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**DCREG**

# MODBUS-RTU USER GUIDE

## - DCREG INTERFACE VIA MODBUS-RTU -

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Versione D3.09

**Italiano**

- Il presente manuale costituisce parte integrante ed essenziale del prodotto. Leggere attentamente le avvertenze contenute in esso in quanto forniscono importanti indicazioni riguardanti la sicurezza d'uso e di manutenzione.
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## 1 COMMUNICATION FEATURES

This manual describes how to interface a DCREG (slave) converter with an intelligent outside control unit (master) via PROFIBUS-DP. **In order to create this interface, an optional module must be installed on the DCREG (see Module description).** The converter thus becomes a slave node from which a Profibus-DP master can read and on which it can write. The DCREG 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 ["From master to DCREG"](#);

write the parameters mentioned in the following ["From DCREG to master"](#)

### 1.1 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: 9.6 kbit/s÷12Mbit/s.

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
1.5 Mbit/s
3 Mbit/s
6 Mbit/s
12 Mbit/s

#### 1.1.1 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.

#### 1.1.2 Configuration and indications

On-board bus termination switch

LED indications: ON-line, OFF-line, diagnostics for the Fieldbus.

#### 1.1.3 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 Eletronica Santerno directly.

## 2 PARAMETER EXCHANGE

The following table shows the parameters of the DCREG exchanged through PROFIBUS-DP.

In each of 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 DCREG (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).

N.B.: For further information on parameter configuration, refer to the "OPERATION MANUAL 15P0059A3 DCREG2 DCREG4" R.01 Software Vers. D3.09.

### 2.1 FROM MASTER TO DCREG

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	00000xxx <sub>b</sub> ÷ 11111xxx <sub>b</sub>	Note A)	
P050 Ilim1A	First voltage limit bridge A	0 ÷ 300	%	1
P051 Ilim1B	First voltage limit bridge B	0 ÷ 300	%	1
not used				
M031 FBDigl <sub>n</sub>	Digital input state from PROFIBUS	00000000 <sub>b</sub> ÷ 11111111 <sub>b</sub>	Note B)	

### 2.2 FROM DCREG TO MASTER

1) Name	2) Meaning
temp	<b>Note C)</b>
M001 nFdbk	Speed / voltage feedback
M004 Iarm	Armour current
M006 Varm	Armature voltage
M010 AnIn1	Auxiliary analog input 1 at terminals 11 and 13
M011 AnIn2	Auxiliary analog input 2 at terminal 17
M012 AnIn3	Auxiliary analog input 3 at terminal 19

**M026 EFreq** Encoder frequency

**Note A)**

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

**Note B)**

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

**Note C)**

The two 8-bit variables **AlarmNumber** and **Led** are mapped inside the variable **temp**. Its meaning is the following:

high part	low part
<b>Led</b>	<b>Alarm Nr.</b>

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

**Note D)**

**DriveSize** identifies the size of the armature circuit of DCREG within the range 10 ÷ 3500 A, as can be seen on the starting page of the remotable keyboard.

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### 3 ALARM A028 COMMUNICATION INTERRUPTED

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

### 4 PROFIBUS-DP MODULE



NOTE

Optional Profibus-DP module must be used for the Profibus link. Insert it into connector CN11 of control board ES800 (DCREG control) and screw it to the three columns. No particular setting is required (see settings for rotary switches and termination switch below).

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#### 4.1 NODE ADDRESS

Before using the Profibus-DP module, select the node address using the two rotary selector switches installed on the module: they allow to select addresses in decimal format ranging from 1 to 99. The selector switch on the left is used to select the tens, while the selector switch on the right is used to select the units.

Example:

$$\text{Address} = (\text{Set left selector switch} \times 10) + (\text{Set right selector switch} \times 1)$$



NOTE

Alternatively, the node address can be selected through the mailbox telegram **FB\_SET\_NODE\_ADDRESS**, allowing to select a node address from 1 to 125 included. For more information, please contact Elettronica Santerno SpA.



NOTE

The node address cannot be changed when the module is operating, but is detected only when the equipment is powered on.

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#### 4.2 TERMINATION

The end nodes of a Profibus-DP network must have terminations avoiding to interfere with the bus line.

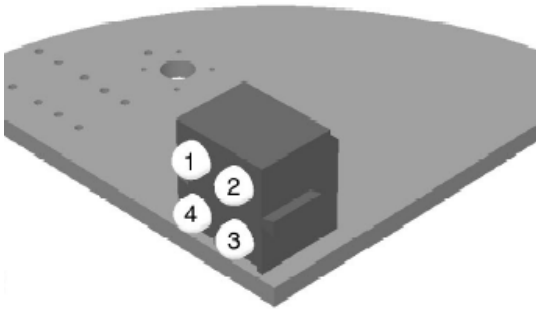
To do so, the Profibus-DP module is equipped with a termination switch. For the first or the last converter in the network, the switch must be ON; otherwise, for intermediate converters, it must be OFF.

**N.B.:** If a connector with an external termination is used, the switch must be OFF.

## 4.3 INDICATIONS

The module is provided with four LEDs installed on its front part and with one LED assembled on the control board and which is used for debugging operations.

### 4.3.1 Front LEDs



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

The LED functions are described in the table below:

LED	Function
2. On-Line	Indicates that the converter is On-Line on the Fieldbus. Green – the module is On-Line; data exchange is allowed. Off – the module is On-Line
3. Off-Line	Indicates that the converter is Off-Line on the Fieldbus. Red – The module is Off-Line; no data exchanged allowed. Off – The module is not Off-Line
4. Fieldbus diagnostics	Indicates that errors occurred on the Fieldbus side Flashing red at 1 Hz – Error while configuring: the message length set while initializing the module does not match with the message length set while initializing the network. Flashing red at 2 Hz – Error in the parameter data: the length and/or contents of the data set while initializing the module do not match with the length and/or contents of the data set while initializing the network. Flashing red at 4 Hz – Error while initializing the Profibus communication ASIC. Off – No diagnostic message provided.

### 4.3.2 LED on the Control Board

The LED located on the control board is a Watchdog LED indicating the state of the module according to the table below:

Colour	Frequency	Description
Red	–	Unspecified internal error, or module operating in bootloader mode.
	1 Hz	RAM fault
	2 Hz	ASIC or FLASH fault
	4 Hz	DPRAM fault
Green	2 Hz	Module not initialized
	1 Hz	Module initialized and operating