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PROFIBUS Option Card

for the dcM6+/dcM12+ Digital DC Drive

Part Number: WW0012010

Instruction Manual

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Part Number 027-2152
REV June 2002

- This manual is an integral and essential part of the product. Carefully read the instructions contained herein as they provide important hints for use and maintenance safety.
- This product shall be used only for the purposes it is aimed at. Any other use is to be considered as improper and dangerous. The manufacturer is not responsible for any possible damage caused by improper, erroneous and irrational applications.
- Saftronics reserves the right to make any technical changes to this manual without prior notice. Any misprint or spelling mistake will be edited in the new versions of this manual.
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INTERNAL SOFTWARE VERSION 3.06 and up

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1. COMMUNICATION FEATURES

This manual describes how to interface a dcM6+ or dcM12+ Digital DC Drive with an intelligent outside control unit (master) via PROFIBUS-DP. **In order to create this interface, an optional module must be installed on the dcM6+ / dcM12+ (see paragraph 3).** The corresponding firmware, on the other hand, is already present in the standard D3.06 version and requires no update. The dcM6+/dcM12+ becomes a slave node from which a Profibus-DP master can read data from or write data to. The dcM6+/dcM12+ will never start a communication towards other nodes, but will only answer incoming commands.

Via PROFIBUS-DP you can:

- Read the parameters mentioned in the following paragraph 2;
- Write the parameters mentioned in the following paragraph 2.

Supported Protocol and Functions

- Fieldbus type: PROFIBUS-DP EN 50170 (DIN 19245).
- Protocol version: 1.10.
- Automatic baudrate detection (should not be configured by the user) within the range: 9.6kbit to12Mbit.

The following values are supported:

9.6 kbit/s
19.2 kbit/s
45.45 kbit/s
93.75 kbit/s
187.5 kbit/s
500 kbit/s
3 Mbit/s
6 Mbit/s
12 Mbit/s

Physical interface

- Means of transmission: Profibus bus line type A or B as specified in EN50170.
- Topology: Master-Slave communication.
- Fieldbus Connector: 9-pin female DSUB.
- Cable: copper shielded pair.
- Insulation: the bus is galvanically separated from the rest of the electronics by means of a DC/DC converter. The signals of the bus (line A and line B) are insulated through optocouplers.
- Profibus-DP communication ASIC: Siemens SPC3 chip.

Configuration and indications

- On-board bus termination switch
- LED indications: ON-line, OFF-line, diagnostics for the Fieldbus.

GSD File

Each device in a Profibus-DP network is associated with a GSD file, containing all the information needed about the device. This file is used by the network configuration programme during configuration of the network.
To get the most recent version of the GSD file, contact Saftronics directly.

2 PARAMETER EXCHANGE

The following table shows the parameters of the dcM+ Drive exchanged through PROFIBUS-DP.

The following are listed: 1) the number and the name of the parameter, 2) its meaning, 3) its range, 4) its unit of measure (shown on the display), 5) the ratio between the value inside the dcM+ Drive (exchanged via Profibus-DP) and the physical value represented (shown on the display).
Note: unless otherwise specified, each parameter is exchanged as integer with sign at 16 bit (between –32768 and +32767).
For further information on parameter configuration, refer to the "**dcM6+/dcM12+ User Manual" Software V3.06.**

From master to dcM6+/dcM12+

1) Name	2) Configuration	3) Range	4) Unit of measure	5) Ratio
M016 FBRref	Speed / voltage reference from PROFIBUS	-100 ÷ +100	%	100 / 3FFFh
M019 AnOut1	Analog output 1 on terminal 8	-10 ÷ +10	V	10 / FFFh
M020 AnOut2	Analog output 2 on terminal 10	-10 ÷ +10	V	10 / FFFh
M022 MDO	Digital output state	00000xxxb ÷ 11111xxxb	**Note A)**	
not used				
not used				
not used				
M031 FBDigIn	Digital input state from PROFIBUS	00000000b ÷ 11111111b	**Note B)**	

From dcM6+/dcM12+ to master

1) Name	2) Meaning	3) Range	4) Unit of measure	5) Ratio
temp	**Note C)**			
M001 nFdbk	Speed / voltage feedback	-100 ÷ +100	%	-100 / 3FFFh
M004 Iarm	Armour current	-1.5**DriveSize** ÷ +1.5**DriveSize**	A **Note D)**	**DriveSize** / 2400
M006 Varm	Armature voltage	-1000 ÷ +1000	V	1
M010 AnIn1	Auxiliary analog input 1 at terminals 11 and 13	-100 ÷ +100	%	100 / 3FFFh
M011 AnIn2	Auxiliary analog input 2 at terminal 17	-100 ÷ +100	%	100 / 3FFFh
M012 AnIn3	Auxiliary analog input 3 at terminal 19	-100 ÷ +100	%	100 / 3FFFh
M026 EFreq	Encoder frequency	-102.4 ÷ +102.4	kHz	10 / 3FFFh

- **Note A)**

Bit 3	→	MDO5
4	→	MDO1
5	→	MDO2
6	→	MDO3
7	→	MDO4

- **Note B)**

Bit 0	→	ENABLE
1	→	START
2	→	MDI1
3	→	MDI2
4	→	MDI3
5	→	MDI4
6	→	MDI5
7	→	MDI6

- **Note C)**

The two 8-bit variables **AlarmNumber** and **Led** are mapped inside the variable **temp** as follows:

high part	low part
AlarmNumber	**Led**

AlarmNumber has the following meaning:

Drive OK if **AlarmNumber** = 0;
Alarm = **AlarmNumber** if **AlarmNumber** ≤ 33;
Warning = **AlarmNumber**-33 if **AlarmNumber** > 33.

Led indicates the state of the LED's on the remotable keyboard with the following map:

Bit 0	→	RUN
1	→	FORWARD
2	→	LOC SEQ
3	→	BRAKE
4	→	REF
5	→	REVERSE
6	→	LOC REM
7	→	I LIMIT

- **Note D)**

DriveSize identifies the size of the armature circuit of dcM+ Drive within the range 10 ÷ 3500 A, as can be seen on the starting page of the digital operator.

3 PROFIBUS-DP MODULE DESCRIPTION

N.B.: This optional module is absolutely necessary in order to make a Profibus connection. It must be fitted into the connector CN11 of the ES800 dcM+ control board and clicked onto three standoffs. It does not require any other special settings, except those of the rotating switches and of the termination switch described below.

Node address

Before using the Profibus-DP module, the node address must be selected. To do so, use two rotating switches on the module: this will allow the user to choose the addresses in a decimal format between (and including) 1 to 99. Looking at the module from the front, the switch on the left is used to select the tens, the switch on the right to select the units.

For example: ***Address = (Left-hand Switch Setting x 10) + (Right-hand Switch Setting x 1)***

Termination

The final nodes of a Profibus-DP network must be terminated in order to prevent reflection on the bus line.
In order to do so easily, the Profibus-DP is equipped with a termination switch. If the converter is the first or the last on the network, the switch must be in ON position. Otherwise it must be in OFF position.
N.B.: If a connector with outside termination is used, the switch must be in OFF position.

Indications

The module is equipped with four LED'S assembled in front and one LED on the board for debugging purposes. The functions of the LED's are described in the table below:

1. **Not used**
2. **On-Line**
3. **Off-Line**
4. **Fieldbus Diagnostics**

Name	Colour	Function
Fieldbus Diagnostics	**Red**	Indicates some errors on the Fieldbus side **Flashing red at 1 Hz** - Error during configuration: the length of the messages fixed during module initialisation does not match the length of the messages fixed during network initialisation. **Flashing red at 2 Hz** – Error in the parameter data: the length and/or the content of the data fixed during module initialisation does not match the length and/or the content of the data fixed during network initialisation. **Flashing red at 4 Hz** – Error during initialisation of the Profibus communication ASIC. **Off** - No diagnostics present
On-Line	**Green**	This means that the converter is On-Line on the Fieldbus. **Green** – The module is On-Line and data may be exchanged. **Off** – The module is not On-Line
Off-Line	**Red**	This means that the converter is Off-Line on the Fieldbus. **Red** - The module is Off-Line and data may not be exchanged. **Off** - The module is not Off-Line

4 ALARM A028 COMMUNICATION INTERRUPTED

This alarm will come into action if the dcM+ Drive does not receive a valid message via PROFIBUS-DP within the timeout which can be set using the parameter **C143 A028Delay.** This alarm can be inhibited using the parameter **C159 A028Inhibit.**