

Profibus Module

INSTRUCTIONS

For ASAC-0/ASAC-1/ASAB

Issued on 15/01/20

R. 02

- 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.
- Enertronica 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 Enertronica Santerno.
- Enertronica Santerno assumes no responsibility for the consequences resulting by the use of non-original spareparts.
- Enertronica 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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Product Compatibility

This communications module is suitable for use with ASAC and ASAB soft starters.

Product description	Soft starter name
Compact soft starter	ASAC-0, ASAC-1
Advanced starter	ASAB

The following functions are only available with ASAB soft starters:

parameter management, dual motor control, digital inputs, jog, current measurement in amperes, power information, warnings.

Parameter Management

Parameter lists vary according to the model and version of soft starter.

Refer to the relevant soft starter literature for a complete parameter list.

For the latest manuals and software, please visit our website.

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1 Disclaimer

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.

2 Important User Information

It is the installer's responsibility to follow all instructions in this manual and to follow correct electrical practice.

Use all internationally recognised standard practice for RS-485 communications when installing and using this equipment.

3 Warnings



WARNING

For your safety, isolate the soft starter completely from mains voltage before attaching or removing accessories.



WARNING

Observe all necessary safety precautions when controlling the soft starter remotely. Alert personnel that machinery may start without warning.

4 Installation

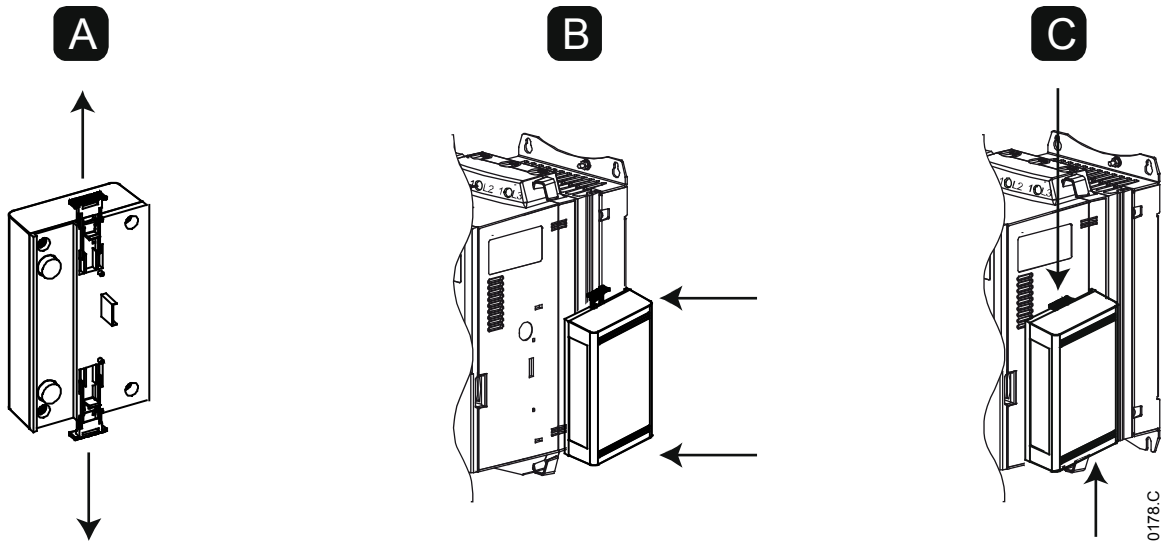


CAUTION

Remove mains and control voltage from the soft starter before attaching or removing accessories. Failure to do so may damage the equipment.

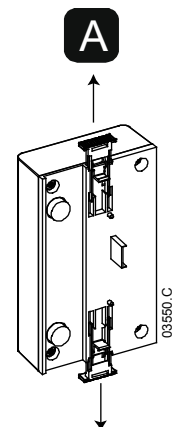
4.1 Installation Procedure

1. Remove control power and mains supply from the soft starter.
2. Fully pull out the top and bottom retaining clips on the module. [A]
3. Line up the module with the comms port slot. [B]
4. Push in the top and bottom retaining clips to secure the module to the starter. [C]
5. Set the module address to match the address set in the Master configuration tool.
6. Apply control power to the soft starter.
7. Insert the network connector and power up the module.



To remove the module:

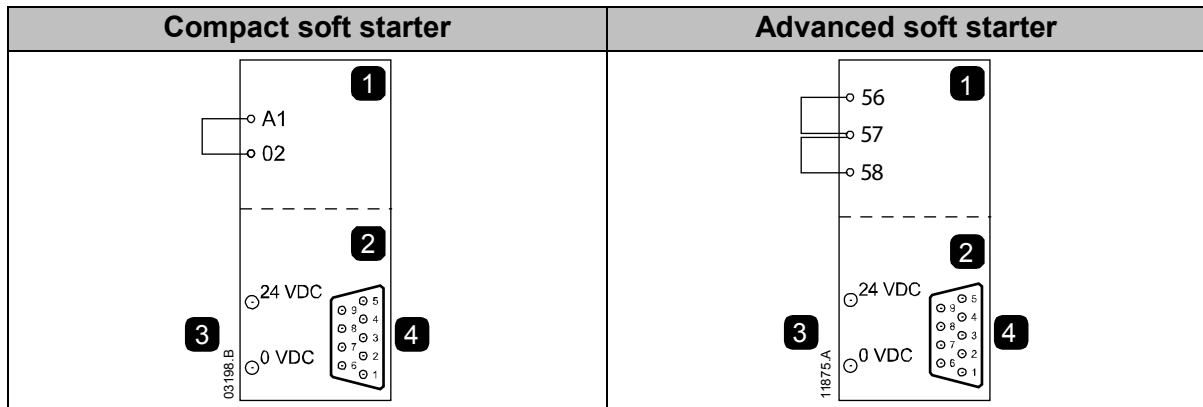
1. Take the module off-line.
2. Remove control power and mains supply from the soft starter.
3. Disconnect all external wiring from the module.
4. Fully pull out the top and bottom retaining clips on the module. [A]
5. Pull the module away from the soft starter.



5 Connection

The module connects to the Profibus network via a standard DB9 connector.

The Profibus Module can be powered either through the network cable or externally (24 VDC).



1	Soft starter A1, 02: Stop input	1	Soft starter (remote mode) 56, 57: Stop input 58, 57: Reset input
2	Profibus Module	2	Profibus Module
3	External 24 VDC supply required if not powered through bus	3	External 24 VDC supply required if not powered through bus
4	DB9 connector to Profibus network	4	DB9 connector to Profibus network

DB9 connector	
Pin No.	Assignment
1	Shield
2	24 VDC negative (optional)
3	RxD/TxD-P
4	Not used
5	DGND
6	VP (end of bus slave only)
7	24 VDC positive (optional)
8	RxD/TxD/-N
9	DGND

Compact soft starter:

- For the soft starter to accept fieldbus commands, a link must be fitted across terminals A1-02 on the soft starter.

Advanced soft starter:

- Control via the fieldbus communication network is always enabled in local control mode, and can be enabled or disabled in remote control mode (parameter 6B *Comms in Remote*). Refer to the soft starter user manual for parameter details.
- Input links are required across the stop and reset inputs if the soft starter is being operated in Remote mode. In Local mode, links are not required.

6 Device Configuration

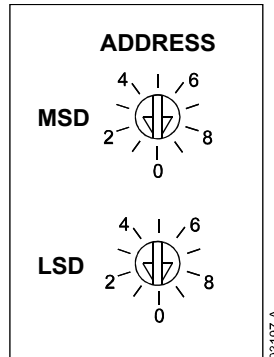
6.1 Address

The Profibus Module has a slave address range of 0 to 99.

Before powering up the Profibus Module, set the two rotary switches so that the module address matches the address set in your Master configuration tool.

eg MSD = 2 and LSD = 1 corresponds to address 21.

The module automatically detects the network data rate.



6.2 Configuration

Import the latest .gsd file into your Master configuration tool. This file is available from your supplier.

If your Master uses on-screen icons, two graphic bitmap files are available from the website. SSPM_N.bmp indicates normal mode. SSPM_D.bmp indicates diagnostic mode.

6.3 Communications Timeout

If the Profibus network fails, the device will leave data exchange mode after the network watchdog timeout period has expired. This timeout period is set at the Master configuration tool.

A Communication Timeout parameter in the GSD file sets how soon after this event the soft starter will be forced into a trip state.

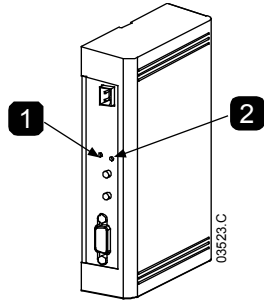
The user can adjust the Communication Timeout parameter in the GSD file to any setting between 0 and 100 seconds. The default setting is 10 seconds.



NOTE

If the Communication Timeout parameter is set to 0, the current state of the soft starter will remain unchanged on a network failure. This gives the user the option of operating the soft starter via local control, but is NOT failsafe.

7 Feedback LEDs



		Off	On
1	Power status (red)	Device is not powered up.	Device is powered up and ready to go online
2	Bus status (green)	No connection, offline or data exchange failure	Device is online and in data exchange state



NOTE

If communication fails between the device and the network, the Bus Status LED will go off. When communication is restored, the Bus Status LED will come back on.



NOTE

When a communications failure occurs, the soft starter may trip if the Communication Timeout parameter for the network is set greater than zero. When communication is restored, the soft starter must be reset.

8 Operation

8.1 Data Structures

The GSD file contains three operating modules:

- The Basic Module allows the user to start and stop the soft starter and read limited information on operating status. See *Soft Starter Control I/O Data Structure* on page 7.
- The Extended Module defines additional bytes allowing the user to read soft starter operating data such as actual motor current and motor temperature. See *Soft Starter Monitoring I/O Data Structure* on page 8.
- The Parameter Upload/Download Module allows the user to read and write soft starter parameter values. See *Soft Starter Programming I/O Data Structure* on page 11.

8.2 Soft Starter Control I/O Data Structure

Master > Slave control word is structured as follows:

Byte	Bits	Details
0	0 to 1	<i>Reserved</i>
	2 to 3	0 = Use soft starter remote input to select motor set 1 = Use primary motor set when starting 2 = Use secondary motor set when starting 4 = <i>Reserved</i>
	4	0 = stop action will be a soft stop (as selected on the soft starter) 1 = stop action will be a quick stop (ie coast to stop)
	5 to 7	<i>Reserved</i>
1	0	0 = Stop 1 = Start
	1 to 2	<i>Reserved</i>
	3	1 = Reset
	4 to 7	<i>Reserved</i>



NOTE

Bit 4 of byte 0 must be set to 0 before the soft starter can perform a start.

Slave > Master status word is structured as follows:

Byte	Bits	Details
0	0 to 5	Current (% motor FLC)
	6	Command source 0 = Remote control 1 = Local control
	7	1 = Ramping (starting or stopping)
1	0	1 = Ready
	1	1 = Starting, running or stopping
	2	1 = Tripped
	3 to 7	<i>Reserved</i>

Motor current (% FLC) represents current as a percentage of the set motor full load current. A maximum value of 63 represents 200% full load current. To convert this value to a readable percentage, divide by 0.315.

8.3 Soft Starter Monitoring I/O Data Structure

Master > Slave output bytes are structured as follows.

Byte 2
Operating data request (Data request numbers 1 to 16)

Slave > Master input bytes, in response to an operating data request, are structured as follows:

Byte 2
Echo data request number
Byte 3
Bits 7 to 1 <i>Reserved</i> Bit 0 = 1: Invalid data request number
Byte 4
Data value (high byte)
Byte 5
Data value (low byte)



NOTE

An invalid data request number will result in the invalid data request number bit being set = 1.

Data values are defined as follows:

Data Request Number	Description	Bits	Details
0	<i>Reserved</i>		
1	Product information	0 to 7	<i>Reserved</i>
		8 to 15	Product type code: 4 = Compact soft starter 9 = Advanced soft starter
2	Starter state	0 to 3	1 = Ready 2 = Starting 3 = Running 4 = Stopping (including braking) 5 = Not ready (restart delay, restart temperature check) 6 = Tripped 7 = Programming mode 8 = Jog forward 9 = Jog reverse
		4	0 = Negative phase sequence 1 = Positive phase sequence
		5	1 = Current exceeds FLC
		6	0 = Uninitialised 1 = Initialised
		7	1 = Communication error between device and soft starter
		8 to 15	See <i>Trip Codes</i> on page 10

Data Request Number	Description	Bits	Details
3	Motor current	0 to 7	Average rms current across all three phases (low byte)
		8 to 15	Average rms current across all three phases (high byte)
4	Motor temperature	0 to 7	Motor 1 thermal model (%)
		8 to 15	Motor 2 thermal model (%)
5		0 to 7	100% = power factor of 1
		8 to 15	<i>Reserved</i>
6	Power (kW)	0 to 11	Power
		12 to 15	Power scale 0 = Multiply power by 10 to get W 1 = Multiply power by 100 to get W 2 = Power (kW) 3 = Multiply power by 10 to get kW
7	Power (kVA)	0 to 11	Power
		12 to 15	Power scale 0 = Multiply power by 10 to get VA 1 = Multiply power by 100 to get VA 2 = Power (kVA) 3 = Multiply power by 10 to get kVA
8	<i>Reserved</i>		
9	Current	0 to 13	Phase 1 current (rms)
		14 to 15	<i>Reserved</i>
10	Current	0 to 13	Phase 2 current (rms)
		14 to 15	<i>Reserved</i>
11	Current	0 to 13	Phase 3 current (rms)
		14 to 15	<i>Reserved</i>
12	<i>Reserved</i>		
13	<i>Reserved</i>		
14	<i>Reserved</i>		
15	Version	0 to 7	Software minor revision number
		8 to 15	Software major revision number
16	Digital input state		For all inputs, 0 = open, 1 = closed (shorted)
		0	Start/Stop
		1	<i>Reserved</i>
		2	Reset
		3	Input A
		4 to 15	<i>Reserved</i>

**NOTE**

For models 0053B and smaller this value, the current reported via communications registers is 10 times greater than the actual value.

8.4 Trip Codes

Data request number 2 high byte indicates the soft starter trip or warning code. Details are as follows:

Trip Code	Description
1	Excess start time
2	Motor overload
3	Motor thermistor
4	Current imbalance
5	Frequency
6	Phase sequence
7	Instantaneous overcurrent
8	Power loss
9	Undercurrent
10	Heatsink overtemperature
11	Motor connection
12	Input A trip
13	FLC too high
14	Unsupported option (function not available in inside delta)
15	Starter communication (between device and soft starter)
16	Network communication (between device and network)
17	Internal fault x (where x is the fault code detailed in the table below)
23	Parameter out of range
26	L1 phase loss
27	L2 phase loss
28	L3 phase loss
29	L1-T1 shorted
30	L2-T2 shorted
31	L3-T3 shorted
32	Motor 2 overload
33	Time-overcurrent / Bypass overload
35	Battery/clock
36	Thermistor circuit
255	No trip

- **Internal Fault X**

The table below details the internal fault code associated with trip code 17.

Internal fault	Message displayed on the keypad
70 ~ 72	Current Read Err Lx
73	Internal fault X Contact your local supplier with the fault code (X).
74 ~ 76	Motor Connection Tx
77 ~ 79	Firing Fail Px
80 ~ 82	VZC Fail Px
83	Low Control Volts
84 ~ 98	Internal fault X Contact your local supplier with the fault code (X).

8.5 Soft Starter Programming I/O Data Structure

The Soft Starter Programming I/O Data Structure allows the user to upload (read) and download (write) soft starter parameter values over the network.

Master > Slave output bytes are structured as follows.

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 3	Parameter number to read/write							
Byte 4	<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>	Write parameter	Read parameter	<i>Reserved</i>
Byte 5	High byte parameter value to write to soft starter/ zero data values for read							
Byte 6	Low byte parameter value to write to soft starter/ zero data values for read							

Slave > Master input bytes are structured as follows.

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 6	Echo parameter number							
Byte 7	<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>	Parameter access level	Write access denied	Invalid parameter value	Invalid parameter number	
Byte 8	High byte parameter value read from soft starter							
Byte 9	Low byte parameter value read from soft starter							

Parameter Access Level

Parameter access level is defined as follows:

0 = Read only

1 = Operator (soft starter parameter groups 1~10)

2 = Supervisor (soft starter parameter groups 15 and 16)

9 Profibus Diagnostic Telegram and Flag

The Profibus Module supports external diagnostics. The following telegram will be sent to the Master if the soft starter trips or if a parameter is changed at the soft starter.

Diagnostic Telegram Data Structure	
Byte 0	User diagnostic length (Always set = 3)
Byte 1	Trip Code
Byte 2	Changed parameter number

Profibus Trip Code

When the soft starter trips, a diagnostic flag is set at the Master and the trip code is reported in Byte 1. When the soft starter is reset, the diagnostic flag and trip code data are reset = 0, provided the trip condition does not still exist (see *Trip Codes* on page 10).

Changed Parameter Number

If a parameter is changed via the keypad, the affected parameter number is reported in Byte 2. When the Master reads or writes the changed parameter, Byte 2 is reset = 0.

A changed parameter number does not set a diagnostic flag.

10 Profibus Freeze Mode

The Profibus Module supports Freeze Mode.

In Freeze Mode, inputs are only updated with new data from the soft starter when another Freeze action is carried out. An Un-Freeze action returns the device to normal operation.

11 Profibus Sync Mode

The Profibus Module supports Sync Mode.

In Sync Mode, commands to the soft starter are not processed until another Sync action is carried out. An Un-Sync action returns the device to normal operation.

12 Profibus Clear Mode

If the Master sends a global Clear command, the device will send a Quick Stop command to the soft starter.

13 Specifications

- **Enclosure**

Dimensions 40 mm (W) x 166 mm (H) x 90 mm (D)

Weight 250 g

Protection IP20

- **Mounting**

Spring-action plastic mounting clips (x 2)

- **Connections**

Soft starter 6-way pin assembly

Contacts Gold flash

Network DB9 female

External power supply 2-way removable screw type

Maximum cable size 2.5 mm²

- **Settings**

Network address

Setting MSD and LSD rotary switches

Range 0 to 99

Data rate

Setting auto-detect

Range 9.6 kb/s ~ 12.0 Mb/s

- **Power**

Consumption (steady state, maximum) 35 mA @ 24 VDC

Reverse polarity protected

Galvanically isolated

- **Certification**

CE EN 60947-4-2

RoHS Compliant with EU Directive 2011/65/EU

Profibus International



