http://www.delta.com.tw/industrialautomation/

2007-05-22

5011617504-2GE4

TP02 *Terminal Panels Series*

Instruction Sheet

Warning

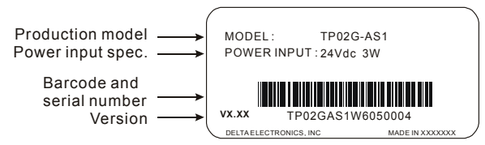
- ✓ *Please read this instruction carefully before use.*
- ✓ *Switch off the power before wiring.*
- ✓ *The display panel of TP02 series is waterproof. But please prevent grease, corrosive liquids and sharp objects from contacting the TP02 series.*
- ✓ *The TP02 series require 24VDC input power. DO NOT connect input AC power supply to any of the RS-485 communication port; otherwise serious damage may occur. Check all the wiring again before switching on the power.*
- ✓ *DO NOT touch any terminal when the power is switched on. DO NOT touch any internal circuit in 1 minute after the power is switched off.*
- ✓ *Make sure the groud terminal ⏚ is correctly grounded in order to prevent electromagnetic interference.*
- ✓ *Please use the fixed support accessory which is packed together with the product provided by Delta. DO NOT tighten the screws out of the normal torque specifications; otherwise serious damage may occur.*

❶ Introduction

1.1 Model Explanation

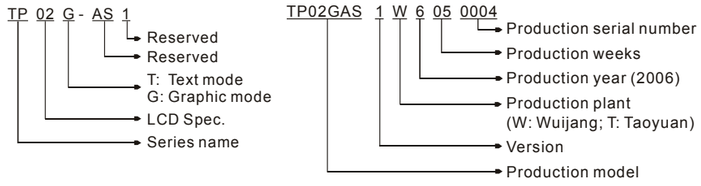
Thank you for choosing Delta TP Series. TP02G-AS1 has the features of high resolution 160×32 dots. It provides multilingual display and two built-in communication ports, one is for RS-232 and the other is for RS-485. RS-232 and RS-485 can be used simultaneously. Besides, it also supports communication and alarm LED indicators. The user can purchase program copy card (optional) to copy settings and programs quickly and save download time.

❖ **Nameplate Explanation**

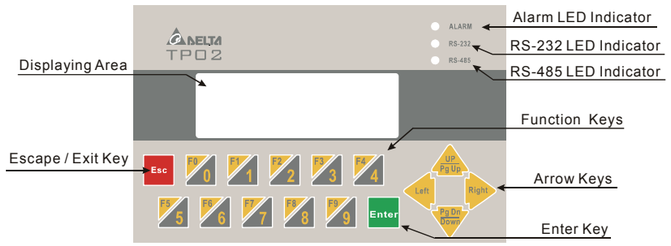


NOTE: The words of “MADE IN XXXXX” will be different due to the manufacturing location. Please refer to the actual product for exact description.

❖ **Model / Serial No. Explanation**



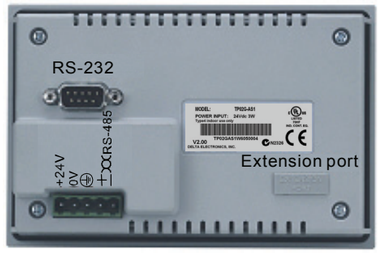
1.2 Product Outline



1.3 Panel Function Explanation

PANEL COMPONENT	EXPLANATION
Alarm LED Indicator (RED)	Status 1: When power is on, LED will blink slowly for three times. Status 2: When there is an abnormal situation, LED will blink quickly along with an alarm sound.
RS-232 LED Indicator (Yellow)	LED will blink when transmits program and communicates via RS-232.
RS-485 LED Indicator (Green)	LED will blink when communicates via RS-485.
Displaying Area	Liquid Crystal Module display area. It is used to display current program status.
Escape / Exit Key	It is used to cancel an incorrect input, or to exit a programming step.
Enter Key	It is used to input a value or accept a programming command.
Arrow Keys	UP / Pg Up: It is used to increase the value or move up one page. Pg Dn / DOWN: It is used to decrease the value or move down one page. Left: This key is left direction key and it can be used to select the position of the value. Right: This key is right direction key and it can be used to select the position of the value.
Function Keys	F0 / 0: It is used as a constant 0, or the user can define it as function F0. F1 / 1: It is used as a constant 1, or the user can define it as function F1. F2 / 2: It is used as a constant 2, or the user can define it as function F2. F3 / 3: It is used as a constant 3, or the user can define it as function F3. F4 / 4: It is used as a constant 4, or the user can define it as function F4. F5 / 5: It is used as a constant 5, or the user can define it as function F5. F6 / 6: It is used as a constant 6, or the user can define it as function F6. F7 / 7: It is used as a constant 7, or the user can define it as function F7. F8 / 8: It is used as a constant 8, or the user can define it as function F8. F9 / 9: It is used as a constant 9, or the user can define it as function F9.

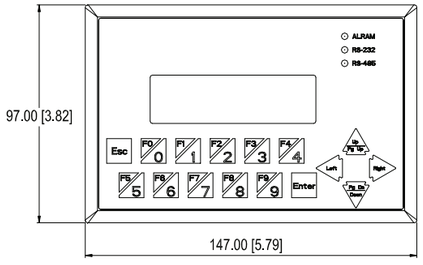
1.4 Back Panel



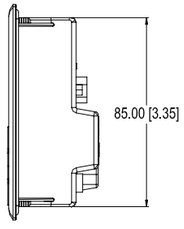
5 PIN terminal / Wire gauge: 12-24 AWG / Torque: 4.5 lb.-inch

1.5 Dimension

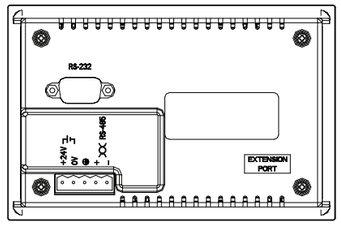
Front panel (unit: mm [inch])



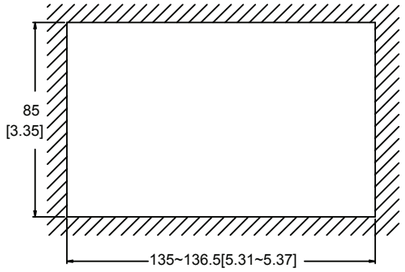
Right side diagram (unit: mm [inch])



Back panel

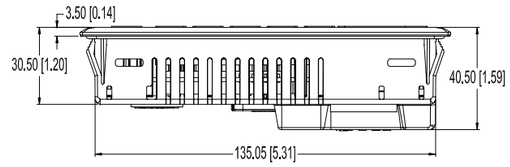


Mounting dimension (unit: mm [inch])



Thickness Range 0.5~9mm

Vertical view (Unit: mm)



1.6 Installation

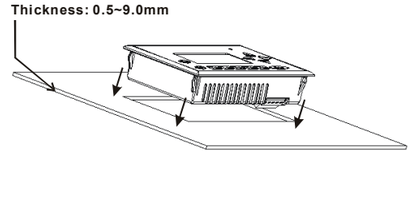
Please insert TP02 series to the opening hole of panel and tighten the screws. However, if a firm mounting TP02 series to the panel is needed, please use the mounting fixed support accessory which is packed together with TP02 series, then insert the fixed support in the back and tighten the screws.

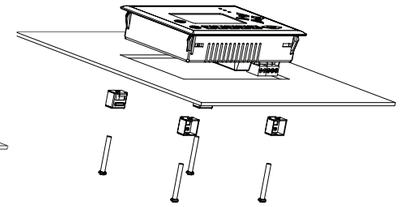
⚠ If the fixed support is not installed well, Delta will not guarantee the waterproof function. The screw torque should be 4-5(kg-cm). DO NOT exceed this specification when tightening the screws; otherwise TP02 series may be damaged. Please leave sufficient space (more than 50mm) around the unit for heat dissipation.

Do not install and mount TP02 series in the following environment.

- ➤ A location subjected to Airborne dust, metallic particles, oil and smoke, corrosive or flammable gases and liquids.
- ➤ A location where temperature and humidity will exceed specifications.
- ➤ A location where vibration and shock will exceed specifications.

❖ **The flat surface should be a UL Type 4 "Indoor Use Only" enclosure or equivalent (IP65 / NEMA4). Please refer to the figures below.**





❷ Function Specifications

ITEM	TP02G-AS1
Screen Type	STN-LCD
Display Color	Monochromatic
Backlight	The back-light automatic turn off time is 1 ~ 99 minutes (0 = do not turn off) (The back-light life is about 50 thousand hours at 25°C)
Resolution	160 x 32 dots
Display Range	(W) x (H) = 72 x 22 (unit: mm)
Contrast Adjustment	15 levels of adjustment
Language / Font	ASCII: Alphanumeric (including European characters) Taiwan: (Big 5 codes) Traditional Chinese Fonts China: (GB2324-80 codes) Simplified Chinese Fonts
Font Size	ASCII: 5 × 8, 8 × 8, 8 × 12, 8 × 16
Alarm LED Indicator (RED)	1. Power on indication (Blink for three times) 2. Communication error alarm 3. Special indication by user programming
RS-232 LED Indicator (Yellow)	It will blink when transmitting program and communicating by using RS-232.
RS-485 LED Indicator (Green)	It will blink when communicating by using RS-485.
Program Memory	256KB flash memory
Serial Communication Port RS-232 (COM1)	Unsynchronized transmission method: RS-232 Data length: 7 or 8 bits, Stop bits: 1 or 2 bits Parity: None/Odd/Even, Transmission speed: 4,800bps ~115,200bps RS-232: 9 PIN D-SUB male
Extension Communication Port RS-485 (COM2)	Unsynchronized transmission method: RS-485 Data length: 7 or 8 bits, Stop bits: 1 or 2 bits Parity: None/Odd/Even, Transmission speed: 4,800bps ~115,200bps RS-485: 5 PIN removal terminal
Extension Interface	1. Update firmware version 2. The slot for program copy card
Battery Cover	DC 3V battery for HMI
5 PIN Removal Terminal	Include DC 24V input and RS-485 communication input

❸ Electrical Specifications

Specifications	TP02G-AS1
Display	Monochromatic STN LCD
Effective Display Area	(W) x (H) = 72 x 22 (unit: mm)
Display Resolution	160x32: ASCII: 5x8, 8x8, 8x12, 8x16
LCD Contrast Adjustment	Set by Software, adjust the contrast by the press button in the function table
LCD Backlight Type	LED Backlight: Automatic Turn-off Setting
Function / Numeric Keys	F0 / 0 ~ F9 / 9, ESC, ENTER and Arrow Keys
External Input Power	24V (3W Max.)
Memory Capacity	256K Byte
CPU	Hitachi HD64F3064F
RAM of System	32K Byte
Communication Interface	COM1: RS-232 COM2: RS-485
Waterproof Class of Front Panel	IP65 / NEMA4
Operating Temperature for Hardware	0 ~ 50°C; 20 ~ 90% RH (non-condensing)
Storage Temperature for Hardware	-20 ~ 60°C
Vibration	5Hz≦f＜9Hz = Continuous: 1.75mm / Occasional: 3.5mm 9Hz≦f≦150Hz = Continuous: 0.5g / Occasional: 1.0g
Shock	15g peak, 11ms duration, half-sine, three shocks in each direction per axis, on 3 mutually perpendicular axes (total of 18 shocks)
Radiated Emission	CISPR11, Class A
Electrostatic Discharge Immunity	EN61000-4-2
Radiated Immunity	EN61000-4-3
Electrical Fast Transient	EN61000-4-4
Weight / Dimensions	0.24kg; 147×97×35.5mm (Width(W) × Height(H) × Deep(D))
Cooling Method	Natural Air Cooling

❹ Program Copy Card

TP02 series provides Program Copy Card Function to copy user program, system function and passwords that is different from the copy program. It is used to copy the whole HMI environment settings and application programs to another HMI rapidly. Using Program Copy Card saves time and manpower. The operation is as follows.

❖ **Definition: Program Copy Card → PCC, TP Series → TP**

	(TP→PCC)	(PCC→TP)
Step 1	Turn the switch on the PCC to TP →PCC	Turn the switch on the PCC to PCC→TP
Step 2	Insert the PCC into the extension slot of TP	Insert the PCC into the extension slot of TP
Step 3	Input the power to TP	Input the power to TP
Step 4	It will display “remove PCC” on the screen and power on again.	It will display “remove PCC” on the screen and power on again.

❖ **HMI Display Message**

	(TP→PCC)	(PCC→TP)
Step 1	If the TP model type does not correspond with the model type of program of PCC, TP will display “TP series and PCC is different. Press Enter to Confirm TP series→PCC. Press Esc to Exit”.	If there is no program in PCC, TP will display “The PCC is Empty. PCC→TP series is illegal”.
Step 2	TP will display “TP→PCC series Please wait!” during transmission.	TP will display “PCC→TP series Please wait!” during transmission.
Step 3	TP will display “Please Remove the PCC and Reboot” when transmission is completed.	TP will display “Please Remove the PCC and Reboot” when transmission is completed.

❺ Password Function

If the user forgot the password, the password can be cleared by using the following code: 8888. This universal code will clear the password and all TP02 series internal programs. The TP02 series will be reset to the factory settings by using this code also. Please pay close attention when using it.

❖ **The password can be the alphabet from A to Z or the number from 0 to 9. But it must use the function keys F0 ~ F9 to input the password characters. Please refer to the following table.**

Function Key	Use Method	Function Key	Use Method
F0	scrolls in a loop as follows 0→A→B→C→D→E→F→0	F5	It just can be used to be constant 5.
F1	scrolls in a loop as follows 1→G→H→I→J→K→1	F6	It just can be used to be constant 6.
F2	scrolls in a loop as follows 2→L→M→N→O→P→2	F7	It just can be used to be constant 7.
F3	scrolls in a loop as follows 3→Q→R→S→T→U→ V→3	F8	It just can be used to be constant 8.
F4	scrolls in a loop as follows 4→W→X→Y→Z→4	F9	It just can be used to be constant 9.

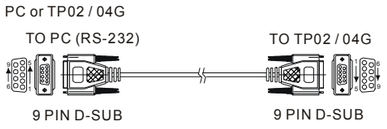
❻ Hardware Operation

When the user wants to startup TP02 series, a 24VDC power is needed. After applying 24VDC power to TP02 series, it will enter into the startup display and then enter the user-designed program. Pressing Esc key and holding on for 5 seconds can return to system menu. There are five selections in the system menu and are described below.

SELECTIONS	EXPLANAION
Download Program	Use the connection cable (DVPACAB530) to connect the TP02 serial communication port RS-232 to a PC. Then use the TPEdit software to download an application program to TP02.
Upload Program	Use the connection cable (DVPACAB530) to connect the TP02 serial communication port RS-232 to a PC. Then use the TPEdit software to upload an application program from TP02.
Copy Program	Transfer a program between two TP02 units. 1: transmit programs 2: receive programs When transmit programs and data between two TP02 units. Set one TP02 to “Receive Program” mode and the other TP02 to “Transmit Program” mode. Please use twisted pair wires to connect the two units via the RS-485 ports.
TP02 Settings	There are 8 items that used to modify TP02 system settings: 1. Communication protocol: Setting the address of TP02, the control port of PLC, and the communication string for either RS-232 or RS-485. 2. Contrast: Adjust the contrast of LCM display screen. 3. Back-light: adjust the automatic turn off time of LCM. Setting range is 00 ~ 99 minutes. If set to 00, the LCM Back-light will not turn off. 4. Buzzer: Used to set the buzzer sound, normal mode or quiet mode. 5. Language Setting: Used to set the displayed language. English, Traditional Chinese, Simplified Chinese or user defined language. 6. Password setting: Used to set, enable, and disable the password function. If the password function is enabled, it will require the user to input a password before entering any system menu. The factory password is 1234. 7. Startup display: Used to select the TP02 startup display. User can select “user defined” to use the file that designed by TPEdit and download to TP02. 8. Comm. indicator: The user can determine if the RS-232 and RS-485 LEDs will blink or not during communication.
PLC Connection	There are two methods to connect to PLC: 1. Using TP02 serial communication port (COM1) RS-232: set 8-pin DIP switch to RS-485 mode and connect the cable (DVPACAB215 or DVPACAB230) to program communication I/O RS-232C of PLC. 2. Using extension communication port (COM2) RS-485: set 8-pin DIP switch to RS-485 mode and connect 5-pin removal terminal of extension communication port to RS-485 of PLC with twisted pair.
Execution	Execute the internal program that download from TPEdit or transmitted from other TP02 units. When program is in execution, the user can return to system menu by pressing Escape / Exit (Esc) key for 5 seconds.

❼ Communication Connection

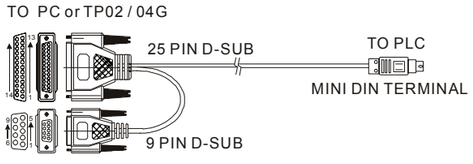
❖ **TP02G may connect to a PC by using connection able DVPACAB515**



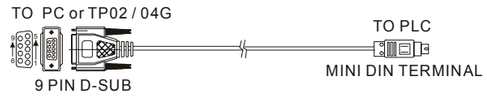
PC COM Port 9 PIN D-SUB female		TP02 / 04G COM Port 9 PIN D-SUB female
Rx 2	⟷	3 Tx
Tx 3	⟷	2 Rx
GND 5	⟷	5 GND

❖ **TP02G may connect to a DVP-PLC by using connection cable DVPACAB215 / DVPACAB230 / DVPACAB2A30**

1. DVPACAB215 / DVPACAB230



2. DVPACAB2A30



PC / TP COM Port 25 PIN D-SUB female		PLC COM1 Port 8 PIN MINI DIN
Tx 2	⟷	4 Rx
Rx 3	⟷	5 Tx
GND 7	⟷	8 GND
4		1,2 5V
5		
6		
8		
20		

PC / TP COM Port 9 PIN D-SUB female		PLC COM1 Port 8 PIN MINI DIN
Tx 3	⟷	4 Rx
Rx 2	⟷	5 Tx
GND 5	⟷	8 GND
7		1,2 5V
8		
1		
4		
6		

❖ **The Pin definition of 9 PIN D-SUB**

TP02 / 04G COM Port RS-232 9 PIN D-SUB male	
3	Tx
2	Rx
5	GND

❽ Battery Life

❖ **Battery Life**

Temperature (°C)	-20	0	20	60
Life (Year)	1.972	2.466	2.712	2.835

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