



ICP DAS tM-DA1P1R1 1-Channel Power Relay Module User Guide

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Quick Start Guide
for tM-DA1P1R1
April, 2014, Version 1.20



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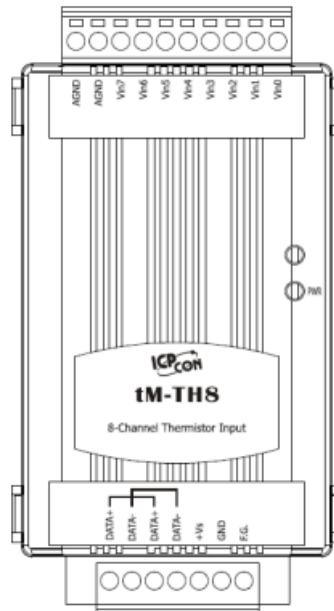
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Congratulations

Congratulations on purchasing the tM-DA1P1R1 the most popular automation solution for remote monitoring and control applications. This Quick Start Guide will provide the information needed to get started with the tM-DA1P1R1. Please also consult the User Manual for detailed information on the setup and use of the tM-DA1P1R1.

What's in the shipping box?

In addition to this guide, the shipping box includes the following items:



tM-DA1P1R1

Technical Support

- ICP DAS Website
<http://www.icpdas.com/>

1. Understanding the Hardware Specifications and Wiring Diagrams

Before installing the hardware, you should have a basic understanding of hardware specifications and the wiring diagrams.

System Specifications

Communication	
Interface	RS-485
Format	(N, 8, 1), (N, 8, 2), (O, 8, 1), (E, 8, 1)
Baud Rate	1200 ~ 115200 bps
Protocol	DCON, Modbus/RTU, Modbus/ASCII
Watchdog	Communication (Programmable)
LED Indicators	
Power	1 LED as Power Indicator
Isolation	
Intra-module Isolation, Filed-to-Logic	2500 VDC
EMS Protection	
ESD (IEC 61000-4-2)	±4 kV contact for Each Terminal
	±8 kV Air for Random Point
EFT (IEC 61000-4-4)	±4 kV for Power Line
Power	
Reverse Polarity Protection	Yes
Input Range	10 ~ 30 VDC
Consumption	1.8 W max.
Mechanical	
Dimensions (W x L x H)	52 mm x 98 mm x 27 mm
Installation	DIN-Rail Mounting
Environment	
Operating Temperature	-25 ~ +75 °C
Storage Temperature	-30 ~ +80 °C
Humidity	10 ~ 95% RH, Non-condensing

I/O Specifications

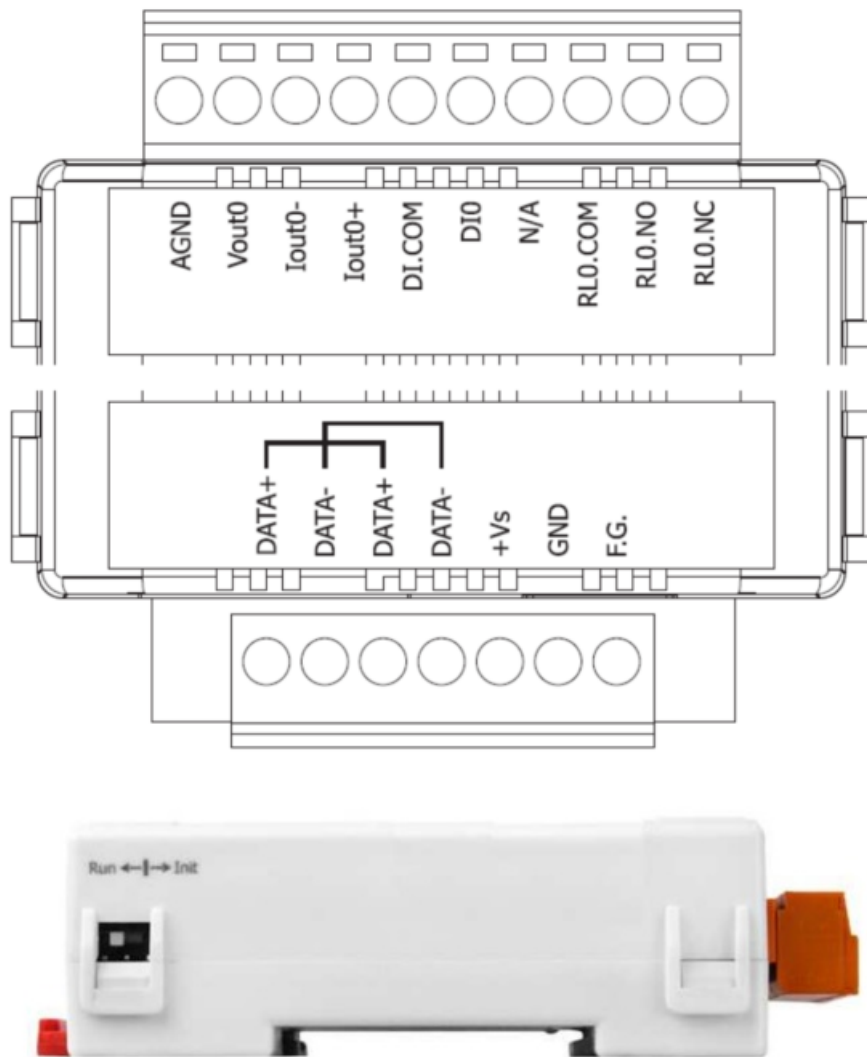
Analog Output	
Channel	1

Type		0~10V, 0~20mA, 4~20mA
Resolution		12-bit
Accuracy		±0.1% of FSR
DA Output Response Time		10 ms
Voltage Output Capability		20 mA
Current Load Resistance		500 Ω
Digital Input/Counter		
Channel		1
Type		Dry
On Voltage Level		Close to GND
Off Voltage Level		Open
Counters	Max. Counts	65536 (16-bit)
	Max. Input Frequency	100 Hz
	Min. Pulse Width	5 ms
Input Impedance		10 KΩ
Relay Output		
Channel		1
Type		Power Relay, Form C
Operating Load Voltage Range		250 V _{AC} or 30 V _{DC}
Max. Load Current		NO : 10 A @250 V _{AC} NC : 6 A @250 V _{AC}
Operate Time		15 ms max.
Release Time		5 ms max.
Mechanical Endurance		1 X 10 ⁷ OPS
Electrical Endurance		5 X 10 ⁴ OPS
Power On and Safe Value		Yes, Programmable

Wire Connection

Voltage Output	
Current Output	
Digital Input/Counter	
ON State Readback as 1	OFF State Readback as 0
Relay Output	
ON State	OFF State

Pin Assignment

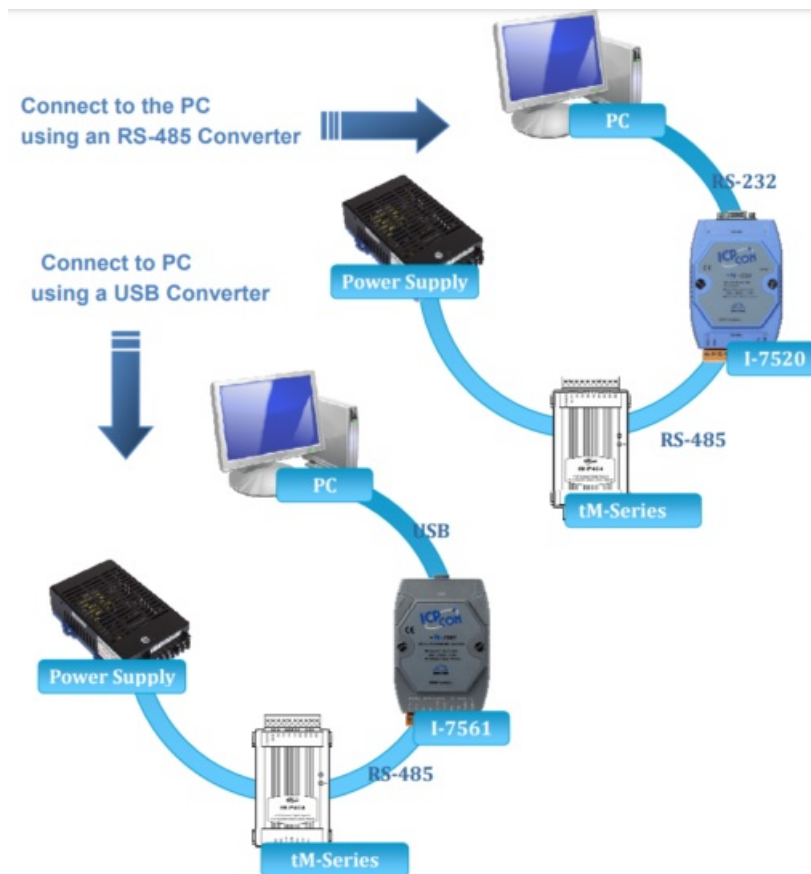


2 Booting the tM-Series in Init Mode

Make sure the switch is placed in the “Init” position.

Connecting to the PC and the Power Supply

The tM-Series series is equipped with an RS-485 port for connection to a 232/USB converter to PC



Installing the DCON Utility

The DCON Utility is an easy-to-use tool designed to enable simple configuration of I/O modules that use the DCON protocol.

Step 1: Locate the DCON Utility



DCON_Utli.

The DCON Utility can be obtained from the companion CD or from the ICPDAS FTP site:

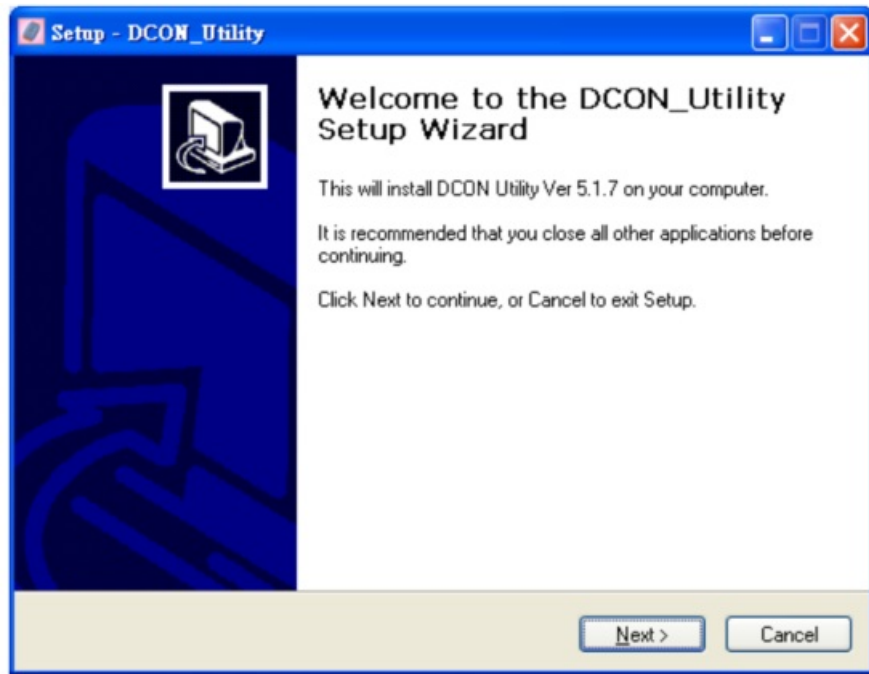
CD:\Napos\8000\NAPDOS\Driver\DCON_Utility\setup\
http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon_utility/

Step 2: Follow the prompts to complete the installation



dcon_utility...

After the installation has been completed, there will be a new shortcut to the DCON Utility on the desktop.

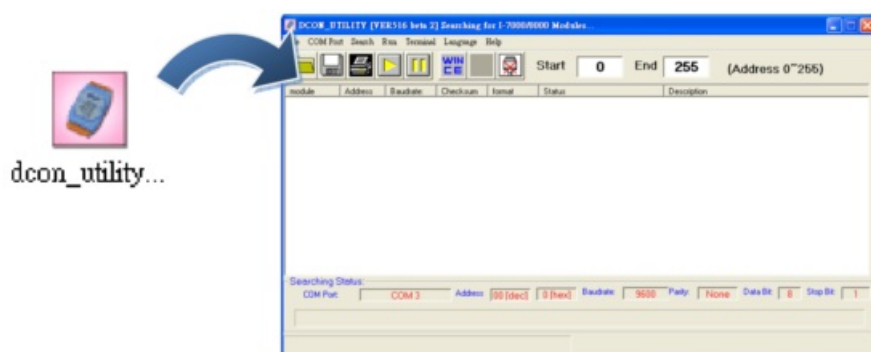


5 Using the DCON Utility to Initialize the TM-Series Module

The M-Series is an I/O module based on the DCON protocol, meaning that you can use the DCON Utility to easily initialize it.

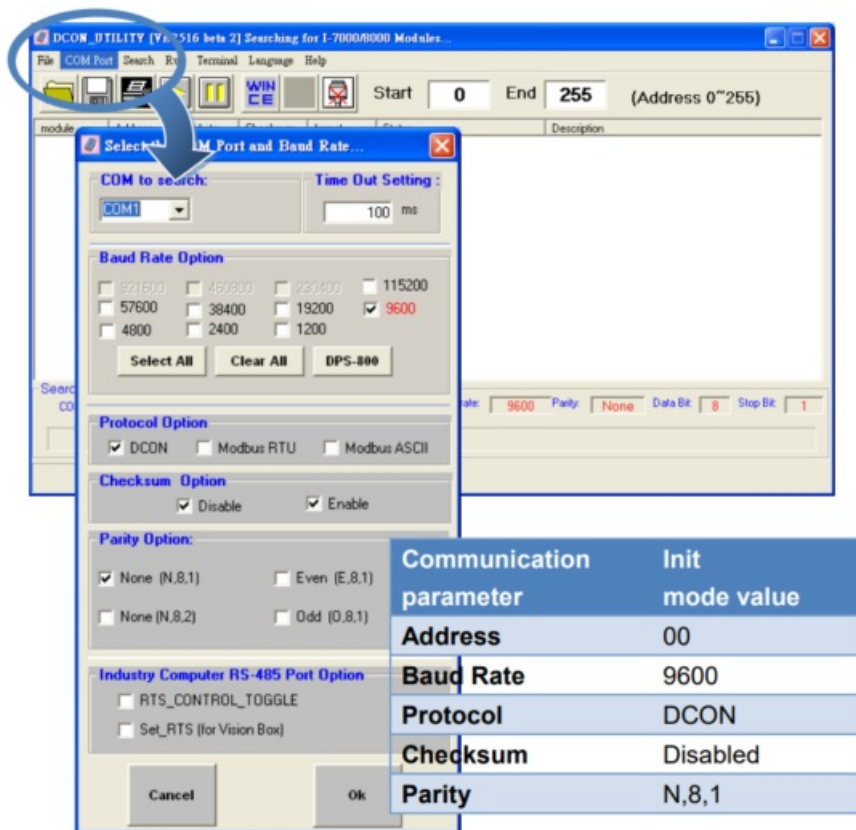
Step 1: Run the DCON Utility

Double-click the DCON Utility shortcut on your desktop.



Step 2: Use the COM1 port to communicate with the TM-Series

Click the "COM Port" option from the menu and a dialog box will be displayed that will allow you to set the communication parameters as described in the table below.



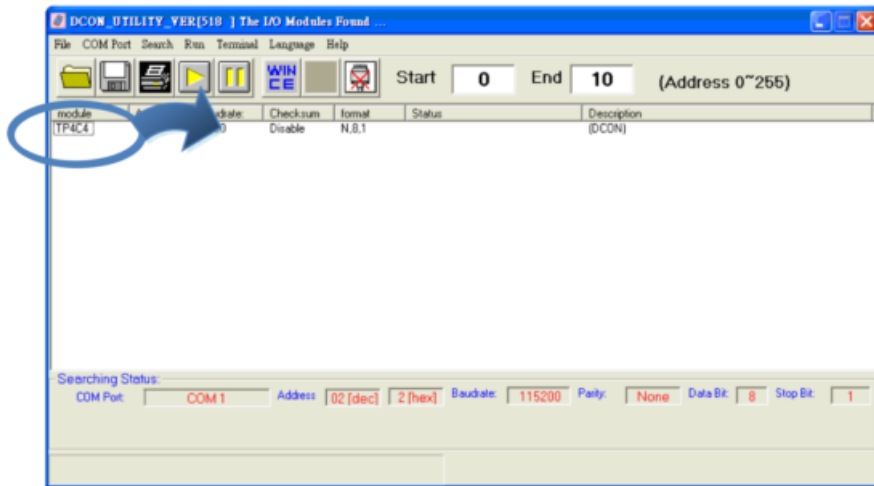
Step 3: Search for the TM-Series module

Click the “Start Search” button from the toolbox to search for the tM-Series module. After the TM-Series module is displayed in the list, click the “Stop Search” button.



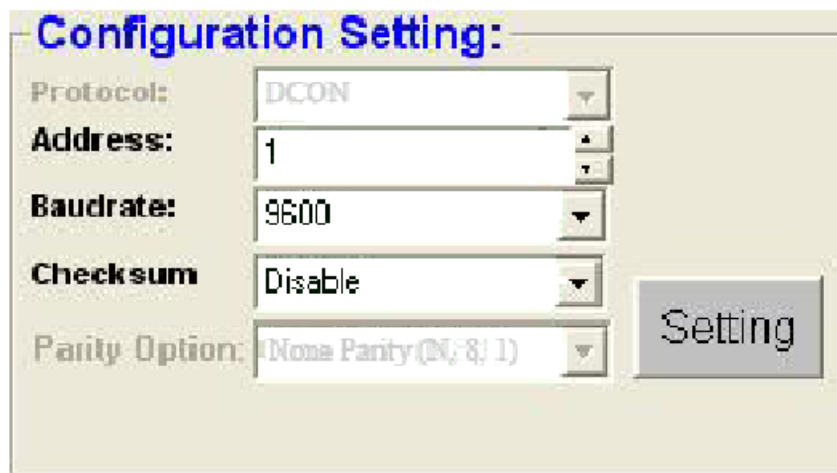
Step 4: Connect to the tM-Series

After clicking on the name of the module in the list, a dialog box will be displayed.



Step 5: Initialize the TM-Series module

Set the "Address" field in the dialog box to 1 and then click the "Setting" button to save the settings.

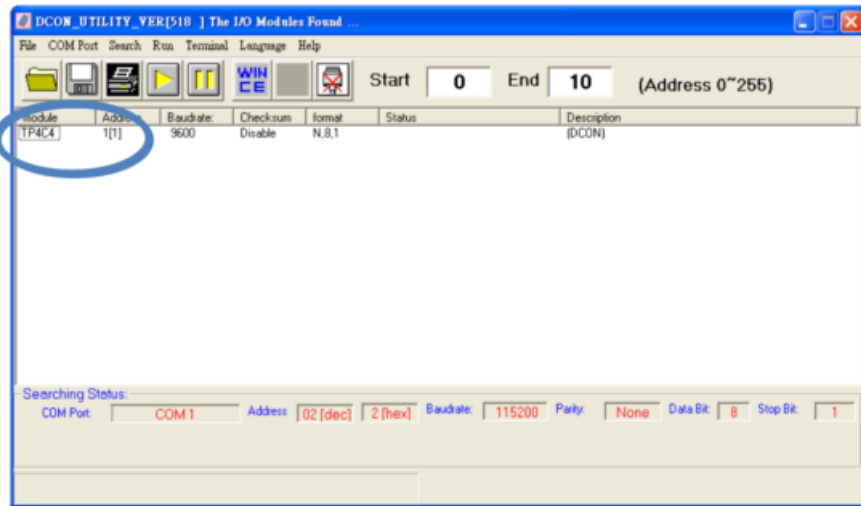


6 Rebooting the TM-SeriesModule in Normal Mode

Make sure the INIT switch is placed in the "Normal" position.

Starting the Module Operation

After rebooting the TM-Series module, search for the module to make sure the settings have been changed. You can double-click on the name of the module in the list to open the configuration dialog box.



DCON Command Sets

Command	Description
\$AAF	read firmware version
\$AAI	read INIT status response: !AA0 -> INIT short to GND !AA1 -> else
\$AAM	read module name
\$AAP	Read Modbus RTU/DCON protocol response: !AA0 -> DCON !AA1 -> Modbus RTU
\$AAPN	Set Modbus RTU/DCON protocol N-> 0: DCON, 1: Modbus RTU
\$AA00	channel 0 AO zero calibration
\$AA10	channel 0 AO span calibration
\$AA2	read configuration
\$AA30VV	trim the channel 0 analog output, VV in hex, 01-7F to increase, FF-80 to decrease
\$AA40	set current analog output as power-on value of channel 0
\$AA5	read reset status !AA1 first after power on, !AA0 others
\$AA60	read back the last analog output value set by the analog output command of channel 0
\$AA70	read the power on value of the analog output channel 0
\$AA80	read back the current analog output value of channel 0
\$AA90	read the type code and slew rate of analog output channel 0
\$AA90TS	set the type code (T) and slew rate (S) of analog output channel 0
#AA0(data)	set analog output value of channel 0
%AANNTTCCFF	set configuration, NN: new address, TT = 00, CC: new baud rate FF: data format
@AACEC0	clear DI counter 0

Command	Description
@AADI	read DIO response !AA00O0I
@AADO0V	set DO, V-> 0: off, 1: on
@AAREC0	read event counter of channel 0
~**	clear host watchdog timeout counter
~AA0	read host watchdog status
~AA1	clear host watchdog timeout status
~AA2	read host watchdog enable/disable status and timeout value
~AA3ETT	enable/disable host watchdog and set timeout value E-> 0: disable host watchdog, 1: enable host watchdog TT: host watchdog timeout in 0.1s in hex format
~AA4	read DO power on and safe value
~AA40	read analog output channel 0 safe value
~AA50P0S	set DO power on and safe value P-> 0: power on value off, 1: power on value on S-> 0: safe value off, 1: safe value on
~AAO(name)	set module name
~AARD	read response delay time in ms in hex format
~AARDVV	set response delay time in ms, VV in hex format, 00 – 1E

Baud Rate Setting (CC) Bits 5:0

Baud rate, 0x03 ~ 0x0A

Code	0x03	0x04	0x05	0x06
Baud	1200	2400	4800	9600
Code	0x07	0x08	0x09	0x0A
Baud	19200	38400	57600	115200

Bits 7:6

00: no parity, 1 stop bit

01: no parity, 2 stop bits

10: even parity, 1 stop bit

11: odd parity, 1 stop bit

Data Format Setting (FF)

Bits 1:0

00: engineering format

01: percent format

10: hex format

Bits 6

0: checksum disabled

0: checksum enabled

Type Code Setting (T)

Type Code	Output Range	Data Format	Max	Min
0	0 ~ 20 mA	Engineering	+20.000	+00.000
		Percent	+100.00	+000.00
		Hexadecimal	FFFFh	0000h
1	4 ~ 20 mA	Engineering	+20.000	+04.000
		Percent	+100.00	+000.00
		Hexadecimal	FFFFh	0000h
2	0 ~ 10 V	Engineering	+10.000	+00.000
		Percent	+100.00	+000.00
		Hexadecimal	FFFFh	0000h
4	0 ~ 5 V	Engineering	+05.000	+00.000
		Percent	+100.00	+000.00
		Hexadecimal	FFFFh	0000h

Slew Rate Setting (S)

S	V/s	mA/s	S	V/s	mA/s
0	Immediate	Immediate	8	8.0	16.0
1	0.0625	0.125	9	16.0	32.0
2	0.125	0.25	A	32.0	64.0
3	0.25	0.5	B	64.0	128.0
4	0.5	1.0	C	128.0	256.0
5	1.0	2.0	D	256.0	512.0
6	2.0	4.0	E	512.0	1024.0
7	4.0	8.0			

Modbus Address Mapping

Address	Description	Attribute
10097	Low latched values of DI	R
10105	Low latched values of DO	R
00001	Digital output value of channel 0	R/W
00033	Digital input value of channel 0	R
00065	High latched values of DI	R
00073	High latched values of DO	R
00097	Low latched values of DI	R
00105	Low latched values of DO	R
00129	Safe value of digital output channel 0	R/W
00161	Power on value of digital output channel 0	R/W
00193	Counter update trigger edge of channel 0	R/W
00513	Write 1 to clear counter value of channel 0	W
00257	Protocol, 0: DCON, 1: Modbus RTU	R/W
00258	0: Modbus RTU, 1: Modbus ASCII	R/W
00260	Modbus host watchdog mode 0: same as I-7000 1: can use A O and DO commands to clear the host watchdog timeout statuses	R/W
00261	1: enable, 0: disable host watchdog	R/W
00264	Write 1 to clear latched DIO	W
00265	DI active state, 0: normal, 1: inverse	R/W
00266	DO active state, 0: normal, 1: inverse	R/W
00269	Modbus data format, 0: hex, 1: engineering	R/W
00270	Host watchdog timeout status, write 1 to clear host watchdog timeout status	R/W
00273	Reset status, 1: first read after powered on, 0: not the first read after powering on	R
30065	Analog output read back	R
30129	The counter value of digital input	R
40033	Analog output value	R/W
40097	Safe analog output value	R/W
40193	Power on the analog output value	R/W

Address	Description						Attribute
40289	Analog output slew rate						R/W
40417	Analog output type code						R/W
40481	Firmware version (low word)						R
40482	Firmware version (high word)						R
40483	Module name (low word)						R
40484	Module name (high word)						R
40485	Module address, valid range: 1 ~ 247						R/W
40486	Bits 5:0 Baud rate, 0x03 ~ 0x0A						R/W
	Code	0x03	0x04	0x05	0x06		
	Baud	1200	2400	4800	9600		
	Code	0x07	0x08	0x09	0x0A		
	Baud	19200	38400	57600	115200		
	Bits 7:6 00: no parity, 1 stop bit 01: no parity, 2 stop bits 10: even parity, 1 stop bit 11: odd parity, 1 stop bit						
40488	Modbus response delay time in ms, valid range: 0 ~ 30						R/W
40489	Host watchdog timeout value, 0 ~ 255, in 0.1s						R/W
40492	Host watchdog timeout count, write 0 to clear						R/W
10033	Digital input value of channel 0						R
10065	High latched values of DI						R
10073	High latched values of DO						R

Type Code	Output Range	Data Format	Max	Min
0	0 ~ 20 mA	Engineering	20000	0
		Hexadecimal	FFFFh	0000h
1	4 ~ 20 mA	Engineering	20000	4000
		Hexadecimal	FFFFh	0000h
2	0 ~ 10 V	Engineering	10000	0
		Hexadecimal	FFFFh	0000h
4	0 ~ 5 V	Engineering	5000	0
		Hexadecimal	FFFFh	0000h

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Documents / Resources

	ICP DAS tM-DA1P1R1 1-Channel Power Relay Module [pdf] User Guide tM-DA1P1R1, 1-Channel Power Relay Module
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References

- [ftp.icpdas.com - /pub/cd/8000cd/napdos/driver/dcon_utility/](ftp://icpdas.com/pub/cd/8000cd/napdos/driver/dcon_utility/)
-  [ICP DAS](#)