INSTRUCTIONS

DEVICENET INTERFACE

RIGHT FROM THE START

AuCom
MOTOR CONTROL SPECIALISTS

Contents

Product Compatibility

This interface is suitable for use with AuCom CSX, EMX3 and MV soft starters.

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.

1. 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.

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.
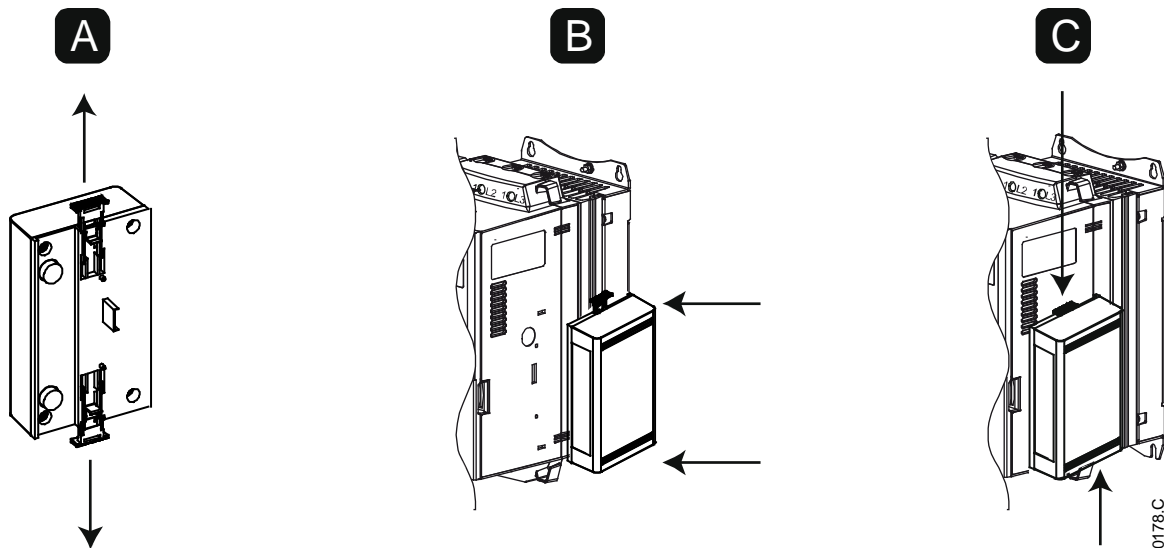
3. Installation

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

3.1 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 interface. [A]
3. Line up the interface with the comms port slot. [B]
4. Push in the top and bottom retaining clips to secure the interface to the starter. [C]
5. Set the DeviceNet Interface Node Address (MAC ID) and Data Rate.
6. Apply control power to the soft starter.
7. Insert the network connector into the interface and power up the DeviceNet network.

MV:
Plug the interface onto the back of the controller.

⚠ **CAUTION**
Network designs must decrease the maximum allowable cumulative dropline length by 400 mm for every device installed on the network. Failure to do so may result in network communication errors and decreased reliability.

Example: ODVA specifies a maximum cumulative dropline length of 156 m on a network operating at 125 kb/s. If six devices were installed on this network, the total cumulative dropline length would need to be decreased to 153.6 m.

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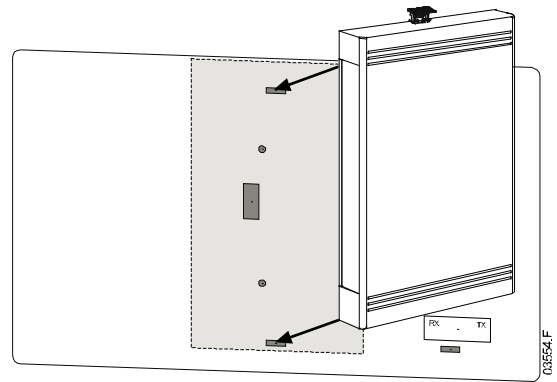3. Remove control power and mains supply from the soft starter.
4. Fully pull out the top and bottom retaining clips on the interface. [A]
5. Pull the interface away from the soft starter.
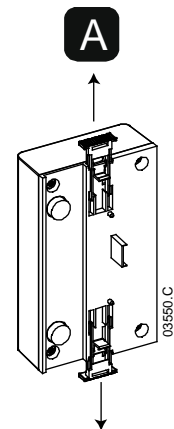
3.2 Connection

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

EMX3 and MV: 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 MV: 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 MV

	CSX		EMX3 or MV
1	Soft starter A1, 02: Stop	1	Soft starter (remote mode) C31, C32: Stop input C41, C42: Reset input
2	DeviceNet Interface	2	DeviceNet Interface
3	Standard connection onto DeviceNet network	3	Standard connection onto DeviceNet network
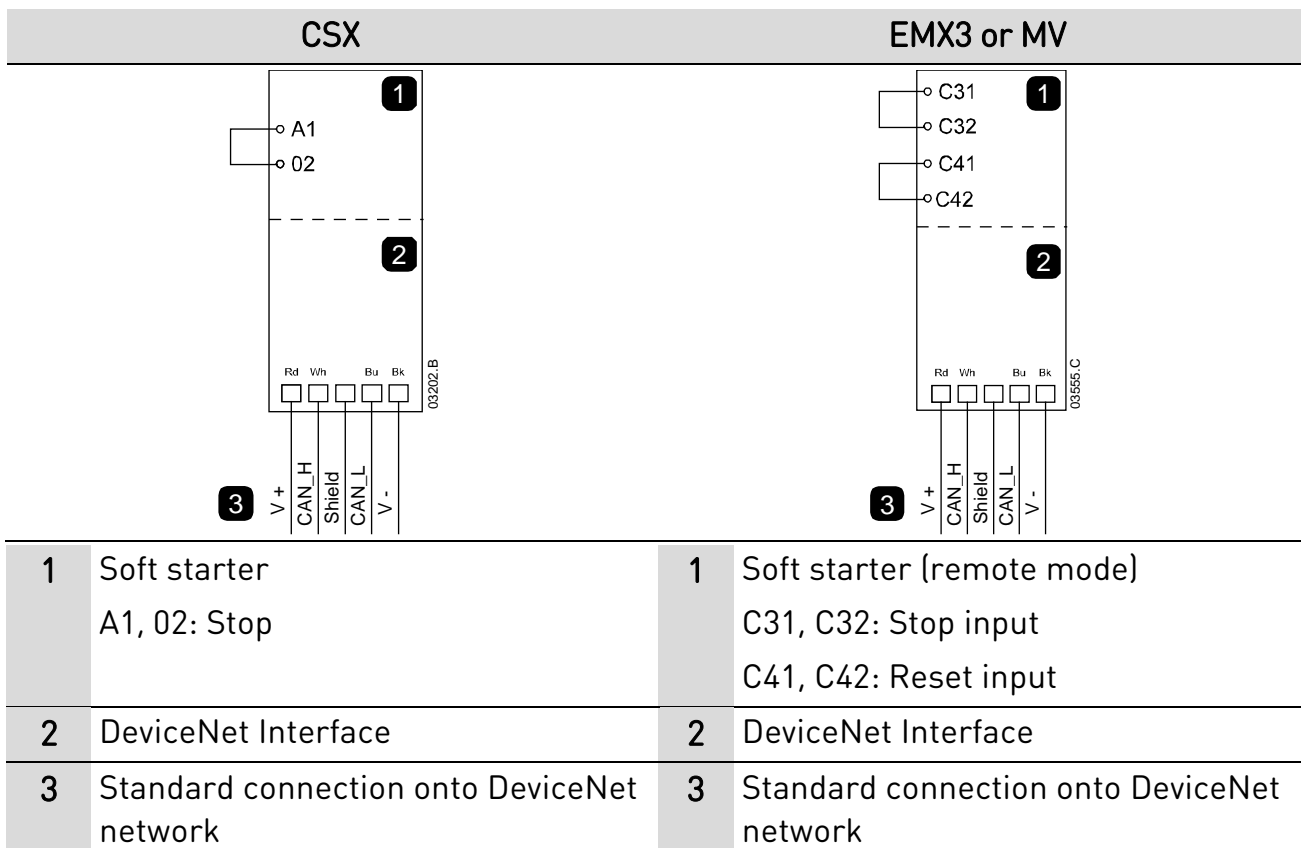
4. Device Configuration

4.1 Adjustment

Changes to the rotary switch settings take effect when the
DeviceNet network is next powered up.
The factory default settings for the rotary adjustment switches are:
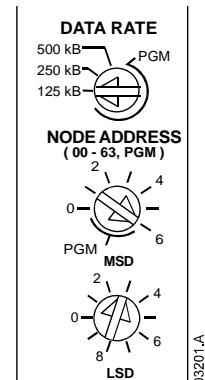
📄 NOTE
The Data Rate and Node Address (MAC ID) must be set locally on the interface.
These cannot be set using DeviceNet management software.
When the Data Rate and MSD Node Address (MAC ID) rotary switches are set
on PGM position, the interface uses the previously used valid on-line Data Rate
and Node Address (MAC ID).

4.2 Configuration

The DeviceNet Interface is a Group 2 slave device, using a predefined master/slave
connection set. I/O data is produced and consumed using polled I/O messaging.

The soft starter must be added to the DeviceNet manager project using the EDS file
and configuration/management software tool. In order to operate successfully, the
correct EDS file must be used. An on-screen graphics bitmap file (device.bmp) is also
available. Contact your local supplier for further information.

5. Feedback LEDs

5.1 Interface and Network LEDs

The Module LED indicates the condition of the power supply and device operation.

The Network LED indicates status of the communication link between the device and the network Master.

LED name	LED status	Description
Module	Off	Network power off
	Green	Normal operation
	Red	Unrecoverable fault
	Red/Green flashing	Self Test mode
Network	Off	Duplicate MAC ID test has not been completed
	Green flashing	Online but no connection with Master
	Green	Online and allocated to a Master
	Red flashing	One or more timed out I/O connections
	Red	Failed communication between device and Master
	Red/Green flashing	Communication faulted and received an Identity communication faulted request

> **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.

6. Operation

> **NOTE**
> The available features and parameter details may vary according to the model and software version of the starter. Refer to the soft starter user manual for details of parameters and supported features.

6.1 DeviceNet Polled I/O Structure

Once the EDS file has been loaded, the device must be added to the scanner list with parameters shown in the following table:

Parameter	Value
I/O connection type	Polled
Poll receive size	14 bytes
Poll transmit size	2 bytes

Once the soft starter, device and Master have been set up, configured and powered up, the Master will transmit 2 bytes of data to the device and receive 14 bytes of data from the device.

Master > Slave polled I/O output data is as follows:

Byte	Bit	Function
0	0	0 = Stop command 1 = Start command
	1	0 = Enable Start or Stop command 1 = Quick Stop (ie coast to stop) and disable Start command
	2	0 = Enable Start or Stop command 1 = Reset command and disable Start command
	3 to 7	*Reserved*
1	0 to 1	0 = Use soft starter remote input to select motor set 1 = Use primary motor set when starting 2 = Use secondary motor set when starting 3 = *Reserved*
	2 to 7	*Reserved*

INSTRUCTIONS

Slave > Master polled I/O input data is as follows:

Byte	Bit	Function	Value
0	0	Trip	1 = Tripped
	1	Warning	1 = Warning
	2	Running	0 = Unknown, Not ready, Ready to start or Tripped
			1 = Starting, Running, Stopping or Jogging
	3	*Reserved*	
	4	Ready	0 = Start or stop command not acceptable
			1 = Start or stop command acceptable
	5	Control from Net	1 = Always except in Program mode
	6	Local/Remote	0 = Local control
			1 = Remote control
	7	At reference	1 = Running (full voltage at the motor)
1	0 to 7	Status	0 = Unknown (menu open)
			2 = Not ready (restart delay, restart temperature check, run simulation)
			3 = Ready to start (including warning state)
			4 = Starting or Running
			5 = Soft stopping
			7 = Tripped
			8 = Jog forward
			9 = Jog reverse
2	0 to 7	Trip/Warning code	Refer to *Trip Codes* on page 9.
3	0	Initialised	1 = Phase sequence bit is valid (bit 1) after first start
	1	Phase sequence	1 = Positive phase sequence
	2 to 7	*Reserved*	
4 [1]	0 to 7	Motor current (low byte)	Current (A)
5 [1]	0 to 7	Motor current (high byte)	
6	0 to 7	Current %FLC (low byte)	Current as a percentage of soft starter FLC setting (%)
7	0 to 7	Current %FLC (high byte)	
8	0 to 7	% Motor 1 temperature	Motor 1 thermal model (%)
9	0 to 7	% Motor 2 temperature	Motor 2 thermal model (%)
10	0 to 7	% Power factor	Percentage power factor (100% = power factor of 1)
11	0 to 7	Power (low byte)	Power low byte, scaled by power scale

Byte	Bit	Function	Value
12	0 to 3	Power (high nibble)	Power high nibble, scaled by power scale
	4 to 5	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
	6 to 7	*Reserved*	
13	0 to 3	Digital input state	For all inputs, 0 = open, 1 = closed (shorted)
			0 = Start
			1 = Stop
			2 = Reset
			3 = Input A
			4 = Input B
			5 = Input C, if fitted
			6 = Input D, if fitted
			7 = *Reserved*
	4 to 7	*Reserved*	

[1] For models EMX3-0053B and smaller, current reported via communications is 10 times greater than the actual value (displayed on the keypad).

6.2 Trip Codes

Code	Trip Type	CSX	CSX*i*	EMX3	MV
0	No trip	●	●	●	●
11	Input A trip			●	●
20	Motor overload		●	●	●
21	Heatsink overtemperature			●	●
23	L1 phase loss			●	●
24	L2 phase loss			●	●
25	L3 phase loss			●	●
26	Current imbalance		●	●	●
27[1]	Ground fault			●	●
28	Instantaneous overcurrent			●	●
29	Undercurrent			●	●
50	Power loss	●	●	●	●
54	Phase sequence		●	●	●
55	Frequency	●	●	●	●
60	Unsupported option (function not available in inside delta)			●	●
61	FLC too high			●	●
62	Parameter out of range			●	●

Code	Trip Type	CSX	CSX*i*	EMX3	MV
70	Miscellaneous			●	●
75	Motor thermistor		●	●	●
101	Excess start time		●	●	●
102	Motor connection			●	●
104	Internal fault x (where x is the fault code detailed in the table below)			●	●
105	Bypass fail (bypass contactor)			●	●
110	Input B trip			●	●
113	Starter communication (between device and soft starter)	●	●	●	●
114	Network communication (between device and network)	●	●	●	●
115	L1-T1 shorted			●	●
116	L2-T2 shorted			●	●
117	L3-T3 shorted			●	●
118	Motor 2 overload			●	●
119[2]	Time-overcurrent (Bypass overload)		●	●	
120	SCR overtemperature				●
121	Battery/clock			●	●
122	Thermistor circuit			●	
123	RTD/PT100 A			●	
124[1]	RTD/PT100 B			●	
125[1]	RTD/PT100 C			●	
126[1]	RTD/PT100 D			●	
127[1]	RTD/PT100 E			●	
128[1]	RTD/PT100 F			●	
129[1]	RTD/PT100 G			●	
131	RTD circuit fail			●	
132	Analog input 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 104.

Internal fault	Message displayed on the keypad
70 ~ 72	Current Read Err Lx
73	ATTENTION! Remove Mains Volts
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).

7. Parameter Object

The device supports parameter objects through explicit messaging. Soft starter parameters can be uploaded (written) and downloaded (read) using DeviceNet management software. When the device is powered up, it automatically obtains parameter information from the soft starter.

Detail	Value (Hex)	Comment
Class	0F	Parameter object address
Instance	1 ~ xxx	xxx = maximum soft starter parameter number
Attribute ID	01	Always 0x01
Get Service	0E	Read single soft starter parameter value
Set Service	10	Write single soft starter parameter value

8. 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
  Network .... 5-way male and unpluggable female connector (supplied)
  Maximum cable size .... 2.5 mm^2
  Contacts .... Gold flash

- **Settings**

  Node address (MAC ID)
     Setting .... Rotary switches
     Range .... 0 ~ 63 (63, factory default)
  Data rate
     Setting .... Rotary switches
     Options .... 125 kB, 250 kB, 500 kB (125 kB, factory default)

- **Power**

  Consumption
     steady state .... 19 mA @ 25 VDC
     .... 31 mA @ 11 VDC
     inrush (at 24 VDC) .... 1.8 A maximum for 2 ms
  Galvanically isolated

- **Certification**

  CE .... EN 60947-4-2
  RCM .... IEC 60947-4-2
  RoHS .... Compliant with EU Directive 2011/65/EU
  ODVA .... *DeviceNet*
  CONFORMANCE TESTED