

ENGINEERING
TOMORROW

Danfoss

Installation Guide

DeviceNet Card VLT® Soft Starter MCD 600



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VLT®

Contents

1	Safety	4
1.1	Disclaimer	4
1.2	Warnings	4
1.3	Important User Information	4
2	Installation	5
2.1	Installing the Expansion Card	5
2.2	Connecting to the Network	5
2.3	Feedback LEDs	6
2.3.1	Module and Network LEDs	6
3	Configuration	8
3.1	Preparations	8
3.2	DeviceNet Network Settings	8
3.3	Enabling Network Control	8
3.4	DeviceNet Polled I/O Structure	8
3.4.1	Output and Input Data	9
4	Troubleshooting	12
4.1	Trip Codes	12
5	Parameter Handling	14
5.1	Parameter Object	14
6	Specifications	15
6.1	Connections	15
6.2	Settings	15
6.3	Power	15
6.4	Certification	15

1 Safety

1.1 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. Responsibility or liability is never accepted for direct, indirect, or consequential damage resulting from the use or application of this equipment.

1.2 Warnings

WARNING

SHOCK HAZARD

Attaching or removing accessories while the soft starter is connected to mains voltage may cause personal injury.

- Before attaching or removing accessories, isolate the soft starter from mains voltage.

WARNING

RISK OF PERSONAL INJURY AND EQUIPMENT DAMAGE

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

- Do not insert foreign objects in the soft starter with the port cover open.
- Do not touch the inside of the soft starter with the port cover open.

1.3 Important User Information

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

The installer is responsible for following all instructions in this manual and for following correct electrical practice.

Use all internationally recognized standard practice for RS485 communication when installing and using this equipment.

2 Installation

2.1 Installing the Expansion Card

Procedure

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

Example:

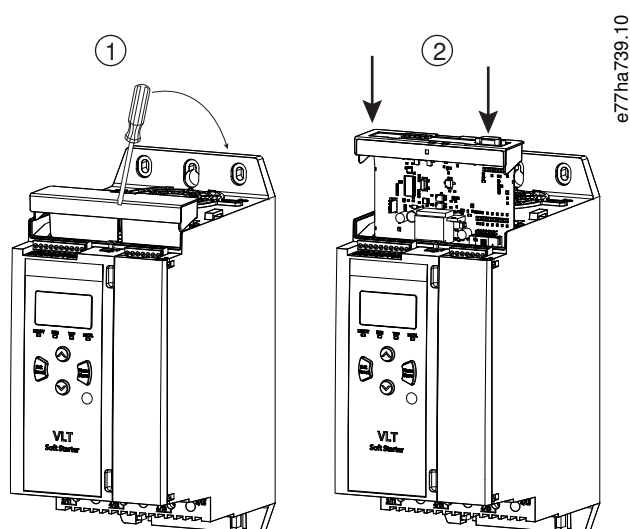


Illustration 1: Installation of the Expansion Cards

2.2 Connecting to the Network

Prerequisites:

The expansion card must be installed in the soft starter.

Procedure

1. Connect field wiring via the 5-way connector plug.
 → The DeviceNet card is powered via the connector.

Example:

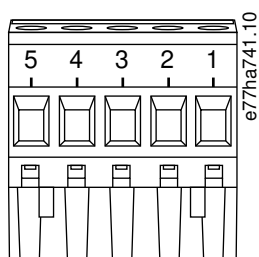


Illustration 2: 5-way Connector Plug

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

⚠ NOTICE ⚠

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

- Decrease the maximum allowable cumulative dropline by 400 mm per device in the network.

Example:

ODVA specifies a maximum cumulative dropline length of 156 m on a network operating at 125 kb/s. If 6 devices were installed on this network, the total dropline length would need to be decreased to 153.6 m.

2.3 Feedback LEDs

2.3.1 Module and Network LEDs

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

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

Table 1: LED Descriptions

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 failed and received an Identity communication failed request.

3 Configuration

3.1 Preparations

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.

Add the soft starter to the DeviceNet manager project via the EDS file and configuration/management software tool. To operate successfully, use the correct EDS file. An on-screen graphics bitmap file (device.bmp) is also available. The files can be downloaded from www.danfoss.com/en/service-and-support/downloads/dds/fieldbus-configuration-files/#tab-downloads. Contact the local supplier for further information.

3.2 DeviceNet Network Settings

Set the network communication parameters for the card via the soft starter. For details on how to configure the soft starter, see the VLT® Soft Starter MCD 600 Operating Guide.

Parameter	Description
12-5 Devicenet Address	Sets the DeviceNet network address for the soft starter.
12-6 Devicenet Baud Rate	Selects the baud rate for DeviceNet communications.

3.3 Enabling Network Control

The soft starter only accepts commands from the expansion card if *parameter 1-1 Command Source* is set to *Network*.

⚠ NOTICE ⚠

If the reset input is active, the soft starter does not operate. If a reset switch is not required, fit a link across terminals RESET, COM+ on the soft starter.

3.4 DeviceNet Polled I/O Structure

Once the EDS file has been loaded, add the device to the scanner list with the following parameters:

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 transmits 2 bytes of data to the device and receives 14 bytes of data from the device.

3.4.1 Output and Input Data

Table 2: Master/Slave Polled I/O Output Data Structure

Byte	Bit	Function
0	0	0=Stop command 1=Start command
	1	0=Enable start or stop command 1=Quick stop (coast to stop) and disable start command
	2	0=Enable start or stop command 1=Reset command and disable start command
	3–7	Reserved
1	0–1	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
	2–7	Reserved

Table 3: Master/Slave Polled I/O Input Data Structure

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	Operating mode	0=Programming mode 1=Operating mode
	6	Command source	0=Remote LCP, Digital input, Clock 1=Network
	7	At reference	1=Running

Byte	Bit	Function	Value
1	0–7	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	0–7	Trip/warning code	See 4.1 Trip Codes
3	0	Initialized	1=Phase sequence bit is valid (bit 1) after 1 st start
	1	Phase sequence	1=Positive phase sequence
	2–7	Reserved	
4 ⁽¹⁾	0–7	Motor current (low byte)	Current [A]
5 ⁽¹⁾	0–7	Motor current (high byte)	
6	0–7	Current %FLC (low byte)	Current as percentage of soft starter FLC setting (%)
7	0–7	Current %FLC (high byte)	
8	0–7	% Motor temperature	Motor thermal model (%)
9	0–7	Reserved	
10	0–7	%Power factor	Percentage of power factor (100%=power factor of 1)
11	0–7	Power (low byte)	Power low byte, scaled by power scale
12	0–3	Power (high nibble)	Power high nibble, scaled by power scale
	4–5	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
	6–7	Reserved	

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

¹ For models MCD6-0063B and smaller, the current reported via communications registers is 10 times greater than the actual value.

4 Troubleshooting

4.1 Trip Codes

Code	Description
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 (Network communication (between device and network))

Code	Description
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
142	LCP disconnected
143	Zero speed detect
144	SCR Itsm
145	Instantaneous overcurrent
146	Rating capacity
156	Current read error L1
157	Current read error L2
158	Current read error L3
159	Power on in run simulation
160	Motor connection T1
161	Motor connection T2
162	Motor connection T3
163	SCR firing fail L1
164	SCR firing fail L2
165	SCR firing fail L3
166	VZC fail L1
167	VZC fail L2
168	VZC fail L3
169	Low control volts
170–182	Internal fault X. Contact the local supplier with the fault code (X).

5 Parameter Handling

5.1 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 class
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

6 Specifications

6.1 Connections

Network	5-way male and unpluggable female connector (supplied)
Maximum cable size	2.5 mm ² (14 AWG)

6.2 Settings

Address range	0–63
Data rate	125 kB, 250 kB, 500 kB

6.3 Power

Consumption	
Steady state	19 mA @ 25 V DC
Inrush (at 24 V DC)	31 mA @ 11 V DC
Galvanically isolated	1.8 A maximum for 2 ms

6.4 Certification

RCM	IEC 60947-4-2
CE	EN 60947-4-2
RoHS	Compliant with EU Directive 2011/65/EU



Illustration 3: ODVA

Index

C

Connector plug 5

D

Data structure

 Input 9

 Output 9

E

EDS file 8

Expansion card 5

Expansion port cover 5

I

I/O data 8

M

Module LED 6

N

Network LED 6

P

Parameter object 14

T

Tools

 Flat-bladed screwdriver 5

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DK-6300 Graasten
vlt-drives.danfoss.com

