

ASAB

ADVANCED SOFT STARTER QUICK SETUP GUIDE

Issued on 22/05/13

R. 03

- This manual is integrant and essential to the product. Carefully read the instructions contained herein as they provide important hints for use and maintenance safety.
- This device is to be used only for the purposes it has been designed to. Other uses should be considered improper and dangerous. The manufacturer is not responsible for possible damages caused by improper, erroneous and irrational uses.
- Elettronica Santerno is responsible for the device in its original setting.
- Any changes to the structure or operating cycle of the device must be performed or authorized by the Engineering Department of Elettronica Santerno.
- Elettronica Santerno assumes no responsibility for the consequences resulting by the use of non-original spareparts.
- Elettronica Santerno reserves the right to make any technical changes to this manual and to the device without prior notice. If printing errors or similar are detected, the corrections will be included in the new releases of the manual.
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1 About This Manual

The examples and diagrams in this manual are included solely for illustrative purposes. The information contained in this manual is subject to change at any time and without prior notice. In no event will responsibility or liability be accepted for direct, indirect or consequential damages resulting from the use or application of this equipment.



WARNING

Indicates a hazard that may cause personal injury or death.



CAUTION

Indicates a hazard that may damage the equipment or installation.



NOTE

Provides helpful information.

2 Caution Statements



This symbol is used throughout this manual to draw attention to topics of special importance to the installation and operation of equipment.

Caution Statements cannot cover every potential cause of equipment damage but can highlight common causes of damage. It is the installer's responsibility to read and understand all instructions in this manual prior to installing, operating or maintaining the equipment, to follow good electrical practice including applying appropriate personal protective equipment and to seek advice before operating this equipment in a manner other than as described in this manual.



NOTE

The ASAB soft starter is not user serviceable. The unit should only be serviced by authorised service personnel. Unauthorised tampering with the unit will void the product warranty.

2.1 Electrical Shock Risk

The voltages present in the following locations can cause severe electric shock and may be lethal:

- AC supply cables and connections
- Output cables and connections
- Many internal parts of the starter, and external option units

The AC supply must be disconnected from the starter using an approved isolation device before any cover is removed from the starter or before any servicing work is performed.



WARNING - ELECTRICAL SHOCK HAZARD

Models ASAB-0500B~ASAB-1600C: The busbar and heatsink must be treated as live whenever the unit has mains voltage connected (including when the starter is tripped or waiting for a command).



SHORT CIRCUIT

The ASAB is not short circuit proof. After severe overload or short circuit, the operation of the ASAB should be fully tested by an authorised service agent.



GROUNDING AND BRANCH CIRCUIT PROTECTION

It is the responsibility of the user or person installing the ASAB to provide proper grounding and branch circuit protection according to local electrical safety codes.

2.2 System Design and Safety of Personnel

The starter is intended as a component for professional incorporation into complete equipment or a system. If installed incorrectly, the starter may present a safety hazard.

The starter uses high voltages and currents, carries stored electrical energy, and is used to control equipment which can cause injury.

Close attention is required to the electrical installation and the system design to avoid hazards either in normal operation or in the event of equipment malfunction. System design, installation, commissioning and maintenance must be carried out by personnel who have the necessary training and experience. They must read this safety information and this guide carefully.

None of the starter functions must be used to ensure safety of personnel, ie they must not be used for safety-related functions.

Careful consideration must be given to the functions of the starter which might result in a hazard, either through their intended behaviour or through incorrect operation due to a fault. In any application where a malfunction of the starter or its control system could lead to or allow damage, loss or injury, a risk analysis must be carried out, and where necessary, further measures taken to reduce the risk.

The system designer is responsible for ensuring that the complete system is safe and designed correctly according to the relevant safety standards.

2.2.1 STOP function

The STOP function does not remove dangerous voltages from the starter, the motor or any external option units.

2.3 Disposal Instructions



Equipment containing electrical components may not be disposed of together with domestic waste. It must be collected separately as electrical and electronic waste according to local and currently valid legislation.



This manual provides brief information to assist in installing and operating the ASAB in simple applications. For comprehensive information on installing and operating the ASAB, refer to the ASAB User Manual (available from santerno.com).

3 Introduction

The ASAB is an advanced digital soft start solution for motors from 11 kW to 850 kW. ASAB soft starters provide a complete range of motor and system protection features and have been designed for reliable performance in the most demanding installation situations.

3.1 Feature List

Extensive starting and stopping options

- Adaptive control
- Constant current
- Current ramp
- Timed voltage ramp soft stop
- Brake

Models for all connection requirements

- 23 A to 1600 A (nominal)
- 200 VAC to 525 VAC
- 380 VAC to 690 VAC
- Internally bypassed options
- In-line or inside delta connection (auto-detect)

Inputs and outputs

- Remote control inputs (3 x fixed, 1 x programmable)
- Relay outputs (3 x programmable)
- Analog output
- DeviceNet, Modbus, Profibus, Ethernet (Ethernet IP, Modbus TCP, Profinet) or USB communication modules (optional)

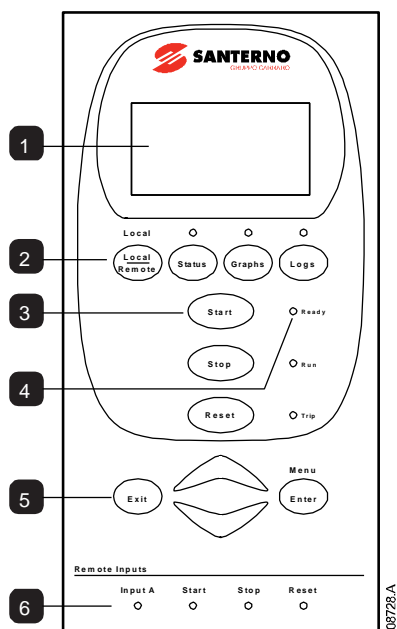
Easy-to-read display with comprehensive feedback

- Multi-language feedback
- Multiple status screens and performance graphs
- Date and time stamped event logging
- Operational counters (number of starts, hours run, kWh)
- Performance monitoring (current, voltage, power factor, kWh)
- User-programmable monitoring screen

Customisable protection

- Motor overload
- Excess start time
- Undercurrent
- Instantaneous overcurrent
- Current imbalance
- Mains frequency
- Input trip
- Motor thermistor
- Power circuit
- Phase sequence

4 The Keypad



1	Four-line display for status and programming details.
2	LOCAL/REMOTE: Toggle between Local and Remote control screens STATUS: Open the status displays and scroll between different status screens GRAPHS: Open the performance graphs and scroll between different graph screens LOGS: Open the logs
3	Soft starter local control buttons: START: Start the motor STOP: Stop the motor RESET: Reset a trip (Local mode only).
4	Status LEDs (see below for details)
5	Menu navigation buttons: EXIT: Exit the menu or parameter, or cancel a parameter change. MENU/ENTER: Enter a menu or parameter, or save a parameter change. ▲ ▼: Scroll to the next or previous menu or parameter, change the setting of the current parameter or scroll through the status or graph screens.
6	Remote input LEDs. When on: INPUT A: Programmable input A is active START: The remote start input is active STOP: The remote stop input is active RESET: The remote reset input is active

4.1 Starter Status LEDs

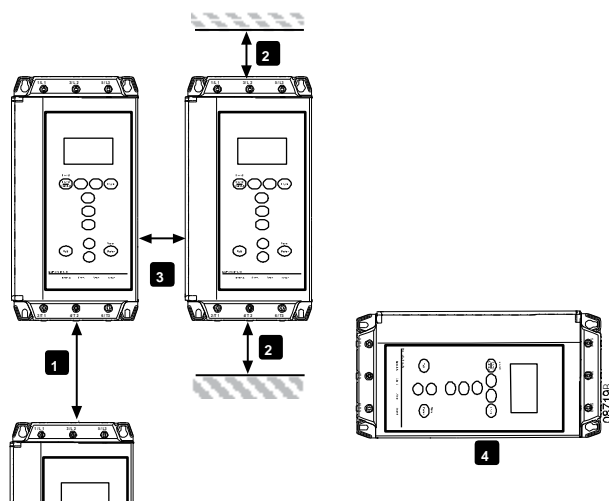
LED name	On	Flashing
Ready	The motor is stopped and the starter is ready to start.	The motor is stopped and the starter is waiting for the <i>Restart Delay</i> (parameter 5A) or <i>Motor Temperature Check</i> (parameter 4F).
Run	The motor is in run state (receiving full voltage).	The motor is starting or stopping.
Trip	The starter has tripped.	The starter is in warning state.
Local	The starter is in Local control mode.	–
Status	The status screens are active.	–
Graphs	The graph screens are active.	The graph has been paused.
Logs	The logs menu is open.	–

If the starter is in remote control mode, the Local LED will be off.

If all LEDs are off, the starter is not receiving control voltage.

5 Installation

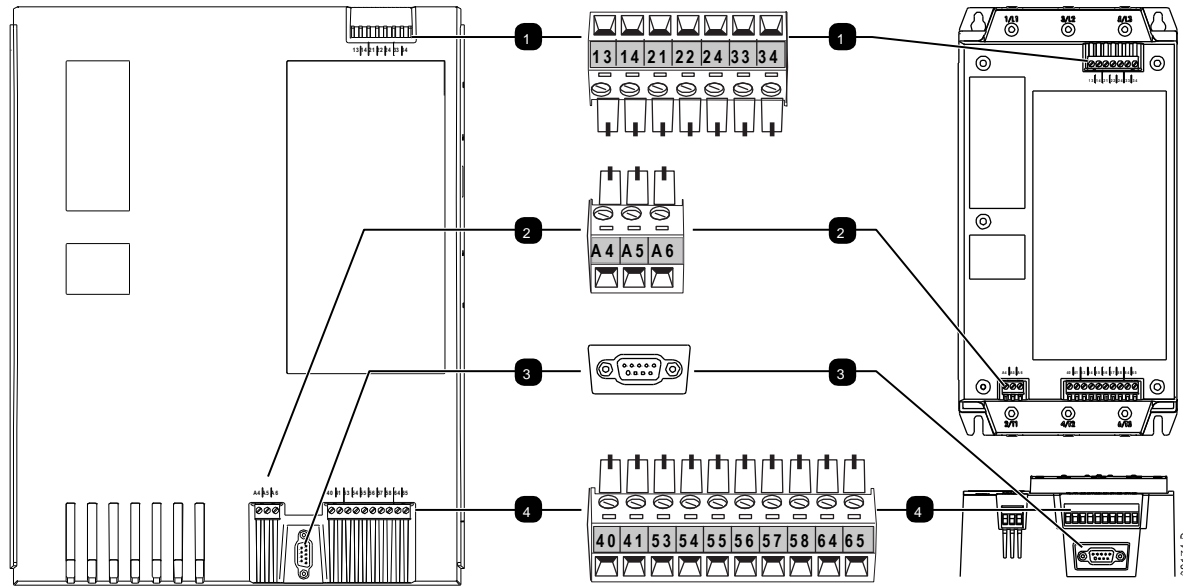
5.1 Physical Installation



1	ASAB-0023B ~ ASAB-0255C: Allow 100 mm (3.94 inches) between soft starters. ASAB-0380C ~ ASAB-1600C: Allow 200 mm (7.88 inches) between soft starters.
2	ASAB-0023B ~ ASAB-0220B: Allow 50 mm (1.97 inches) between the soft starter and solid surfaces. ASAB-0255C: Allow 100 mm (3.94 inches) between the soft starter and solid surfaces. ASAB-0380C ~ ASAB-1600C: Allow 200 mm (7.88 inches) between the soft starter and solid surfaces.
3	Side by side: allow 50 mm (1.97 inches) between soft starters.
4	The soft starter may be mounted on its side. Derate the soft starter's rated current by 15%.

5.2 Control Terminals

Control terminations use 2.5mm² plug-in terminal blocks. Unplug each block, complete the wiring, then reinsert the block.



1	Relay outputs
13, 14	Relay output A
21, 22, 24	Relay output B
33, 34	Relay output C
2	Control voltage (model dependent)
A5, A6	110~120 VAC
A4, A6	220~240 VAC
A5, A6	24 VAC/VDC
3	DB9 connector for remote control panel

4	Inputs and outputs
54, 55	Start
56, 57	Stop
58, 57	Reset
53, 55	Programmable input A
64, 65	Motor thermistor input
40, 41	Analog output
55, 41	24 VDC output



NOTE

If you are not using a thermistor, do not short terminals 64, 65.



NOTE

The DB9 connector on the soft starter should only be used to connect to a remote control panel. Connecting other equipment to this port can damage the soft starter or the equipment.

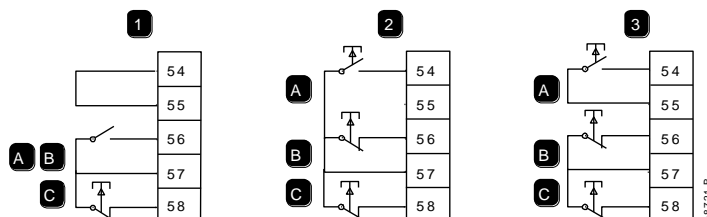
5.3 Control Voltage

Different models require control voltage to different terminals:

- 12 (110~120 VAC) A5, A6
- 12 (220~240 VAC) A4, A6
- 14 (24 VAC/VDC) A5, A6

5.4 Control Wiring

The ASAB has three fixed inputs for remote control. These inputs should be controlled by contacts rated for low voltage, low current operation (gold flash or similar).



1	Two-wire control
2	Three-wire control
3	Four-wire control
A	Start
B	Stop
C	Reset



CAUTION

Do not apply voltage to the control input terminals. These are active 24 VDC inputs and must be controlled with potential free contacts.

Cables to the control inputs must be segregated from mains voltage and motor cabling.

5.5 Power Terminations



NOTE


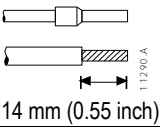
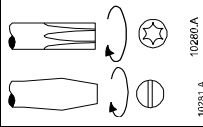
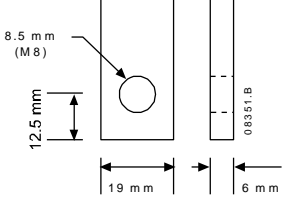
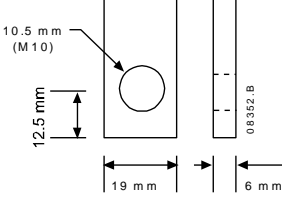
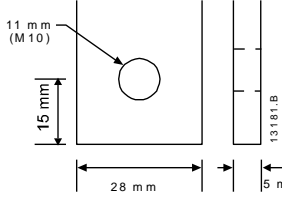
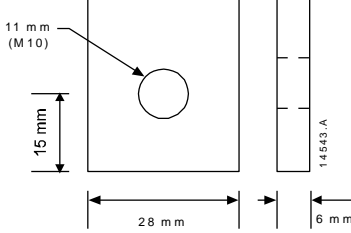
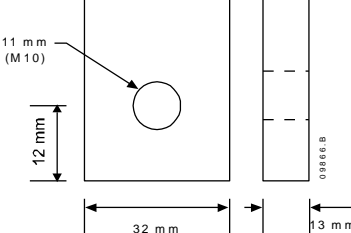
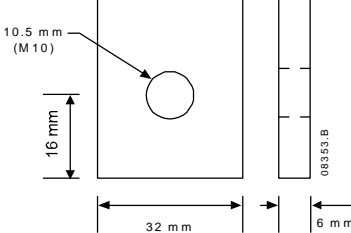
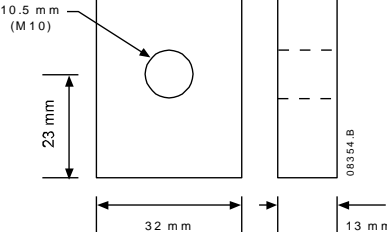
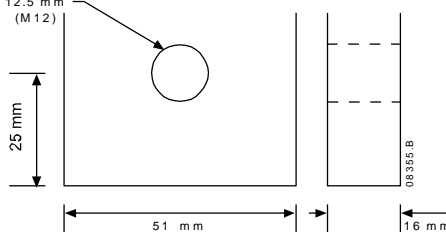
For personnel safety, the power terminals on models up to ASAB-0105B are protected by snap-off tabs. When using large cables, it may be necessary to break off these tabs.



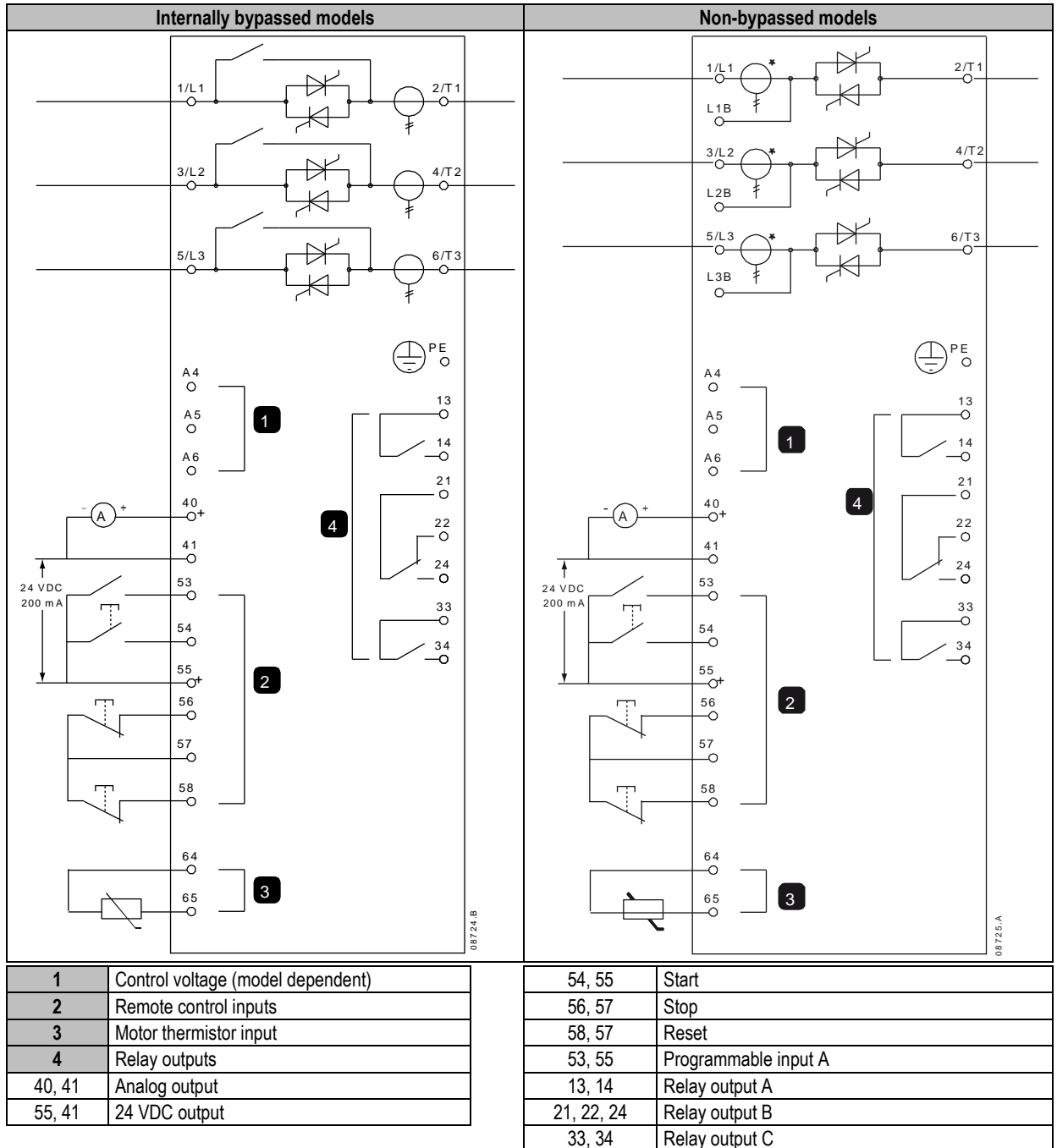
NOTE

Some units use aluminium busbars. When connecting power terminations, we recommend cleaning the surface contact area thoroughly (using an emery or stainless steel brush) and using an appropriate jointing compound to prevent corrosion.

Use only copper stranded or solid conductors, rated for 75 °C or higher.

ASAB-0023B~ASAB-0105B		
 <p>Cable size: 6-50 mm² (AWG 10-1/0) Torque: 4 Nm (2.9 ft-lb)</p>	 <p>14 mm (0.55 inch)</p>	 <p>Torx T20 x 150 Flat 7 mm x 150</p>
<p>ASAB-0145B</p> <p>19 Nm (14.0 ft-lb)</p> 	<p>ASAB-0170B~ASAB-0220B</p> <p>38 Nm (28.0 ft-lb)</p> 	<p>ASAB-0255B</p> <p>38 Nm (28.0 ft-lb)</p> 
<p>ASAB-0350B~ASAB-0425B</p> <p>38 Nm (28.0 ft-lb)</p> 	<p>ASAB-0500B~ASAB-1000B</p> <p>38 Nm (28.0 ft-lb)</p> 	<p>ASAB-0255C</p> <p>38 Nm (28.0 ft-lb)</p> 
<p>ASAB-0380C~ASAB-0930C</p> <p>38 Nm (28.0 ft-lb)</p> 	<p>ASAB-1200C~ASAB-1600C</p> <p>66 Nm (48.7 ft-lb)</p> 	

5.6 Schematic Diagrams



NOTE

Different models require control voltage to different terminals:

- 12 (110~120 VAC) A5, A6
- 12 (220~240 VAC) A4, A6
- 14 (24 VAC/VDC) A5, A6



NOTE

* ASAB-0255C current transformers are located on the output. Bypass terminals are labelled T1B, T2B and T3B.

6 How to configure the ASAB

1. Open the programming menu.
2. Scroll to Quick Setup Menu, then select your application.
3. Adjust each parameter to match your motor and application.

6.1 Programming Menu

You can access the Programming Menu at any time, including while the soft starter is running. Any changes to the start profile take effect immediately.

The Programming Menu contains four sub-menus:

Quick Setup Menu	Provides access to quick setup options for common applications.
Standard Menu	The Standard Menu provides access to commonly used parameters, allowing you to configure the ASAB to suit your application.
Extended Menu	The Extended Menu provides access to all the ASAB's programmable parameters, allowing experienced users to take advantage of advanced features.
Setup Tools	Setup Tools includes maintenance options to configure the ASAB's date and time or load a standard parameter set.

6.2 Standard Menu

The standard menu provides access to commonly used parameters, allowing the user to configure the ASAB as required for the application.

		Default Setting
1	Motor Details	
	1A <i>Motor Full Load Current</i>	Model dependent
2	Primary Start/Stop	
	2A <i>Start Mode</i>	Constant Current
	2B <i>Current Limit</i>	350%
	2C <i>Initial Current</i>	350%
	2D <i>Start Ramp Time</i>	00:10 mm:ss
	2G <i>Excess Start Time</i>	00:20 mm:ss
	2H <i>Stop Mode</i>	Coast To Stop
	2I <i>Stop Time</i>	00:00 mm:ss
4	Protection Levels	
	4B <i>Phase Sequence</i>	Any Sequence
	4C <i>Undercurrent</i>	20% FLC
	4D <i>Instantaneous Overcurrent</i>	400% FLC
	4E <i>Input A Trip</i>	Always Active
5	Protection Delays	
	5C <i>Undercurrent Delay</i>	00:05 mm:ss
	5D <i>Instantaneous Overcurrent Delay</i>	00:00 mm:ss
	5E <i>Input A Trip Delay</i>	00:00 mm:ss
	5F <i>Input A Initial Delay</i>	00:00 mm:ss
6	Inputs	
	6D <i>Input A Function</i>	Motor Set Select
	6E <i>Input A Name</i>	Input Trip
7	Relay Outputs	
	7A <i>Relay A Function</i>	Main Contactor
	7B <i>Relay A On Delay</i>	00:00 mm:ss
	7C <i>Relay A Off Delay</i>	00:00 mm:ss
	7D <i>Relay B Function</i>	Run
	7E <i>Relay B On Delay</i>	00:00 mm:ss
	7F <i>Relay B Off Delay</i>	00:00 mm:ss
	7G <i>Relay C Function</i>	Trip
	7H <i>Relay C On Delay</i>	00:00 mm:ss
	7I <i>Relay C Off Delay</i>	00:00 mm:ss
	7J <i>Low Current Flag</i>	50% FLC
	7K <i>High Current Flag</i>	100% FLC
	7L <i>Motor Temperature Flag</i>	80% FLC

10	Display	
	10A <i>Language</i>	English
	10B <i>User Screen - Top Left</i>	Starter State
	10C <i>User Screen - Top Right</i>	Blank
	10D <i>User Screen - Bottom Left</i>	Hours Run
	10E <i>User Screen - Bottom Right</i>	Blank
	10J <i>Display A or kW</i>	Current

For a full list of all parameters in the ASAB Extended Menu, refer to the ASAB User Manual, available from santerno.com.

7 Operation

7.1 Start, Stop and Reset Commands

The soft starter can be controlled in three ways:

- using the buttons on the keypad
- via remote inputs
- via a serial communication link

The **LOCAL/REMOTE** button controls whether the ASAB will respond to local control (via the keypad) or remote control (via the remote inputs). The ASAB can also be set to allow local control only or remote control only, using parameter 6A *Local/Remote*. The Local LED on the keypad is on when the soft starter is in local control mode and off when the soft starter is in remote control mode.

The **STOP** button on the keypad is always enabled.

Control via the serial communication network is always enabled in local control mode, and can be enabled or disabled in remote control mode (parameter 6B *Comms in Remote*). Control via the serial communication network requires an optional communication module.

7.1.1 Using the Soft Starter to Control a Motor

To soft start the motor, press the **START** button on the keypad or activate the Start remote input. The motor will start using the start mode selected in parameter 2A.

To stop the motor, press the **STOP** button on the keypad or activate the Stop remote input. The motor will stop using the stop mode selected in parameter 2H.

To reset a trip on the soft starter, press the **RESET** button on the keypad or activate the Reset remote input.

To stop the motor with a coast to stop, regardless of the setting of parameter 2H *Stop Mode*, press the local **STOP** and **RESET** buttons at the same time. The soft starter will remove power from the motor and open the main contactor, and the motor will coast to stop.

8 Specifications

Supply

Mains voltage (L1, L2, L3)

5	200 VAC ~ 525 VAC (± 10%)
7	380 VAC ~ 600 VAC (± 10%) (in-line or inside delta connection)
7	380 VAC ~ 690 VAC (± 10%) (earthed star supply system only)

Control voltage (A4, A5, A6)

12	110 ~ 120 VAC or 220 ~ 240 VAC (+ 10% / -15%), 600mA
14	24 VAC/VDC ±20%, 2.8A

Mains frequency	45 Hz ~ 66 Hz
Rated insulation voltage to earth	600 VAC
Rated impulse withstand voltage	4 kV
Form designation	Bypassed or continuous, semiconductor motor starter form 1

Short circuit capability

Coordination with semiconductor fuses	Type 2
Coordination with HRC fuses	Type 1
ASAB-0023B ~ ASAB-0220B	prospective current 65 kA
ASAB-0255B ~ ASAB-1000B	prospective current 85 kA
ASAB-0255C ~ ASAB-0930C	prospective current 85 kA
ASAB-1200C ~ ASAB-1600C	prospective current 100 kA

Electromagnetic capability (compliant with EU Directive 89/336/EEC)

EMC Emissions	IEC 60947-4-2 Class B and Lloyds Marine No 1 Specification
EMC Immunity	IEC 60947-4-2

Inputs

Input rating	Active 24 VDC, 8 mA approx
Start (54, 55)	Normally Open
Stop (56, 57)	Normally Closed

Reset (58, 57) Normally Closed
 Programmable input (53, 55) Normally Open
 Motor thermistor (64, 65) Trip >3.6 k Ω , reset <1.6k Ω

Outputs

Relay outputs 10A @ 250 VAC resistive, 5A @ 250 VAC AC15 pf 0.3
 Programmable outputs
 Relay A (13, 14) Normally Open
 Relay B (21, 22, 24) Changeover
 Relay C (33, 34) Normally Open
 Analog output (40, 41) 0-20 mA or 4-20 mA (selectable)
 Maximum load 600 Ω (12 VDC @ 20 mA)
 Accuracy \pm 5%
 24 VDC output (55, 41)
 Maximum load 200 mA
 Accuracy \pm 10%

Environmental

Protection
 ASAB-0023B ~ ASAB-0105B IP20
 ASAB-0145B ~ ASAB-1600C IP00
 Operating temperature -10 °C to 60 °C, above 40 °C with derating
 Storage temperature -25 °C to + 60 °C
 Operating Altitude 0 - 1000 m, above 1000 m with derating
 Humidity 5% to 95% Relative Humidity
 Pollution degree Pollution Degree 3
 Vibration (ASAB-0023B ~ ASAB-1000B) IEC 60068-2-6

Heat Dissipation

During Start 4.5 watts per ampere
 During Run
 ASAB-0023B ~ ASAB-0053B \leq 39 watts approx
 ASAB-0076B ~ ASAB-0105B \leq 51 watts approx
 ASAB-0145B ~ ASAB-0220B \leq 120 watts approx
 ASAB-0255B ~ ASAB-0500B \leq 140 watts approx
 ASAB-0580B ~ ASAB-1000B \leq 357 watts approx
 ASAB-0255C ~ ASAB-1600C 4.5 watts per ampere approx

Certification

C \checkmark IEC 60947-4-2
 CCC GB 14048.6 (CNCA-01C-011:2007)
 CE IEC 60947-4-2
 GOST GOST R 50030.4.1-2002
 RoHS Compliant with EU Directive 2002/95/EC
 UL / C-UL UL 508
 ASAB-0023B ~ ASAB-0105B IP20 & NEMA1, UL Indoor Type 1
 ASAB-0145B ~ ASAB-1600C IP00, UL Indoor Open Type
 Marine Lloyds Marine No 1 Specification

8.1 Model Code

