (Operational circuit)	IP 00
Operating position	Vertical at ± 30°
Ambient temperature	Storage. -40 °C to + 70 °C (-40 °F to 158 °F) Operation: -25 °C to + 40 °C (-13 °F to 104 °F) without derating. + 40 °C to + 60 °C (104 °F to 140 °F) with derating 0.6 % /1 °C (0.6% / 1,8 °F).
Altitude	1000 m (3281 ft.) above sea level without derating. 1000-4000 m (3281 - 13123 ft.) above sea level with derating 0.007% / m.
Pollution degree	3
Relative humidity	5-95% (non-condensing)
Standards	IEC 60947-1 IEC 60947-4-2 EN 60947-1 EN 60947-4-2
Standards c UL us	UL 508, CSA C22.2 No 14-10

3.7 Technical data

3.7.1 General

Table 3.2

General data	
Rated insulation voltage, U_i	600 V
Rated operational voltage, U_e	208-600 V 50 / 60 Hz
Rated control supply voltage, U_s	100 - 250 V 50 / 60 Hz
Voltage tolerance	+10% to -15%
Frequency tolerance	± 5%
Rated impulse withstand voltage	6 kV operational circuit / 4 kV control supply circuit
Number of controlled phases	2
Inputs	Start, stop, reset
Analog out	4-20 mA
Cooling system	Fan
Rated duty	Uninterrupted
EMC	IEC 60947-4-2 Class A ❶ Lloyds Register (2002)
Recommended fuse Supply circuit	6A Delayed MCB use characteristics
Communication protocols	DeviceNet/Profibus/Modbus/CANopen

❶ This product has been designed for class A equipment. Use of the product in domestic environments may cause radio interference, in which case the user may be required to employ additional mitigation methods.

3.7.2 Weights

Table 3.3

Type	Weight in kg	Weight in lbs
PSE18...60	2.4	5.3
PSE72...105	2.5	5.5
PSE142...170	4.2	9.2
PSE210	12.4	27.3
PSE250...370	13.9	30.6