Installation and Maintenance manual **Softstarters** PST / PSTB







PST30... PST1050 Installation and maintenance manual

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General information about this manual

1 General

This is the Installation and maintenance manual for Softstarters PST30... PSTB1050

Document number: 1SXU 132 021 M0201 Edition: 01

Revision: 01

Issue Date:	April	11,	2005
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This document has been carefully checked. If the user nevertheless detects any errors, please 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, it is possible that there may be some differences between the softstarter and the information in this manual.

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2 Safety

This section describes warning and information signs used in this manual. The user should pay close attention to these signs.

The softstarter should be installed by authorized personnel only.

This manual is a part of the softstarter and should always be accessible to personnel working with this product.

The manual should always be read before performing any installation or commissioning tasks.

3 Safety signs

3:1 Use of Caution, Warning and Information



Caution icon indicates the presence of a hazard which could res	ult
in personal injury.	



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



Information!

Alerts the reader to pertinent facts and conditions.



Chapter 1 Introduction

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Chapter 1 Introduction

1:1 About the documentation for the softstarter

For the softstarter, the following documents are available:

PST30/PSTB1050 Softstarters Installation and Maintenance manual

Document ID: 1SXU 132 021 M0201 - English

1SFC132003M0101 (German) 1SFC132003M0101 (German) 1SFC132003M0101 (German) 1SFC132003M0301 (Swedish) 1SFC132003M0301 (French) 1SFC132003M0901 (Italian) 1SFC132003M0701 (Spanish) 1SFC132003M101 (Dutch) 1SFC132003M1601 (Portuguese) 1SFC132003M1801 (Finnish) 1SFC132003M1101 (Russian) 1SFC132003M2001 (Chinese 1SFC132003M1901 (Turkish)

Soft Starter Catalog

Document ID: 1SXU 132 019 C0201

For other documents related to the PST Softstarters, see www.abb-control.com/products/softstarters.htm#type_pst

1:2 About the installation and commissioning manual

This manual contains instructions on how to install and commission the softstarter. The manual covers procedures for mechanical and electrical installation and installation of communication devices. It also covers how to energize, set, configure and verify settings. For the quickest possible start, read Chapter 2 " Quickstart".

1:2.1 Intended audience

1:2.1.1 General

The installation and commissioning manual is intended for personnel responsible for installing, commissioning and maintaining the softstarter.

1:2.1.2 Requirements

All personnel who interact with the softstarter 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 Chapters included

- Introduction introduces the reader to this manual.
- Quickstart contains information on how to install the softstarter and put it into operation in the quickest and safest way. This chapter is intended for the experienced user.
- Description describes the softstarter in general, its functions and specifications.
- Mounting contains information on receiving, unpacking and mounting the softstarter.
- Connection contains instructions on how to make the electrical connections as well as connections for communication devices.
- Human-Machine Interface describes the local Human-Machine Interface, how it works and what it contains.
- Settings and configuration describes all possible settings and how to navigate in the menu system.
- Fieldbus communication describes how to install and set up the fieldbus communication.
- Maintenance describes what maintenance is required.
- · Functions describes all functions included in the softstarter. This chapter also describes parameter ranges and default values.
- Trouble shooting contains instructions on how to quickly find and correct the most common faults.
- Diagrams contains a number of electrical diagrams for the softstarter itself. It also contains some typical application diagrams.

Chapter 1 Introduction

1:2.3 Revision notes

Please check www.abb-control.com/products/softstarters.htm#type_pst for latest information on revisions.

1.2.4 Acronyms and abbreviations

The following acronyms and abbreviations are used in this manual.

Acronym/abbreviation	Description
LED	Light Emitting Diode
LCD	Liquid Crystal Display
SCR	Silicon Controlled Rectifier
ІТ	Information Technology
НМІ	Human-Machine Interface
FBP	Fieldbusplug
PLC	Programmable Logic Controller
РСВ	Printed Circuit Board
TOR	Top of Ramp (full voltage)

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Notes



Chapter 2 Quickstart

Connection	2.2
Configuration	2.3
Start of the motor	2.3

Chapter 2 Quickstart

1 2 ABB 3 (0) (₽. Figure 1:

1 Status indication LEDs

LCD display 2 3

Selection keys for selecting, changing and storing parameters

4 Navigation keys for navigating in the menus Arrows shown in the display indicate that the value/menu is possible to change or scroll





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



Mounting and installing the softstarter shall be done in accordance with local laws and regulations and must be performed by authorized personnel only. Do not change any parameters in the Service Settings menu.

2:1 Connection

- 1. Mount the softstarter according to Chapter 4 " Mounting" .
- 2. Be aware of the ambient temperature. Derating is required above 40 °C (104 °F). See Chapter 3 for more information.
- 3. Connect the main circuit: terminals 1L1 3L2 5L3 to the line side and terminals 2T1 - 4T2 - 6T3 to the motor side.
- 4. Connect the control voltage: terminals 1 and 2 (100-250V 50/60Hz).
- 5. Connect the functional ground: terminal 3.



Information!

The wire shall be as short as possible, and be connected to the mounting plate. The mounting plate should also be grounded.

- 6. Connect the start/stop circuits: terminal 4, 5, 8, 9 and 10 according to Figure 2. 24 VDC only!
- 7. Verify that the main and control voltage corresponds to the softstarter ratings.
- 8. Switch on the control voltage.
- 9. The green "Power on" LED should be lit and the LCD should appear as shown in Figure 3.

Chapter 2 Quickstart



2:2 Configuration

- 1. Enter the Application Setting by pressing the left selection key twice. Press *Select* using the left selection key. See Figure 4.
- 2. Select the appropriate type of load by using the navigation keys. See Figure 5.
- 3. Press *Store Set* and *Nex*t to continue or *Back* to previous parameter using the selection keys. See Figure 6.
- Set le (motor FLA) using the navigation keys. In Line connected = rated motor current Inside Delta connected = 58% (1/(√3)) of the rated motor current. For example, if the soft starter is connected in line with a 100A motor, le = 100A. If the softstarter is connected inside the delta of a 100A motor, le = 58A. See Figure 7.
- 5. Press *Store* and *Next* to continue or press *Back* to access the previous parameter. See Figure 8.
- 6. Set the required overload class using the navigation keys. See Figure 9.
- 7. Press *Store* and *Next* to continue or press *Back* to access the previous parameter. See Figure 10.
- 8. If an external by-pass contactor is used set *Ext ByPass* to Yes using the navigation keys. (PST30...300 only). See Figure 11.
- 9. Press *Store* and *Next* to continue or *Back* to previous parameter using the selection keys. See Figure 12.
- 10. Select Yes if ready or *Tune Set* if ramp times, initial voltage, current limit etc. need to be adjusted. See Figure 13.
- 11. To change language, see Section 7:2.5.

2:3 Start of the motor

- 1. Switch on the main voltage.
- Give a start command to the softstarter. (To start the softstarter from the keypad, enter the LOCAL CONTROL menu, select Start/ Stop and press Start. The motor must be stopped before leaving this menu.)

Notes



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3

This chapter describes the softstarter in general, specifications and available accessories and spare parts.

3:1 Overview

The PST softstarter is a microprocessor-based softstarter designed with the latest technology for the soft start and soft stop of squirrel cage motors. The softstarter has several advanced motor protection features as standard.

The softstarter is designed to be used with or without a by-pass contactor except for the larger sizes, PSTB370...1050 where the bypass contactor is integrated. In an emergency, it is possible to start the motor across the line with the integrated bypass contactor. See Section 3:8.4 for AC3 ratings.

The keypad on the front is designed to be as user-friendly as possible, with a clear text display. It is possible to choose between twelve different languages (default is English).

The softstarter can be controlled in four ways:

- Hardware inputs
- Keypad control (local)
- Fieldbus communication interface
- Remote keypad (option)

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

Only one type of control method can be enabled simultaneously.

Default selection is hardware inputs.



Information!

Keypad control has the highest priority and overrides all other control methods.

3:2 Functions

The PST softstarter has several integrated protection and warning functions. Almost any type of fault can be detected and displayed.

All available protections, warnings and fault indications are listed below.

Start/Stop functions

- Start ramp
- · Stop ramp (also called soft stop or decel)
- Initial voltage
- Step down voltage
- Current limit
- Kick Start
- Extended start rangeExtended stop range
- Sequence start

Protection functions

- Motor overload protection
- Locked rotor protection
- Motor underload protection
- High current protection
- Phase imbalance protection
- Phase reversal protection
- SCR overload protection
- PTC input for motor protection
- Shorted SCR

Warning functions

- Warning high current
- Warning low current
- Warning motor overload
- Warning SCR overload

Fault Supervision functions

- Internal softstarter faults
- Shorted SCR
- Non conducting SCR
- Open circuit motor side
- · Over-temperature heat sink
- Phase loss
- Frequency out of range
- Fieldbus communication
- Non-closing by-pass contactor
- Non-opening by-pass contactor

Other functions

- Jog
- Real time clock
- Event log
- Keypad password

3:3 Markings and connections





3:4 Industrial ^{IT}

3



Thanks to ABB's broad program of product standardisation, today's Industrial IT components are - whether they are products or systems, hardware or software - the building blocks of larger solutions, incorporating functionalities that will allow seamless interactions in real-time automation and information systems.

At the product level, ABB's Industrial IT enabled symbol ensures that all the products can fully interact. All product information pertaining to these products is available in electronic format, based on Aspect Object™ technology. The Industrial IT commitment from ABB ensures that every product is equipped with the tools necessary to install, operate and maintain it efficiently throughout the product's life cycle.

The PST softstarters is an Industrial IT enabled product. Documentation such as brochures, catalogues, certificates and drawings can be found at : www.abb-control.com/products/softstarters.htm#type_pst.

3:6 Environmental influence

The product is designed to minimize the environmental affects during manufacturing and use of the product. Most of the materials used are recyclable.

ltem	Specification
Degree of protection (main circuit)	IP 10 for PST3072; IP 00 for PST851050
Operating position	Vertical at ± 10°
Ambient temperature	Storage: -25°C to +70°C (-13°C to 158°F)
Operation Without derating With derating	0°C to +40°C (32°F to 104°F) +40° C to +50°C (104°F to 122°F) of 0.8% / °C (1.8%/°F)
Altitude	1000 m (3281 ft.) above sea level without derating 1000 - 4000 m (3281 - 13,123 ft.) by derating 1% for each 333 ft above 3300 ft.
Pollution degree	3
Relative humidity	5 - 95% (non-condensing)
Standards	UL508 IEC 60947-1 IEC 60947-4-2 EN 609471
PTC input	IEC 60947-8 Mark A detectors, DIN 44081 and DIN 44082
Marine approvals	Contact your ABB sales office

3:8 Technical data

3:8.1 General

Item	Technical data
Rated insulation voltage, Ui	690V
Rated operational voltage, Ue	208-690 V (in two modes)
Rated control voltage, Us	100 - 250 V 50/60 Hz
Rated frequency	50 / 60 Hz
Voltage tolerances	+10% to -15%
Frequency tolerances	±5%
Rated impulse withstand voltage	2 kV
Number of controlled phases	3
Programmable inputs	24 VDC, 10 mA
Output relays	250 VAC, Ith = 5A, Ie = 1.5A (AC-15)
Battery back-up D20mm	Lithium 3V CR2032
PTC input	2825 ohm \pm 20% switch off resistance 1200 ohm \pm 20% switch on resistance
Cooling system	Fan
Recommended fuse for control circuit	6A Delayed MCB use C characteristics
Service factor	115% (100% for PSTB1050)
Communication protocols	AS-Interface DeviceNet / Profibus DP / Modbus

3:8.2 Semi-conductor fuses

Softstarter type	Bussmann fuses		Holders
	А	Туре	
PST30	80	170M1366	170H1007
PST37	125	170M1368	170H1007
PST44	160	170M1369	170H1007
PST50	160	170M1369	170H1007
PST60	200	170M1370	170H1007
PST72	250	170M1371	170H1007
PST85	315	170M1372	170H1007
PST105	400	170M3019	170H3004
PST142	450	170M3020	170H3004
PST175	500	170M3021	170H3004
PST210	630	170M5012	170H3004
PST250	700	170M5013	170H3004
PST300	900	170M5015	170H3004
PSTB370	700	170M5013	170H3004

3:8.3 Softstarter types

Concent Construction nethedIndineDeltaIndineDeltaIndineDeltaIndineDeltaIndineDeltaRated Current le (A)203025376444030504000Motor rating 4400 (IP)20302518.53022372546AC-3 fauting with integrated bysas (A)7777777Prover issa at rated current (V)107777777Conceil on methodInlineDeltaInlineDeltaInlineDelta181 <th>Туре</th> <th>PS</th> <th>Т30</th> <th colspan="2">PST37</th> <th colspan="2">PST44</th> <th colspan="2">PST50</th>	Туре	PS	Т30	PST37		PST44		PST50	
Reade Current le (A)30523764444765085Motor rating 304-15V (KW)1525403022376444AC-3 Rating with integrated Bypasa (A)	Connection method	Inline	Delta	Inline	Delta	Inline	Delta	Inline	Delta
Mater range at 480 / LHP2030254030574060Motor range 380-415V (KW)152518.53022372.545AC3 Rain guith integrated Styase (N)Power loss at rated current (V)1010Second constraint (N)5	Rated Current le (A)	30	52	37	64	44	76	50	85
	Motor rating at 480V (HP)	20	30	25	40	30	50	40	60
AC-3 Raing with integrande dynams (A) − − − − − − − Power loss at rated current (W) 10 10 10 100 100 100 100 Control power requirements (W) 05 5 5 5 5 5 Connaction method Inline Delta Inline	Motor rating 380-415V (KW)	15	25	18.5	30	22	37	25	45
Pewer nequirements (vi/o I <td>AC-3 Rating with integrated Bypass (A)</td> <td>-</td> <td>-</td> <td>-</td> <td>_</td> <td>-</td> <td>_</td> <td>-</td> <td>_</td>	AC-3 Rating with integrated Bypass (A)	-	-	-	_	-	_	-	_
Control power requirements (vA)SSTypePSTUPSTUPSTUPSTUPSTUConnection methodInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaInlineDeltaAda Current (VA)1DeltaInlineDeltaInlineDeltaAda Current (VA)1DeltaInlineDeltaDeltaConnection methodInlineDeltaInlineDeltaDeltaDeltaDeltaDeltaDeltaDeltaDeltaDeltaInline	Power loss at rated current (W)	1(00	12	20	14	40	16	60
TypePST60PST72PST875PST05Connection methodInlineDeltaInline <td>Control power requirements (VA)</td> <td>Ę</td> <td>5</td> <td>ŧ</td> <td>5</td> <td>Ę</td> <td>5</td> <td>Ę</td> <td>5</td>	Control power requirements (VA)	Ę	5	ŧ	5	Ę	5	Ę	5
Type PFTo PFTo PFTo PFTo Connection method Inline Delta Inline Delta Inline Inline Delta Inline Delta <td< td=""><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td></td<>						1			
Connection method Inline Defla Inline Defla <thinline< th=""></thinline<>	Туре	PS'	T60	PS	T72	PS ⁻	T85	PST	105
Rated Current is (A) 60 105 72 124 85 147 105 181 Motor rating at 480V (HP) 40 75 50 77 60 100 75 150 Motor rating 380-415V (KV) 30 55 37 59 45 75 55 90 AC-3 Rating with integrated Bypass (A) - <td>Connection method</td> <td>Inline</td> <td>Delta</td> <td>Inline</td> <td>Delta</td> <td>Inline</td> <td>Delta</td> <td>Inline</td> <td>Delta</td>	Connection method	Inline	Delta	Inline	Delta	Inline	Delta	Inline	Delta
Mathemating at 480v (HP) 40 75 60 75 60 100 75 150 Mathemating 380-415v (KW) 30 55 37 65 45 75 60 100 75 60 90 AG2 Rating with integrated Bypass (A) $$ $$ $$ $$ $$ $$ Power loss at rated current (W) 19° $23°$ $27°$ $00°$ $75°$ $60°$ $100°$ $75°$ $60°$ $75°$ $60°$ $75°$ $90°$ Connection method Inline Delta Inline Delta Inline Delta Inline Delta $100°$ $250°$ $430°$ Rated Current Ive (A) 142 245° 175 20° 150° 20° $430°$ Motor rating 380-415V (KW) 75 132 90° 160° 110° 184 132 20° Control nower requirements (VA) 1° 1° 645° 75° 5° 5° 5°	Rated Current le (A)	60	105	72	124	85	147	105	181
	Motor rating at 480V (HP)	40	75	50	75	60	100	75	150
AC-3 Rating with integrated Bypass (A) − − − − − Power loss at rated current (W) 19' 23' 71' 32'' 32'' Control power requirements (VA) 98'' 98'' 10'' 10'' 10'' Schwar Loss at rated current (VA) 14'2 24's 11's 30'' 210'' 36'' 20'' 43'' Rated Current le (A) 14'2 24's 11's 30'' 210'' 36'' 43'' Motor rating at 480V (HP) 100 150'' 12''' 20'''' 16''''''''''''''''''''''''''''''''''''	Motor rating 380-415V (KW)	30	55	37	59	45	75	55	90
$ \begin{array}{ c c c } \hline \matrix 0 & 190 & 20 & 270 & 325 \\ \hline \matrix 0 & 5 & 5 & 1 & 7 & 325 \\ \hline \matrix 0 & 7 & 7 & 7 & 7 & 7 & 7 & 7 & 7 & 7 &$	AC-3 Rating with integrated Bypass (A)	-	-	-	-	-	-	-	-
Control power requirements (v/A) 5 10 10 Type PST142 PST35 PS120 PST25 Connection method Inline Delta Inline Delta <td>Power loss at rated current (W)</td> <td>19</td> <td>90</td> <td>23</td> <td>30</td> <td>27</td> <td>70</td> <td>32</td> <td>25</td>	Power loss at rated current (W)	19	90	23	30	27	70	32	25
TypePST-/PST-/PST-/PST-/PST-/Connection methodInlineDeltaInlineDeltaInlineDeltaInlineDeltaRated Current le (A)142245175300210360250430Motor rating at 480V (HP)100150125200150250200350Motor rating at 480V (HP)100150125200150250200350Motor rating at 480V (HP)7513290160110184132220A C-3 Rating with integrated Bypass (A)Power loss at rated current (W)43554U645110184132220Connection methodInlineDeltaInlineDeltaInlineDeltaTypePST-VFST-VFST-VFST-V987987Connection methodInlineDeltaInlineDeltaInlineDelta100987Rated Current (e)300515370640470814570987Motor rating at 80V (HP)2504003005004400600500700Motor rating at 80V (HP)250400300500450450760475Contactor type329235520455654755Contactor typeP	Control power requirements (VA)	5	5	5	5	1	0	1	0
hype restrict restrict restrict restrict restrict Connection method Inline Delta Inline Delta Inline Delta Inline Delta Rated Current le (A) 142 245 175 300 210 360 250 430 Motor rating 380-415V (KW) 75 132 90 160 110 184 132 220 AC-3 Rating with integrated Bypass (A) -	Type	Det	142	Det	175	Det	210	Det	250
Connection method Imme Deta Imme </td <td>Connection method</td> <td>Inline</td> <td>Delta</td> <td>Inline</td> <td>Delta</td> <td>Inline</td> <td>Delta</td> <td>Inline</td> <td>Delta</td>	Connection method	Inline	Delta	Inline	Delta	Inline	Delta	Inline	Delta
National relation of the integrated Bypass (A) 142 2.00 17.00 15.00 12.50 2.00 15.00 2.50 2.00 35.00 Motor rating at 480V (HP) 100 150 125 200 150 250 200 350 Motor rating at 480V (HP) 75 132 90 160 110 184 132 220 AC-3 Rating with integrated Bypass (A) - - <td>Rated Current le (A)</td> <td>1/2</td> <td>245</td> <td>175</td> <td>300</td> <td>210</td> <td>360</td> <td>250</td> <td>/30</td>	Rated Current le (A)	1/2	245	175	300	210	360	250	/30
Match rating at 80-0 (17) 100 100 120 100 110 1184 132 220 AC-3 Rating with integrated Bypass (A) - <td>Motor rating at 480V/ (HP)</td> <td>100</td> <td>150</td> <td>175</td> <td>200</td> <td>150</td> <td>250</td> <td>200</td> <td>350</td>	Motor rating at 480V/ (HP)	100	150	175	200	150	250	200	350
Moder range Goder (Nr)173 <td>Motor rating 380-415V (KW)</td> <td>75</td> <td>132</td> <td>90</td> <td>160</td> <td>110</td> <td>18/</td> <td>132</td> <td>220</td>	Motor rating 380-415V (KW)	75	132	90	160	110	18/	132	220
$ \begin{array}{ c c c } \begin{tabular}{ c c } \hline c c \\ \hline Power loss at rated current (W) & 435 & 540 & 645 & 765 \\ \hline \ Control power requirements (VA) & 10 & 13 & 15 & 15 \\ \hline \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	AC-3 Rating with integrated Bypass (A)	10	102		-	110		102	
Note root at failed durint (N) 100 100 100 100 100 100 100 Control power requirements (VA) 10 10 15 15 15 Type PST300 PSTB370 PSTB470 PSTB570 Connection method Inline Delta	Power loss at rated current (W)	43	35	54	40	64	15	76	35
Control point requirements (in)1010TypePST300PSTB370PSTB370PSTB370PSTB370PSTB370Connection methodInlineDeltaInlineDeltaInlineDeltaRated Current le (A)300515370640470814570987Motor rating at 480V (HP)250400300500400600500700Motor rating 380-415V (KW)160257200355250450315475Contactor type $ AF302$ $AF302$ $AF40$ $AF45$ Contactor type $ 302$ 300 300 $20/480$ $25/90^{-1}$ Power loss at rated current (W)9209011011010TypePSTB720PSTB720PSTB1050Connection methodInlineDeltaInlineDeltaInlineOpeltaInlineDeltaInlineDeltaInlineDeltaRated Current le (A)7201247840145510501810Motor rating 380-415V (KW)400670450780560875Contactor type $AF580$ $AF75$ $AF75$ $AF50$ Ac-3 Rating with integrated Bypass (A)590720720	Control power requirements (VA)	1	0	1	5	1	5	1	5
TypePST3/V			0		•		•		•
$ \begin{array}{c c c c c c } \hline Connection method & Inline & Delta &$	Туре	PST	300	PST	B370	PST	B470	PST	B570
Rated Current le (A) 300 515 370 640 470 814 570 987 Motor rating at 480V (HP) 250 400 300 500 400 600 500 700 Motor rating 380-415V (KW) 160 257 200 355 250 450 315 475 Contactor type — — AF302 AF302 AF302 480 AC-3 Rating with integrated Bypass (A) — — 302 302 480 10 <td< td=""><td>Connection method</td><td>Inline</td><td>Delta</td><td>Inline</td><td>Delta</td><td>Inline</td><td>Delta</td><td>Inline</td><td>Delta</td></td<>	Connection method	Inline	Delta	Inline	Delta	Inline	Delta	Inline	Delta
Motor rating at 480V (HP) 250 400 300 500 400 600 500 700 Motor rating 380-415V (KW) 160 257 200 355 250 450 315 475 Contactor type — — AF3∪2 AF3∪2 AF3∪2 AF3∪2 AF3 Contactor type — — AF3∪2 AF3	Rated Current le (A)	300	515	370	640	470	814	570	987
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Motor rating at 480V (HP)	250	400	300	500	400	600	500	700
Contactor type $-$ AF302AF302AF480AC-3 Rating with integrated Bypass (A) $ 302$ 302 480 Power loss at rated current (W) 920 90 110 110 Control power requirements (VA) 15 $20/480$ $20/480$ $25/900$ TypePSTB20PSTB840PSTB1050Connection methodInlineDeltaInlineDeltaInlineDeltaRated Current le (A)7201247840145510501810Motor rating at 480V (HP) 600 1000 700 1200 900 1500Motor rating 380-415V (KW) 400 670 450 780 560 875 AC-3 Rating with integrated Bypass (A) 590 720 720 720 720 Power loss at rated current (W) 110 170 170 $05(700)$	Motor rating 380-415V (KW)	160	257	200	355	250	450	315	475
AC-3 Rating with integrated Bypass (A) $ 302$ 302 302 480 Power loss at rated current (W) 920 90 110 110 110 Control power requirements (VA) 15 $20/480$ $20/480$ $25/900$ TypePSTB720PSTB840PSTB1050Connection methodInlineDeltaInlineDeltaInlineDeltaRated Current le (A) 720 1247 840 1455 1050 1810 Motor rating at 480V (HP) 600 1000 700 1200 900 1500 Motor rating 380-415V (KW) 400 670 450 780 560 875 Contactor type $AF580$ $AF750$ $AF750$ $AF750$ AC-3 Rating with integrated Bypass (A) 590 720 720 720 Power loss at rated current (W) 110 170 170	Contactor type	-	_	AF	302	AF:	302	AF	480
Power loss at rated current (W)92090110110Control power requirements (VA)15 $20/480$ $20/480$ $20/480$ $25/900$ TypePSTB720PSTB840PSTB1050Connection methodInlineDeltaInlineDeltaInlineDeltaRated Current le (A)7201247840145510501810Motor rating at 480V (HP)600100070012009001500Motor rating 380-415V (KW)400670450780560875Contactor typeAF580AF750AF750AF750AC-3 Rating with integrated Bypass (A)590720720720Power loss at rated current (W)110170170Contactor type $05/020$ $05/020$ $05/020$	AC-3 Rating with integrated Bypass (A)	-	-	30	02	302		480	
Control power requirements (VA)15 $20/480$ $20/480$ $20/480$ $25/900$ TypePSTB720PSTB840PSTB1050Connection methodInlineDeltaInlineDeltaRated Current le (A)7201247840145510501810Motor rating at 480V (HP)600100070012009001500Motor rating 380-415V (KW)400670450780560875Contactor typeAF580AF750AF750AF750AC-3 Rating with integrated Bypass (A)590720720720Power loss at rated current (W)11017017005/000	Power loss at rated current (W)	92	20	90		110		110	
TypePSTB720PSTB840PSTB1050Connection methodInlineDeltaInlineDeltaRated Current le (A)7201247840145510501810Motor rating at 480V (HP)600100070012009001500Motor rating 380-415V (KW)400670450780560875Contactor typeAF580AF750AF750AF750AC-3 Rating with integrated Bypass (A)590720720720Power loss at rated current (W)11017017000	Control power requirements (VA)	1	5	20/-	480	20/-	480	25/	900
TypePSTB-VPSTB-VPSTB-VConnection methodInlineDeltaInlineDeltaInlineDeltaRated Current Ie (A)7201247840145510501810Motor rating at 480V (HP)600100070012009001500Motor rating 380-415V (KW)400670450780560875Contactor type AF -S AF -S AF -S AF -S AF -SAC-3 Rating with integrated Bypass (A) 5 -V 72 -V 72 -V 72 -VPower loss at rated current (W)11-V 0 -C 0 -C 0 -C		1				1		1	
Connection methodInlineDeltaInlineDeltaInlineDeltaRated Current le (A)7201247840145510501810Motor rating at 480V (HP)600100070012009001500Motor rating 380-415V (KW)400670450780560875Contactor type $AF \rightarrow$ $AF \rightarrow$ $AF \rightarrow$ $AF \rightarrow$ $AF \rightarrow$ AC-3 Rating with integrated Bypass (A) $5 \rightarrow$ $72 \rightarrow$ $72 \rightarrow$ $72 \rightarrow$ Power loss at rated current (W) $11 \rightarrow$ $01 \rightarrow$ $01 \rightarrow$ $01 \rightarrow$	Туре	PSTI	B720	PST	B840	PSTE	31050]	
Rated Current le (A) 720 1247 840 1455 1050 1810 Motor rating at 480V (HP) 600 1000 700 1200 900 1500 Motor rating 380-415V (KW) 400 670 450 780 560 875 Contactor type $AF > U$ AC-3 Rating with integrated Bypass (A) $59 - U$ $72 - U$ $72 - U$ $72 - U$ Power loss at rated current (W) 11 U $17 - U$ $90 - U$ $90 - U$	Connection method	Inline	Delta	Inline	Delta	Inline	Delta		
Motor rating at 480V (HP) 600 1000 700 1200 900 1500 Motor rating 380-415V (KW) 400 670 450 780 560 875 Contactor type AF -3 AC-3 Rating with integrated Bypass (A) 5 -7 72 -7 72 -7 72 -7 Power loss at rated current (W) 11-7 17 -7 170 -7	Rated Current le (A)	720	1247	840	1455	1050	1810		
Motor rating 380-415V (KW)400670450780560875Contactor type $AF5$ $AF75$ $AF75$ $AF75$ AC-3 Rating with integrated Bypass (A) 59 72 72 72 Power loss at rated current (W) 11 17 17 17	Motor rating at 480V (HP)	600	1000	700	1200	900	1500		
Contactor typeAF580AF750AF750AC-3 Rating with integrated Bypass (A)590720720Power loss at rated current (W)110170170Control as were negative service se	Motor rating 380-415V (KW)	400	670	450	780	560	875		
AC-3 Rating with integrated Bypass (A) 590 720 720 Power loss at rated current (W) 110 170 170	Contactor type	AF	580	AF	750	AF	750		
Power loss at rated current (W) 110 170 170 Output loss at rated current (W) 05/000 05/000 05/000	AC-3 Rating with integrated Bypass (A)	59	90	72	20	72	20		
	Power loss at rated current (W)	11	10	17	70	17	70		
Control power requirements (VA) 25/860 25/860 25/860	Control power requirements (VA)	25/	860	25/	860	25/	860		

3:8.4 Weights

Туре	Weight in kg	Weight in Ibs
PST3050	4.8	10.6
PST6072	5.0	11.0
PST85	11.2	24.7
PST105142	13.0	28.7
PST175210	21.5	47.4
PST250300	23.0	50.7
PST370470	31.0	68.3
PSTB570	52.0	114.6
PSTB720	55.0	121.3
PSTB8401050	60.0	132.3

3:8.5 PSTB AC3 Integrated contactor ratings

PST type	PSTB370	PSTB470	PSTB570	PSTB720	PSTB840	PSTB1050
Contactor type	AF300	AF300	AF460	AF580	AF750	AF750
AC3 Rating @ 480V HF	250	250	400	500	600	600
AC3 Rating A	302	302	480	590	720	720

3:8.6 UL information

Equipment suitable for use in a circuit with maximum available fault current as shown when protected by devices indicated.

Model	Rating (kA)	Max V	Fuse (A)	MCCB (A)
PST30142	10	600	Any UL Listed	Any UL Listed
PST175300	18	600	Any UL Listed	Any UL Listed
PSTB370470	30	600	Any UL Listed	Any UL Listed
PSTB570	30	600	Any UL Listed	Any UL Listed
PSTB720	42	600	1200/L	1200
PSTB840	42	600	1200/L	1200
PSTB1050	85	480	-	800
PSTB1050	85	600	1200/L	-
PSTB1050	42	600	-	1200

← 00.00 Inches [00.00] Millimeters

3:8.7 Dimensions

PST30...72

3





Figure 1: Dimensions PST30...72

PST85...142



Figure 2: Dimensions PST85...142



PSTB175...300



Figure 3: Dimensions PST175...300

PSTB370...470



Figure 4: Dimensions PSTB370...470





Figure 5: Dimensions PSTB570...1050



Chapter 4 Mounting

Receiving, unpacking and checking	4.2
Intermediate storage	4.2
Mounting	4.2
Handling when mounting	4.2
Requirements	4.2
Minimum distance to wall/front	4.2
Minimum enclosure sizes	4.3

4

Chapter 4 Mounting



Figure 1: Package



Figure 2: Airways





Figure 3: Minimum distances, wall/front

This chapter describes instructions on how to receive the softstarter and how to mount it in the proper way.

4:1 Receiving, unpacking and checking

- Check that the package is turned with the correct side up, Figure 1.
- Check for transport damages
- Remove transport casing.
- · Visually inspect the softstarter
- · Check that the serial number corresponds with the delivery documents
- Check the softstarter as well as the package. If you find any damages, please contact the transport company or supplier immediately.

4:1.1 Intermediate storage

Until the softstarter is mounted, it should be stored in its package.

4:2 Mounting

4:2.1 Handling when mounting

The softstarter is available in five physical sizes. Models PST30 to PST300 can be taken out of the packages and mounted without lifting equipment.

For all other models, lifting equipment is recommended due to the weight.

See Chapter 3 "Description", for weights.



Do not lift the softstarter by the connection bars. Lifting by the connection bars may cause damage to the product.

4:2.2 Requirements

See Chapter 3 "Description" for environmental requirements.

4:2.3 Minimum distance to wall/front

To ensure a suitable cooling, the softstarter must be mounted vertically and in such a way that the airways are not blocked, see Figure 2.

Use the table below and Figure 3 for minimum distances between wall/front of the PST softstarter.



Information!

The values are minimum distances.

Softstarter type	A		В		С	
	mm	in	mm	in	mm	in
PST3072	100	3.94	10	0.39	20	0.79
PST85300	100	3.94	10	0.39	20	0.79
PST175300	100	3.94	10	0.39	20	0.79
PSTB370470	150	5.91	15	0.59	20	0.79
PSTB5701050	150	5.91	15	0.59	20	0.79

Chapter 4 - Mounting

4:2.4 Minimum enclosure sizes

In applications where the softstarter is installed in an enclosure, the following minimum enclosure sizes and fan capacities are recommended.

	Minimum enclosure dimensions								
Softstarter type	W		Н		D		Fan capacity		
	mm	in	mm	in	mm	in	m³/h	ft³/min	
PST3072	300	12	400	16	250	10	42	25	
PST85300	400	16	500	20	300	12	95	60	
PST175300	500	20	600	24	300	12	210	125	
PSTB370470	600	24	600	24	400	16	210	125	
PSTB5701050	750	30	900	36	400	16	210	125.00	

Dimensions and drilling plan: See Chapter 3, "Description"

Notes



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5



Figure 1: In Line Connection



Figure 2: Inside Delta connection

This chapter describes the electrical connections as well as connections for communication devices (optional) that must be made before the softstarter can be operated.

5:1 General



All wiring and connection must be carried out by a qualified electrician, and in accordance with installation standards and safety regulations.

See Chapter 2 " Quickstart".

5:2 Electrical connection

5:2.1 Main circuit

Softstarters PST30...PSTB1050 can be connected both "In Line", see Figure 1, and "Inside Delta", see Figure 2.

Connect the line side to terminals 1L1, 3L2, 5L3.

Connect the motor to terminals 2T1, 4T2, 6T3 on the motor side. The terminal marking is printed on the front label. For torque requirements and cable sizes, see Figure 5.





5:2.1.1 External Bypass contactor

An external by-pass contactor can be used for softstarter sizes PST30...300 (built in for PSTB370...1050).

Connect the contactor to terminals B1, B2 and B3 on the line side and terminals 2T1, 4T2 and 6T3 on the motor side.

The terminal markings are printed on the front label.



Information!

Do not use terminals B1, B2 or B3 for the "Inside Delta" connection. The current measurement will be wrong.

5:2.1.2 Protective earthing

Softstarters type PST85...PSTB1050 should be earthed using the terminals as shown in Figure 5 (one connection is sufficient).



Do not operate machine with the grounding wire disconnected









 \mathbf{O}

45 Nm - 443 lb.in

0 4T2 0 2T1

0

Figure 6: Tightening torgues and cable sizes

C

5

Chapter 5

Connection



Figure 7: Control voltage



Figure 8: Functional ground



5:2.2 Control voltage and control circuit 5:2.2.1 Control voltage, terminals 1 and 2

Connect the hot and neutral and phase to terminals 1 and 2.



Information!

Check that you have the correct control voltage U.

5:2.2.2 Grounding, terminal 3

Connect the cable to a grounding point close to the softstarter. The cable should be as short as possible. A suitable grounding point would be next to the softstarter on the mounting plate, see Figure 8. The mounting plate should also be grounded.



Information!

This is not a protective ground, it is a functional ground. The grounding cable should be as short as possible. Maximum length: 1.5 ft.

5:2.2.3 Start and Stop, terminals 4, 5, 8, 9, 10, 11

Internal control voltage

The softstarter has a built-in holding circuit which does not require any external power source for start and stop, See Figure 10.

A conventional circuit with a HOA switch is also possible, see Figure 11.



Figure 10: Holding circuit (momentary start signal required)



Figure 11: Conventional circuit (maintained start signal required)

Figure 12: Tightening torques and cable sizes

External control voltage

The softstarter can, if required, also be used with an external 24 V DC source from a PLC or similar. Connect the cables according to Figure 13 or Figure 14 depending on which type of control method is used.



Figure 13: Holding circuit with external control voltage (momentary start signal required)



AUTO

Figure 14: Conventional circuit with external control voltage (maintained start signal is required)



5:2.2.4 Programmable inputs, terminals 6 and 7

- The softstarter has two programmable inputs.
- In0: default, reset event
- In1: default, reset event

See Chapter 7 "Settings and configuration" for programming.

Connect the cables according to Figure 16 or Figure 17 depending on whether the internal or external source is being used.



Information!

See next page for multiple motor (sequence) starting



Figure 18: Tightening torques and cable sizes

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5

Figure 20: Terminals 12, 13, 14

M3 0,5 Nm - 4,3 lb.in

1......20

0,14 ... 2,5 mm² AWG 12 ... 22 0.14 ... 2.5 mm²

Figure 21: Tightening torques and cable dimensions (1 mm=0,0394 in)

3.5x0.6

5.6

1SXU 132 021 M0201





Figure 26: Fieldbus plug



Figure 28: External keypad



5:3 Connection of communication devices (optional)

5:3.1 Fieldbus communication

The fieldbus communication plug must be connected to the communication interface on the front of the PST, see Figure 26. Make sure that the plug is in correct position and tighten the screw with 0.8 Nm (7.1 lb in) and additional 1/4 turn.

For programming and other information, see Chapter 7 "Settings and configuration" and Chapter 8 "Fieldbus communication (option)".



Figure 27: Principle of a fieldbus network with PST softstarters connected

5:3.2 External keypad

An external keypad for door mounting can be connected to the softstarter. A 3-meter cable including both the serial communication and the power supply to the keypad makes the connection.

The external keypad can also be used for transferring parameters from one softstarter to another during commissioning (temporarily handheld). Note that NEMA 4/4X cannot be achieved when the keypad is not mounted.

When thee external keypad is used, both keypads will work in parallel but the softstarter keypad always has the highest priority if the keys on both units are pressed simultaneously.

5:3.3 Transferring parameters

To transfer (copy) parameters from one softstarter to another, connect the keypad to the chosen softstarter and follow the sequence below.

5:3.3.1 Uploading parameters

Enter the menu *Transfer par*. Select *To Keypad* and confirm by pressing *Select*. A text *Load to Keypad* will be displayed. Continue by pressing *Execute* and then Yes when the text *Are You Sure* is displayed. *Transfer OK* will now be displayed if the transmission was successful. Otherwise, *Transfer Not OK* will be displayed.



5:3.3.2 Downloading parameters

To download the parameters, connect the keypad to the chosen softstarter and select *To Starter*. A text *Load to Start* will be displayed. Continue by pressing *Execute* and then Yes when the text *Are You Sure* is displayed. *Transfer OK* will now be displayed if the transmission was successful; otherwise, *Transfer Not OK* will be displayed. Set the parameter *Setting le* and confirm by pressing *Next*.



Information!

The parameters in the menu Service Settings will not be transferred.

To learn how to operate the keypad, see Chapter 6 "Human-Machine Interface (HMI)"

5:3.3.3 Technical data

Display	LCD type
Signal indication LEDs	Power on: Green Protection: Yellow Fault: Red
Ambient temperature	Storage: -25°C to +70°C (-13°F to 158°F) Operation: 0°C to +50°C (32°F to 122°F)
Degree of protection	IP66
UL approval	Type 1 Type 4X Indoor Type 12
Marine approvals	Contact your ABB sales office

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6

This chapter describes how the human-machine interface (keypad and display) works.

6:1 Overview

6:1.1 Application

The Human-Machine Interface is used for several purposes such as programming the softstarter, i.e setup of inputs and outputs, protection functions, warning levels, fieldbus communication, etc. The HMI is also used for monitoring, local control and receiving status information from the softstarter.

6:1.2 Design

- The HMI consists of:
- · Status indication LED indicators
- LCD display
 - Selection and Navigation keys

The LED indicators work as follows:

LED	Color	Description				
Power on	Green	Control voltage connected				
Fault Red Indicates faults						
Protection Yellow Indicates protective function has activated		Indicates protective function has activated				
When a Fault of	When a Fault or Protection LED is activated, the LCD displays the actual fault or protection.					

The keypad is based on the same user concept as today's mobile phones.

The LCD contains two rows with 20 characters each.

The top row presents various information depending on its state. The bottom row indicates which function is currently selected.

A scrolling icon indicates what parameter or setting value is possible to change at the position.

The *Selection keys* normally have more than one function, such as selecting, changing and storing parameters. See the text on the bottom row of the LCD.

The *Navigation keys* are used for navigating through the various menus to the desired setting. When selecting from a list, the scrolling is done in a closed loop fashion.

The functionality of the keypad is illustrated by the following example:

Changing the rated motor current (Setting I,).

1. You will find the setting as well as a short explanation and the path to it in Chapter 10 "Functions". **Path in menu:**

Menu/SETTINGS/Functional Settings/

Start/Stop /Setting le

2. The top level of the softstarter start menu looks as in Figure 3. Press the left selection key to enter the menu. The display now appears as in Figure 4.

3. Press the left selection key to select SETTINGS. The display appears as in Figure 5.

4. Press the lower navigation key until the display appears as in Figure 6.

5. Press the left selection key to select *Functional settings*. Press the left selection key to select *Start/Stop*, Figure 7.

6. Press the left selection key to Change the Setting le, Figure 8.

The display now appears as in Figure 9.

7. Use the navigation keys to set the rated current. If you want to quit, you select *Cancel*, using the right selection key. Otherwise, you store the new setting by selecting *Store* with the left selection key. The display should now appear as in Figure 10.

8. Press the right selection key four times to return to top level.

Change Password Select Back

Figure 11: Change password

New Password	1
Store	Back

Figure 12: New password

1

New Password Next

Figure 13: New password stored

Wrong Password

Next Figure 14: Wrong password

Support Code 1 Next

Figure 15: Support code

\$Keypad is	Active
Lock	
Figure 16: Key	oad is menu

Figure 17: Locked keypad menu

Locked

Back

\$Keypad is

Unlocked

6:1.3 Password

To lock the keypad from control and change of settings, a password can be set. When the keypad is locked, all menus are available but no changes or actions can be initiated.

6:1.3.1 Setting password

The default password is always 1.

1 Press the upper navigation key once to enter the parameter Change Password.

- 2 Select Change Password, Figure 11
- 3 Set the new password (*No or 1...255*) using the navigation keys. Select *Store* and *Next*, Figure 12 and Figure 13. Select *Back* to return to top level.

6:1.3.2 Wrong password

If an incorrect password is entered, the text "Wrong Password" will be displayed, Figure 14. A support code will be given, Figure 15. The code can be ignored and an unlimited number of attempts can be made.

If you are unable to unlock the keypad, note the support code and contact your local ABB sales office.

6:1.4 Locking/unlocking the keypad

1 Press the upper navigation key twice to enter the parameter *Keypad is* Figure 16. The keypad is unlocked if the display indicates *Active* in the upper right corner.

2 Lock the keypad

Select *Lock.* Enter the correct password. Select *Enter.* Keypad is now locked. Select *Back* to return to top level.

3 Unlock the keypad.
 Select Unlock.
 Enter the correct password.
 Select Enter. The keypad is now active.
 Select Back to return to top level.

6



Press Back to return to previous state

Menu	Description			
Settings	Set up softstarter parameters			
Local control	Control the softstarter			
Event log	Present the Event Log, faults, protections, warnings			
Status Information	Present various information			
Reset Events	Reset of events			

Event Log Event Log Status Information Reset Events Figure 19: Top level



6:2.3 Settings menu

The settings menu is used to set up the softstarter parameters for various applications. Use the navigation keys to cycle through the various sub menus.

Function	Description
Application setting	Predefined parameters for typical applications
Basic settings	The basic and most used start/stop settings
Functional settings	Language, date, time, etc.
Service settings	Service and repair settings
All settings	A list with all possible settings
Changed settings	A list of all changed settings
Reset all settings	Reset all settings to factory default settings
Operation mode	Test mode for softstarter

Figure 20: Settings menu

6:2.4 Local Control menu

The Local Control menu is used to start or stop the motor from the keypad. When local control is selected, the softstarter can only be controlled by the keypad. The previous type of control is activated when exiting local control. Three different selections are possible (see the table below). Press navigation keys to view different types of local control.



The LOCAL CONTROL menu can not be entered if Sequence start is selected. Once the motor has been started in this menu, it must first be stopped before you leave the menu. If the motor is already running when the menu is entered, it is possible to leave the menu without stopping the motor.

Function	Description
Start/stop	To start and stop the motor with the keypad
Jog	To run the motor as long as Jog is pressed
DOL start (PSTB370PSTB1050 only)	To start and stop the motor with the built- in by-pass contactor. (See Chapter 3 for AC3 ratings.)

Figure 21: Local control menu





6:2.5 Event Log menu

The Event Log menu is used to check the event log in the softstarter. When entering this menu, the twenty latest events in the log are presented, in chronological order with the latest event as No. 1, the second latest as No. 2 etc.

The events are presented with "type of event", date and time.

Use the navigation keys to view all entries in the event log.

6:2.6 Status Information menu

The Status information menu is used to present various information. Use the navigation keys to cycle through the various sub menus.

If the unit is connected "inside delta", the displayed phase currents, L1, L2 & L3 are inside delta current values.

Display text	Function
Frequency	Measured frequency
Phase seq	Phase sequence indication
Connection	Type of connection, In Line/Inside Delta
Phase L1	Phase current L1
Phase L2	Phase current L2
Phase L3	Phase current L3
Run time	Total run time of the motor
No. of Starts	Run counter
SW Ver. CU	Software version CU.
SW Ver. FU	Software version FU.
SW Ver KP ①	Software version External Keypad
DB Version	Database version
MAC Address	Internal addressing
LV Board No	Serial No of the LV PCB

1 Only if connected.

6:2.7 Reset Events menu

The Reset Events menu is entered automatically when a fault has occurred or a protection is activated. It can also be entered through the main menu. Use the navigation keys to view all events. Each event can be reset.

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Changed settings	7.23
Reset all settings	7.23

1:1 Settings
Settings can be done in three different ways:
• Keypad
Fieldbus communication
External keypad (optional)
With the keypad, settings can be done as individual parameter settings or by selecting pre- defined parameters for different applications.
The unit has one complete set of parameters but some parameters have extra settings (i.e., sequence start). All default parameters are stored in the unit in case a full reset to default values is required. When the fieldbus communication is selected, most parameters can also be modified from this interface.
Caution! The motor may start unexpectedly if there is a start signal present when doing any of the actions listed below:
Switching from one type of control to another (fieldbus control / hardware control) Re-programming the programmable inuts
Reset all Settings (programmable input set to Enable).

7

Setting/parameter	Top level	Application setting	Basic settings	Functional settings	Presentation settings	All settings	Reset all settings
Password	Х						
Keypad lock/unlock	Х						
Reset to factory default setting							Х
Application type		Х					
Setting le		Х	Х	Х		Х	
Overload class		Х	Х	Х		Х	
External By-pass		Х	Х	Х		Х	
Start ramp		Tune Set	Х	Х		Х	
Stop ramp		Tune Set	х	х		Х	
Initial voltage		Tune Set	х	Х		Х	
End voltage		Tune Set	Х	Х		Х	
Step down voltage		Tune Set	Х	Х		Х	
Current limit		Tune Set	Х	Х		Х	
Kick start				Х		Х	
Kick level				Х		Х	
Kick time				Х		Х	
Start range				Х		Х	
Stop range				Х		Х	
Overload protectcion				х		Х	
Overload start class				Х		Х	
Overload run class				Х		Х	
Overload operation				Х		Х	
Locked rotor protection				Х		Х	
Locked rotor protection level				Х		Х	
Locked rotor protection time				Х		Х	
Locked rotor protection operation				Х		Х	
Underload protection				Х		Х	
Underload protection level				Х		Х	
Underload protection time				Х		Х	
Underload protection operation				Х		Х	
Phase imbalance protection				Х		Х	
Phase imbalance protection level				Х		Х	
Phase imbalance protection operation				Х		Х	
High current protection				Х		Х	
High current protection operation				Х		Х	
Phase reversal protection				Х		Х	
Phase reversal protection operation				х		Х	
PTC protection				Х		Х	
PTC protection operation				Х		Х	
By-pass fault operation				Х		Х	
Warning high current				Х		Х	
Warning high current level				Х		Х	
Warning low current				Х		Х	
Warning low current level				Х		Х	
Warning overload				х		Х	
Warning overload level				Х		Х	
Warning thyristor (SCR) overload				Х		Х	
Phase loss fault operation				Х		Х	
Fieldbus fault operation	1			Х		Х	
Frequency fault operation				×		x	

7:1.1 Overview of all accessible settings (different menus)

Setting/parameter	Top level	Application setting	Basic settings	Functional settings	Presentation settings	All settings	Reset all settings
Heat sink over-temperature operation				Х		Х	
Shorted thyristor (SCR) fault operation				Х		Х	
Programmable input, In0				Х		Х	
Programmable input, In1				Х		Х	
Programmable output relay, K4				Х		Х	
Programmable output relay, K5				Х		Х	
Programmable output relay, K6				Х		Х	
Programmable software output, V7				Х		Х	
Event for relay K4				Х		Х	
Event for relay K5				Х		Х	
Event for relay K6				Х		Х	
Event for SW output V7				Х		Х	
Fieldbus control				Х		Х	
Fieldbus type				Х		Х	
Fieldbus address				Х		Х	
No. of sequences (sequence start)				Х		Х	
1st Setting le				Х		Х	
2nd Setting le				Х		Х	
3rd Setting le				Х		Х	
Start ramp 1				х		Х	
Start ramp 2				х		Х	
Start ramp 3				Х		Х	
Initial voltage 1				х		Х	
Initial voltage 2				Х		Х	
Initial voltage 3				х		Х	
Current limit 1				Х		Х	
Current limit 2				Х		Х	
Current limit 3				Х		Х	
Language					Х	Х	
LCD auto off					Х	Х	
Date type					Х	Х	
Date year					Х	Х	
Date month					Х	Х	
Date day					Х	Х	
Time hour					Х	Х	-
Time minutes					X	Х	

7:1.1 Overview of all accessible settings (different menus) cont.

	3- (
Description	Display text	Setting range	Default value	Actual setting
Setting current	Setting le	9.01207A	Individual	
Time for start ramp	Start Ramp	130s, 1120s	10s	
Time for stop ramp	Stop Ramp	030s, 0120s	0s	
Initial voltage for start ramp	Init Volt	3070%	30%	
End voltage for stop ramp	End Volt	3070%	30%	
Step down voltage	Step down	30100%	100%	
Level of the current limit	Current Lim	2.07.0xle	4.0xle	
Selection of kick start	Kick Start	Yes, No	No	
Level of kick start	Kick Level	50100%	50%	
Time for kick start	Kick Time	0.11.5s	0.2s	
Range for start ramp	Start Range	1-30s, 1-120s	1-30s	
Range for stop ramp	Stop Range	0-30s, 0-120s	0-30s	
Overload protection	Overload	No, Normal, Dual	Normal	
Overload class	OL Class	10A, 10, 20, 30	10	
Overload class, Dual type, Start class	OL Class S	10A, 10, 20, 30	10	
Overload class, Dual type, Run class	OL Class R	10A, 10, 20, 30	10	
Type of operation for overload protection	OL Op	Stop-M, Stop-A, Ind	Stop-M	
Locked rotor protection	Locked Rotor	Yes, No	No	
Trip level for locked rotor protection	Lock R Lev	0.58.0xle	4.0xle	
Trip time for locked rotor protection	Lock R Time	0.210s	1.0s	
Type of operation for locked rotor protection	Lock R Op	Stop-M. Stop-A. Ind	Stop-M	
Underload protection	Underload	Yes. No	No	
Trip level for underload protection	Underl Lev	0.40.8xle	0.5xle	
Trip time for underload protection	Underl Time	1 30s	10s	
Type of operation for underload protection	Underl Op	Stop-M Stop-A Ind	Stop-M	
Phase impalance protection	Phase Imb	Yes No	No	
Trip level for phase imbalance protection	Ph Imb I ev	10.80%	80%	
Type of operation for imbalance protection	Ph Imb On	Ston-M Ston-A Ind	Stop-M	
High current protection	High L	Yes No	No	
Type of operation for high current protection	High I On	Stop-M Stop-A Ind	Stop-M	
Phase reversal protection	Phase Rev	Yes No	No	
Type of operation for phase reversal protection	Ph Rey On	Stop-M Stop-A Ind	Stop-M	
PTC protection	PTC	Ves No	No	
Type of operation for PTC protection	PTC On	Stop M Stop A Ind	Stop-M	
	Ext ByPass	Yos No	Stop-Ivi	
	BR Closed On	Stop_M_Stop_A	Stop-M	
	BP Closed Op	Stop-M, Stop A	Stop-M	
High ourront worning	BF Open Op	Stop-Ivi, Stop A	Stop-IVI	
Trip level for bigh ourrent worning	Wall Here		1.2×10	
	Warp I-Low	Voc. No.	1.2xie	
	Wall I Low		0.0.1	
I rip level for low current warning	Wa I=L Lev	0.41.0xie	U.8xie	
motor overload warning	Warn OL	Yes, No	NO	
Trip level for motor overload warning	Wa OL Lev	4099%	90%	
Thyristor overload warning	Warn SCR OL	Yes, No	NO	
Type or operation for phase loss fault	Ph Loss Op	Stop-M, Stop-A	Stop-M	
Type of operation for fieldbus fault	FB Fault Op	Stop-M, Stop-A	Stop-M	
Type of operation for frequency fault	Freq F Op	Stop-M, Stop-A	Stop-M	
Type of operation for heatsink overtemp fault	HS Temp Op	Stop-M, Stop-A	Stop-M	
Type of operation for shorted thyristor fault	SCR SC Op	Stop-M, Stop-A	Stop-M	
Function of programmable input In0	In0	None, Reset, Enable Jog, DOL, Start 2, EB-Dic	Reset	

7:1.1 Overview of all accessible settings (different menus) cont.

Description	Display text	Setting range	Default value	Actual setting
Function of programmable input In1	In1	None, Reset, Enable Jog, DOL, Start 3, FB-Dis	Reset	
Function of programmable output relay K4	Relay K4	Run, TOR, Event	Run	
Function of programmable output relay K5	Relay K5	Run, TOR, Event	TOR	
Function of programmable output relay K6	Relay K6	Run, TOR, Event	Event	
Function of programmable software relay V7	SW Outp V7	Run, TOR, Event	Event	
Overload event of relay K4	K4 Overload	Yes, No	No	
Fault event of relay K4	K4 Fault	Yes, No	No	
Shunt fault of relay K4	K4 Shunt Fault	Yes, No	No	
High current event of relay K4	K4 High I	Yes, No	No	
Thyristor overload event of relay K4	K4 SCR OL	Yes, No	No	
Locked rotor event of relay K4	K4 Lock Rot	Yes, No	No	
Underload event of relay K4	K4 Underload	Yes, No	No	
Phase imbalance event of relay K4	K4 Phase Imb	Yes, No	No	
PTC event of relay K4	K4 PTC	Yes, No	No	
Phase reversal event of relay K4	K4 Phase Rev	Yes, No	No	
Warning motor overload event of relay K4	K4 Warn OL	Yes, No	No	
Warning thyristor overload event of relav K4	K4 Wa SCR OL	Yes, No	No	
Warning high current event of relay K4	K4 Wa I=High	Yes, No	No	
Warning low current event of relay K4	K4 Wa I=Low	Yes, No	No	
Overload event of relay K5	K5 Overload	Yes, No	No	
Eault event of relay K5	K5 Fault	Yes, No	No	
Shunt fault of relay K5	K5 Shunt Fault	Yes, No	No	
High current event of relay K5	K5 High I	Yes No	No	
Thyristor overload event of relay K5	K5 SCR OI	Yes No	No	
Locked rotor event of relay K5	K5 Lock Rot	Yes No	No	
Linderload event of relay K5	K5 Underload	Yes No	No	
Phase imbalance event of relay K5	K5 Phase Imb	Yes No	No	
PTC event of relay K5	K5 PTC	Yes No	No	
Phase reversal event of relay K5	K5 Phase Rev	Yes No	No	
Warning motor overload event of relay K5	K5 Warn Ol	Yes No	No	
Warning thyristor overload event of relay K5	K5 Wa SCR OL	Yes No	No	
Warning high current event of relay K5	K5 Wa I-High	Yes No	No	
Warning low current event of relay K5	K5 Wa I=Low	Yes No	No	
Overload event of relay K6	K6 Overload	Yes No	Ves	
Fault event of relay K6	K6 Fault	Ves No	Ves	
Shunt fault of relay K6	K6 Shunt Fault	Yes No	Ves	
High current event of relay K6	K6 High I	Yes No	Vos	
Thyrister overlead event of relay K6		Yes, No	No	
Locked rotor event of relay K6	K6 Lock Rot	Ves No	No	
Linderlead event of relay K6	K6 Linderload	Vos. No	No	
	Ke Bhase Imb	Yes, No	No	
PTC event of relay K6		Yes, No	No	
Proceivent of relay Ko	KC Phase Day	Yes, No	No	
Warning meter everlend event of relay K6	K6 Phase Rev	Yes, No	No	
Warning motor overload event of relay Ko	K6 Warn OL	Yes, No	No	
warning thyristor overload event of relay K6	K6 Wa SCR OL	Yes, No	NO	
Warning high current event of relay K6	K6 Wa I=High	Yes, No	No	
Warning low current event of relay K6	K6 Wa I=LOW	Yes, No	NO	
	V/ Overload	Yes, NO	res	
Fault event of relay V7	V7 Fault	Yes, No	Yes	
High current event of relay V7	V7 High I	Yes, No	Yes	
I hyristor overload event of relay V7	V7 SCR OL	Yes, No	No	
Locked rotor event of relay V7	V7 Lock Rot	Yes, No	No	
Underload event of relay v7	V7 Underload	Yes, No	No	
Phase imbalance event of relay V7	V7 Phase Imb	Yes, No	No	

7:1.1 Overview of all accessible settings (different menus) cont.

7.1 1	Overview o	of all	accessible	settings	(different	menus	cont
1.1.1	Overview (лап	accessible	settings	lamerent	menus	Cont.

Description	Display text	Setting range	Default value	Actual setting
PTC event of relay V7	V7 PTC	Yes, No	No	
Phase reversal event of relay V7	V7 Phase Rev	Yes, No	No	
Warning motor overload event of relay V7	V7 Warn OL	Yes, No	No	
Warning thyristor overload event of relay V7	V7 Wa SCR OL	Yes, No	No	
Warning high current event of relay V7	V7 Wa I=High	Yes, No	No	
Warning low current event of relay V7	V7 Wa I=Low	Yes, No	No	
Control of the softstarter with the fieldbus	Fieldb Ctrl	Yes, No	No	
Type of fieldbus protocol used	Fieldb Type	AS-Int, Other	Other	
Fieldbus address	Fieldb Addr	01000	0	
Number of sequences for sequence start	No of Seq	No, 2, 3	No	
1st sequence, time for start ramp	Start Ramp 1	130s, 1120s	10s	
1st sequence, initial voltage for start ramp	Init Volt 1	3070%	30%	
1st sequence, current limit level	Curr Lim 1	2.07.0xle	4.0xle	
1st sequence, setting current	1st Set le	9.01207A	Individual	
2nd sequence, time for start ramp	Start Ramp 2	130s, 1120s	10s	
2nd sequence, initial voltage for start ramp	Init Volt 2	3070%	30%	
2nd sequence, current limit level	Curr Lim 2	2.07.0xle	4.0xle	
2nd sequence, setting current	2st Set le	9.01207A	Individual	
3rd sequence, time for start ramp	Start Ramp 3	130s, 1120s	10s	
3rd sequence, initial voltage for start ramp	Init Volt 3	3070%	30%	
3rd sequence, current limit level	Curr Lim 3	2.07.0xle	4.0xle	
3rd sequence, setting current	3st Set le	9.01207A	Individual	
Language to use on the display	Language	US/UK, FI, SE, PT, NL, IT, FR, ES, DE, CN, RU, TR	Indiividual	
Time for display automatic turn off	LCD Auto Off	1255min	15min	
Type of date presentation	Date Type	ISO, CE, US	ISO	
Year	Date Year	20012060	Individual	
Month	Date Month	112	Individual	
Day	Date Day	131	Individual	
Hour	Time Hour	023	Individual	
Minutes	Time Min	059	Individual	







Tuning parameters

Six parameters can be tuned individually if a more specific adjustment is required. Each parameter is described in Chapter 10 " Functions" .

- · Start ramp
- Stop ramp
- Initial voltage
- End voltage
- Step down voltage
- Current limit level

When all tuning parameters have been cycled through, the following information will be displayed, Figure 21. Select *Yes* if all necessary parameters are tuned. If a new tuning is required, select *Back* and follow the step *Tune Set* above

7:2.3 Basic Settings

The Basic settings menu consists of the most common start/stop parameters required for the set-up. Each parameter can be adjusted separately. For a detailed description of each parameter, see Chapter 10 " Functions" .

Enter the Basic settings

Enter the menu by selecting Basic Settings.

Setting I (motor FLA)

Set the current that the softstarter will be exposed to (i.e. rated motor current, if the unit is connected In Line).



Information!

For units connected Inside Delta the Setting I_e must be set according to the current in the delta circuit = 58% (1/($\sqrt{3}$)) of the rated motor current. Press Store to save the data after setting the current

External By-Pass contactor (Ext ByPass)

Set the parameter to Yes if an External By-pass Contactor is used, otherwise select No.

Start ramp

Set the ramp time for start.

Stop ramp

Set the ramp time for stop (softstop). Note that this function should only be used for applications with small flywheel masses, for example pumps and conveyors (minimizes product damage during the stop).

Initial voltage (Init Volt)

Set the initial voltage level.

End voltage (End Volt)

Set the end voltage level.

Step down

Set the level of the step down voltage. This function is only present if softstop is selected.

Current limit (Current Lim)

Set the current limit level for the start.

Overload Class (OL Class) Select the desired overload class.

The configuration of the basic setting menu is now completed. It is possible to return to the top level by pressing *Back* 3 times.



Protections Warnings Faults Inputs Outputs Fieldbus Seq. Start



7:2.4 Functional Settings

The Functional setting menu consists of groups with parameters arranged by function such as protection, warning, fault, fieldbus communication etc. This menu should be used if a more advanced set-up is required. For a detailed description of each parameter, see Chapter 10 "Functions"

Enter the Functional settings

Enter the menu by selecting Functional Settings.

7:2.4.1 Start/Stop

To set parameters related to start and stop, enter the Start/Stop group. The following parameters are available in this group:

- Setting I
- External By-Pass
- Start ramp
- Stop ramp
- Initial voltage
- End voltage
- Step down voltage
- · Current limit level
- Kick start
- Kick level
- Kick time
- · Start range
- Stop range

To set parameters from Setting I to Current limit level, see "Basic Settings".

Kick Start

Activate the Kick Start function by entering this menu. Press Store to save the selection.

Kick Level

Set the required level of the Kick Start. Press Store to save the data. This menu will only be visible if Kick Start is activated.

Kick Time

Set the required time for the kick start. Press Store to save the data. This menu will only be visible if Kick Start is activated.

Start Range

The ramp time for start can be set between 1 and 30 seconds as default. If required, the range can be extended up to 120 seconds by entering this menu. Press Store to save the data.

Stop Range

The ramp time for stop can be set between 0 and 30 seconds as default. If required, the range can be extended up to 120 seconds by entering this menu. Press Store to save the data.

The configuration of the parameters in the Start/Stop group is now completed. It is possible to return to top level by pressing Back three times. To configure the protections, proceed to that menu.



Underload Activate the protection if required by changing to Yes.
If "Yes" is selected, the following settings will be available:
Underload level (Underl Lev) Set the level of the underload protection. Available only if the protection is selected.
Underload time (Underl Time) Set the time for the underload protection. Available only if the protection is selected.
Underload type of operation (Underl Op)Select what operation should be initiated if the underload protection is activated:Stop-MThe motor will stop and a manual reset is required.Stop-AThe motor will stop and an automatic reset is performed.IndOnly indication will be given.PressStore to save the selected operation.
Phase imbalance (Phase Imb) Activate the protection if required by changing to Yes.
If "Yes" is selected, the following settings will be available: Phase imbalance level (Ph Imb Lev) Set the level of the phase imbalance protection. Available only if the protection is selected.
Phase imbalance type of operation (Ph Imb Op)Select what operation should be initiated if the phase imbalance protection is activated:Stop-MThe motor will stop and a manual reset is required.Stop-AThe motor will stop and an automatic reset is performed.IndOnly indication will be given.PressStore to save the selected operation.
High current (High I)
If "Yes" is selected, the following setting will be available: High current type of operation (High I Op) Select what operation should be initiated if the high current protection is activated: Stop–M The motor will stop and a manual reset is required. Stop–A The motor will stop and automatic reset is performed. Ind Only indication will be given. Press Store to save the selected operation.
Phase reversal (Phase Rev) Activate the phase reversal protection if required by changing to Yes. If "Yes" is selected, the following setting will be available:
Phase reversal type of operation (Ph Rev Op)Select what operation should be initiated if the phase reversal protection is activated:Stop-MThe motor will stop and a manual reset is required.Stop-AThe motor will stop and an automatic reset is performed.IndOnly indication will be given.Press Store to save the selected operation.
PTC Activate the PTC protection if required by changing to Yes.
If "Yes" is selected, the following setting will be available: PTC type of operation (PTC Op) Select what operation should be initiated if the PTC protection is activated: Stop-M The motor will stop and a manual reset is required. Stop-A The motor will stop and an automatic reset is performed. Ind Only indication will be given. Press <i>Store</i> to save the selected operation.



Frequency fault type of operation (Freq F Op)
Select what operation should be initiated if the frequency fault occurs (out of range):
Stop–M The motor will stop and a manual reset is required.
Stop–A The motor will stop and an automatic reset is performed.
Press Store to save the selected operation.
Heat sink type of operation (HS Temp Op)
Select what operation should be initiated if an over-temperature occurs:
Stop–M The motor will stop and a manual reset is required.
Stop–A The motor will stop and an automatic reset is performed.
Press Store to save the selected operation.
Shorted SCR type of operation (SCR SC Op)
Select what operation should be initiated if a fault occurs with shorted thyristor:
Stop–M The motor will stop and a manual reset is required.
Stop–A The motor will stop and an automatic reset is performed.
Press Store to save the selected operation.
By-pass doesn't open operation
Select what operation should be asserted if the contactor does not open:
Stop–M The motor will stop and a manual reset is required.
Stop–A The motor will stop and an automatic reset is performed.
Press Store to save the selected operation.
By-pass doesn't close operation (BP Open Op)
Select what operation should be asserted if the contactor does not close:
Stop–M The motor will stop and a manual reset is required.
Stop–A The motor will stop and an automatic reset is performed.
Press Store to save the selected operation.
Fault Connection, Fault Open SCR, Fault Line Side and Fault Intern
Selected operation for the faults listed above is always:
Stop–M The motor will stop and a manual reset is required.
Stop–A The motor will stop and an automatic reset is performed.
Press Store to save the selected operation.

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First sequence parameters (1st Seq .Pa
--

To set parameters related to the first sequence, enter the 1st Seq. Param. group. Following parameters can be adjusted:

1st Set le Setting current. Start Ramp1 Init Volt1 Curr Lim1

Ramp time for start. Initial voltage. Current limit level.

Press Store to save the selected parameter.

Second sequence parameters (2nd Seq .Param.)

To set parameters related to the second sequence, enter the 2nd Seq. Param. group. The following parameters can be adjusted:

2nd Set le Setting current. Start Ramp2 Ramp time for start. Init Volt2 Curr Lim2

Initial voltage. Current limit.

Press Store to save the selected parameter.

Third sequence parameters (3rd Seq .Param.)

To set parameters related to the third sequence, enter the 3rd Seq. Param. group. The following parameters can be adjusted:

3rd Set le Start Ramp3 Init Volt3 Curr Lim3

Setting current. Ramp time for start. Initial voltage. Current limit.

Press Store to save the selected parameter.



Information!

For wiring and operation of the start/stop signals, see Chapter 5, "Connection" under programmable inputs.



7:2.5 Presentation Settings

The Presentation setting menu consists of parameters for the LCD set-up. The presentation language can be chosen among 12 different languages. The real-time clock for the softstarter can be set in this menu.

Enter the Presentation settings

Enter the menu by selecting Presentation Set.

Presentation language

To set the desired presentation language on the LCD, press *Change* and *Store* the selected language. Country codes are based on ISO 3166.

Available languages are:

Language	Abbreviation in LCD	Language	Abbreviation in LCD
English	US/UK	Italian	IT
Chinese	CN	Dutch	NL
German	DE	Portuguese	PT
Spanish	ES	Swedish	SE
French	FR	Finnish	FI
Russian	RU	Turkish	TR



Information!

In case the wrong language is selected, follow the "emergency instructions" below to reach this parameter. (Start from the top level.)

Press left selection key twice.

Press lower navgation key three times.

Press left selection key twice.

Use the navigation keys to find the required language abbeviation.

Press left selection key to save the parameter.

LCD Auto Off

The LCD will be switched off automatically by a pre-set time between 1 - 255 minutes. If the display has switched off, touch any of the keys to turn it on again.

Date Type

The date can be presented in three different ways. Depending on the selected type, the following will be displayed at the top level:

Date type	type Display on the LCD	
ISO	Year - Month - Day	
US	Month - Day - Year	
CE	Day - Month - Year	

Date Year

To set the year in the real time clock, press *Change* to enter the setting level. Press *Store* to save the set value.

Date Month

To set the month in the real time clock, press *Change* to enter the setting level. Press *Store* to save the set value.

Date Day

To set the day in the real time clock, press *Change* to enter the setting level. Press *Store* to save the set value.

Time Hour

To set the hours in the real time clock, press *Change* to enter the setting level. Press *Store* to save the set value.

Time Min

To set the minutes in the real time clock, press *Change* to enter the setting level. Press *Store* to save the set value.

The configuration of the presentation setting menu is now completed. It is possible to return to the top level by pressing *Back* 3 times.





Figure 38: Display appearance in normal mode

	;Ope	eration	Mode		
	Sele	ect		Back	
Fig	ure 39:	Display a	appearanc	ce in demo	mode

during demo mode. When exiting demo mode, these values will be reset to previous values. Parameters changed and the Event Log will be kept when exiting demo mode.



7:2.7.1 Changed Settings

The Changed settings menu consists of all parameters that have been changed from the factory default setting.

If no parameters have been changed, the LCD will display No Changed Settings.

7:2.7.2 Reset all Settings

To reset all the changed parameters back to factory default setting, enter this menu. Confirmation of reset will be displayed as *Done* on the LCD. The real time clock, the hour run meter, and the total number of starts will not be affected by the reset. Notes



Chapter 8 Fieldbus communication (option)

Chapter 8 Fieldbus communication (option)



Figure 1: Principle of a fieldbus network with PST softstarters connected

8:1 Overview

The PST softstarter has an interface on the front for connecting the ABB fieldbus plug is used for fieldbus communication. Through this interface, it is possible to control the softstarter, achieve status information, as well as upload and down-load parameters.

The interface between the softstarter and the eplug is always the same. Independent of softstarter size, it is possible to connect any fieldbus protocol in the future since the protocol is defined in the eplug itself.

The following fieldbus protocols are available:

- AS-Interface
- DeviceNet
- Profibus DP
- Modbus

8:1.1 Required accessories

To connect the softstarter to a fieldbus system, the following accessories are required:

- Fieldbusplug for appropriate protocol (check that the cable length is sufficient).
- Connectors for bus connection.
- End plug (some protocols).
- Software for PLC set-up.

8:1.2 Instructions

To set up I/O, parameters, etc., please visit www.abb-control.com, go to the Literature Library, select "3. Technical Manual Download Library" and scroll down the page to locate the Softstarter technical literature library. Engineering document packages can be downloaded for all available protocols.



Chapter 9 Maintenance

 Regular maintenance
 9.2

 Service and repair
 9.2

Chapter 9 Maintenance

This chapter describes the maintenance required for the softstarter. In principle, the product is maintenance free but some items should be checked regularly. Caution! Do not open the softstarter or touch any live parts when the main and control voltage is connected. 9:1 Regular maintenance · Check that all mounting bolts/screws are fastened. Tighten if necessary. • Check that all connections of main, control and supply circuits are fastened. • Tighten the terminal screws and bolts on the connection bars, if necessary. • Check that the cooling airways are free from dirt and dust. If required, use pressurised air to clean. · Check external filters. Clean, if necessary. · Check that the fan is working and rotating freely. The blades should rotate without any resistance and this can be checked at voltage free state. Check the real time clock and adjust if necessary. In case of a fault or if a fault can not be reset, see Chapter 11, "Trouble shooting". 9:2 Service and repair A spare parts list and all necessary instruction for softstarter repair can be found at www.abb-control.com Information! Service and repair should be performed by authorized personnel only. Unauthorized repair may affect warranty.


Setting Current	
Start Ramp	
Stop Ramp	
End voltage	10.4
Step down voltage	10.4
Current limit	10.4
Kick Start	10.5
Kick Start Level	10.5
Kick Start Time	10.5
Start ramp range	10.5
Stop ramp range	10.5
Motor overload protection	10.6
Overload class	10.6
Overload class, dual type, start class	10.6
Overload class, dual type, run class	10.6
Overload protection, type of operation	10.7
Locked rotor protection	10.7
Locked rotor protection, trip level	10.7
Locked rotor protection time	10.7
Locked rotor protection, type of operation	10.7
Underload protection	10.8
Underload protection level	10.8
Underload protection time	10.8
Underload protection, type of operation	10.8
Phase imbalance protection	10.8
Phase imbalance protection level	
Phase imbalance protection, type of operation	10.9
High current protection	10.9
High current protection, type of operation	
Phase reversal protection	
Phase reversal protection. type of operation	
PTC protection	
PTC protection, type of operation	
External By-Pass	
High current warning	10 10
High current warning level	
Low current warning	10 11
Low current warning level	10 11
Overload warning	10 11
Overload warning level	10.11
SCR overload warning	10.11
	10.1
	10.1

Phase loss fault, type of operation	
Fieldbus fault, type of operation	
Frequency fault, type of operation	
Heatsink over-temperature fault, type of operation	
SCR short circuit fault, type of operation	
Programmable inputs In0 and In1	
Programmable outputs, Relay K4, K5 and K6	
Programmable software output V7	
Fieldbus control	10.15
Fieldbus type	
Fieldbus address	
Sequence start, number of sequences	10.15
Start ramp, first sequence	
Initial voltage, first sequence	
Current limit, first sequence	
Setting current, first sequence	
Start ramp, second sequence	
Initial voltage, second sequence	
Current limit, second sequence	
Setting current, second sequence	
Start ramp, third sequence	
Initial voltage, third sequence	
Current limit, third sequence	
Setting current, third sequence	
Language	10.18
LCD displaly automatic switch-off	10.18
Password	10.18
Date type	10.18
Year	10.18
Month	10.19
Day	10.19
Hour	10.19
Minutes	10.19
By-Pass doesn't open, type of operation (BP Closed Op)	
By-Pass doesn't close, type of operation (BP Open Op)	

This chapter describes all possible settings and functions in the softstarter, as well as the easiest way of finding them. The respective default values, setting ranges and parameter texts shown in the display are also described.

10:1 Setting Current

Path in menu:

Menu/SETTINGS/Functional Settings/ Start/Stop / Setting le

The setting of this parameter shall be according to the current the softstarter is exposed to. If the motor is connected In Line, set the rated motor current (see rating plate on the motor).



Information!

If the motor is connected Inside Delta, set the current in the Delta circuit by multiplying the rated motor current by $1/(\sqrt{3}) = 58\%$ (or .58).

Parameter text	Default value	Setting range	Description
Setting le	Individual (size related	91207A divided into 19 overlapping ranges	Rated motor current



Figure 1: Start ramp



Figure 2: Stop ramp

10:2 Start Ramp

Path in menu:

Menu/SETTINGS/Functional Settings/ Start/Stop / Start Ramp

When a start signal is given, the softstarter performs a start ramp by gradually increasing the output voltage to the motor. The start ramp continues until full voltage is applied to the motor.

Parameter text	Default value	Setting range	Description
Start Ramp	10s	130s, 1120s (Range depends on Start Range)	Time for start ramp

10:3 Stop Ramp

Path in menu: Menu/SETTINGS/Functional Settings/

Start/Stop / Stop Ramp

When a stop signal is given, the softstarter performs a stop ramp by gradually decreasing the output voltage to the motor. If the ramp time is set to 0, the softstarter will completely remove the voltage when a stop command is given.



This parameter shall be set to 0 for applications when large masses are involved!

Parameter text	Default value	Setting range	Description
Stop Ramp	0s	130s, 1120s (Range depends on Stop Range)	Time for stop ramp



70% 30% Figure 4: End voltage for Stop ramp



Figure 5: Step down voltage for Stop ramp



10:4 Initial voltage Path in menu:

Menu/SETTINGS/Functional Settings/ Start/Stop / Init Volt

This parameter makes it possible to set the voltage level where the start ramp begins. If the initial voltage is set too low, it will cause unneccessary long starting times and unnecessary heating of the motor.

Parameter text	Default value	Setting range	Description
Init Volt	30%	3070%	Initial voltage for Start Ramp

10:5 End voltage

Path in menu: Menu/SETTINGS/Functional Settings/ Start/Stop / End Volt

This parameter makes it possible to set the voltage level where the stop ramp ends. This function will be active only if parameter Stop ramp is used.

Parameter text	Default value	Setting range	Description
End Volt	30%	3070%	Initial voltage for Stop Ramp

10:6 Step down voltage Path in menu:

Menu/SETTINGS/Functional Settings/ Start/Stop / Step Down

When stopping a motor using the stop ramp, the speed will not decrease immediately. The step down voltage function makes it possible to set a level where the motor speed decreases as soon as the stop ramp begins. By using, a more optimized stopping of the motor is achieved. It is mainly used for pump applications.

Parameter text	Default value	Setting range	Description
Step down	100%	30100%	Voltage value to which the softstarter will step down at stop and where it will begin the stop ramp

10:7 Current limit

Path in menu:

Menu/SETTINGS/Functional Settings/ Start/Stop / Current Lim

It is possible to limit the starting current by using this function. When the current limit is reached, the output voltage stays stable until the current level falls below the limit, then the ramping continues.



Information!

The starting current must be high enough to make it possible for the motor to reach the rated speed. The lowest possible current depends on the performance of the motor and the characteristics of the load.

Parameter text	Default value	Setting range	Description
Current Lim	4.0 x le	2.07xle	Level of the current limit

10.4



10:8 Kick Start

Path in menu: Menu/SETTINGS/Functional Settings/ Start/Stop / Kick Start

In some applications it may be necessary to kick loose the motor i.e. initial friction, and therefore a kick start can be used. With this function, a selectable fixed voltage is applied during a settable time. Note that the current limit function is disabled during kick start.

Parameter text	Default value	Setting range	Description
Kick start	No	Yes, No	Selection of Kick Start

10:9 Kick Start Level

Path in menu:

Menu/SETTINGS/Functional Settings/ Start/Stop / Kick Level

With this parameter it is possible to set the level of the kick start. It is active only if kick start is selected.

Parameter text	Default value	Setting range	Description
Kick Level	50%	50100%	Level of Kick Start

10:10 Kick Start Time

Path in menu: Menu/SETTINGS/Functional Settings/ Start/Stop / Kick Time

This parameter makes it possible to set the time of the kick start. It is active only if kick start is selected.

Parameter text	Default value	Setting range	Description
Kick Time	0.2s	0.11.5s	Time for Kick Start

10:11 Start ramp range

Path in menu: Menu/SETTINGS/Functional Settings/ Start/Stop / Start Range

The time of the start ramp is settable up to 30 seconds as default, but if required the range could be extended up to 120 seconds by this parameter.

A long start ramp time will increase the risk of tripping the overload protection.

Parameter text	Default value	Setting range	Description	
Start range	1-30s	1-30s, 1-120s	Selectable range for start ramp	1

10:12 Stop ramp range

Path in menu: Menu/SETTINGS/Functional Settings/ Start/Stop / Stop Range

The time for the stop ramp is settable up to 30 seconds as default, but if required the range could be extended up to 120 seconds by this parameter.

Parameter text	Default value	Setting range	Description
Start range	0-30s	0-30s, 0-120s	Selectable range for stop ramp

Functions



Figure 8: Tripping curves for the electronic overload



- B Class 20
- C Class 10

D Class 10A

10

10:13 Motor overload protection

Path in menu:

Menu/SETTINGS/Functional Settings/ Protections/Overload

This parameter makes it possible to set the required function of the integrated motor overload protection. If an overload occurs, the motor stops and a reset is necessary before a restart is possible.

The motor overload protection has three different modes:

- No The protection is not activated
- Normal The protection is in normal operation

Dual The protection has two classes, one during start and another during continuous run

Parameter text	Default value	Setting range	Description
Overload	Normal	No, Normal, Dual	Overload protection



Information!

The motor thermal temperature is stored in the event of a power loss.

10:14 Overload class

Path in menu:

Menu/SETTINGS/Functional Settings/ Protections/Overload/OL Class

This parameter makes it possible to set the required overload class. Four different classes are available according to Figure 8.

- · Class 10A
- Class 10
- Class 20
- Class 30

Parameter text	Default value	Setting range	Description
OL Class	10	10A, 10, 20, 30	Overload class

10:15 Overload class, dual type, start class

Path in menu:

Menu/SETTINGS/Functional Settings/

Protections/Overload/Dual Class S

This parameter makes it possible to set the required overload class during start. When full voltage is reached, there will be a switch-over to run class after 30 seconds (see below).

Parameter text	Default value	Setting range	Description
OL Class S	10	10A, 10, 20, 30	Overload class

10:16 Overload class, dual type, run class

Path in menu:

Menu/SETTINGS/Functional Settings/

Protections/Overload/Dual Class R

This parameter makes it possible to set the required overload class during continuous run. The run class is activated 30 seconds after full voltage has been reached.

Parameter text	Default value	Setting range	Description		
OL Class R	10	10A, 10, 20, 30	Overload class, Dual type, Run class		

10:17 Overload protection, type of operation Path in menu: Menu/SETTINGS/Functional Settings/

Protections/Overload/OL Op

This parameter makes it possible to select between three different actions when the protection is activated. It is active only if the motor overload protection is selected.

- Stop-M The motor stops and a manual reset is required before restart.
- Stop-A The motor stops and an automatic reset is performed when the fault disappears (motor temp <80%)

Ind The motor continues to run but a fault indication is given

Parameter text	Default value	Setting range	Description
OL Class R	10	10A, 10, 20, 30	Overload class, Dual type, Run class

10:18 Locked rotor protection

Path in menu: Menu/SETTINGS/Functional Settings/ Protections/Locked Rotor

If the motor current exceeds the set level and the set time when the motor is running at full voltage, this protection is activated. The protection starts monitoring when full voltage is applied to the motor.

Parameter text	Default value	Setting range	Description
Locked rotor	No	Yes, No	Locked rotor protection

10:19 Locked rotor protection, trip level

Path in menu:

Menu/SETTINGS/Functional Settings/

Protections/Locked Rotor/Lock R Lev

This function makes it possible to set the level of the locked rotor protection. It is active only if Locked rotor protection is selected.

Parameter text	Default value	Setting range	Description
Lock R Lev	4.0 x le	0.58.1 xle	Trip level for locked rotor protection

10:20 Locked rotor protection time

Path in menu:

Menu/SETTINGS/Functional Settings/

Protections/Locked Rotor/Lock R Time

This parameter makes it possible to set the delay time from detection until activation of the protection. It is active only if Locked rotor protection is selected.

Parameter text	Default value	Setting range	Description
Lock R Time	1.0s	0.210.0s	Trip time for locked rotor protection

10:21 Locked rotor protection, type of operation

Path in menu:

Menu/SETTINGS/Functional Settings/

Protections/Locked Rotor/Lock R Op

This parameter makes it possible to select between three different actions when the protection is activated. It is active only if the Locked rotor protection is selected.

Stop M	The motor stops and	l a manual react in	required before restort
Slop-IVI	The motor stops and	i a manual reset is	required before restart.

Stop-A The motor stops and an automatic reset is performed when the fault disappears

Ind The motor continues to run but a fault indication is given.

Parameter text	Default value	Setting range	Description
Lock R Op	Stop-M	Stop-M, Stop-A, Ind	Type of operation for locked rotor protection

Functions

10:22 Underload protection Path in menu:

Menu/SETTINGS/Functional Settings/ Protections/Underload

If the motor current falls below the set level and the set time when the motor is running at full voltage, the protection is activated. The protection starts monitoring when full voltage is applied to the motor.

Parameter text	Default value	Setting range	Description
Underload	No	Yes, No	Underload protection



Information!

This protection could be used to avoid for example a pump running dry or detecting a broken belt.

10:23 Underload protection level

Path in menu:

Menu/SETTINGS/Functional Settings/ Protections/Underload/Underl Lev

This parameter makes it possible to set the level of the underload protection. It is active only if the underload protection is selected.

Parameter text	Default value	Setting range	Description
Underl Lev	0.5 x le	0.40.8xle	Trip level for Underload protection

10:24 Underload protection time

Path in menu:

Menu/SETTINGS/Functional Settings/

Protections/Underload/Underl Time

This parameter makes it possible to set the delay time from detection until the protection is activated. It is active only if underload protection is selected.

Parameter text	Default value	Setting range	Description
Underl Time	10s	130s	Trip time for Underload protection

10:25 Underload protection, type of operation

Path in menu:

Menu/SETTINGS/Functional Settings/

Protections/Underload/Underl Op

This parameter makes it possible to select between three different actions when the protection is activated. It is active only if the underload protection is selected.

Stop-M	The motor stops and a manual reset is required before re	estart
--------	--	--------

Stop-A The motor stops and an automatic reset is performed when the fault disappears

Ind The motor continues to run but a fault indication is given

Parameter text	Default value	Setting range	Description
Underl Op	Stop-M	Stop-M, Stop-A, Ind	Type of operation for Underload protection

10:26 Phase imbalance protection Path in menu:

Menu/SETTINGS/Functional Settings/ Protections/Phase Imb

If the current in one phase differs from another phase by more than the set level, the protection is activated. The protection starts monitoring 30 seconds after full voltage and trips after 10 seconds of imbalance.

Parameter text	Default value	Setting range	Description
Phase Imb	No	Yes, No	Phase imbalance protection

Protections/Ph	S/Functional Settings/ ase Imb/Ph Imb Lev		
This parameter active only if the	makes it possible to set the Phase imbalance protect	ne level of the phase imba tion is selected.	alance protection. It is
Parameter text	Default value	Setting range	Description
Ph Imb Lev	80%	1080%	Trip level for Phase imbalance protection
10:28 Phas Path in menu: Menu/SETTING Protections/Ph	e imbalance protec SS/Functional Settings/ lase Imb/Phase Imb Op	tion, type of operat	ion
tion is activated	. It is active only if the pha	ase imbalance protection i	s selected.
Stop-I Stop- <i>I</i> Ind	 M The motor stops and a The motor stops and a disappears The motor continues to 	a manual reset is required an automatic reset is perfo o run but a fault indication	before restart ormed when the fault is given
Parameter text	Default value	Setting range	Description
Ph Imb Op	Stop-M	Stop-M, Stop-A, Ind.	Type of operation for Phase imbalance protection
Parameter text	Default value	Setting range	Description
High I	No	Yes, No	High current protection
10:30 High c Path in menu:	urrent protection, typ S/Functional Settings/	e of operation	
Menu/SETTING Protections/Hig	gh l/High I Op	the transformer dimensional difference t	
Menu/SETTING Protections/Hig This parameter tion is activated	gh I/High I Op makes it possible to selec . It is active only if the hig	t between three different h current protection is selo	actions when the protec-
Menu/SETTING Protections/Hig This parameter tion is activated Stop-N	<pre>gh I/High I Op makes it possible to selec . It is active only if the hig</pre>	ct between three different h current protection is sel a manual reset is required	actions when the protec- ected. before restart
Menu/SETTING Protections/Hig This parameter tion is activated Stop-M Stop-/	 gh I/High I Op makes it possible to select . It is active only if the hig M The motor stops and a A The motor stops and a disappears 	ct between three different h current protection is selv a manual reset is required an automatic reset is perfo	actions when the protec- ected. before restart prmed when the fault
Menu/SETTING Protections/Hig This parameter ion is activated Stop-f Stop-/ Ind	 gh I/High I Op makes it possible to select . It is active only if the hig M The motor stops and a A The motor stops and a disappears The motor continues to 	ot between three different h current protection is self a manual reset is required an automatic reset is perfo o run but a fault indication	actions when the protec- ected. before restart prmed when the fault is given
Menu/SETTING Protections/Hig This parameter tion is activated Stop-M Stop-A Ind Parameter text	<pre>gh I/High I Op makes it possible to selec . It is active only if the hig M The motor stops and a A The motor stops and a disappears The motor continues to Default value</pre>	t between three different h current protection is self a manual reset is required an automatic reset is perfo o run but a fault indication Setting range	actions when the protec- ected. before restart ormed when the fault is given Description
Menu/SETTING Protections/Hig This parameter tion is activated Stop-N Stop-A Ind Parameter text High I Op	gh I/High I Op makes it possible to select . It is active only if the hig M The motor stops and a A The motor stops and a A The motor stops and a Image: A stop of the motor stops and a The motor stops and a M The motor stops and a M The motor continues to Image: Default value Stop-M	t between three different h current protection is self a manual reset is required an automatic reset is perfo o run but a fault indication Setting range Stop-M, Stop-A, Ind	actions when the protect ected. before restart ormed when the fault is given Description Type of operation for high current protection
Menu/SETTING Protections/Hig This parameter tion is activated Stop-/ Ind Parameter text High I Op 10:31 Phas Path in menu: Menu/SETTING Protections/Ph The softstarter as	gh l/High I Op makes it possible to seler . It is active only if the hig M The motor stops and a A The motor stops and a disappears The motor continues to Default value Stop-M e reversal protection iS/Functional Settings/ ase Rev accepts any phase sequences	t between three different h current protection is self a manual reset is required an automatic reset is perfor o run but a fault indication Setting range Stop-M, Stop-A, Ind on	actions when the protec- ected. before restart ormed when the fault is given Description Type of operation for high current protection
Menu/SETTING Protections/Hig This parameter tion is activated Stop-N Ind Parameter text High I Op 10:31 Phas Path in menu: Menu/SETTING Protections/Ph The softstarter a sequence must	gh l/High I Op makes it possible to seler . It is active only if the hig M The motor stops and a disappears The motor continues to Default value Stop-M e reversal protection iS/Functional Settings/ ase Rev accepts any phase seque be L1, L2, L3 or else the Default value	t between three different h current protection is self a manual reset is required an automatic reset is perfor o run but a fault indication Setting range Stop-M, Stop-A, Ind On here but if this protection is protection is activated.	actions when the protec- ected. before restart ormed when the fault is given Description Type of operation for high current protection
Menu/SETTING Protections/Hig This parameter tion is activated Stop-/ Ind Parameter text High I Op 10:31 Phas Path in menu: Menu/SETTING Protections/Ph The softstarter a sequence must Parameter text	gh I/High I Op makes it possible to seler . It is active only if the hig M The motor stops and a A The motor stops and a disappears The motor continues to Default value Stop-M e reversal protection iS/Functional Settings/ ase Rev accepts any phase seque be L1, L2, L3 or else the Default value	t between three different h current protection is sele a manual reset is required an automatic reset is perfor o run but a fault indication Setting range Stop-M, Stop-A, Ind ON nce but if this protection is protection is activated. Setting range	actions when the protected. before restart ormed when the fault is given Description Type of operation for high current protection

Functions

10:32 Phase reversal protection, type of operation Path in menu:

Menu/SETTINGS/Functional Settings/ Protections/Phase Rev/Ph Rev Op

This parameter makes it possible to select between three different actions when the protection is activated. It is active only if the phase reversal protection is selected.

Stop-M The motor stops and a manual reset is required before restart

Stop-A The motor stops and an automatic reset is performed when the fault disappears

Ind The motor continues to run but a fault indication is given

Parameter text	Default value	Setting range	Description
Ph Rev Op	Stop-M	Stop-M, Stop-A, Ind	Type of operation fro phase reversal protection

10:33 PTC protection

Path in menu: Menu/SETTINGS/Functional Settings/ Protections/PTC

The softstarter has an input for an external PTC thermistor that can be used independent of the built-in electronic overload protection status.

Parameter text	Default value	Setting range	Description
PTC	No	Yes, No	PTC protection

10:34 PTC protection, type of operation

Path in menu:

Menu/SETTINGS/Functional Settings/

Protections/PTC/PTC Op

This parameter makes it possible to select between three different actions when the protection is activated. It is active only if the PTC protection is selected.

- Stop-M The motor stops and a manual reset is required before restart
- Stop-A The motor stops and an automatic reset is performed when the fault disappears
- Ind The motor continues to run but a fault indication is given

Parameter text	Default value	Setting range	Description
PTC Op	Stop-M	Stop-M, Stop-A, Ind	Type of operation for PTC protection

10:35 External bypass

Path in menu:

Menu/SETTINGS/Functional Settings/ Start/Stop/Ext ByPass

This parameter defines whether an external bypass contactor is used or not.

Parameter text	Default value	Setting range	Description
Ext ByPass	No	Yes, No	An external bypass contactor is used

10:36 High current warning

Path in menu:

Menu/SETTINGS/Functional Settings/ Warnings/Warn I=High

If the function is selected, a warning signal will be given provided that the current during full voltage is higher than the set value. The measurement starts 30 seconds after **full voltage** is reached.

Parameter text	Default value	Setting range	Description
Warn I = High	No	Yes, No	High current warning

10:37 High current warning level Path in menu:

Menu/SETTINGS/Functional Settings/ Warnings/Warn I=High/Wa I=H Lev

This parameter makes it possible to set the indication level of the high current warning function.

Parameter text	Default value	Setting range	Description
WA I=H Lev	1.2 x le	0.55.0 x le	Trip level for high cur- rent warning

10:38 Low current warning

Path in menu:

Menu/SETTINGS/Functional Settings/ Warnings/Warn I=Low

If the function is selected, a warning signal will be given provided that the current during full voltage is lower than the set value. The measurement starts 30 seconds after **full voltage** is reached.

Parameter text	Default value	Setting range	Description
WA I=Low	No	Yes, No	Low current warning

10:39 Low current warning level Path in menu:

Menu/SETTINGS/Functional Settings/

Warnings/Warn I=Low/Wa I=L Lev

This parameter makes it possible to set the indication level of the low current warning function.

Parameter text	Default value	Setting range	Description
WA I=L Lev	0.8 x le	0.41.0 x le	Trip level for low current warning

10:40 Overload warning

Path in menu: Menu/SETTINGS/Functional Settings/ Warnings/Warn OL

If the function is selected, a warning signal will be given that the overload protection will be activated if the motor load does not decrease.

Parameter text	Default value	Setting range	Description
Warn OL	No	Yes, No	Overload warning

10:41 Overload warning level

Path in menu:

Menu/SETTINGS/Functional Settings/ Warnings/Warn OL/Wa OL Lev

This parameter makes it possible to set the indication level of the motor overload protection. The actual trip level of the protection is represented by 100%.

Parameter text	Default value	Setting range	Description
Wa OL Lev	90%	4099%	Trip level for overload warning

10:42 SCR overload warning

Path in menu: Menu/SETTINGS/Functional Settings/ Warnings/Warn SCR OL

If this function is selected, a warning signal will be given that the SCR overload protection will be activated if the current does not decrease. The warning level is 90%.

Parameter text	Default value	Setting range	Description
Warn SCR OL	No	Yes, No	SCR overload warning

Functions

10:43 Phase loss fault, type of operation

Path in menu: Menu/SETTINGS/Functional Settings/

Faults/Ph Loss Op

This parameter makes it possible to select between two different actions if a phase loss fault occurs.

- Stop-M The motor stops and a manual reset is required before restart
- Stop-A The motor stops and an automatic reset is performed when the fault disappears

Parameter text	Default value	Setting range	Description
Ph Loss Op	Stop-M	Stop-M, Stop-A	Type of operation for phase loss fault

10:44 Fieldbus fault, type of operation

Path in menu:

Menu/SETTINGS/Functional Settings/

Faults/FB Fault Op

This parameter makes it possible to select between two different actions if a fault occurs in the fieldbus communication.

- Stop-M The motor stops and a manual reset is required before restart
- Stop-A The motor stops and an automatic reset is performed when the fault disappears

Parameter text	Default value	Setting range	Description
FB Fault Op	Stop-M	Stop-M, Stop-A	Type of operation for fieldbus fault

10:45 Frequency fault, type of operation

Path in menu:

Menu/SETTINGS/Functional Settings/

Faults/Freq F Op

This parameter makes it possible to select between two different actions if the frequency is out of range (frequency fault).

Stop-M The motor stops and a manual reset is required before restart

Stop-A The motor stops and an automatic reset is performed when the fault disappears

Parameter text	Default value	Setting range	Description
Freq F Op	Stop-M	Stop-M, Stop-A	Type of operation for frequency fault

10:46 Heatsink over-temperature fault, type of operation

Path in menu:

Menu/SETTINGS/Functional Settings/

Faults/HS Temp Op

This parameter makes it possible to select between two different actions if the heat sink temperature of the softstarter is too high.

- Stop-M The motor stops and a manual reset is required before restart
- Stop-A The motor stops and an automatic reset is performed when the fault disappears

Parameter text	Default value	Setting range	Description
HS Temp Op	Stop-M	Stop-M, Stop-A	Type of operation for heat sink overtempera- ture fault

Figure 9: Internal control voltage



10:47 SCR short circuit fault, type of operation Path in menu:

Menu/SETTINGS/Functional Settings/ Faults/SCR SC Op

If one or several thyristors are shorted, this parameter makes it possible to select between two different actions.

- Stop-M The motor stops and a manual reset is required before restart
- Stop-A The motor stops and an automatic reset is performed when the fault disappears

Parameter text	Default value	Setting range	Description
SCR SC Op	Stop-M	Stop-M, Stop-A	Type of operation for SCR short circuit fault

10:48 Programmable inputs In0 and In1

Path in menu: Menu/SETTINGS/Functional Settings/ Inputs/In0 / In1

The softstarter has two programmable inputs, In0 and In1. They can be used for different purposes depending on the selected function, independently of each other.

Parameter text	Default value	Setting range	Description
In0	Reset	None, Reset, Enable, Jog, DOL, Start 2, FB-Dis	Function of program- mable input In0
ln1	Reset	None, Reset, Enable, Jog, DOL, Start 3, FB-Dis	Function of program- mable input In1



The motor may start unexpectedly if there is a start signal present when doing any of the actions listed below.

- Switching from one type of control to another (fieldbus control / hardwire control)
- Re-programming the programmable inputs
- Reset all Settings (programmable input set to Enable)

unctional Settings/ / K5 / K6		
three programmable h the selected functio It setting Run, relay I Event.	output relays that can be u n, independently of each c K5 has default setting Top	used for different pur- other. of Ramp and relay K6
during start ramp, ruitactor.	nning, and stop ramp if use	ed. Can be used to con-
is given when full vo contactor.	Itage to the motor is applie	d. Can be used to control
nas several alternativ	es that can be switched O	n/Off as required.
an be programmed to	o any combination of event	s below:
rotection ection otection tection tion Protection	 Shunt fault Low current w High current w SCR Overload Overload War Phase Revers PTC Protection 	varning varning d Warning ning sal Protection on
r does not close ault onsists of: r does not open e used to trip an upst	ream breaker in case the s	oftstarter is not able to
Default value	Setting range	Description
Run	Run, TOR, Event	Function of program- mable relay output K4
TOR	Run, TOR, Event	Function of program- mable relay K5
Event	Run, TOR, Event	Function of program- mable relay output K6
	three programmable the selected function t setting Run, relay H Event. during start ramp, run actor. is given when full vol- contactor. has several alternative an be programmed to rotection tection betection tection Protection a of: does not close hult bissts of: does not close but Default value Run TOR Event	hree programmable output relays that can be up in the selected function, independently of each of the setting Run, relay K5 has default setting Top is event. during start ramp, running, and stop ramp if use factor. is given when full voltage to the motor is applie contactor. has several alternatives that can be switched O an be programmed to any combination of event rotection ection • Shunt fault tection • Shunt fault ection • Shunt fault ection • Scr Overload is of: • Overload War is of: • Overload War etain • PTC Protection sof: • odoes not close nult • setting range eused to trip an upstream breaker in case the setting range Run Run, TOR, Event TOR Run, TOR, Event

10:51 Fieldbus control

Path in menu: Menu/SETTINGS/Functional Settings/ Fieldbus/Fieldb Ctrl

If the softstarter is going to be used with fieldbus communication, the fieldbus interface must be activated before any action can be taken.



The motor may start unexpectedly if there is a start signal present when doing any of the actions listed below.

- Switching from one type of control to another (fieldbus control / hardwire control)
- Re-programming the programmable inputs

• Reset all Settings (programmable input set to Enable)

Parameter text	Default value	Setting range	Description
Fieldb Ctrl	No	Yes, No	Control of the softstarter with fieldbus

10:52 Fieldbus type

Path in menu: Menu/SETTINGS/Functional Settings/ Fieldbus/Fieldb Ctrl/Fieldb Type

When the fieldbus communication is used, the present type of fieldbus must be selected. The following fieldbus types are available in the softstarter:

- AS-Interface
- DeviceNet
- Profibus DP Modbus

Parameter text	Default value	Setting range	Description
Fieldb type	Other	AS-Int, Other	Type of fieldbus, AS-Interface=short protocol Other=long protocol

10:53 Fieldbus address

Path in menu:

Menu/SETTINGS/Functional Settings/ Fieldbus/Fieldb Addr

With this parameter, it is possible to set a fieldbus address for the softstarter. Select a suitable, non-occupied number as the address.

Parameter text	Default value	Setting range	Description	
Fieldb Addr	0	01000	Fieldbus address	

10:54 Sequence start, number of sequences

Path in menu:

Menu/SETTINGS/Functional Settings/ Seg Start/No of Seg

Information!

The softstarter can start motors with up to three different parameter sets (1st parameter set, 2nd parameter set and 3rd parameter set). This function can be used for starting motors in a sequence (one by one) and also for starting two or three speed motors where different starting parameters are required for each speed.

Parameter text	Default value	Setting range	Description
No of Seq	No	No, 2, 3	Number of sequences for sequence start



The LOCAL CONTROL menu cannot be entered if Sequence start is selected.

10:55 Star	t ramp, first	sequence		
Path in menu: Menu/SETTING Seq Start/1st \$	SS/Functional Seq. Param./Sta	Settings/ art Ramp1		
This parameter	makes it possib	ble to set the star	t ramp time fo	r the first parameter se
Parameter text	Default value	Setting range	Description	
Start Ramp1	10 s	130s, 1120s	First sequence	e, time for start ramp
10:56 Initia Path in menu: Menu/SETTING	l voltage, fii	'st sequence Settings/	9	
Seq Start/1st S	makes it possik	t VOIt1	al voltage for t	he first parameter set
Parameter text		Setting range		no mot parameter set.
			First seguence	initial valtage for start re
Path in menu: Menu/SETTING Seq Start/1st S	GS/Functional Seq. Param./Cu	Settings/ Irr Lim1		(
Path in menu: Menu/SETTING Seq Start/1st S This parameter Parameter text	GS/Functional Geq. Param./Cu makes it possik	Settings/ Irr Lim1 ble to set the curr Setting range	rent limit level	for the first parameter
ath in menu: enu/SETTING eq Start/1st S nis parameter Parameter text Curr Lim1	SS/Functional Seq. Param./Cu makes it possik Default value 4 x le	Settings/ Irr Lim1 ble to set the curr Setting range 2.07.0xle	rent limit level Description First sequence	for the first parameter s
Path in menu: Menu/SETTING Seq Start/1st S This parameter Parameter text Curr Lim1 10:58 Setti Path in menu: Menu/SETTING Seq Start/1st S This parameter	SS/Functional Seq. Param./Cu makes it possib Default value 4 x le ng current, SS/Functional Seq. Param./1s makes it possib	Settings/ Irr Lim1 ble to set the curri- Setting range 2.07.0xle first sequence Settings/ t Set le ble to set the rate	rent limit level Description First sequence	for the first parameter s
Path in menu: Menu/SETTING Seq Start/1st S This parameter Parameter text Curr Lim1 10:58 Setti Path in menu: Menu/SETTING Seq Start/1st S This parameter Parameter text	SS/Functional Geq. Param./Cu makes it possit Default value 4 x le SS/Functional Geq. Param./1s makes it possit Default value	Settings/ Irr Lim1 ble to set the currical Setting range 2.07.0xle First sequence Settings/ t Set le ble to set the rate Setting range	rent limit level Description First sequence	for the first parameter s , current limit nt for the first paramete Description

Parameter text	Default value	Setting range	Description
Start Ramp1	10 s	130s, 1120s	First sequence, time for start ramp

Parameter text	Default value	Setting range	Description
Init Volt1	30%	3070%	First sequence, initial voltage for start ramp

Parameter text	Default value	Setting range	Description
Curr Lim1	4 x le	2.07.0xle	First sequence, current limit

set.

Parameter text	Default value	Setting range	Description
1st Set le	lr	91207A divided into 19 over- lapping ranges	First sequence, current limit

Parameter text	Default value	Setting range	Description
Start Ramp2	10s	130s, 1120s	Second sequence, time for start ramp

10:60 Initial voltage, second sequence

Path in menu: Menu/SETTINGS/Functional Settings/

Seq Start/2nd Seq. Param./Init Volt2

This parameter makes it possible to set the initial voltage for the second parameter set.

Parameter text	Default value	Setting range	Description
Init Volt2	30%	3070%	Second sequence, initial voltage for start ramp

10:61 Current limit, second sequence

Path in menu: Menu/SETTINGS/Functional Settings/

Seq Start/2nd Seq. Param./Curr Lim2

This parameter makes it possible to set the current limit level for the second parameter set.

Parameter text	Default value	Setting range	Description
Curr Lim2	4 x le	2.07.0xle	Second sequence, current limit

10:62 Setting current, second sequence

Path in menu:

Menu/SETTINGS/Functional Settings/

Seq Start/2nd Seq. Param./2nd Set le

This parameter makes it possible to set the rated motor current for the second parameter set.

Parameter text	Default value	Setting range	Description
2 Set le	lr	91207A divided into 19 overlapping ranges	Second sequence, current limit

10:63 Start ramp, third sequence

Path in menu:

Menu/SETTINGS/Functional Settings/

Seq Start/3rd Seq. Param./Start Ramp3

This parameter makes it possible to set the start ramp time for the third parameter set.

Parameter text	Default value	Setting range	Description
Start Ramp3	10s	130s, 1120s	Third sequence, time for start ramp

10:64 Initial voltage, third sequence

Path in menu:

Menu/SETTINGS/Functional Settings/ Seq Start/3rd Seq. Param./Init Volt3

This parameter makes it possible to set the initial voltage for the third parameter set.

Parameter text	Default value	Setting range	Description
Init Volt3	30%	3070%	Third sequence, initial voltage for start ramp

10:65 Current limit, third sequence

Path in menu: Menu/SETTINGS/Functional Settings/ Seq Start/3rd Seq. Param./Curr Lim3

This parameter makes it possible to set the current limit level for the third parameter set.

Parameter text	Default value	Setting range	Description
Curr Lim3	4 x le	2.07.0xle	Third sequence, current limit

10:66 Setting current, third sequence

Path in menu:

Menu/SETTINGS/Functional Settings/ Seq. Start/3rd Seq. Param./3rd Set le

This parameter makes it possible to set the rated motor current for the third parameter set.

Parameter text	Default value	Setting range	Description
3rd Set le	Ir	91207A divided into 19 overlapping ranges	Third sequence, motor rated current

Functions

10:67 Language

Path in menu: Menu/SETTINGS/Presentation Set./Language

The text on the LCD display can be presented in 12 different languages. This parameter makes it possible to select among the following languages:

Parameter text	Default value	Setting range	Description	
_				
 Italian 		 Dutch 		
 French 		 Portuguese 		
 Spanish 		 Swedish 		
 German 		 Finnish 		
 Chinese 		 Russian 		
 English 		 Turkish 		
	-			

Farameter text	Delault value	Setting range	Description
Language	By country	US/UK, CN, DE, ES, FR, IT, NL, PT, SE, FI, RU, TR	Language to use on display

10:68 LCD display automatic switch-off

Path in menu:

Menu/SETTINGS/Presentation Set./LCD Auto Off

The LCD display on the softstarter will be automatically switched off by a pre-set time. This time is always calculated from the last key activation. With this parameter, it is possible to set this time.

Parameter text	Default value	Setting range	Description
LCD Auto Off	15 min	1255 min	Time for display auto- matic turn off.

10:69 Password

Path in menu: Top level

Press Upper navigation key once.

This parameter makes it possible to set a password to lock the keypad. All menus are available when the keypad is locked but no changes or actions can be done.

Parameter text	Default value	Setting range	Description
Change Password	No	No, 1255	Password for display

10:70 Date type Path in menu:

Menu/SETTINGS/Presentation Set./Date Type

This parameter makes it possible to select the required type of date presentation on the LCD display.

The following three options are available:

- · ISO Year Month Day
- CE Day Month Year
- US Month Day Year

Parameter text	Default value	Setting range	Description
Date Type	ISO	ISO, CE, US	Type of date presenta- tion

10:71 Year Path in menu:

Menu/SETTINGS/Presentation Set./Date Year

This parameter makes it possible to set the current year for the real time clock.

Parameter text	Default value	Setting range	Description
Date Year	Individual	20012060	Year

10:72 Month

Path in menu:

Menu/SETTINGS/Presentation Set./Date Month

This parameter makes it possible to set the current month for the real time clock.

Parameter text	Default value	Setting range	Description		
Date Month	Individual	112	Month		

10:73 Day

Path in menu:

Menu/SETTINGS/Presentation Set.Date Day

This parameter makes it possible to set the current day for the real time clock.

Parameter text	Default value	Setting range	Description		
Date Day	Individual	131	Day		

10:74 Hour

Path in menu:

Menu/SETTINGS/Presentation Set./Time Hour

This parameter makes it possible to set the current hour for the real time clock.

Parameter text	Default value	Setting range	Description		
Time Hour	Individual	023	Hour		

10:75 Minutes

Path in menu:

Menu/SETTINGS/Presentation Set./Time Min

This parameter makes it possible to set the current minutes for the real time clock.

Parameter text Default value		Setting range	Description
Time Min	Individual	059	Minutes

10:76 By-pass doesn't open, type of operation (BP Closed Op) Path in menu:

Menu/SETTINGS/Functional Settings/Faults/BP Closed Op

This parameter makes it possible to select between two different actions of the softstarter if the by-pass contactor does not open in a proper way.

Stop-M The motor stops and a manual reset is required before restart.

The motor stops and an automatic reset is performed when the fault disappears Stop-A

Parameter text	Default value	Setting range	Description	
BP Closed Op	Stop-M	Stop-M, Stop-A	Type of operation if the bypass does not open	1

10:77 By-pass doesn't close, type of operation (BP Open Op) Path in menu:

Menu/SETTINGS/Functional Settings/Faults/BP Open Op

This parameter makes it possible to select between two different actions of the softstarter if the by-pass contactor does not close in a proper way.

Stop-M The motor stops and a manual reset is required before restart.

Stop-A The motor stops and an automatic reset is performed when the fault disappears

Parameter text	Default value	Setting range	Description		
BP Open Op	Stop-M	Stop-M, Stop-A	Type of operation if the bypass does not close		







General	11.2
Overview of indications	11.2
General problems and faults	11.2
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Fault indication	11.3 - 11.4
Protection indication	11.5 - 11.6

11:1 General

This chapter is a guide that can be used in case problems arise with the softstarter or the application.

The softstarter normally indicates a fault with LED Fault, and the LCD displays what type of fault it is. When a protection is activated, it will be indicated with LED Protection and the LCD displays what type of protection is active.

Faults not displayed in the softstarter can also be found in this chapter.

11:2 Overview of indications

This table shows in which state the different indications for protections, faults and warning may show up.

Active when selected						Always active							Active when selected										
LCD indication	Prot Motor OL	Prot Underload	Prot Locked Rot	Prot High I	Prot Phase Imb	Prot Phase Rev	Prot PTC	Prot SCR OL	Fault Phase Loss	Fault Connection	Fault Wrong Freq	Fault Line Side	Fault HS Temp	Fault Kick-Cur	Fault SC SCR	Fault Open SCR	Fault FB Timeout	Fault BP Closed	Fault BP Open	Warn OL	Warn SCR OL	Warn I=High	Warn I=Low
Stand by	Х	-	-	Х	-	-	Х	Х	-	-	-	-	Х		-	-	X ¹	-	-	Х	Х	-	-
At start signal	Х	-	-	Х	-	Х	Х	Х	Х	Х	Х	Х	Х	X ²	Х	-	X1	-	-	Х	Х	-	-
Ramp up	Х	-	-	Х	-	-	Х	Х	Х	-	-	-	Х		-	Х	X ¹	-	-	X	Х	-	-
TOR	Х	Х	Х	Х	Х	-	Х	Х	Х	-	-	-	Х		-	Х	X ¹	-	X ³	Х	Х	Х	Х
At stop signal	Х	-	-	Х	-	-	Х	Х	Х	-	-	-	Х		X ⁴	Х	X ¹	X ³	-	Х	Х	-	-
Ramp down	Х	-	-	Х	-	-	Х	Х	Х	-	-	-	Х		Х	Х	X ¹	-	-	Х	Х	-	-

1) Only if Fieldbus control is selected

2) Only if Kick-start is selected.

3) Only if by-pass is used.
 4) Only if by-pass is <u>not</u> used.

11:3 General problems and faults

Status	Possible cause	Solution
Motor humming/starts without given start signal	Shorted SCR By-pass contactor stuck in the closed position	Check and replace Check and correct the reason
Bad motor sound during start and operation	Inside Delta connection wrong	Check and correct the wiring
Bad motor sound during stop	Wrong ramp time for stop	Try different ramp times (some adjustments may be necessary for best result)
Motor does not start when giving start command using the hardware inputs	Control wiring not correct Start and stop command given at the same time Keypad is in Local Control menu	Check connections for start and stop Check that start and stop command is not given at the same time Check that the keypad is not in Local Control menu Check that parameter Fieldbus Ctrl is set to No.
Motor does not start when giving start command using the fieldbus communication	Setting of fieldbus parameter wrong	Check that parameter Fieldbus Ctrl is set to Yes Check that bit "Enable" is used Check that programmable inputs have correct settings
Displayed current in LCD does not correspond to mo- tor current	Inside Delta connection	If the softstarter is connected inside Delta, the current displayed is 58% (1/($\sqrt{3}$)) of the motor current.
Displayed current in LCD is not stable	The motor is too small The load on the motor is too small (current is out of measuring range)	Check that the softstarter corresponds to the m
Loading of parameters does not work properly	Fieldbus settings	See Chapter 8 Fieldbus for actual fieldbus type

11:4 Start up faults

Status			Possible cause	Solution		
Power on	Fault	Protection				
			LCD Auto shut off the keypad	Touch any key onn the keypad		
Power on	Fault	Protection				
			Control voltage is not connected	Connect the control voltage according to the circuit diagram		

11:5 Fault indication

Status	Possible cause	Solution
Power on Fault Protection	The main contactor or circuit breaker is open	Check and close contactor / breaker or any external switching device
Fault Phase Loss	Fuse blown	Check and replace the fuse in all (3) three phases
Reset Back	Any external device open / tripped	Check upstream disconnect or fuses. Check all power cable connections
	Main contactor opens too quickly	Add a time delay before opening
Power on Fault Protection Fault Connection Reset Back	The motor connection is not correct Shorted SCR at start	 In Line connected Check that there are no connections missing to the motor Check that the connections are carried out correctly Check and replace Inside Delta connected Check that there are no connections missing to the motor Check that the circuits are closed and correspond to the circuit diagram
	Shorted SCR at start	Check and replace
Frequency fault Power on Fault Wrong Freq Reset Back	The frequency is out of range. (47.5 - 52.5Hz or 57-63 Hz)	Check and correct the frequency
Line side fault Power on Fault Line Side Reset Back	The main voltage is not correct on the line side	Check and correct voltage on the line side
By-Pass does not open fault Power on Fault Protection Fault BP Closed Reset Back	The by-pass contactor is not opening properly	 Without by-pass Check that the parameter Ext byPass is set to No. With by-pass Check why the contactor is not opening and make necessary actions. Check that the parameter Ext ByPass is set to Yes
By-Pass does not close fault Power on Fault Protection Fault BP Open Reset Back	The by-pass contactor is not closing properly	 Without by-pass Check that the parameter Ext byPass is set to No. With by-pass Check why the contactor is not closing and make necessary actions. Check that the parameter Ext ByPass is set to Yes

11.3

11:5 Fault indication	(cont.)	
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Heat sink over-temperature Power on Fault Fault HS Temp Reset Back	Temperature too high on the heat sink. If the fault remains after reset, the heat sink temperature is too warm.	Check that the fans are working in a proper way Check that the cooling airways are free from dirt and dust Check that the ambient temperature is not too high
Kick-current fault Power on Fault Kick Cur Reset Back	Parameter Setting le is set too low	 In Line connected Set the value according to the rated motor current Inside Delta Set the value according to 58% (1/(√3)) of the rated motor current
Shorted SCR fault Power on Fault Fault SC SCR Reset Back	One or several SCRs are shorted	Check and replace. Contact your ABB sales office for replacement parts.
Non conducting SCR fault Power on Fault Fault Open SCR Reset Back	One or several SCRs are not conducting	Check and replace. Contact your ABB sales office for replacement parts.
Fieldbus fault Power on Fault FB Timeout Reset Back	The fieldbus commmunication is not working	Check that the fieldbusplug is connected correctly Check that the correct type of fieldbusplug is used Check that the paramter Fieldbus Type is set accord- ing to the present fieldbus type
Internal faults Power on Fault Intern 1 Reset Back Power on Fault Intern 2 Reset Back Power on Fault Intern 2 Reset Back Power on Fault Intern 3 Reset Back Power on Fault Intern 4 Reset Back	An internal communication fault of the softstarter has occurred	Disconnect and reconnect the control voltage (Ue) and make a restart. If the same fault remains, contact your ABB sales office

11:6 Protection indication



11:6 Protection indication (cont.)

PTC protection Power on Fault Protection 	An over-temperature is detected by the PTC thermis- tors in the motor	Check that the PTC circuit is closed and that the inputs are connected Check and correct the reason for the overheating
SCR overload protection Power on Fault Protection 	The softstarter is too small Too many starts/hour The ramp time for start is too long	Check and replace the softstarters with one of a suitable size Check and decrease number of starts/hour Check that current limit level is not set too low Check that the ramp time for start is not too long



Chapter 12 Diagrams

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Diagrams

12:1 Circuit Inline PST30...PST300



Terminal 3 is a functional ground, it is not a protective ground. It shall be connected to the mounting plate.

12.2 1SXU 132 021 M0201

Diagrams

12:2 Circuit Inside Delta PST30...PST300



Terminal 3 is a functional ground, it is not a protective ground. It shall be connected to the mounting plate.

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Diagrams

12:3 Circuit Inline PSTB370...PSTB1050



Terminal 3 is a functional ground, it is not a protective ground. It shall be connected to the mounting plate.

12.4

Chapter 12 Diagrams

12:4 Circuit Inside Delta PSTB370...PSTB1050



Figure 4: Circuit diagram PSTB370...PSTB1050

Notes

Notes

Notes



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