POWER ELECTRONICS

V6

ACCESSORIES MANUAL

DEVICENET BOARD

DIGITAL SOFTSTARTER

V6

DIGITAL SOFTSTARTER

Programming and Software Manual

Edition: June 2023

Rev. A

ABOUT THIS DOCUMENT

COMPATIBILITY

The DeviceNet Card is suitable for use with v6 soft starters.

The available features may vary according to the model and version of the starter.

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.

Failure to follow the information and instructions in this manual will void the warranty.

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REVISIONS CONTROL

DATE	REVISION	DESCRIPTION
30/06/2023	A	First edition.

SAFETY SYMBOLS

Always follow safety instructions to prevent accidents and potential hazards from occurring.

In this manual, safety messages are classified as follows:

NOTICE

Indicates a hazard that may cause personal injury or death.

CAUTION

Indicates a hazard that may damage the equipment or installation.

WARNING

Provides helpful information.

Other symbols used in this manual for safety messages are the following:

Hot surface. Be careful and follow the instructions to avoid burns and personal injuries.

Risk of fire. Be careful and follow the instructions to prevent causing an unintentional fire.

Energy storage timed discharge. Wait for the indicated time to avoid electrical hazards.

Caution, risk of hearing damage. Wear hearing protection.

Warnings

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

WARNING

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

WARNING

Inserting foreign objects or touching the inside of the starter while the expansion port cover is open may endanger personnel, and can damage the starter.

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.

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

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1 INSTALLATION

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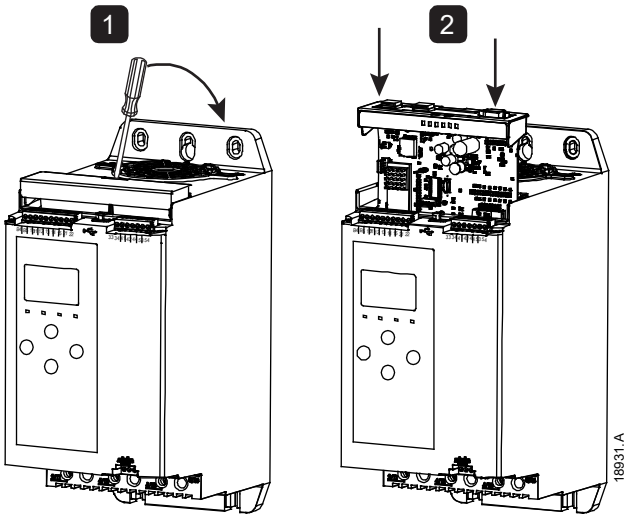
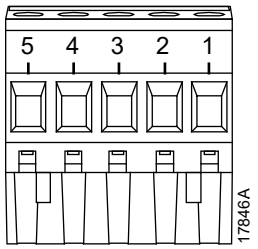
Installing the Expansion Card

1. Push a small flat-bladed screwdriver into the slot in the centre of the expansion port cover, and ease the cover away from the starter.
2. Line up the card with the expansion port. Gently push the card along the guide rails until it clicks into the starter.



Connecting to the Network

After the card is in place, field wiring can be connected via the 5-way connector plug. The DeviceNet Card is powered via the connector.



Pin	Function
5	V +
4	CAN_H
3	SHIELD
2	CAN_L
1	V –

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.

Feedback LEDs

Module 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

2 CONFIGURATION

2

The DeviceNet Card 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.

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DeviceNet Network Settings

Network communication parameters for the card must be set via the soft starter. For details on how to configure the soft starter, see the soft starter user manual.

Parameter	Parameter name	Description
12E	*Devicenet Address*	Sets the DeviceNet network address for the soft starter.
12F	*Devicenet Baud Rate*	Selects the baud rate for DeviceNet communications.

Enabling Network Control

The soft starter will only accept commands from the DeviceNet Card if parameter 1A *Command Source* is set to 'Network'.

NOTICE
If the reset input is active, the starter will not operate. If a reset switch is not required, fit a link across terminals 10, 11 on the soft starter.

3 DEVICENET POLLED I/O STRUCTURE

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NOTICE
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.

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*

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

Byte	Bit	Function	Value
	3	*Reserved*	
	4	Ready	0 = Start or stop command not acceptable 1 = Start or stop command acceptable
	5	Operating mode	0 = Programming mode 1 = Operating mode
	6	Command source	0 = Remote Keypad, Digital Input, Clock 1 = Network
	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, reset input is open) 3 = Ready to start (including warning state) 4 = Starting or Running 5 = Stopping 7 = Tripped 8 = Jog forward 9 = Jog reverse
2	0 to 7	Trip/Warning code	See *Trip Codes* on page 13
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 temperature	Motor thermal model (%)
9	0 to 7	*Reserved*	
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
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*	

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Byte	Bit	Function	Value
13	0 to 4	Digital input state	For all inputs, 0 = open, 1 = closed (shorted) 0 = Start/Stop 1 = *Reserved* 2 = Reset 3 = Input A 4 = Input B
	5 to 7	*Reserved*	

NOTICE

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

4 TRIP CODES

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Code	Trip Type
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
28	Overcurrent
29	Undercurrent
50	Power loss
51	Undervoltage
52	Overvoltage
54	Phase sequence
55	Frequency
60	Incorrect control card
61	FLC out of range
62	EEPROM fail (Parameter out of range)
75	Motor thermistor
101	Excess start time
102	Motor connection
104	Internal fault
110	Input B trip
113	Communications card fault
114	Forced network trip
115	L1-T1 shorted
116	L2-T2 shorted
117	L3-T3 shorted
119	Bypass overload
120	SCR overtemperature
121	Battery/clock
122	Thermistor circuit
124	RTD/PT100 B
133	Overpower
134	Underpower

Code	Trip Type
142	Keypad disconnected
143	Zero Speed Detect
144	SCR Itsm
145	Instantaneous overcurrent
146	Rating Capacity
156	Current Read Err L1
157	Current Read Err L2
158	Current Read Err L3
159	Remove Mains Volts (mains voltage connected in run simulation)
160	Motor Connection T1
161	Motor Connection T2
162	Motor Connection T3
163	Firing Fail P1
164	Firing Fail P2
165	Firing Fail P3
166	VZC Fail P1
167	VZC Fail P2
168	VZC Fail P3
169	Low Control Volts
170~182	Internal fault x. Contact your local supplier with the fault code (X).

5 PARAMETER OBJECT

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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

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6 SPECIFICATIONS

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- **Connections**

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

- **Settings**

Address range ..... 0 ~ 63
Data rate ..... 125 kB, 250 kB, 500 kB

- **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
RoHS ..... Compliant with EU Directive 2011/65/EU
ODVA ..... DeviceNet CONFORMANCE TESTED

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