

PL-DTS DI/DO TO RS485 Converter

DESCRIPTION

PL-DTS is an I/O controller product with Serial Port on its data communication and makes data acquisition easier through ModBus Protocol of RTU mode on Serial Bus.

It uses the MSP430 microprocessor family for implementing the whole framework. Basically, it supports up to 10 inputs and 8 outputs or 18 inputs and 0 outputs. Moreover, it equips the counter function in each input channels, and is also designed for friendly use and convenience concerns.



FEATURE

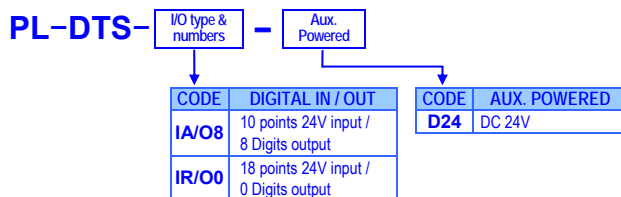
- Support ModBus Protocol
 - ▶ Auto Detect ModBus RTU and ASCII Mode
 - ▶ Supported Modbus Function 01, 02, 03, 04, 05, 06, 10, 0F
- Configurable Parameters with Device ID Control
 - ▶ Configurable under Console Mode
 - ▶ Enable / Disable: When Device ID Control is enabled, it will reply the modbus requests only when the Device ID is correct
- Each Input will enable Counter Function simultaneously when DIP Switch select to enable Counter Function.

APPLICATIONS

It is easy to convert DI status and DO control to RS485 in IA, Factory Automation, Security or any other low data rate data transmission by using it as the intermediate converter.

- Security devices
- Warehouse terminals
- Access control terminals
- Time recorders
- Shop floor automation terminals

ORDERING INFORMATION



TECHNICAL SPECIFICATION

CPU: MSP430
Network interface: RS485,
Protocol: Modbus/RTU, Modbus/ASCII, Console Mode
Reset: Built-in reset key to restore the defaults
Watch dog timer: Built-in hardware auto reset function

DI & DO
 10 DI & 8 DO or 18 DI & 0 DO available
Digital input: photo-couple, 24V±10%, 7mA
 ON status: 12V/2.0mA or higher
 OFF status: 4V/1.0mA or lower
 Response: 8 msec or less
Open collect, 24V±10%, 0.5A
Digital output:
 Type: NPN/Sink
 ON status: 15V or less voltage drop
 OFF status: 0.1mA or I less voltage drop
 Response: 8 msec or less
 External supply: 24V +/- 10%, 100mA

LED indication:
 SYS: Red high bright round LED
 RX: Green high bright round LED
 TX: Green high bright round LED
 DI/DO: Red high bright round LED

Configuration: Configure by Hardware DIP Switch, Console or ModBus
 (When DIP Device ID=0)
 Serial port:
Baud Rate: 300 ~ 115200 bps
 (57600 bps with counter function enabled.)

Data bits: 7 or 8 bits
Parity: None, even or odd
Stop Bit: 1 or 2 bits

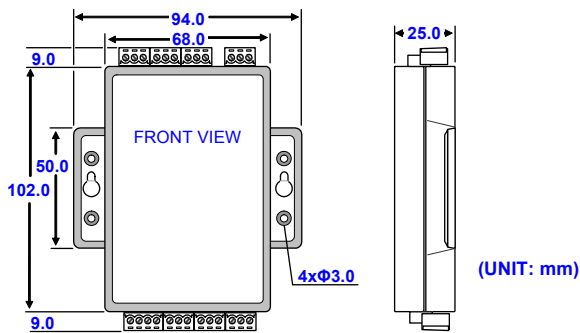
Power
Power Supply: DC 24V
Power consumption: ≤ 1W

Electrical
Isolation: Isolated between DI, DO and Ethernet (RJ45)
Dielectric Strength: 3 KV, 1 minute; between Serial ports / RJ45 / Power
Insulation resistance: ≥100MΩ at 500Vdc, Between Serial ports / RJ45 / Power

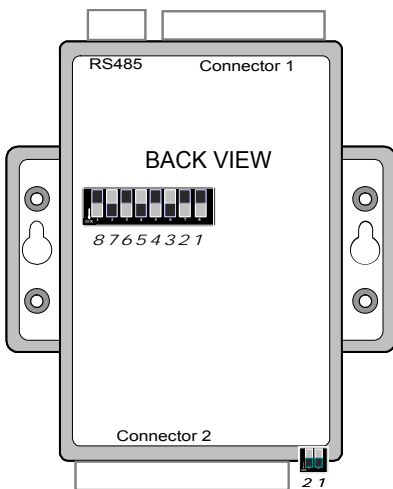
Environmental
Operating temp.: 0~60 °C
Operating humidity: 20~95 %RH, non-condensing
Storage temperature: -10~70 °C

Mechanical
Case Material: ABS fire-protection (UL 94V-0)
Mounting: Surface mounting
Terminal block: Plastic NYLON 66 (UL 94V-0)
Weight: 110g

DIMENSIONS



DEVICE ID SELECTION



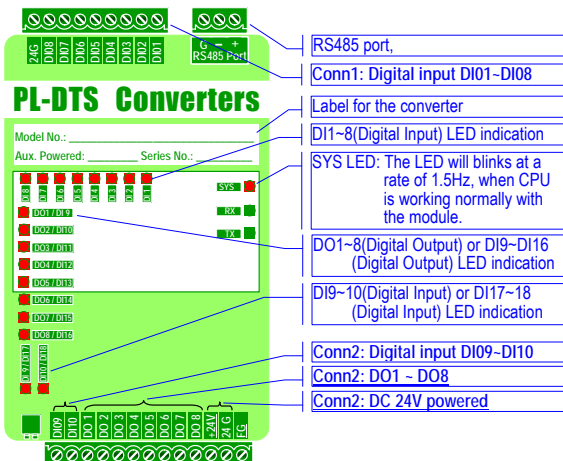
PIN Def.	PIN1	PIN2	PIN3	PIN4	PIN5	PIN6	PIN7	PIN8
Status Value	1	0	1	0	1	0	1	0
ON	0	1	0	1	0	1	0	1
Exp. Value	2^0	2^1	2^2	2^3	2^4	2^5	2^6	2^7

Device ID = Sum of Corresponded Entry Value (Status Value x Exp. Value).

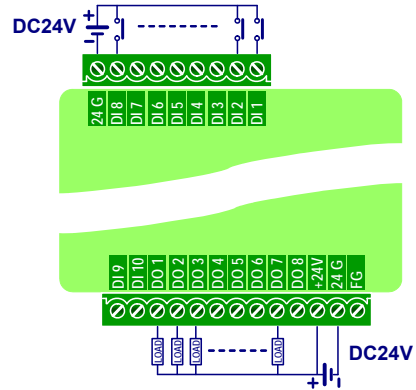
Example: PIN1, PIN2 ON, PIN3~PIN8 OFF -->
 Device ID = $2^0 \times 1 + 2^1 \times 1 = 3$

FRONT PANEL & CONNECTION

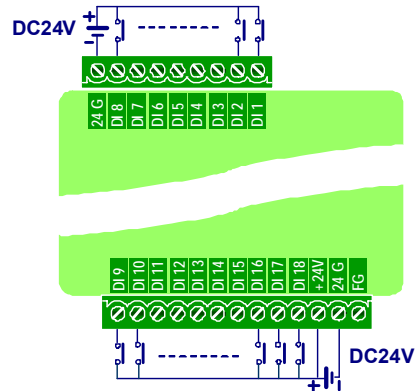
Please check the voltage of power supplied first, and then connect to the specified terminals.



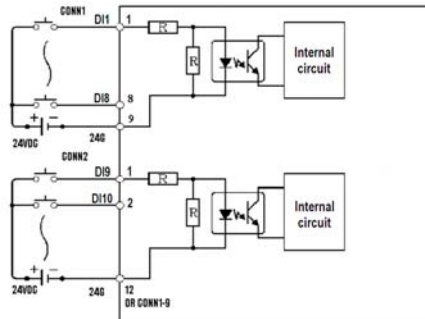
Digital Input / Output – 10 DI & 8 DO



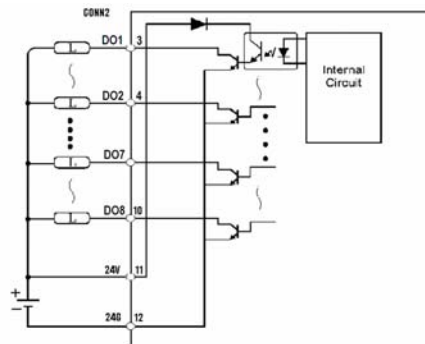
Digital Input / Output – 18 DI & without DO



Equivalent Digital Input Circuit



Equivalent Digital Output Circuit



MODBUS ADDRESS FOR I/O

The I/O points of the PL-DTS can easily be controlled and monitored through Modbus protocol. The Modbus address mapping with I/O is described as the followings.

Digital Output Status & Control

ADDRESS	EXPLAN	Write/Read
00001	DO1, OUT1 Status; 0 = off 1 = on	0x01 Read Coil Status 0x05 Force Single Coil 0x0F Force Multiple Coil
00002	DO2, OUT2 Status; 0 = off 1 = on	
00003	DO3, OUT3 Status; 0 = off 1 = on	
00004	DO4, OUT4 Status; 0 = off 1 = on	
00005	DO5, OUT5 Status; 0 = off 1 = on	
00006	DO6, OUT6 Status; 0 = off 1 = on	
00007	DO7, OUT7 Status; 0 = off 1 = on	
00008	DO8, OUT8 Status; 0 = off 1 = on	

Digital Input Status

ADDRESS	EXPLAN	Write/Read
10001	DI1, IN1 Status; 0 = Low 1 = High	0x02 Read Input Status
10002	DI2, IN2 Status; 0 = Low 1 = High	
10003	DI3, IN3 Status; 0 = Low 1 = High	
10004	DI4, IN4 Status; 0 = Low 1 = High	
10005	DI5, IN5 Status; 0 = Low 1 = High	
10006	DI6, IN6 Status; 0 = Low 1 = High	
10007	DI7, IN7 Status; 0 = Low 1 = High	
10008	DI8, IN8 Status; 0 = Low 1 = High	
10009	DI9, IN9 Status; 0 = Low 1 = High	
10010	DI10, IN10 Status; 0 = Low 1 = High	

Input Register

ADDRESS	EXPLAN	Write/Read
30001	DI1 Pulse Frequency mode	Read Only 0x04 Read Input Registers
30002	DI2 Pulse Frequency mode	
30003	DI3 Pulse Frequency mode	
30004	DI4 Pulse Frequency mode	
30005	DI5 Pulse Frequency mode	
30006	DI6 Pulse Frequency mode	
30007	DI7 Pulse Frequency mode	
30008	DI8 Pulse Frequency mode	
30009	DI9 Pulse Frequency mode	
30010	DI10 Pulse Frequency mode	
30011	DI1 Count; Low Byte	0x04 Read Input Registers * Counter Value for DI Odd Address (Low Byte) Even Address (High Byte)
30012	DI1 Count mode; High Byte	
30013	DI2 Count mode; Low Byte	
30014	DI2 Count mode; High Byte	
30015	DI3 Count mode; Low Byte	
30016	DI3 Count mode; High Byte	
30017	DI4 Count mode; Low Byte	
30018	DI4 Count mode; High Byte	
30019	DI5 Count mode; Low Byte	
30020	DI5 Count mode; High Byte	
30021	DI6 Count mode; Low Byte	
30022	DI6 Count mode; High Byte	
30023	DI7 Count mode; Low Byte	
30024	DI7 Count mode; High Byte	
30025	DI8 Count mode; Low Byte	
30026	DI8 Count mode; High Byte	
30027	DI9 Count mode; Low Byte	
30028	DI9 Count mode; High Byte	
30029	DI10 Count mode; Low Byte	
30030	DI10 Count mode; High Byte	

Holding Register

ADDRESS	EXPLAN	Write/Read
40001	Output Register	0x03 Read Holding Registers 0x06 Preset Single Register 0x10 Preset Multiple Registers
40002	Input Register DI1 ~ DI10 High / Low Status BIT0=DI1,...BIT10=DI10 ON=1, OFF=0	Read Only 0x03 Read Holding Registers
40003	Device ID; 0 < Device ID < 256 Enable while Hardware Device ID = 0	0x03 Read Holding Registers 0x06 Preset Single Register 0x10 Preset Multiple Registers
40004	Baud Rate(x 100); 3, 12, 24, 48, 96, 192, 384, 576, 1152	
40005	Word Length; (8bit and 7bit)	
40006	Parity Check; 0: None, 1: Odd, 2: Even	
40007	Stop Bit; 1: 1 stop bit 2: 2 stop bits	
40008	Write Data Command 0xAAAA: Save Device ID and RS485 Configuration Setting. 0xBBBB: Save User Defined Registers 0xCCCC: Save DI Counter Registers 0xFFFF: Restore the Default Value(40009=0)	
40009	Write Data Status: Show Status of 40008	
40010	RS485 Change on-line	
40011	User Defined Register	
40012	User Defined Register	
40013	User Defined Register	
40014	User Defined Register	
40015	User Defined Register	
40016	User Defined Register	
40017	User Defined Register	
40018	User Defined Register	
40019	User Defined Register	
40020	User Defined Register	
40021	DI1 Input Frequency	Read Only 0x03 Read Holding Registers
40022	DI2 Input Frequency	
40023	DI3 Input Frequency	Read Only 0x03 Read Holding Registers
40024	DI4 Input Frequency	
40025	DI5 Input Frequency	
40026	DI6 Input Frequency	
40027	DI7 Input Frequency	
40028	DI8 Input Frequency	
40029	DI9 Input Frequency	
40030	DI10 Input Frequency	
40031	DI1 Count (Low Byte)	
40032	DI1 Count (High Byte)	
40033	DI2 Count (Low Byte)	
40034	DI2 Count (High Byte)	
40035	DI3 Count (Low Byte)	
40036	DI3 Count (High Byte)	
40037	DI4 Count (Low Byte)	
40038	DI4 Count (High Byte)	
40039	DI5 Count (Low Byte)	
40040	DI5 Count (High Byte)	
40041	DI6 Count (Low Byte)	
40042	DI6 Count (High Byte)	
40043	DI7 Count (Low Byte)	
40044	DI7 Count (High Byte)	
40045	DI8 Count (Low Byte)	
40046	DI8 Count (High Byte)	
40047	DI9 Count (Low Byte)	
40048	DI9 Count (High Byte)	
40049	DI10 Count (Low Byte)	
40050	DI10 Count (High Byte)	