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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 RS485 communications when installing and using this equipment.

Users are cautioned that 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.

General Description

The Remote Operator allows remote operation of MCD 3000 ⋆ and MCD 200 Series soft starters, and offers the following functionality:

- Operational Control (Start, Stop, Quick Stop and Reset)
- Starter Status Monitoring (Start, Run and Trip)
- Performance Monitoring (Motor Current and Motor Temperature)
- Trip Code Display
- 4-20 mA Analogue Output (Motor Current)
- Optional RS485 Network Connection ⋆⋆

⋆ The Remote Operator is compatible for use with MCD 3000 starters with serial numbers xxxx06-482 or greater.

⋆⋆ The Remote Operator can act as a gateway device for connection to an RS485 serial communications network, allowing remote control of a motor from an RS485 serial communications network using Modbus RTU or standard AP ASCII communications protocol. For details, please contact Danfoss and request a copy of the Modbus Module Operating Instructions.

Manual Description

This manual describes the installation, connection, configuration and operation of the Remote Operator for use with MCD 3000 and MCD 200 soft starters.

The MCD 200 Series comprises two separate ranges, MCD 201 and MCD 202. This manual uses the designation MCD 200 when referring to characteristics common to both the MCD 201 and MCD 202 ranges. In all other cases the text refers to the specific range MCD 201 or MCD 202.

NB!:
Indicates something to be noted by the reader.

Indicates a general warning

Installation

This section describes the installation and connection procedures to use the Remote Operator for basic control and monitoring of a soft starter. The Remote Operator is pre-configured to control a soft starter once control supply power is applied to both devices. For basic operation, no parameter adjustments are required to the Remote Operator or the soft starter.

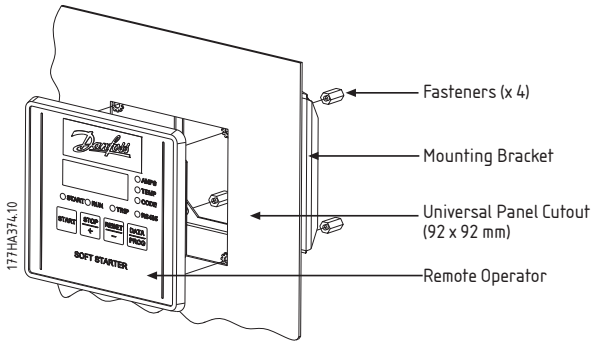
In order to use the Remote Operator's 4-20 mA Analogue Output to monitor motor current, follow the instructions in Section 5.

Mounting

The Remote Operator is rated IP54 or NEMA 12 ★ when mounted correctly in accordance with these instructions. It is intended for use on the flat surface of a panel, with all external wiring connected from behind the panel.

The Remote Operator is supplied with a mounting bracket and four fasteners. The built-in gasket seal guarantees protection from outside the panel.

Choose the panel location of the Remote Operator. The required panel cutout is 92 x 92 mm. Place the Remote Operator through the cutout and locate the mounting bracket at the rear of the panel onto the four studs. Use the four fasteners to tighten the mounting bracket up to the rear of the panel.



★ For use on a flat surface of a NEMA 1 or NEMA 12 enclosure.

Connection

The Remote Operator requires a minimum of three electrical connections – the external power supply, the chassis earth and the RS485 Starter port to the soft starter. All external wiring, except the chassis earth (M4 stud provided), is connected to spring operated clamp connector terminals with a maximum wire size of 2.5 mm^2. No special tools are required.

Once the Remote Operator is mounted, connect it to the starter as illustrated below.

Grounding and Shielding

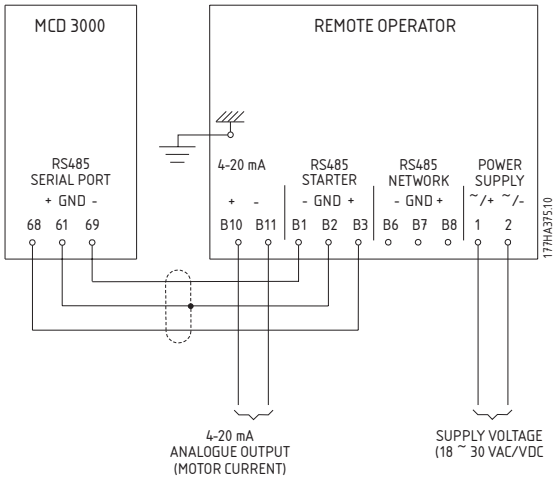
Twisted pair data cable with earth shield is recommended. The cable shield should be connected to a GND device terminal at both ends and one point of the site protective earth.

Termination Resistors

In long cable runs prone to excessive noise interference, termination resistors should be installed. This resistance should match the cable impedance (typically 120 Ω). Do not use wire wound resistors.

For Use with MCD 3000
Order Code: 175G3061

To connect the Remote Operator to an MCD 3000 soft starter:

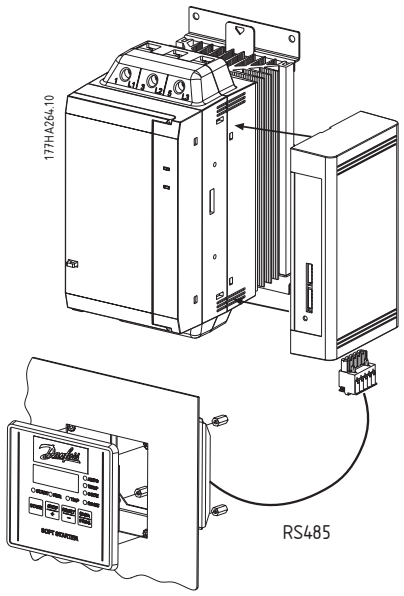


For the Remote Operator to operate correctly, the MCD 3000 must be in LOCAL mode (set Parameter 20 = 2: Local Control Only).

For Use with MCD 200 Series
Order Code: 175G9004
(comprising display and Remote Operator Module)

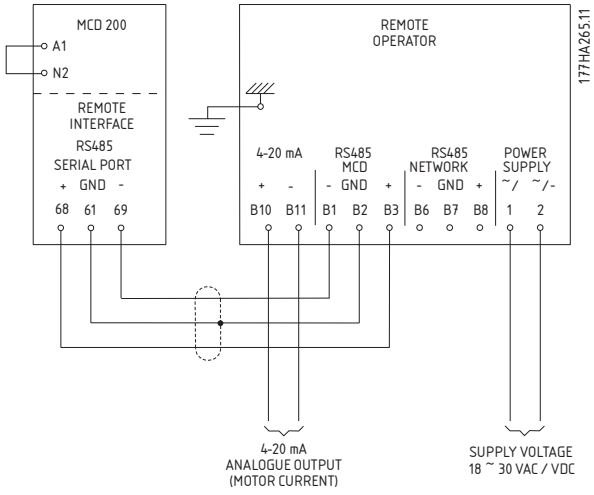
In order to use the Remote Operator with MCD 200 Series soft starters, a Remote Operator Module must first be installed to the starter using the following steps:

1. Remove control power and mains supply from the starter.
2. Attach the Remote Operator Module to the side of the starter as illustrated.



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

Once the Remote Operator Module has been installed, wire between the Remote Operator and the module as follows:



For the Remote Operator to operate correctly, a link must also be made between A1 and N2 on the MCD 200.

■ General Technical Data

Enclosure	
Front Panel Height	120 mm
Front Panel Width	120 mm
Inside Panel Depth (when mounted)	30 mm
Panel Cutout	92 mm^2
Weight	450 g

Power Supply	
Voltage	18 – 30 VDC or VAC (50/60 Hz)
Consumption	250 mA (max)

RS485 Serial Network Port (Optional)	
RS485 Network Interface	AP ASCII or Modbus RTU protocol (selectable)
Connection (Terminals B6, B7, B8)	3 pole spring clamp connector terminals

RS485 Serial Starter Port	
RS485 Soft Starter Interface	AP ASCII Protocol as standard
Connection (Terminals B1, B2, B3)	3 pole spring clamp connector terminals

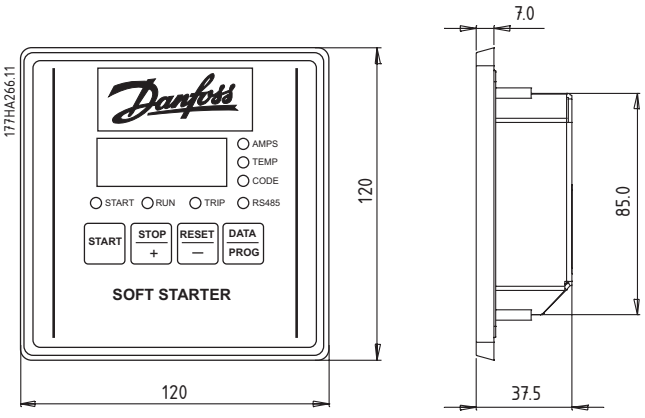
Analogue Output	
Motor Current Monitoring Interface	4 – 20 mA (max burden 200 Ω)
Connection (Terminals B10, B11)	2 pole spring clamp connector terminals

Environment	
Enclosure Rating	IP54 or NEMA 12 when correctly installed
Pollution Degree	Pollution Degree 3
Operating Temperature	- 5 °C / + 60 °C
Relative Humidity	5 to 95% (max non condensing)

This product has been designed for Class A equipment. Use of the product in domestic environments may cause radio interference, in which case the user may be required to employ additional mitigation methods.

Standards Approvals	
C✓	IEC 60947-4-2
UL / C-UL	UL 508
CE	IEC 60947-4-2

■ Dimensions



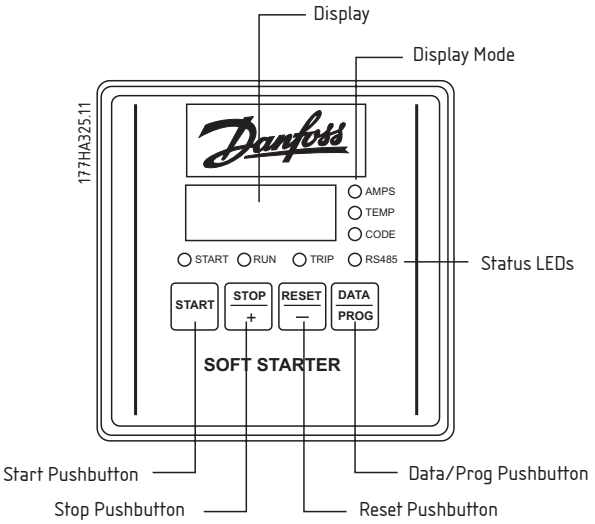
Functionality Range

The Remote Operator provides the following range of functions:

Description	MCD 201	MCD 202	MCD 3000
Operational Control (Start, Stop, Reset, Quick Stop)	●	●	●
Status Monitoring (Ready, Starting, Running, Stopping, Tripped)	●	●	●
Performance Monitoring (Motor Current, Motor Temperature)		●	●
Trip Code Display	●	●	●
4-20 mA Analogue Output		●	●

Operation

The Remote Operator performs all sort starter functions except programming of the soft starter. The Remote Operator can only be used to program its own adjustable parameters. Uploading and downloading of the soft starter parameters is achieved locally at the soft starter or through the serial communications network if connected.



Start Pushbutton: Starts the motor.
Stop/+ Pushbutton: Stops the motor.
Reset/- Pushbutton: Resets the soft starter.

NB!:
Simultaneously pressing the Stop/+ and Reset/- pushbuttons causes the soft starter to immediately remove voltage from the motor resulting in a coast to stop. Any soft stop settings are ignored.

Data/Prog Pushbutton: Selects the parameter to be shown on the display (Motor Current or Motor Temperature).

Status LEDs: Indicate the status of the starter, and of the RS485 link between the Remote Operator and the starter.

Display Mode: Denotes the parameter shown on the display (Motor Current, Motor Temperature, Trip Code).

Display: Indicates the value of the selected data.

NB!:
Motor Current and Motor Temperature information is only available on MCD 3000 and MCD 202 starters. If connected to a MCD 201 starter, the display will show 2222 instead of Motor Current and 1.11 instead of Motor Temperature.

Trip Codes

If the soft starter trips, the relevant trip code is displayed on the Remote Operator display. The CODE and TRIP LEDs are illuminated. Some trip codes are not available from all starter models – see to the table below.

If the soft starter has an internal problem indicated by a Code E (EEPROM Read/Write Failure) or Code U (CPU Error) on its display, the soft starter will not communicate with the Remote Operator. The Remote Operator display will show four dashes and the RS485 LED will flash.

Code	Description	MCD 201	MCD 202	MCD 3000*
1-0	Shorted SCR			●
1-1	Excess Start Time		●	●
1-2	Motor Overload		●	●
1-3	Motor Thermistor		●	●
1-4	Phase Imbalance		●	●
1-5	Supply Frequency	●	●	●
1-6	Phase Rotation		●	●
1-7	Instantaneous Overcurrent			●
1-8	Power Circuit	●	●	●
1-9	Undercurrent			●
1-C	Communications Failure between starter and module	●	●	●
1-E	EEPROM Read/Write Failure			●
1-F	Heatsink Overtemperature			●
1-H	Communications Failure between module and network	●	●	●
1-J	Auxiliary Trip			●
1-L	FLC Out of Range			●
1-P	Invalid Motor Connection			●
1-U	CPU Error			●
1-Y	Incorrect Main Control Module			●

★ When used in conjunction with MCD 3000 starters with serial numbers between xxxx06-482 and xxxx07-xxx, Trip Codes C (Communications Failure), L (FLC Out of Range) and Y (Incorrect Main Control Module) are displayed as 1– on the Remote Operator. These trip codes are displayed correctly on the soft starter front panel.

Overview

The Remote Operator has a 4-20 mA Analogue Output for monitoring motor current. The 4-20 mA output is available on terminals B10 and B11.

The analogue output signal spans from 4 mA when the motor current is zero (i.e. soft starter is not running) to 20 mA when the motor current is 125% of the Motor FLC setting in the Remote Operator (Parameter 6).

NB!:
The 4-20 mA output is available only when the Remote Operator is connected to MCD 3000 and MCD 202 models.

Calibration

The Remote Operator Motor FLC parameter (Parameter 6) must be adjusted to match the Motor FLC setting in the soft starter. The lower end of the analogue output signal can be calibrated using the Remote Operator Analogue Output 4 mA Offset parameter (Parameter 7). This is set to give a 4 mA output signal when the motor current is zero.

The 4-20 mA Analogue Output must only be used for motor current monitoring and metering. It is not designed for process signal control use.

NB!:
The Remote Operator uses only one Motor FLC setting. This function is not suitable for applications using both MCD 3000 primary and secondary parameter sets.

Programming

When the 4-20 mA output is being used, the Remote Operator's Motor FLC and Analogue Output 4 mA Offset parameters (Parameters 6 and 7) must be set to suit the application. Programming can only be carried out while the soft starter is not running.

Programming Procedure

1. Enter Programming Mode by holding down the Data/Prog Pushbutton for four seconds. The default value of the first parameter will be displayed.
2. Use the Data/Prog Pushbutton to advance to the next parameter.
3. Use the Stop/+ and or Reset/- pushbuttons to adjust parameter values.

Programming Mode is exited when the Data/Prog Pushbutton is pressed after Parameter 8.

Par. No	Parameter	Default Setting	Adjustable Range
1	RS485 Network Baud Rate *	4	
2	RS485 Network Satellite Address *	20	
3	RS485 Network Timeout *	0	
4	RS485 Network Protocol *	1	
5	Modbus Protocol Parity *	0	
6	Motor FLC (A)	10	1 to 2868
7	Analogue Output 4 mA Offset (%)	100	80 to 120
8	Start/Stop/ Quick Stop disable	0	0 = Remote Operator start, stop, quick stop function enabled. 1 = Remote Operator start, stop, quick stop function enabled. 2 = Remote Operator start, stop, quick stop function disabled. ** 3 = Remote Operator start, stop, quick stop function disabled. **

★ Parameters 1 to 5 are not relevant for the 4-20 mA output. See the Modbus Module Operating Instructions for details.

★★ Remote Operator Reset/- Pushbutton is always enabled.

NB!:
There is a 20 second timeout when the Remote Operator is in Programming Mode. Programming Mode will automatically close if no input is registered for 20 seconds. Any changes already made will be saved.

General Faults

Indication	Problem/Possible Solution
No display	No control supply voltage. • Check that correct voltage is present at terminals 1 and 2.
AMPS or TEMP LED flashing	Soft starter in restart delay mode. • Wait for the restart delay (programmed in the soft starter) to elapse.
Four dashes on display and RS485 LED flashing	A loss of communication has been detected on the RS485 link to the soft starter. • Verify and solve the cause for loss of communication. If communication is restored before the soft starter registers a Communications Failure, the display will return to active status and the RS485 LED will illuminate. If communication is restored after the soft starter registers a Communications Failure, the display will indicate a trip code. Use the Reset/- Pushbutton to reset the soft starter fault.
-	Incorrect or no 4-20 mA Analogue Output signal. • Check the correct voltage is present at terminals 1 and 2. • Check that correct polarity is used at terminals B10 and B11. • Check that Motor FLC and Analogue Output 4 mA Offset parameters are set correctly.
-	The motor cannot be started. • Check that control voltage is connected to the starter. • If connected to an MCD 200 starter, check that terminals A1 and N2 are linked.

Notes

Notes