

RTU DIGITAL OUTPUT MODULE TELEM-DO5-T

User manual

Martem AS
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Preface

This document, User Manual edition 1.0 for RTU Digital Output Module TELEM-DO5T version 1.0, provides a general technical description of the module, its 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 that might become necessary are included in the next releases. Any suggestions for improvement are welcome.

The RTU Digital Output Module TELEM-DO5T has been designed and manufactured according to the quality principles of ISO 9001.

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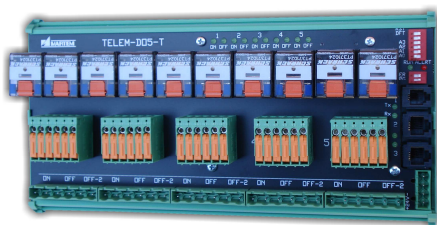
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1. Application

TELEM-DO5T digital output module is used to perform OPEN and CLOSE operations. The functionality of the module allows it to be used for distributed process automation in supervision, control and data acquisition systems (SCADA) where excellent noise immunity with respect to environmental and electromagnetic influences is important. It may be used as a standalone device or in a daisy chain connection with other modules.

2. Construction

The mechanical design is based on a plastic enclosure that can be readily mounted on 35-mm rails.



The TELEM family RTU module TELEM-DO5-T with fixed or changeable relay outputs for control operation of 5 objects (+ 3 objects with external relays). The module is based on 32-bit ARM CPU. Interfaces to other equipment are RS-232 or RS-422. Data exchange protocol IEC 60870-5-1-101.

3. Features

- Configuration / parameterization with the IEC 60870-5-101 protocol using the Configuration Tool.
- Adjustable Control pulse length 20ms ...1min.
- Daisy chain master – slave connection of up to 15 same type of modules using RS- 422 interface and up to 45 different type of modules
- Self diagnostics and supervision simultaneously with data acquisition
- Operation execution control
- Relay coil impedance control before the control operation
- Execution signal of the control operation
- Fixed or changeable relay sockets

4. Technical Data

Number of controllable objects	5 (+3)
Number of outputs for every objects	1 output for ON operation, 2 for OFF/TRIP operation
Relay block relay coil impedance	777 Ohm
Indication	2 for every output, 1 for a running indication, 1 r for an alert indication

Power requirements

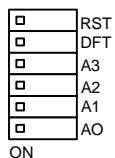
Supply voltage for main board and relays	24 V DC, 4 VA
Fuse protection	24 V 0,1A (resettable)

Installation, terminals and environment

Weight	761 g
Mounting	DIN 35
Dimensions (WxHxD)	250 x 60 x 64
Terminals for signal	GMVSTBW 2,5/6-ST
Terminal for power	MVSTBWA 2,5/4-ST
Terminal for communication	RJ4/4 (RS232); RJ12 (RS422)
Over voltage protection	IEC-60255-4, 5 kV pulse protection IEC-60255-5, 2 kV DC on
Disturbance	IEC-61000-3-2, 61000-6-2, 6100-6-4
Ambient temperature in operation	-20...+50°C

5. Mode Switches and Indication LED

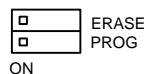
Mode of operation, address of the module and the default settings are determined using switches on the board



RST - ON - reset the device

DFT - ON - restores the default setup after a reset

A0 - A3 - determines the address of the module in binary



ERASE - ON erases the frame program (**be careful**)

PROG - ON loads a new frame program

Indication LEDs display the state of the device:

ALERT – fired, error state

RUN – blinking fire/unfired 1/1, normal operation and synchronized by an internal clock,

RUN – blinking fired /unfired 1/9, normal operation and synchronized by a gateway

SIGNAL STATE – green fired, signal is activated, polarity of signal voltage normal,

SIGNAL STATE – red fired, signal is activated, polarity of signal voltage inversed

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 a Module

RTU Module is configurable by Telem-2000 software or by other configuration software that supports the IEC60870-5-101 protocol. Configuration parameters are altered using the parameter setting commands of the IEC60870-5-101 protocol. Specification of parameter setting commands for this module is available on request. Telem-2000 RTU configuration software runs under 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 of Telem RTU modules
- Back up of RTU configuration data
- Diagnostics and real-time supervision simultaneously with data acquisition.

Configuration of Telem controllers

1 - No. of controller (look at Settings/Channels and controllers)

Contr. addr.: 2 Obj. base address: 0 GPS enabled: 0 - No

ASDU address: 2 Comm. port control: 0 - Online Short time Disable prot. sync.

Comm. speed: 0 - 9600 Buffer depth: 0

Parity: 0 - No

Type/version: DO 3.03 Load to contr. Cancel

OK (Loaded parameters are activated after Reset with code 1)

Digital outp.

No.	In use (Y/N)	Direct exec.	Length of short pulse	Number of short pulses	Length of long pulse	Number of long pulses
1	2 - In use	1 - Yes	0	1	0	1
2	2 - In use	1 - Yes	1	1	0	1
3	2 - In use	1 - Yes	0	1	0	1
4	2 - In use	1 - Yes	0	1	3	1
5	2 - In use	1 - Yes	0	1	0	1
6	2 - In use	1 - Yes	0	1	0	1
7	2 - In use	0 - No	0	1		1
8	2 - In use	0 - No	0	1	0	1

0 = 1500 ms 0 = 1 0 = 3000 ms 0 = 1

Parameters of all types are read (Loaded parameters are activated after Reset with code 1)

Load from contr. Load from copy Load to contr. Make copy Cancel

OK OK

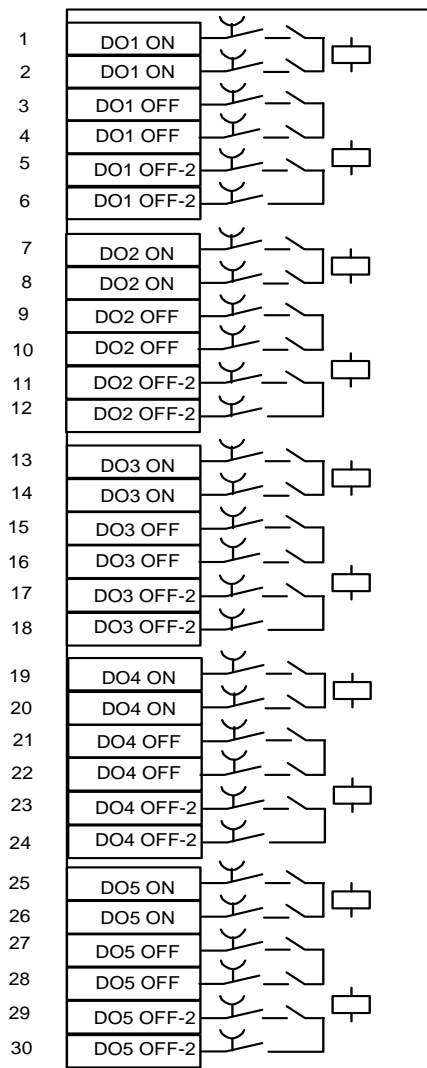
TELEM-DO5Tconfiguration tab card

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. Base address of the objects	0-65534	0
5. Communication mode	Online Online with RTS/CTS Offline with RTS/DCD	Online
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 pulse duration	20-65535 ms	2000 ms (0)
6. Number of long pulses	1-256	1 (1)

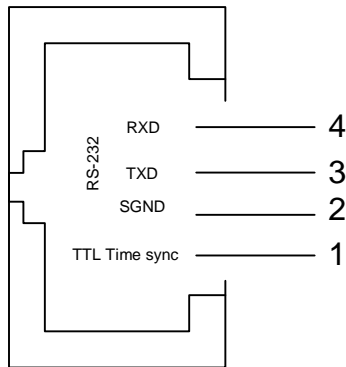
8. Connection to Output Lines



8. Pin layout of Communication ports

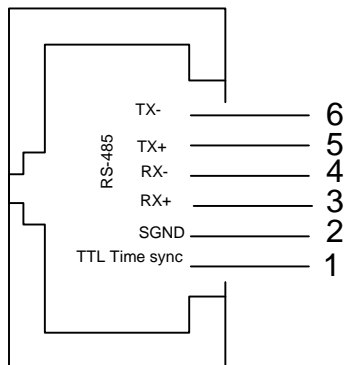
Port 1

RJ 11/4



Port 2 and 3

RJ 12/6



9. Loading Frame Program

To load a new frame program

- 1) switch ERASE to ON/OFF state
- 2) switch PROG to ON state
- 3) load a new program
- 4) switch PROG to OFF state
- 5) switch DFT to ON state
- 6) switch RST ON/OFF
- 7) switch DFT to OFF