

I Important User Information

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

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

2 Installation



CAUTION

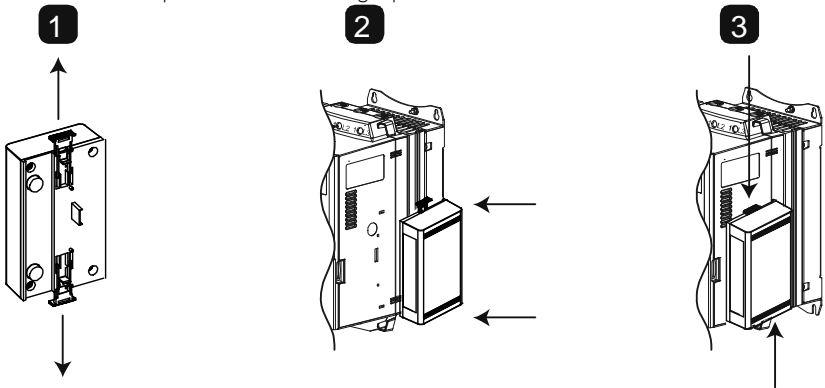
Remove mains and control voltage from the soft starter before attaching or removing accessories. Failure to do so may damage the equipment.

Installation Procedure

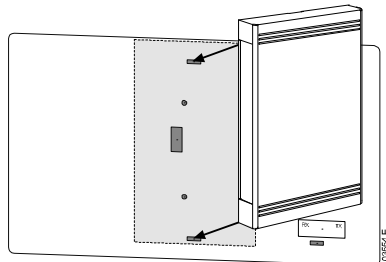
1. Remove control power and mains supply from the soft starter.
2. Attach the interface to the soft starter as illustrated.
3. Set the interface address to match the address set in the Master configuration tool.
4. Apply control power to the soft starter.
5. Insert the network connector and power up the interface.

Physical installation

1. Fully pull out the top and bottom retaining clips on the interface.
2. Line up the interface with the comms port slot.
3. Push in the top and bottom retaining clips to secure the interface to the starter.

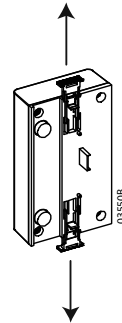


MVS and MVX:
Plug the interface onto the back of the controller.



Remove the interface using the following procedure:

1. Remove power from the interface.
2. Remove control power and mains supply from the soft starter.
3. Disconnect all field wiring from the interface.
4. Fully pull out the top and bottom retaining clips on the interface.
5. Pull the interface away from the soft starter.



3 Configuration

Import the latest .gsd file into your Master configuration tool. This file is available from www.aucom.com.

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.



NOTE

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

If the Profibus network fails, the interface 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.

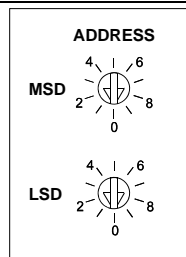
4 Adjustment

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

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

(The diagram shows the factory default setting for the rotary switches).

The interface automatically detects the network data rate.



5 Connection

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

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

CSX: For the Profibus Interface to accept serial commands, a link must be fitted across terminals A1-02 on the soft starter.

EMX3 and MVS/MVX: 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.



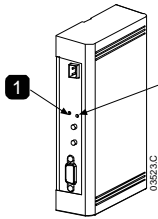
NOTE

EMX3 and MVS/MVX: Parameter *Comms in Remote* selects whether the soft starter will accept Start and Stop commands from the Serial Network Master while in Remote Mode. Refer to the soft starter user manual for parameter details.

CSX		EMX3 or MVS/MVX	
1	CSX	1	EMX3 or MVS/MVX (Remote mode) C31, C32: Stop C41, C42: Reset
2	Profibus Interface	2	Profibus Interface
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

6 LEDs



		OFF	ON
1	Power status (red)	Interface not powered up	Interface powered up and ready to go online
2	Bus status (green)	No connection, offline or data exchange failure	Interface online and in data exchange state



NOTE

If communication fails between the interface 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.

7 Data Structures

The GSD file contains three operating modules, supporting data I/O structures as follows:

Data Structure	Basic Module	Extended Module	Parameter Upload/Download Module
Soft Starter Control I/O Data Structure on page 5	✓	✓	✓
Soft Starter Monitoring I/O Data Structure on page 7	✗	✓	✓
Soft Starter Programming I/O Data Structure on page 10	✗	✗	✓

The Basic Module allows the user to start and stop the soft starter and read limited information on operating status.

The Extended Module defines additional bytes allowing the user to read soft starter operating data such as actual motor current and motor temperature.

The Parameter Upload/Download Module allows the user to read and write soft starter parameter values (only applicable to EMX3 and MVS/MVX soft starters).

7.1 Soft Starter Control I/O Data Structure

Master > Slave control word is structured as follows:

Byte 0							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>	Quick stop	Motor set		<i>Reserved</i>	<i>Reserved</i>
Byte 1							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>	Reset	<i>Reserved</i>	<i>Reserved</i>	Fwd run

Quick stop bit

When Fwd run bit changes from 1 to 0:

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).



NOTE

The Quick stop bit must be set to 0 before the soft starter can perform a start.

Motor set bits

Selects which parameter set to use when starting:

0 = selected from soft starter remote input (programmable input must be set to 'Motor Set Select')

1 = soft starter primary motor set (ensure soft starter programmable input is not set to 'Motor Set Select')

2 = soft starter secondary motor set (ensure soft starter programmable input is not set to 'Motor Set Select')

3 = *Reserved*



NOTE

Ensure that the programmable input is not set to Motor Set Select before using this function.

Slave > Master status word is structured as follows:

Byte 0							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Ramping	Local	Motor current (% FLC) ¹					
Byte 1							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>	<i>Reserved</i>	Warning	Fault	On	Ready

¹ 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.

Ready is set when the soft starter is ready to start the motor.

On is set when the soft starter is starting, running or soft stopping the motor.

Warning is set when the soft starter detects a warning condition.

Fault is set when the soft starter has tripped.

Ramping is set when the soft starter is starting or soft stopping the motor.

Local is set when the soft starter is set to Local mode.

7.2 Soft Starter Monitoring I/O Data Structure

Master > Slave output byte is 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:



NOTE

Some soft starters do not support some functions.

Data Request Number	Data Value High Byte	Data Value Low Byte
0	<i>Reserved</i>	
1	Soft starter product type code ¹	Soft starter software version number
2	Trip/Warning code	Soft starter status
3 ²	Average current (high byte)	Average current (low byte)
4 ³	Motor 2 temperature	Motor 1 temperature
5	<i>Reserved</i>	Percentage power factor
6	Power (kW)	
7	Power (kVA)	
8	Average voltage	
9 ²	L1 current	
10 ²	L2 current	
11 ²	L3 current	
12	L1 voltage	
13	L2 voltage	
14	L3 voltage	
15	Software major version number	Software minor revision number
16	<i>Reserved</i>	Digital Input state

¹ Product type code:

4 = CSX/CSXi

5 = MVS (two-line controller)

6 = EMX3

10 = MVX

11 = MVS (four-line controller)

² For models EMX3-0053B and smaller this value will be 10 times greater than the value displayed on the keypad.

³ Motor temperature is calculated using the soft starter thermal modelling.

Soft starter status

The low byte data value of data request number 2 reports soft starter status.

Bits 0 to 3 function as follows:

Value (decimal) Bits 0 to 3	Soft Starter Status
0	Unknown (communication error between interface and soft starter)
1	Ready to start (waiting)
2	Starting (soft starting)
3	Running (running – full voltage at the motor)
4	Stopping (soft stopping)
5	Not ready (restart or thermal delay and Run simulation)
6	Fault (tripped)
7	Menu or Logs Menu open (cannot start)
8	Jog Forward (slow speed)
9	Jog Reverse (slow speed)

Bits 4 to 7 function as follows:

Bit Number	Function
Bit 4	Set if positive phase sequence detected (Bit 6 must = 1)
Bit 5	Set if average current exceeds Motor FLC setting
Bit 6	Set after first start once phase sequence has been confirmed
Bit 7	Set if a communication failure occurs between interface and soft starter

Power

Input bytes for data request numbers 6 and 7 are defined as follows:

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
High Byte	Power scale factor				Power high nibble			
Low Byte	Power low byte							

Powerscale functions as follows:

0 = multiply Power by 10 to get W

1 = multiply Power by 100 to get W

2 = Power is represented in kW

3 = multiply Power by 10 to get kW

Digital Input State

The low byte of data request number 16 reports digital input state as follows (0 = open, 1 = closed):

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Low Byte	<i>Reserved</i>	Input D	Input C	Input B	Input A	Reset	Stop	Start

Trip Codes

Data request number 2 high byte indicates the soft starter trip or warning code.

Trip Code	Description	CSX	CSX/	EMX3	MVS and MVX
1	Excess start time		●	●	●
2	Motor overload (thermal model)		●	●	●
3	Motor thermistor		●	●	●
4	Current imbalance		●	●	●
5	Frequency (Mains supply)	●	●	●	●
6	Phase sequence		●	●	●
7	Instantaneous overcurrent			●	●
8	Power loss/Power circuit	●	●	●	●
9	Undercurrent			●	●
10	Heatsink (starter) overtemperature			●	●
11	Motor connection			●	●
12	Input A trip/Auxiliary Trip A			●	●
13	FLC too high/FLC out of range			●	●
14	Unsupported option (function not available in inside delta)			●	
15	Starter communication (between interface and soft starter)	●	●	●	●
16	Network communication (between interface and network)	●	●	●	●
17	Internal fault x (where x is the fault code detailed in the table below).			●	●
20 ¹	Ground fault			●	●
23	Parameter out of Range			●	●
24	Input B trip/Auxiliary Trip B			●	●
25	Bypass fail (bypass contactor)			●	●
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 (thermal model)			●	●
33 ²	Time-overcurrent (Bypass overload)		●	●	
34	SCR overtemperature				●
35	Battery/clock			●	●
36	Thermistor circuit			●	
37	RTD A overtemperature			●	
38 ¹	RTD B overtemperature			●	
39 ¹	RTD C overtemperature			●	
40 ¹	RTD D overtemperature			●	
41 ¹	RTD E overtemperature			●	
42 ¹	RTD F overtemperature			●	
43 ¹	RTD G overtemperature			●	

45	RTD circuit fail			●	
46	Analog input trip			●	●
255	No trip	●	●	●	●

¹ Available with EMX3 only if the appropriate option card is fitted.

² For EMX3, time-overcurrent protection is only available on internally bypassed models.

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	Power On in Simulation mode
74 ~ 76	Motor connection Tx
77 ~ 79	Firing fail SCRx
80 ~ 82	VZC Fail Px
83	Low Control Volts
84 ~ 98	Internal fault X Contact your local supplier with the fault code (X).

7.3 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 (EMX3 parameter groups 1~14, MVS and MVX groups 1~16)

2 = Supervisor (EMX3 parameter groups 15 and 16, MVS and MVX groups 20 and 21)



NOTE

This operating module only functions with EMX3 and MVS/MVX soft starters.

8 Profibus Diagnostic Telegram and Flag

The Profibus Interface 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 (EMX3 and MVS/MVX only)

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 (refer to *Trip Codes* on page 7).

Changed Parameter Number

If a parameter is changed via the MVS and MVX Controller, 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.

9 Profibus Freeze Mode

The Profibus Interface 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 Profibus Interface to normal operation.

10 Profibus Sync Mode

The Profibus Interface 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 Profibus Interface to normal operation.

11 Profibus Clear Mode

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

12 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 at 24 VDC
Reverse polarity protected
Galvanically isolated

Certification

C✓ IEC 60947-4-2
CE IEC 60947-4-2
Profibus International

