RTU DIGITAL OUTPUT MODULE TELEM-DO8G
User manual

Preface

This document, User Manual edition 1.0 for RTU Digital Output Module TELEM-DO8G version 1.0, provides a general technical description of the module, configuration and use. Although we have carefully checked the contents of this publication for conformity with the hardware and software described, we cannot guarantee complete conformity since errors cannot be excluded**.** The information provided in this manual is checked at regular intervals and any corrections which might become necessary are included in the next releases. Any suggestions for improvement are welcome.

The RTU Digital Output Module TELEM-DO8G has been designed and manufactured according to the quality principles of ISO 9001.

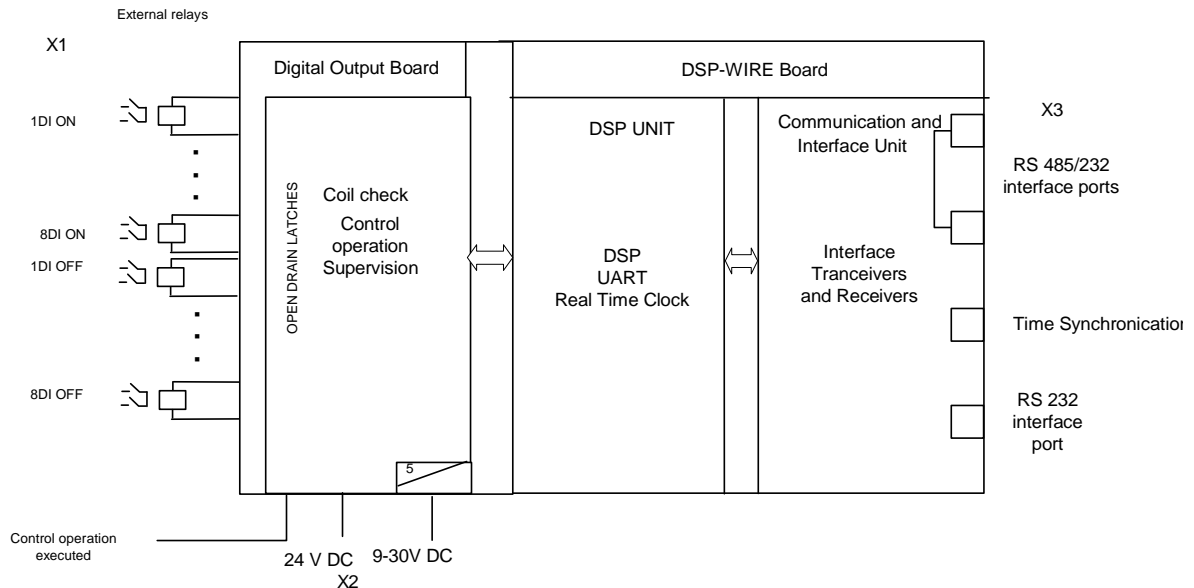 TELEM is registered trademarks of Martem AS.

Contents

1. Application
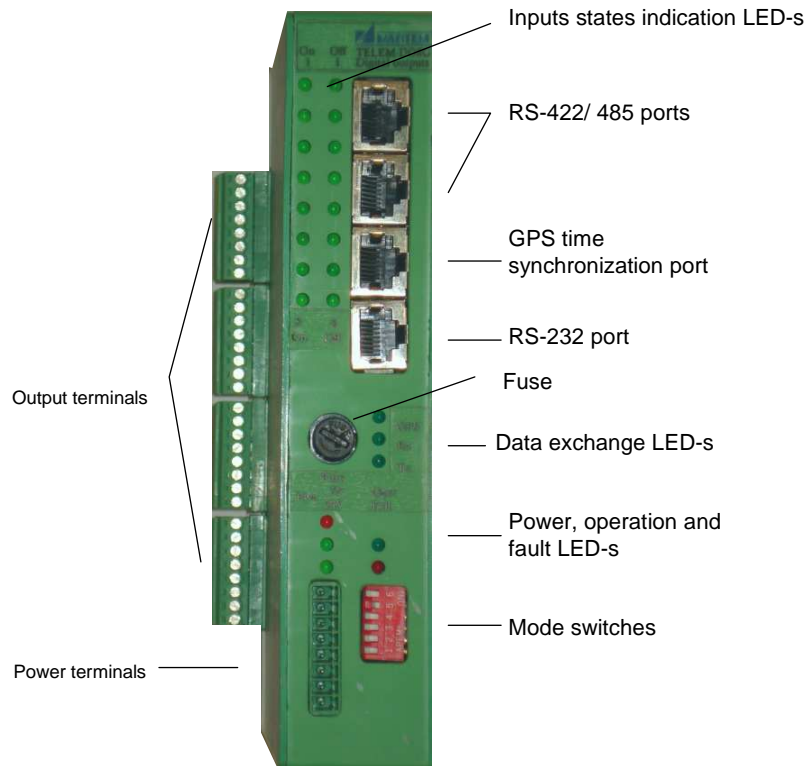
TELEM-DO20G digital output module is used to perfom OPEN and CLOSE operions with external relay block. The open drain type output is a pulse with programmable lenght. Its functionality allows it to be used flexibly in systems for distributed process automation in supervision, control and data acquisition systems (SCADA), where excellent noise immunity with respect to environmental and electromagnetic influences are important. It may be used as standolone device or in daisy-chain connection with other modules.

2. Construction

The mechanical design is based on plastic encloser that can be readily mounted on 35-mm rails. It contains universal for TELEM family modules DSP-WIRE board and DIGITAL OUTPUT board. The input screw terminal blocks are located on the left side of the enclosure. Max 1,5 mm2 conductors can be connected to each terminal. A connector diagram, switch position and indication LED-s meaning are also shown on the left side of the enclosure.

TELEM DO8G block diagram

Inputs states indication LED-s

RS-422/ 485 ports

GPS time synchronization port

RS-232 port

Fuse

Data exchange LED-s

Power, operation and fault LED-s

Mode switches

Output terminals

Power terminals

TELEM DO8G view

3. Features

- GPS time synchronization with 1 ms accuracy
- Online leased line or offline dial-up mode operation, data GSM communication request by event in substation or by remote control centre
- Configuration / parameterization with IEC protocol at the same line with data communication
- Daisy- chain master – slave connection of 30 modules is possible using RS 485/422 interface
- Self diagnostics and supervision simultaneously with data acquisition
- Coil impedance control before operation (select/execute)
- Control operation execution indication and output signal
- Built in clock with backup battery

4. Technical data

Output
- Number of independently configurable control operations 8
- Number of open drain type outputs 16
- Conrollable load resistance range 400-800 Ω
- Control operation pulse lenght duration 20 ms... 1 min
- Number of pulses in series 1...256

Power requirements
- Supply voltage for main board 9-30V DC, 3 W
- Supply voltage for external relay block

Installation, terminals and environment
- Enclosure (widexhighxdeep) 38x174x127
- Weight 0,3 kg.
- Mountable DIN 35
- Plug connector for output MC1,5/8-ST-3,5
- Plug connector for power MCVW1,5/8-ST-3,5
- Plug connector for communication RJ45

Disturbance
- Emission EN-55022A
- Static discharge EN-61000-4-2
- Fast transients EN-61000-4-4
- Surge EN-6100-4-5
- Conducted HF field EN-61000-4-6
- Emitted HF field EN-5022BB

- Ambient temperature in operation -20…+50℃

5. Mode switches

Mode of operation and type of interfaces is detemined using switches on the DSP-Wire board

```
6
5
4
3
2
1
ON
```
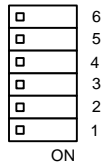
1) ON- reset the device
2) OFF– operation mode, ON firmware load mode
3) ON– restore default setup
4) Not used
5)ON - Master mode operation, OFF - Slave mode operation
6) ON - Port 1 and 2 interface RS -485, OFF Port 1 and 2 interface RS - 422.

6. Communication

- Transmission rate   200…38400 bit/s
- Communication mode   asynchronous data bits 8, parity N, stop bits 1
- Communication interface   selectable RS232, RS422 or RS485
- Communication protocol   IEC60870-5-101 slave/master, unbalanced
- Link address length   1 byte
- ASDU address length   2 byte
- Object address length   2 byte
- GPS time synchronization input   9600 bps (RS422/485 RX),
- Time synchronization protocol   ASCII (Motorola), device TLM-
- Communication interface isolation   optically to 2,5kV RMS

7. Configuration

7.1. Configuration parameters for module

RTU Module is configurable by Telem-2000 software or other configuration software, which support IEC60870-5-101 protocol. Configuration parameters are altered using IEC60870-5-101 protocol parameter setting commands. Parameter setting commands specification for this module is available on request. Telem-2000 RTU configuration software runs under the Windows -95, -98, -2000,-XP and NT4.0 operating systems on any standard PC, communicates via COM port interface and performs the following principal functions:

- Configuration / parameterization Telem RTU modules
- Back up of RTU configuration data
- Diagnostics and real-time supervision simultaneously with data acquisition.

TELEM-DO8G configuration tab card

Parameter	Value	Default value (in cell)
1. Communication speed	200 – 38400 bps	9600
2. Link Address	1-255	1
3. ASDU address	1-255	1
4. Objects base address	0-65534	0
5. Communication mode	Online	Online
	Online with RTS/CTS	
	Offline with RTS/DCD	
6. GPS enabled	Yes/No	Yes
7. Buffer depth for each command		20

7.2 Configuration parameters for digital outputs

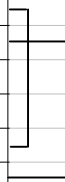| Parameter	Value	Default value (in cell)
1. In use	Yes/No	Yes (0-No)
2. Control mode (Direct execute)	Select and execute Execute	Select and execute (0)
3. Short pulse duration	20-65535 ms	1500 ms (0)
4. Number of short pulses	1-256	1 (1)
5. Long pulseduration	20-65535 ms	2000 ms (0)
6 . Number of long pulses	1-256	1 (1)

8. Connection to output lines

TELEM-DO8G	
Terminal contact	Signal
1	1 DO on
2	1 DO on
3	2 DO on
4	2 DO on
5	3 DO on
6	3 DO on
7	4 DO on
8	4 DO on
9	5 DO on
10	5 DO on
11	6 DO on
12	6 DO on
13	7 DO on
14	7 DO on
15	8 DO on
16	8 DO on
17	1 DO off
18	1 DO off
19	2 DO off
20	2 DO off
21	3 DO off
22	3 DO off
23	4 DO off
24	4 DO off
25	5 DO off
26	5 DO off
27	6 DO off
28	6 DO off
29	7 DO off
30	7 DO off
31	8 DO off
32	8 DO off

9. Communication ports pin layout

X3		
Port	Signal	Pin
X 3-1 RS -422/485	+ CTS	1
	-CTS	2
	+RTS	3
	-RTS	4
	+RX	5
	-Rx	6
	+TX	7
	-TX	8
X 3-2 RS -422/485	CTS	1
	-CTS	2
	+RTS	3
	-RTS	4
	+RX	5
	-Rx	6
	+TX	7
	-TX	8
X3 -3GPS RS- 422/485	+RX	1
	-RX	2
		3
	GND	4
	GND	5
		6
	-RX	7
	+RX	8
X 3-4 RS -232		1
	CTS	2
	GND	3
	RXD	4
	TXD	5
	FGND	6
	RTS	7
		8

10. Connection to power supply

X2		
Terminal contact	Voltage	
1	+24 V	
2	-24 V	
3	+24 V	
4	-24 V	
5	+24 V	
6	-24 V	
7		
8		

Control relay supply

Control operation executed signal

11. Connection example

12. Connection cables