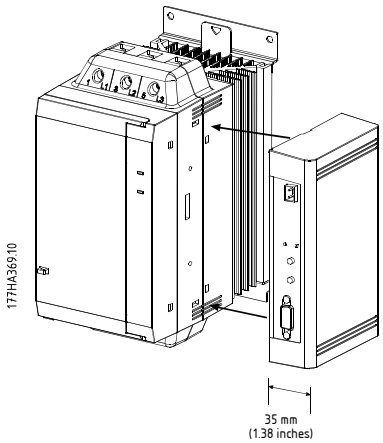
OPERATING INSTRUCTIONS
MCD 200 Profibus Module

Order Code: 175G9001

■ Installation



To install the Profibus Module, remove control power and mains supply from the soft starter then plug the module onto the side of the MCD 200. Set the module's address to match the address in the Master configuration tool, then restore control power to the MCD 200 before inserting the network connector and applying power to the Profibus Module.

To remove the Profibus Module, remove power from the module and the MCD 200. Insert a small flat-bladed screwdriver into the gaps at the top and bottom of the module to depress the retaining clips, then pull the module away from the soft starter.

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.

■ Configuration

Import the "SSPM08A8.gsd" file from disk or from the Internet at www.danfoss.com/drives into your Master configuration tool. Select the Basic module if you require strict adherence to the Low Voltage Switchgear (LVSG) Motor Starter Profile 2, or the Extended module if you require access to the full range of MCD 200 operating parameters.

If your Master uses on-screen icons, there are two graphic bitmap files available from disk or from the Internet at www.danfoss.com/drives. SSPM_N.bmp indicates normal mode. SSPM_D.bmp indicates diagnostic mode.

NB!:
The Profibus Module has a slave address range of 0 to 99.

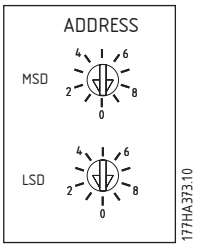
If the Profibus network fails, the module will leave data exchange mode after the network watchdog timeout period has expired. The Master configuration tool sets this timeout period. A Comms Timeout parameter in the GSD file sets how long after this event it takes for the MCD 200 to be forced into a trip state (i.e. Ready LED flashing x 8).

The user can adjust the Comms Timeout parameter in the GSD file to any setting between 0 and 100 seconds. The default setting is 10 seconds.

NB!:
If the Comms Timeout parameter is set to 0, the current state of the starter will remain unchanged on a network failure. This gives the user the option of operating the MCD 200 via local control, but is NOT failsafe.

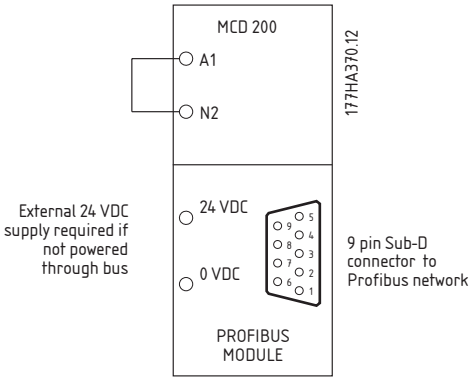
■ Adjustment

Before powering up the Profibus Module, set the two rotary switches so that the module address matches the address set in your Master configuration tool. Diagram (below) shows factory default setting for the rotary switches.



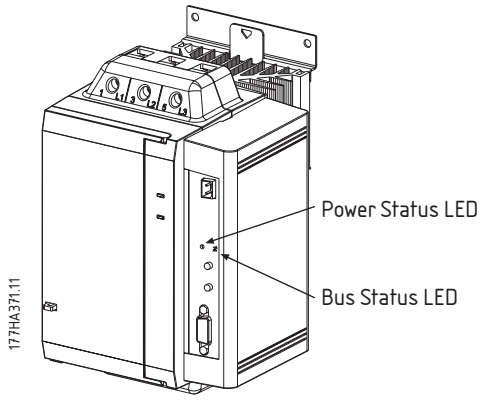
The module has data rate auto-detection so no adjustment is required for this.

■ Connection



9 pin Sub-D connector	
Pin No.	**Assignment**
1	Shield (not connected internally)
2	24 VDC negative (optional)
3	RxD/TxD-P
4	CNTR-P (optional)
5	DGND
6	VP (end of bus slave only)
7	24 VDC positive (optional)
8	RxD/TxD/-N
9	CNTR-N/DGND (optional)

■ Power Status and Bus Status LEDs



Power Status LED (Red)	
Off	**On**
Module not powered up	Module powered up and ready to go online

Bus Status LED (Green)	
Off	**On**
No connection, offline or data exchange failure	Module online and in data exchange state

NB!:
If communication fails between the module and the network, the Bus Status LED will go off. When communication is restored, the Bus Status LED will come back on.

When a communications failure occurs, the MCD 200 may trip if the Comms Timeout parameter for the network is set greater than zero. When communication is restored, the MCD 200 will require an independent Reset.

■ Profibus Data Structure

The Profibus Module uses the data structure defined in the Low Voltage Switchgear (LVSG) Motor Starter Profile 2. Additional bytes have been defined which allow the user to access MCD 200 operating parameters such as actual motor current and motor temperature.

The Profibus Module is defined in the GSD file as a Modular Slave. The MCD 200 is supported by a choice of two modules in the GSD file.

The Basic module allows the MCD 200 to be configured in a network with strict adherence to the Low Voltage Switchgear (LVSG) Motor Starter Profile 2. This module provides Start/Stop, Quick Stop and Reset control, as well as starter status and % FLC current feedback.

The Extended module provides the same access as the Basic module, with the addition of extensions allowing extra operating parameter requests.

The Extended module has two I/O areas:

- The first I/O area supports the bytes defined in the Low Voltage Switchgear (LVSG) Motor Starter Profile 2.
- The second I/O area is an extension providing read only access to extra operating parameters.

■ Low Voltage Switchgear (LVSG) Motor Starter Profile 2 Data Structure

Master > Slave Control Word is structured as follows. Reserved bits may be defined in the profile but are not relevant to the MCD 200 series.

Byte 0	
Bit 7	*Reserved*
Bit 6	*Reserved*
Bit 5	*Reserved*
Bit 4	*Reserved*
Bit 3	Reset
Bit 2	*Reserved*
Bit 1	*Reserved*
Bit 0	Fwd Run
Byte 1	
Bit 7	*Reserved*
Bit 6	*Reserved*
Bit 5	*Reserved*
Bit 4	Quick Stop
Bit 3	*Reserved*
Bit 2	*Reserved*
Bit 1	*Reserved*
Bit 0	*Reserved*

NB!:
Quick Stop is a manufacturer-defined bit and functions as follows, when Fwd Run bit changes from 1 to 0:
Byte 2, Bit 4 = 0: stop action will be a Soft Stop if set on the MCD 200
Byte 2, Bit 4 = 1: stop action will be a Quick Stop (i.e. Coast to Stop)

Slave > Master Status Word is structured as follows. Reserved bits may be defined in the profile but are not relevant to the MCD 200 series.

Byte 0	
Bit 7	*Reserved*
Bit 6	*Reserved*
Bit 5	*Reserved*
Bit 4	*Reserved*
Bit 3	*Reserved*
Bit 2	Fault
Bit 1	On
Bit 0	Ready

Byte 1	
Bit 7	Ramping
Bit 6	*Reserved*
Bit 5	Motor Current (% FLC) ⋆
Bit 4	
Bit 3	
Bit 2	
Bit 1	
Bit 0	

⋆ **Motor Current (% FLC)** represents current as a percentage of the set motor FLC. A maximum value of 63 represents 200% FLC. To render this value as a readable percentage, divide by 0.315. *This feature is only available on MCD 202 closed loop soft starters with serial number format xxxx04-xxx or higher.*

NB!:
Ready is set when the MCD 200 is ready to start the motor.
On is set when the MCD 200 is starting, running or soft stopping the motor.
Fault is set when the MCD 200 has tripped.
Ramping is set when the MCD 200 is starting or soft stopping the motor.

■ Low Voltage Switchgear (LVSG) Motor Starter Profile 2 with Extended Data Structure

Master > Slave output byte is structured as follows:

Byte 0
Operating Parameter request (Parameter number 1 to 4)

Slave > Master input bytes, in response to an Operating Parameter request, are structured as follows:

Byte 0	
Bits 7 to 1 *Reserved*	Bit 0 = 1: Invalid Parameter Number
Byte 1	
Echo Parameter Number	
Byte 2	
Low Byte Operating Parameter value read from MCD 200	
Byte 3	
High Byte Operating Parameter value read from MCD 200	

NB!:
An invalid Operating Parameter Number will result in the Invalid Parameter Number bit (Byte 3, Bit 0) being set = 1.

Parameter Numbers are defined as follows:

Parameter Number	Parameter Value (High Byte)	Parameter Value (Low Byte)
0	*Reserved*	*Reserved*
1	Soft Starter product type code (= 4) Bits 7 – 3 only	MCD 200 software version number
2	Trip code	MCD 200 state
3 ★	Average Current (High Byte)	Average Current (Low Byte)
4 ★	*Reserved*	Motor Temperature
5 to 15	*Reserved*	*Reserved*

★ All MCD 201 open loop soft starter models will read back average current as '2222' decimal and motor temperature as '111' decimal.

MCD 200 Parameter Number 2 Low Byte is structured so that Bits 0 to 3 indicate MCD 200 status and Bits 4 to 7 function as follows:

Value (Decimal) Bits 0 to 3	MCD 200 Status
0	Unknown (communication error between module and MCD 200)
1	Ready to start (waiting)
2	Starting (MCD 200 soft starting)
3	Running (MCD 200 running and bypass contactors closed)
4	Stopping (MCD 200 soft stopping)
5	Not Ready (Restart delay)
6	Fault (MCD 200 has tripped)
Bit Number	**Function**
Bit 4	Set if positive phase rotation detected (Bit 6 must = 1)
Bit 5	Set if average current exceeds FLC setting
Bit 6	Set after first start once phase rotation has been validated
Bit 7	Set if comms failure occurs between module and MCD 200

MCD 200 Parameter Number 2 High Byte indicates the MCD 200 trip code. Details are as follows:

Trip code (decimal)	MCD 200 trip state
1	Excess Start Time ★
2	Motor Overload ★
3	Motor Thermistor ★
4	Phase Imbalance ★
5	Supply Frequency
6	Phase Rotation ★
8	Power Circuit
15	Communication failure between module and MCD 200
16	Communication failure between module and network
255	No Trip

★ These trip states only apply to MCD 202 closed loop soft starter models.

■ Profibus Diagnostic Telegrams

The Profibus Module supports external diagnostics. If the MCD 200 trips, the trip code will be automatically returned in a Diagnostic Telegram consisting of the following three bytes:

Diagnostic Telegram Data Structure	
Byte 0	= User diagnostic length (always set = 3)
Byte 1	= MCD 200 trip code
Byte 2	= *Reserved*

See the table above for MCD 200 trip codes.

■ Profibus Freeze Mode

The Profibus Module supports Freeze Mode.

In Freeze Mode, the input buffers are not updated with new data from the MCD 200 until an Un-Freeze command is received from the Master.

■ Profibus Sync Mode

The Profibus Module supports Sync Mode.

In Sync Mode, commands to the MCD 200 are not processed with new data from the Master until the module receives an Un-Sync command.

■ Profibus Clear Mode

If the Master sends a global Clear command, the Profibus Module will send a Quick Stop command to the MCD 200 soft starter. The Profibus Module will inhibit any start commands until the Master exits Clear Mode.

NB!:

When Clear mode is entered, the MCD 200 will Quick Stop the motor. If the Fwd Run bit is set (i.e. Fwd Run bit = 1) before leaving Clear mode, the motor will restart. If the Fwd Run bit is cleared (i.e. Fwd Run bit = 0) before leaving Clear mode, the motor will not start.