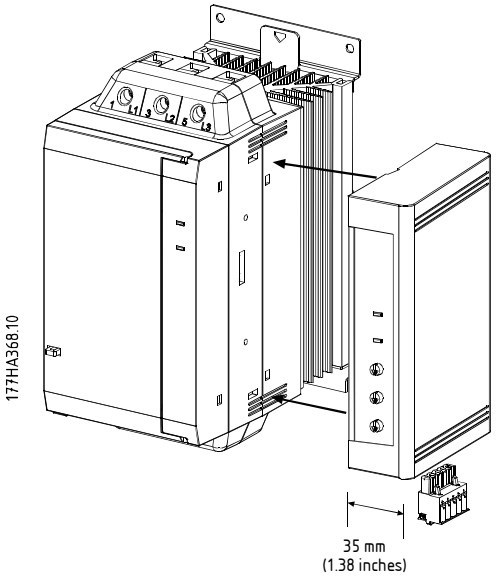
OPERATING INSTRUCTIONS
MCD 200 DEVICENET Module

Order Code: 175G9002

Installation



Control power and mains supply must be removed from the MCD 200 before attachment or removal of an accessory module. Failure to do so may result in equipment damage.

Do not apply control power or mains supply to the MCD 200 until the DEVICENET module Node Address (MAC ID) and Data Rate is set up.

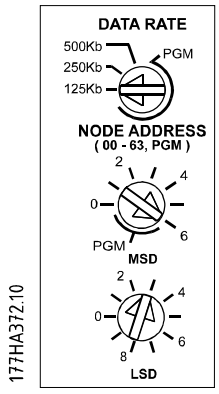
Configuration

The DEVICENET module 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 MCD 200 must be added to the DEVICENET manager project using the EDS file and configuration/management software tool. The EDS file name is “SSDM01.eds”. This file is available from disk or on the internet at www.danfoss.com/drives.

If your Master uses on-screen icons, a graphic bitmap file is available from disk or on the internet at www.danfoss.com/drives. This file is named “DEVICE.bmp”.

Adjustment



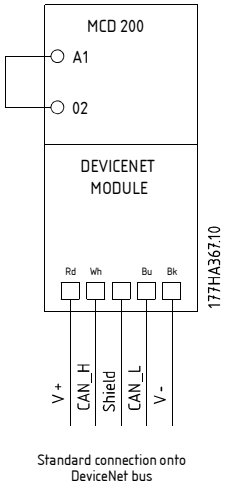
ATTENTION

DEVICENET network power must be removed and reapplied before rotary switch settings take effect. Diagram (above) shows factory default setting for rotary switches.

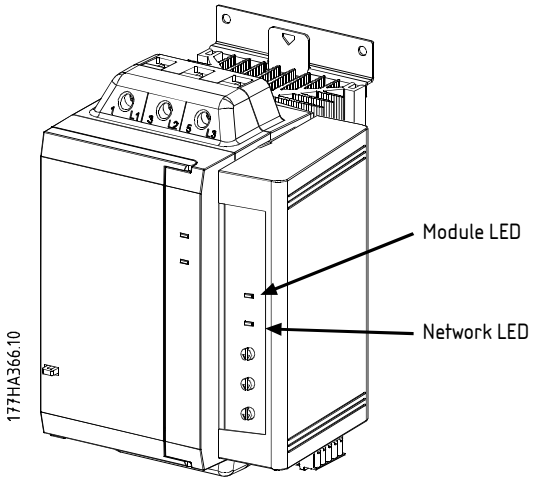
The Data Rate and Node Address (MAC ID) must be set locally on the DEVICENET module. These can not be set using DEVICENET management software.

When the Data Rate and MSB Node Address (MAC ID) rotary switches are set on PGM position, the DEVICENET module uses the previously used valid on-line Data Rate and Node Address (MAC ID).

Connection



Module and Network LEDs



The Module LED indicates condition of the power supply and module operation. The Network LED indicates status of the communication link between the DEVICENET module and the network. LED operation is as follows;

LED	State	Description
Module	Off	Network power off
	Green	Normal operation
	Green flashing	Standby (Commissioning required)
	Red flashing	Minor recoverable fault
	Red	Unrecoverable fault
	Red/Green flashing	The Device is in 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 Module and Master
	Red/Green flashing	Communication faulted and received an Identity communication faulted request

ATTENTION
When a communications failure occurs, the MCD 200 may trip on a Comms Timeout. When communication is restored, the MCD 200 will require an independent Reset.

DEVICENET

Polled I/O Data Structure

Once the EDS file has been loaded, the DEVICENET module 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 MCD 200, DEVICENET module and Master (PLC) have been set-up, configured and powered up, the Master will transmit 2 bytes of data to the module and receive 14 bytes of data from the module.

Master > Slave data transmitted 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 command 1 = Reset command and disable Start command
	3 to 7	Reserved
1	0 to 7	Reserved

Slave > Master data transmitted is as follows;

Byte	Bit	Function	Value
0	0	Trip/fault	0 = no trip 1 = trip
	1	Reserved	
	2	Running 1	0 = unknown, ready to start or trip 1 = starting, running or stopping
	3	Reserved	
	4	Ready	0 = start or stop command not acceptable 1 = start or stop command acceptable
	5	Control from net	1 (always = 1)
	6	Reserved	
	7	At reference	1 = running (full voltage)
1	0 to 7	Status	0 = unknown 2 = not ready (restart delay) 3 = ready to start 4 = starting or running 5 = soft stopping 7 = trip/fault
2	0 to 7	Trip/fault code	0 = no trip 20 = motor overload (1) 26 = phase imbalance (1) 50 = power circuit 54 = phase rotation (1) 55 = supply frequency 75 = motor thermistor (1) 101 = excess start time (1) 113 = comms failure between module and MCD 200 114 = network comms failure
3	0	Initialised	1 = phase rotation bit is valid (bit 1) after 1st start
	1	Phase rotation	1 = positive phase rotation detected
	2 to 7	Reserved	
4	0 to 7	Current (low byte)	current (amps)
5	0 to 7	Current (high byte)	
6 (2)	0 to 7	Current % FLC (low byte)	current as a percentage of soft starter FLC setting (%)
7 (2)	0 to 7	Current % FLC (high byte)	
8	0 to 7	Temperature	motor temperature (%)
9 to 13	0 to 7	Reserved	

ATTENTION (1)
These trip states are not available with MCD 201 open loop soft starter models.

ATTENTION (2)
This feature is not available on MCD 200 series soft starters with serial number format xxxx03-xxx or less.

ATTENTION
When communication fails between the DEVICENET module and the network, the MCD 200 will be commanded to trip by the module when a network watchdog time out occurs. The MCD 200 will require an independent Reset to clear this trip state.

APPENDIX

DEVICENET Objects

DEVICENET objects can be accessed through DEVICENET management software. These details are for information only and have no affect on setting up or configuring the DEVICENET module.

Identity

Details		Value(hex)	Comment
Object Address		01	Identity Object
Connection Instance		01	
Services	Get Attribute Single	0E	Request details of specific attribute
	Reset	05	Resets the DEVICENET module (not the starter)

Attribute Name	Attribute ID	Access Rule/Service	Comment
Vendor ID	01	Get Attribute Single	Vendor identification number = 204
Device Type	02	Get Attribute Single	ODVA device type = 0x17 (soft start)
Product Code	03	Get Attribute Single	Vendor assigned product code = 1
Revision	04	Get Attribute Single	Revision number written as major.minor
Status	05	Get Attribute Single	Status of the converter (hex) 0001 Configured 0400 Major recoverable fault 0800 Major unrecoverable fault
Serial Number	06	Get Attribute Single	Vendor assigned serial number
Product Name	07	Get Attribute Single	Vendor assigned product name
State	08	Get Attribute Single	State of the identity object (hex) 00 Non-existent 01 Device self testing 02 Standby 03 Operational 04 Major recoverable fault 05 Major unrecoverable fault

DeviceNet

Details		Value (hex)	Comment
Object Address		03	DeviceNet Object
Connection Instance		01	
Services	Get Attribute Single	0E	Request details of specific attribute
	Allocate master/slave	4B	Requests allocation of Master/Slave connection set
	De-allocate master/slave	4C	Requests release of master/slave connection set

Attribute Name	Attribute ID	Access Rule/Service	Comment
MAC ID	01	Get Attribute Single	DeviceNet node address
Baud Rate	02	Get Attribute Single	DeviceNet baud rate
Bus-off Interrupt	03	Get Attribute Single	The default, 01hex, is for the device to reset the CAN controller
Allocation Info	05	Get Attribute Single	Indicates allocation configuration of master/slave connection set
MAC ID switch changed	06	Get Attribute Single	Indicates that the MAC ID switch has changed
Baud rate switch changed	07	Get Attribute Single	Indicates that the baud rate switch has changed
MAC ID switch value	08	Get Attribute Single	Actual MAC ID switch value
Baud rate switch value	09	Get Attribute Single	Actual baud rate switch value

Polled I/O Connection

Details		Value (hex)	Comment
Object Address		05	Connection Object
Connection Instance		02	Polled I/O connection
Services	Get Attribute Single	0E	Request details of specific attribute
	Set Attribute Single	10	Sets details of specific attribute

Attribute Name	Attribute ID	Access Rule/Service	Comment
State	01	Get Attribute Single	State of the object 00 Non-existent 01 Configuring 03 Established 04 Timed out
Instance type	02	Get Attribute Single	Indicates I/O messaging
Transport class trigger	03	Get Attribute Single	Defines behaviour of the connection
Produced connection ID	04	Get Attribute Single	Produced message CAN identifier value
Consumed connection ID	05	Get Attribute Single	Consumed message CAN identifier value
Initial communication characteristics	06	Get Attribute Single	Messaging characteristics.
Produced connection size	07	Get Attribute Single	Max number of bytes transmitted
Consumed connection size	08	Get Attribute Single	Max number of bytes received
Expected packet rate	09	Get Attribute Single Set Attribute Single	Value for inactivity/watchdog timer for this object instance (milliseconds)
Watchdog timeout action	12	Get Attribute Single	Transition to timed out state
Produced connection path length	13	Get Attribute Single	= 6
Produced connection path	14	Get Attribute Single	= [20 04 24 3D 30 03]
Consumed connection path length	15	Get Attribute Single	= 6
Consumed connection path	16	Get Attribute Single	= [20 04 24 05 30 03]

Explicit Connection

Details		Value (hex)	Comment
Object Address		05	Connection Object
Connection Instance		01	Explicit messaging connection
Services	Get Attribute Single	0E	Request details of specific attribute
	Set Attribute Single	10	Sets details of specific attribute

Attribute Name	Attribute ID	Access Rule/Service	Comment
State	01	Get Attribute Single	State of the object 00 Non-existent 03 Established
Instance type	02	Get Attribute Single	Indicates Explicit messaging
Transport class trigger	03	Get Attribute Single	Defines behaviour of the connection
Produced connection ID	04	Get Attribute Single	Produced message CAN identifier value
Consumed connection ID	05	Get Attribute Single	Consumed message CAN identifier value
Initial communication characteristics	06	Get Attribute Single	Messaging characteristics.
Produced connection size	07	Get Attribute Single	Max number of bytes transmitted
Consumed connection size	08	Get Attribute Single	Max number of bytes received
Expected packet rate	09	Get Attribute Single Set Attribute Single	Value for inactivity/watchdog timer for this object instance (milliseconds)
Watchdog timeout action	12	Get Attribute Single	Transition to non-existent state
Produced connection path length	13	Get Attribute Single	0
Produced connection path	14	Get Attribute Single	No data
Consumed connection path length	15	Get Attribute Single	0
Consumed connection path	16	Get Attribute Single	No data

Control Supervisor

Details		Value (hex)	Comment
Object Address		29	Control Supervisor Object
Connection Instance		01	
Services	Get Attribute Single	0E	Request details of specific attribute
	Set Attribute Single	10	Sets details of specific attribute
	Reset	05	Reset soft starter to Ready state. If motor is running, soft starter is commanded to coast to stop.

Attribute Name	Attribute ID	Access Rule/Service	Comment
Run 1	03	Get Attribute Single Set Attribute Single	State of starter 1 Enabled or Stopping 0 Other state Set, Transition 0 =>1 to start, 0 to stop
State	06	Get Attribute Single	State of the control supervisor object 00 Unknown 02 Not Ready 03 Ready 04 Enabled 05 Stopping 07 Faulted
Ready	09	Get Attribute Single	State of starter 1 Ready, Enabled, or Stopping 0 Other state
Faulted	10	Get Attribute Single	State of starter 1 Trip occurred (latched) 0 No faults present
Fault Reset	12	Set Attribute Single	Set to 1 to reset trip
Fault Code	13	Get Attribute Single	Trip/Fault code
DN Fault Mode	16	Get Attribute Single Set Attribute Single	Action on loss of DeviceNet 00 Fault and stop (See ATTENTION) 01 Ignore (warning only)

ATTENTION
When “DN Fault Mode” = 00 (Fault and stop), the DEVICENET module forces the MCD 200 to trip. The MCD 200 immediately removes voltage from the motor and enters a trip state. The MCD 200 Ready LED flashing (x 8) indicates this “Forced Comms Trip”.

Output Assembly

Refer to Polled I/O Data Structure for details.

Details		Value (hex)	Comment
Object Address		04	Assembly Object
Connection Instance		05	Extended Soft Starter Output
Services	Set Attribute Single	10	Sets details of specific attribute

Attribute Name	Attribute ID	Access Rule/Service	Comment
Data	03	Set Attribute Single	8 Bytes of data as shown in following table

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved	Reserved	Reserved	Reserved	Reserved	Trip/fault Reset	Quick Stop	Start/ Stop
1	Reserved							
2	Reserved							
3	Reserved							
4	Reserved							
5	Reserved							
6	Reserved							
7	Reserved							

Input Assembly

Refer to Polled I/O Data Structure for details.

Details		Value (hex)	Comment
Object Address		04	Assembly Object
Connection Instance		3D	Extended Soft Starter Input
Services	Get Attribute Single	0E	Request details of specific attribute

Attribute Name	Attribute ID	Access Rule/Service	Comment
Data	03	Get Attribute Single	14 Bytes of data as shown in following table

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Reference	Reserved	Control from Net (= 1)	Ready	Reserved	Running 1	Warning	Trip/Fault
1	Status							
2	Trip/Fault Code							
3	Reserved						Phase Rotation	Initialised
4	Motor Current (Low Byte)							
5	Motor Current (High Byte)							
6	% Motor Current (Low byte)							
7	% Motor Current (High Byte)							
8	Motor Temperature – Thermal Model							
9	Reserved							
10	Reserved							
11	Reserved							
12	Reserved							
13	Reserved							