

Display type teach pendant

DTP7H-D

Hardware user's manual (R1) Version

DAINCUBE Corp.
Display type

FORM 170905F – 2017.09.05



DTP7H-D Hardware user's manual
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Preface

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Important information

This documentation is intended for qualified audience only. The product described herein is not an end user product. It was developed and manufactured for further processing by trained personnel.

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Product support

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Safety precautions

Be sure to observe all of the following safety precautions.

Strict observance of these warning and caution indications are a MUST for preventing accidents, which could result in bodily injury and substantial property damage. Make sure you fully understand all definitions of these terms and related symbols given below, before you proceed to the manual.

Symbols

The following symbols may be used in this specification:



Warning

Warnings indicate conditions that, if not observed, can cause personal injury.



Caution

Cautions warn the user about how to prevent damage to hardware or loss of data.



Note

Notes call attention to important information that should be observed.

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User's Manual

1. Introduction

Thank you very much for purchasing our product.

Improper usage or mishandling may result in a product not only being unable to deliver full functions but also produce unexpected troubles or shorten the product's life.

Please read this manual carefully, and operate the product properly by paying attention to its handling. When operating the product, always keep this manual at hand and read the relevant items as required.

1.1. General precautions

- Be sure to read this Instruction Manual for proper use of this product.
- Part or all of this Instruction Manual may not be used or reproduced without permission.
- Please take note that we shall not be liable for any effects resulting from using this Instruction manual.
- This manual may be modified when necessary because of improvement of the product, modification or changes in specifications.
- Some drawings in this manual are shown as a typical example and may differ from the shipped product.

2. Safety information

- Before unpacking and installing the product or adding devices on it, carefully read all the manuals that came with the package.
- Avoid using product in extreme dust, humidity and temperature conditions. Do not place the product in wet area.
- Before carrying out assembly and adjustment work or maintenance and inspection work of the machine, be sure to disconnect the power cord. Otherwise, electric shock may result.
- After turning OFF power, wait at least five minutes before servicing the product. Otherwise, residual electric charges may result in electric shock.



Warning

- Be sure to check grounding before you use the unit. Danger of personal injury due to electric shock!
- Be sure to use the unit within the voltage range indicated.
- The operator must have a sufficient educational level and must know details of intended use described in the user's manual.
- Be sure to check the wiring to the main unit.
- When the user (customer) extends wiring, malfunction may occur due to faulty wiring. In this case, inspect wiring thoroughly and check it for properness before turning on the power.
- Before operating the unit, be sure to check that there is no danger in or around the operating range.
- Do not allow water or oil to get on the unit and the power cord.
- Install the unit in a place which can endure its weight and conditions while running.
- Take care not to squeeze and thus damage the cable with any object.
- Do not lay the cable over sharp edges to avoid damaging the cable sheath.
- Check the mounting screws regularly so that they are always firmly tightened.
- Never touch terminals directly or internal parts of controller.
- Do not disassemble or modify the product.
- Before carrying out assembly and adjustment work or maintenance and inspection work of the machine, be sure to disconnect the power cord.
- Connect the power supply after completing the adjustment of all the cables and switches.



Caution

- After the shutdown window, turn off the power supply. Otherwise the components could be destroyed or undefined signals could occur.
- To prevent the equipment from falling to the ground.
- Never lay the device onto unstable surfaces. It could fall to ground and thus be damaged.
- It is recommended to use the unit in an environment where no electrical noise is present. In noisy environments, use a filter fitted.

- Never lay the device close to heat sources or into direct sunlight.
- Avoid exposing the device to mechanical vibrations, excessive dust, and humidity or to strong magnetic fields.
- Make sure that no foreign objects or liquids can penetrate into the device.
- Wipe the power plug with a clean, dry cloth periodically to eliminate dust.
- Always pay special attention to the robot's movement in the Teaching Mode.

3. Warranty and warranty coverage

The Teaching pendant you purchased has been delivered upon completion of our strict shipping test.

3.1. Warranty period

The warranty period is as follows:

- 12 months after our shipment.

3.2. Scope of the warranty

Where a defective condition occurs during proper use conditions and obviously under the responsibility of the manufacturer, within the term above, we shall repair the product without charge.

However, any items that apply to the following are excluded from the warranty coverage.

- The warranty is not valid if the defect is due to accidental damage, mishandling, misuse, voltage fluctuation, high/low voltage or natural disaster.
- If the product is repaired or tried to repair from unauthorized personal/Repair Shop.
- If the product serial number is tempered.
- The product is defective due to wear of parts, which can be considered as consumable parts by the nature. (such as a cable)
- Defects resulting from changes over time such as natural color fading of paint.
- Defects resulting from mishandling or improper use.
- Defects resulting from an inadequacy or error in maintenance and inspection.
- Defects resulting from the use of any part other than our genuine parts.
- Defects resulting from a modification not approved by us or our dealers.

Only a delivered product shall be singly warranted, and no damage induced by the defect of the delivery product can be warranted. For repair, transport the product to our factory.

3.3. Service coverage

The cost of a delivered product does not include expenses for program creation and engineer dispatching. Therefore, the following are charged separately even within the warranty term:

- Maintenance and inspection.
- Technical guidance and technical training in the operating instructions.
- Technical guidance and technical training on program-related matters such as program creation.

4. Description

DTP7H-D is a portable Teach Pendant which is used to manipulate robots and various equipment (semiconductor and LCD equipment). With this product, users can extend and duplicate the image on the main monitor. In addition, users can use every function of the monitor, the keyboard and the mouse with ease. All functions of the monitor, the keyboard and the mouse can be used very conveniently.

4.1. Front view



1 : TFT-LCD with touch screen	2 : Select switch
3 : Emergency stop switch	5 : Hand strap
6 : Left keypad	7 : Right keypad

[Table 4-1] Front function

4.2. Bottom view and dimension



8 - Reset switch	11 - USB host
9 - Not used	12 - Not used
10 - USB device (*option)	

[Figure 4-1] Bottom function

Note: These ports are used for software development and testing.

4.3. Rear view and dimension



4 : Left enabling switch	14 : Mount hole
15 : Right enabling switch (*Option)	16 : Label

[Table 4-2] Rear function

4.4. System cable



1: Circular plug 26pin connector	2: Power and switch connector
3: VGA connector	4: USB communication connector
5: Anti-angle cable grand	

[Table 4-3] System cable

5. Features

DTP7H-D is a portable Teach Pendant which is used to manipulate robots and various equipment (semiconductor and LCD equipment). With this product, users can extend and duplicate the image on the main monitor. In addition, users can use every function of the monitor, the keyboard and the mouse with ease. All functions of the monitor, the keyboard and the mouse can be used very conveniently.

Benefits of DTP7H-D products :

- The GUI can be sent (transmitted) from the Controller PC to LCD through VGA.
- Unlike other companies (P** and M**companies) which use existing graphic panels to develop additional UI, DTP7H simply extends and clones the screen of PC-type controllers.
- It provides clear screen with no noises when transforming and transferring VGA signal.
- We provided junction box which convenient wiring.
- Various high resolution and clear screen
- OSD function (brightness, contrast, color temperature, H-position, V-position, OSD timer)
- Waterproof / dustproof (IP54)
- 1.5M drop (IEC standard 1.2M)
- Certified: KC, CE, ISO 9001, ISO 14001
- It weighs less than 900g.
- Cable length: 5m, 10m
- 26-pin circular type socket connector

Main function of built-in hardware :

- Built-in alarm buzzer.
- VGA transmission method : UTP transmission technology applied
- Communication: Virtual COM Port (keypad, LED, buzzer), USB HID (touch)
- Safety(Emergency stop, Enabling) switch: Use redundant switch

Operation and display panel :

- TFT 7"1024x600, 16.7M Color with LED Backlight
- 4 wire resistive touch screen
- Tact switch for soft key feeling and Membrane nameplate used
- 6 color LEDs for status display use
- Desktop button settings
- Wall bracket and desktop holder for installation

5.1. Specification

■ DTP7H-D Hardware specification

Item	Contents	Remarks
LCD	TFT 7" 1024x600, 16.7M color, 6 LED backlight	
Video interface	Standard VGA (Expandable, Replicable)	
Supported resolutions	1920 x 1080 60Hz (Not warranty) 1680 x 1200 60Hz 1280 x 1024 60Hz 1280 x 800 60Hz, 75Hz 1280 x 720 60Hz, 75Hz 1024 x 768 60Hz, 70Hz, 75Hz 800 x 600 60Hz, 72Hz, 75Hz	
OSD function	Brightness, Contrast, Color temp, H-position, V-position, OSD timer	
Communication	Virtual COM Port (keypad, LED, buzzer), USB HID (touch)	
Touch	4-wire analog-resistive	
LED	3 Color LED 6EA	


Keypad	Jog(+,-) 12EA, Function 3EA, Direction 4EA jog key interface	
Switch	Emergency stop / 3-Level enabling / Select	
Power supply voltage	DC 24 \pm 5%	
Power consumption	Max. DC 24V / 400mA	
Environment	Operating temperature : 0°C to + 45°C	
	Storage temperature :-20°C to + 70°C	
	Humidity max 85% (Non-condensing)	
Appearance	Size :195 x 270 x 72mm / Weight : Max. 900g (without cable and emergency switch cap)	
Cooling method	Ambient	

[Table 5-1] Hardware specification

5.2. Display & Touch screen

Items	Specification
Type	TFT LCD
Size	7.0"(164.9 X 100mm)
Resolution	1024 X 600
Representation	16.7M
Background lighting	24 LEDs (Light Emitting Diode)
Touch screen	4-Wire Analog-Resistive

[Table 5-2] LCD & Touch screen specification

 Note : For smooth touch operation, we recommend removing a LCD protective film.

5.3. Safety switch

The Emergency stop switch, Select switch, and Enabling switch connect to the I/O of the system of the main controller via the cable.

Emergency stop switch supports redundant configuration according to cable connection method.

Enabling switch was configured to confront the emergency situation by using a 3 step switch.

The Select switch is implemented so that the user can select three states.

5.4. User interface

In the user interface there is a touch screen, you can easily control the GUI environment of the platform using the touch screen. The Keypad interface has direction key and three function keys on the left side and twelve function keys on the right side. Also, 3 LEDs are mounted on the left / right, three LEDs each, and it can be used according to the application.

5.5. Communications

DTP7H-D provides USB Virtual COM Port and USB HID.

Control the keypad, LED, buzzer through serial of USB Virtual COM Port, and control touch through USB HID.

6. Functions

This chapter describes how to operate the teaching pendant.

6.1. Operation keys and functions



[Figure 6.1] Pendant Controls and Function

(1) LCD Display

The 7" TFT LCD display area contains 1024 x 600pixels and can display up to 16.7M colors. Shows programs and motion status for the UI.

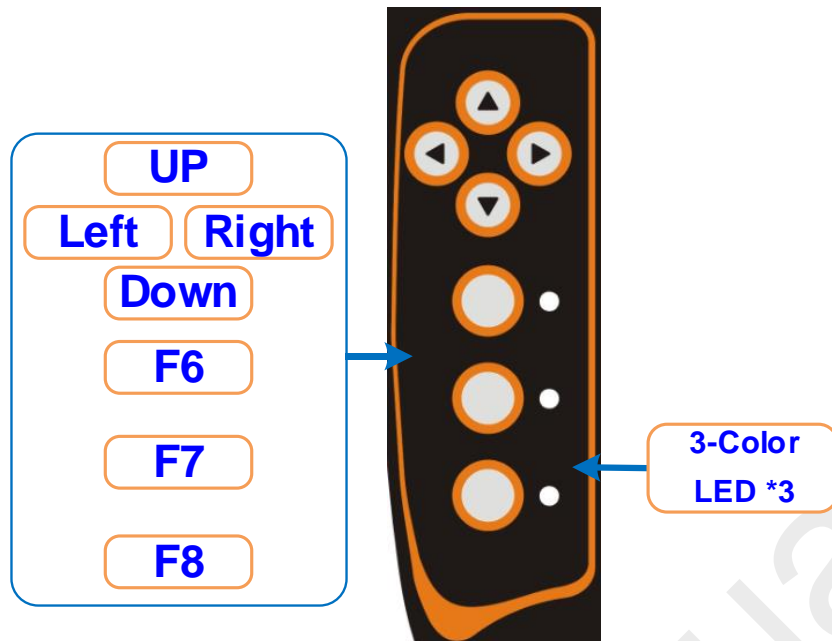
(2) Touch panel

The resistive film method is used for the touch panel. By touching the button or data input area displayed on the screen, it is an integrated type with LCD and touch panel together, you can select the menu and execute the action.

(3) Left keypad

Each key and LED can define their respective function when developing by the user. For details, refer to the software API document.

Generally, it is used as a shortcut for each axis of the robot. In robot manual mode, these keys can be used to easily move and set each axis. This key function is enabled by setting in the robot setting application.



[Figure 6.2] Left keys and LEDs

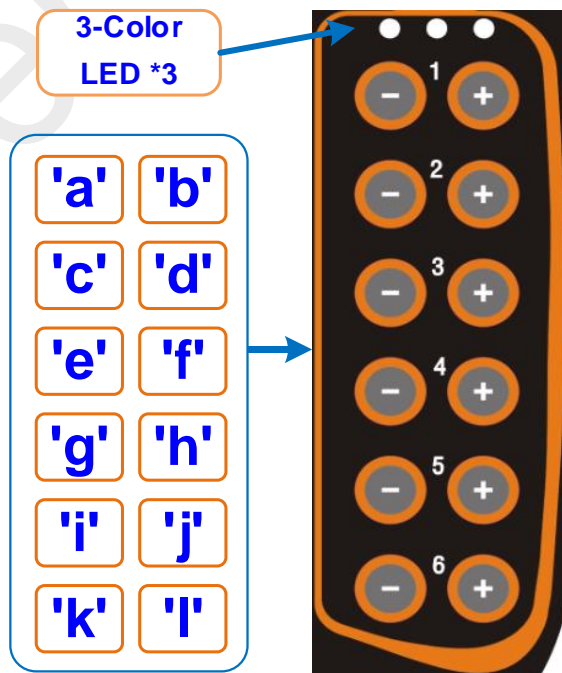
- Direction key: Left, Right, Up, Down key function.
- F6, F7, F8 The function key of Key: 3 is defined by the user's application
- The LED on the right allows you to define each function under development by the user.

(4) Right keypad (Axis Keys)

The functions for each key is set when the user development.
See the software API manual for more information.

Generally, Use the axis keys to move the robot. The axis key's specific functions are available only from the Manual Menu screen, as manual robot motion can be initiated from only the teaching pendant Manual Motion screen.

The response to the axis keys depends on the robot motion settings.



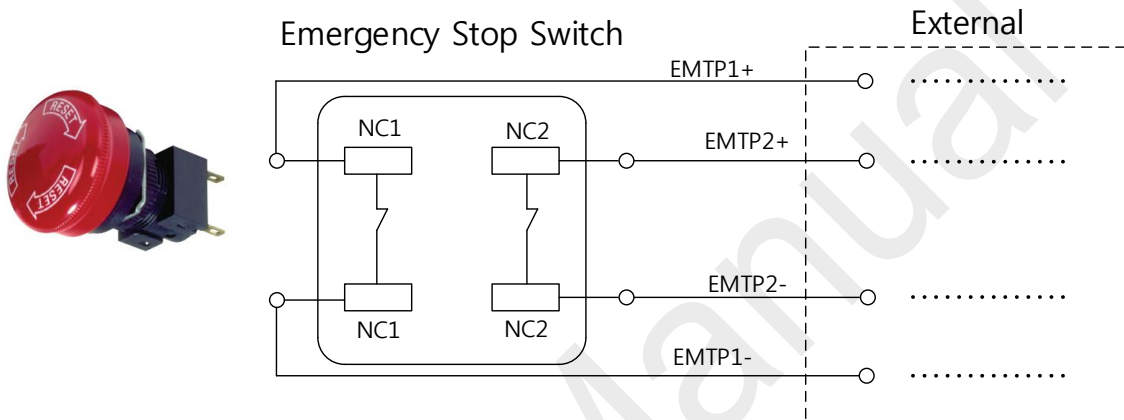
[Figure 6.3] Right keypad

(5) Protective cover mounted



[Figure 6.4] A state that the protective cover is attached.

(6) Emergency Stop Switch



[Figure 6.5] Emergency stop switch

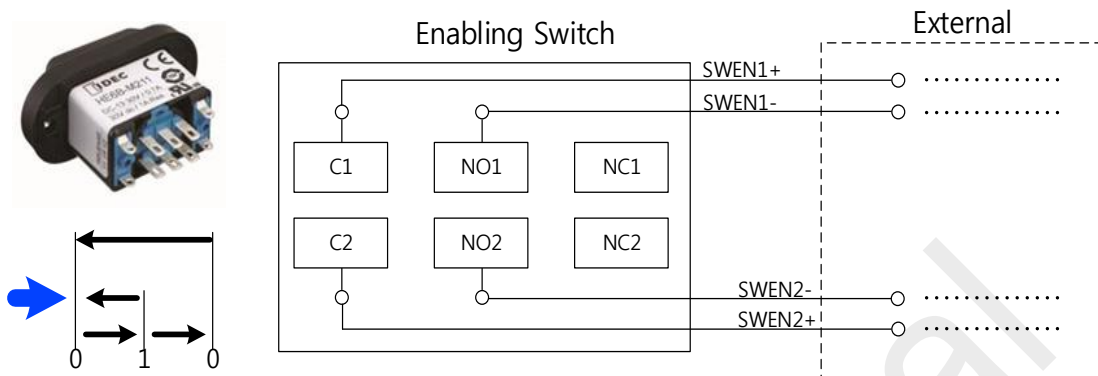
The emergency stop switch (large red handle on the upper right of the pendant) is a safety function that stops the robot immediately and interrupts the power supply of the robot.

Position	Picture	Symbol	EMTP 1 (+,-)	EMTP 2(+,-)
Not pressed		Left Contact: NO NC Right Contact: NO NC	Short	Short
Pressed		Left Contact: NO NC Right Contact: NO NC	Open	Open

[Table 6-1] Emergency Stop Switch function table

(1) Enabling switch

This product is equipped with 3 stage Enabling switch as standard. As shown in the above drawing, the enabling switch is on the back of the pendant. This switch is called the alias dead-man switch.



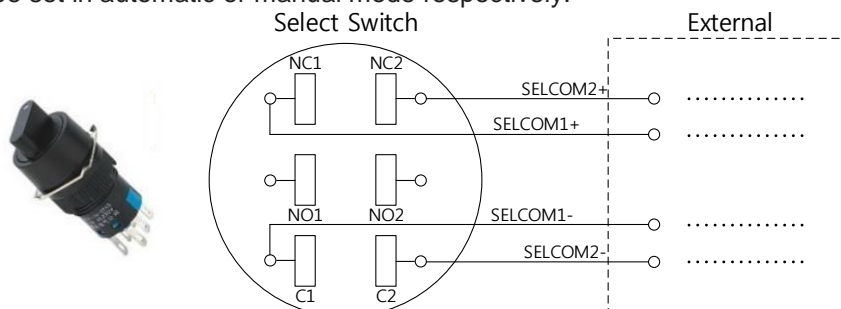
[Figure 6.6] Enabling switch

Action	Position	Picture	Symbol
Not pressed	Null		
Pressed	Enabling		
Pressed strong	Panic		


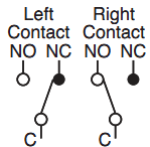

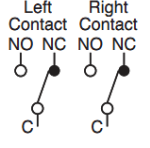

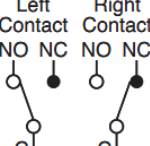
[Table 6-2] Enabling switch operation

(2) Mode select switch

This switch can be set in automatic or manual mode respectively.



[Figure 6.7] Select switch

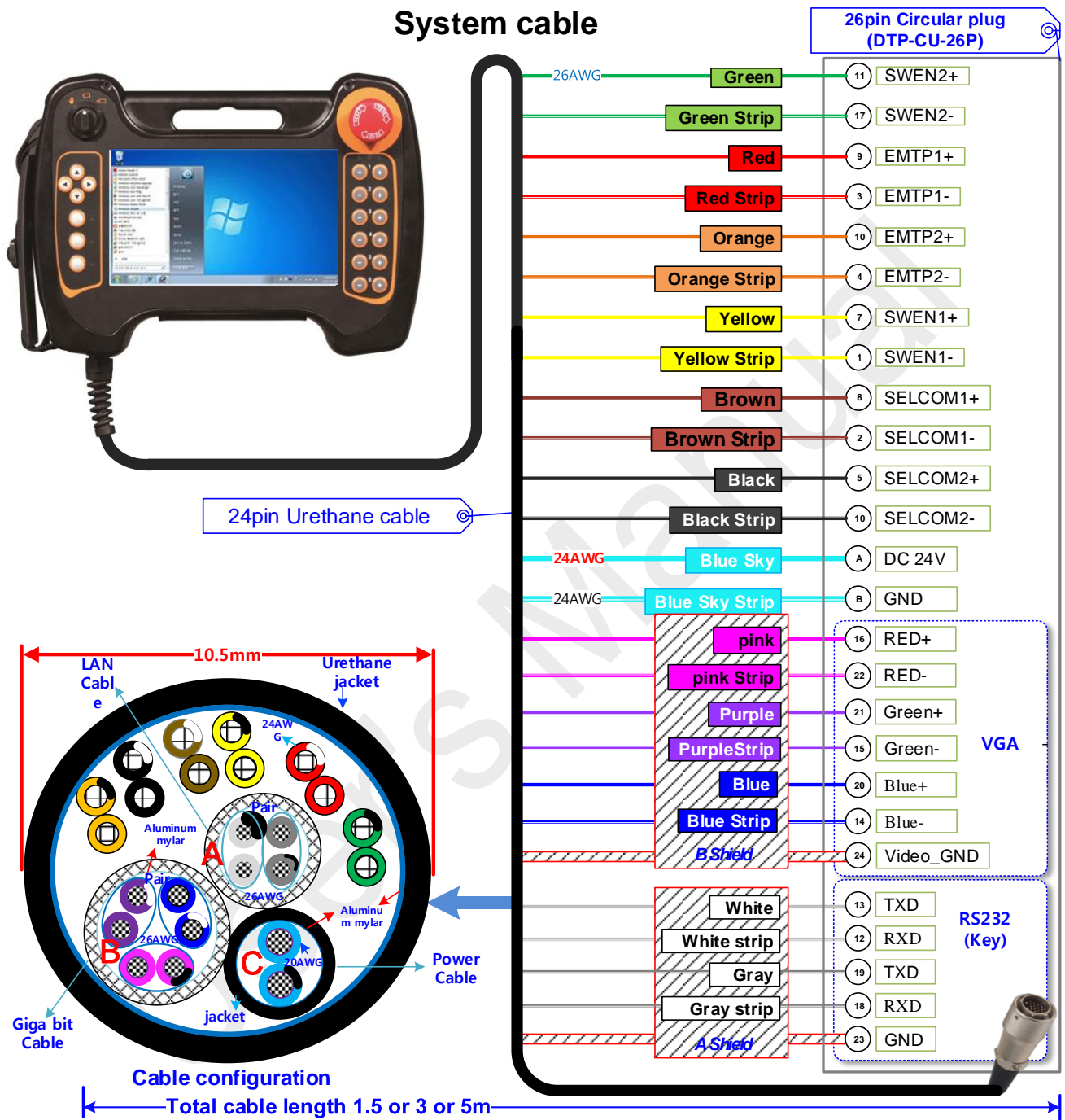
location	Drawing	Symbol	SELCOM 1 (+,-)	SELCOM 2(+,-)
Left		<p>Left Contact NO NC</p> <p>Right Contact NO NC</p> 	Short	Open
Center		<p>Left Contact NO NC</p> <p>Right Contact NO NC</p> 	Short	Short
Right		<p>Left Contact NO NC</p> <p>Right Contact NO NC</p> 	Open	Short

[Table 6-3] Select switch operation

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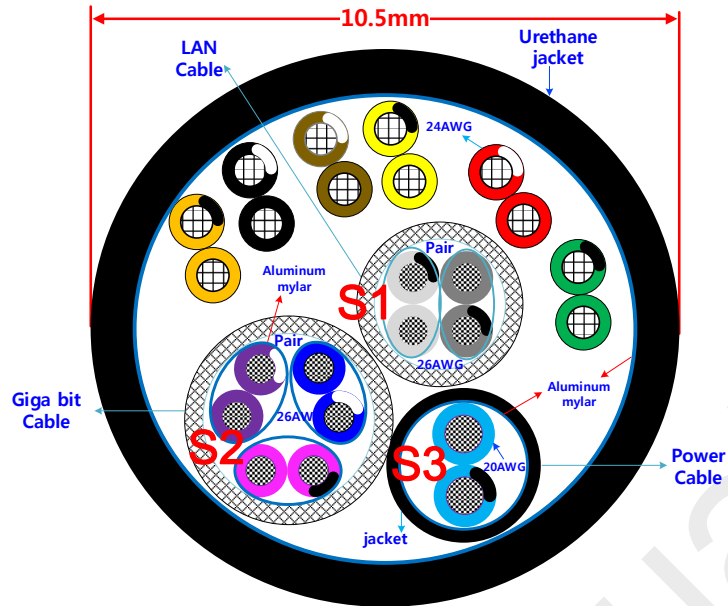
6.2. System cable connection diagram

System cables are customer custom made specifications. Cable length and type, connector type can be changed to customer's specifications.



[Figure 6.8] Also connect system cables

(1) Cable configuration



[Figure 6.9] Cable configuration

(2) 26pin circular plug pin configuration

Plug Pin	Name	Description	Cable Color
System I/O			
3	EMTP1+	Emergency switch the first signal (+)	RED
4	EMTP1-	Emergency switch the first signal (-)	Red Strip
5	EMTP2+	Emergency switch the second signal (+)	Orange
6	EMTP2-	Emergency switch the second signal (-)	Orange Strip
7	SWEN1+	Enabling switch the first signal (+)	Yellow
8	SWEN1-	Enabling switch the first signal (-)	Yellow Strip
1	SWEN2+	Enabling switch second signal (+)	Green
2	SWEN2-	Enabling switch second signal (-)	Green Strip
9	SELCOM1+	Select switch first signal (+)	Brown
10	SELCOM1-	Select switch first signal (-)	Brown Strip
11	SELCOM2+	Select switch second signal (+)	Black
17	SELCOM2-	Select switch second signal (-)	Black Strip
Display (VGA)			
16	RED+	VGA Red+	Pink
22	RED-	VGA Red-	Pink Strip
21	Green+	VGA Green+	Purple
15	Green-	VGA Green-	Purple strip
20	BLUE+	VGA Blue+	Blue
14	BLUE-	VGA Blue-	Blue Strip
24	GND	VGA Ground	S2 Shield
Virtual Com Port (Touch&KEY)			
12	USB_LINE_M0	USB0-	White Strip
13	USB_LINE_P0	USB0+	White
23	GND	USB GND	S1 Shield
18	USB_LINE_M1	USB1-	Gray Strip
19	USB_LINE_P1	USB1+	Gray

Power			
A	VCC	Input power DC 24V±5%	Blue Sky
B	GND	Ground	Blue Sky Strip
Shield	Shield	Shield	S3 Shield

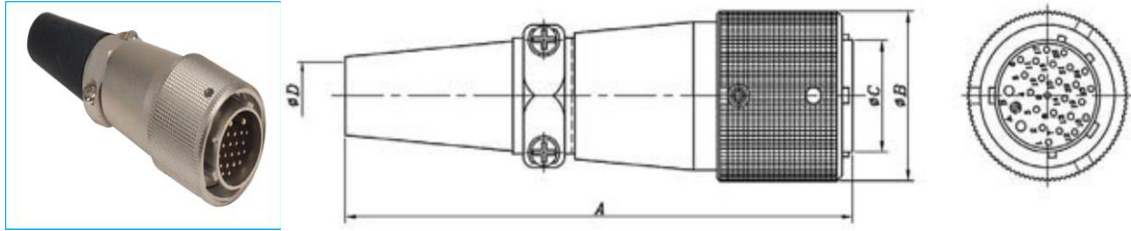
[Table 6-4] Pin configuration of circular plug connector

(3) Cable specifications

Item	Unit	specifications
AWG 26#x3 pair	Construction	NO. / mm 7 / 0.16TA
	Wire Thickness	A-472 0.79 ϕ
	Color	(Blue×Blue Strip + Purple×Purple Strip + Pink×Pink Strip)
	Braided Shield	mm 7/0.10×16
AWG 26#x2 pair	Construction	NO. / mm 7 / 0.16TA
	Wire Thickness	A-472 0.79 ϕ
	Color	(Gray×Gray Strip + White×White Strip)
	Braided Shield	mm 7/0.10×16
AWG 24#x12C	Construction	NO. / mm 7 / 0.16TA
	Wire Thickness	A-472 0.79 ϕ
	Color	(Blue×Blue Strip + Purple×Purple Strip) (Gray×Gray Strip + White×White Strip)
AWG 20#x2C	Construction	NO. / mm 11 / 0.16
	Wire Thickness	A-472 1.15 ϕ
	색상(Color)	(Blue×Blue Strip)
Tapping the whole		(26#x3Pr) + (26#x2Pr) + (24#x12C) + (20#x2C)
	Thickness	Nom. Thick mm
Jacket	Urethane	10~10.3 ϕ ↓

[Table 6-5] Cable specifications

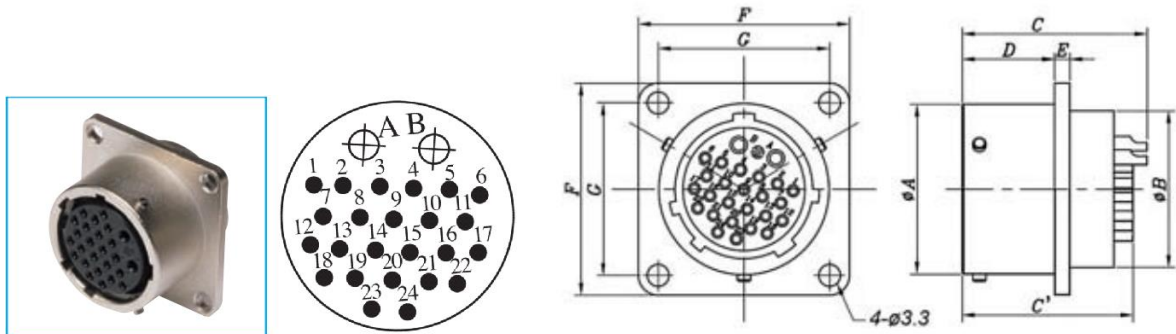
(4) Circular plug connector



Part Number	A	ØB	ØC	ØD
SRC6A21-26P	98.0	31.0	20.4	12.2

[Figure 6.10] Circular plug connector information

(5) Circular connector



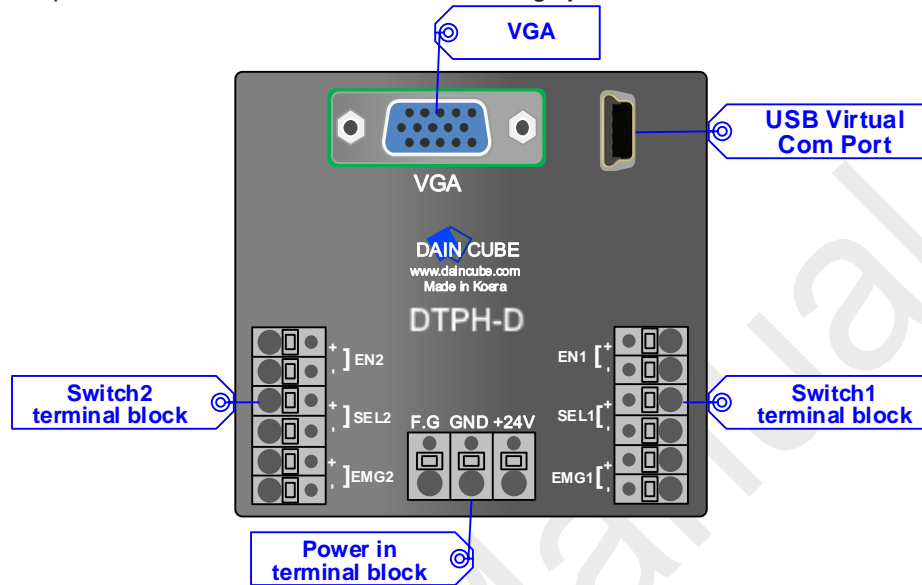
Part Number	A	ØB	C(C')	D	E	F	G
SRC2A21-26S	25.6	23.6	27.7(25.5)	14	2.3	32	26

[Figure 6.11] Circular receptacle connector information

7. Junction box

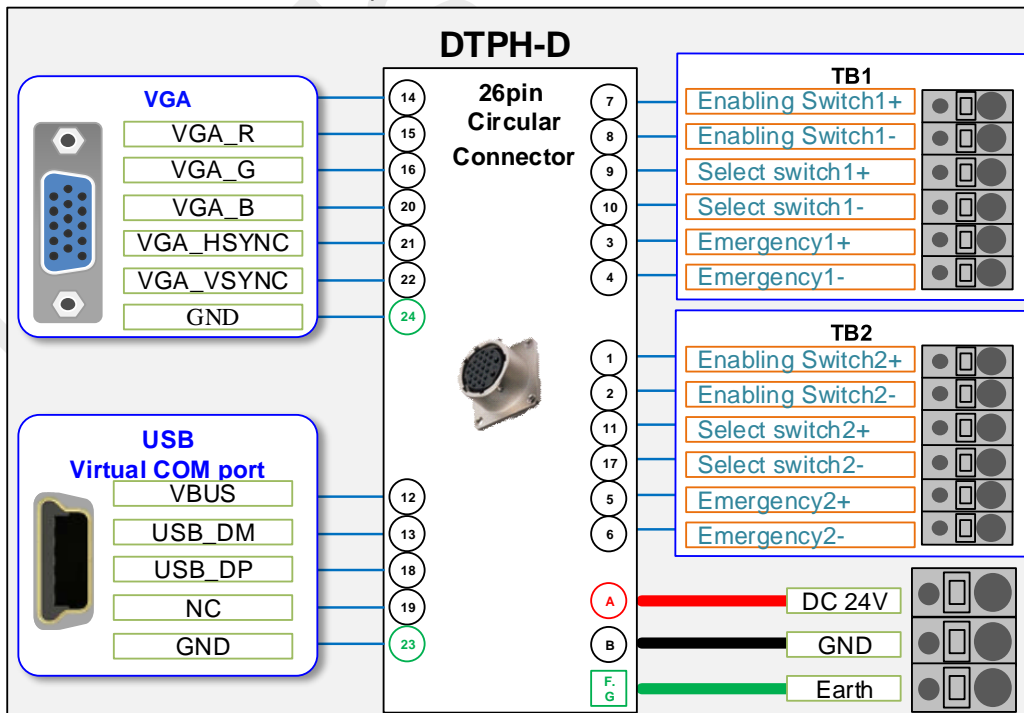
7.1. Junction box

- Each signal line of the circular 26-pin connector is connected to the connector or terminal.
- The junction box is used for conversion of VGA signal to UTP transmission signal and convenient wiring.
- When PC's VGA signal is input to the junction box VGA connector, clear video is transmitted to DTP7H-D using UTP video transmission method.
- All signals and power for DTP7H-D are connected through junction box.



[Figure 7-1] Junction box connector diagram

- VGA : Connect the VGA output of the PC using a standard D-SUB VGA cable.
- USB Virtual COM port: Connect using PC's USB to Mini USB cable
- Switch terminal block: Redundant switch (Enabling, Emergency stop), Mode switch(Select)
- Power in terminal block: DC24V input

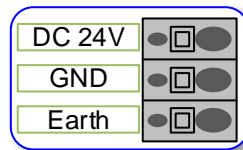


[Figure 7-2] Junction box pin map

If you are using a junction box, you can use a standard cable that can easily be purchased on the market.

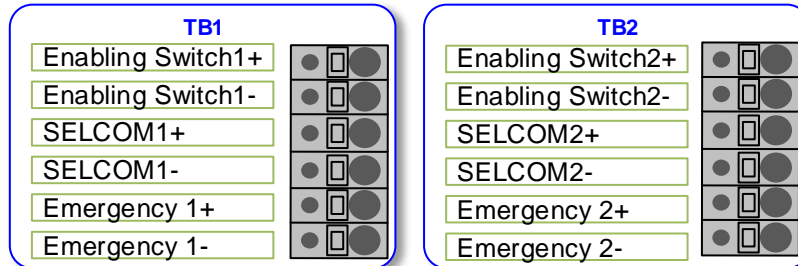
7.1.1. Junction box pin configuration

■ Power in terminal block



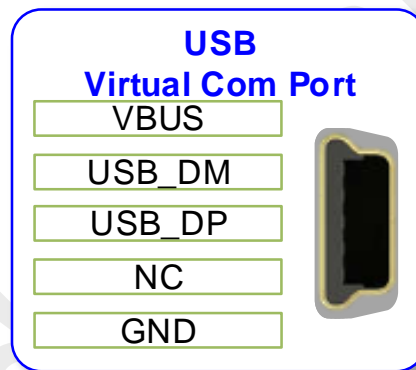
[Figure 7-3] Power terminal block diagram

■ Switch terminal block



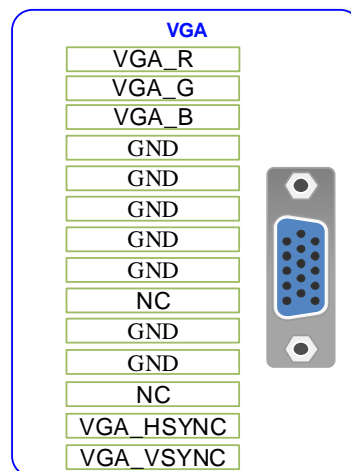
[Figure 7-4] Switch terminal block diagram

■ USB Virtual COM port



[Figure 7-5] USB Virtual COM Port terminal block diagram

■ VGA

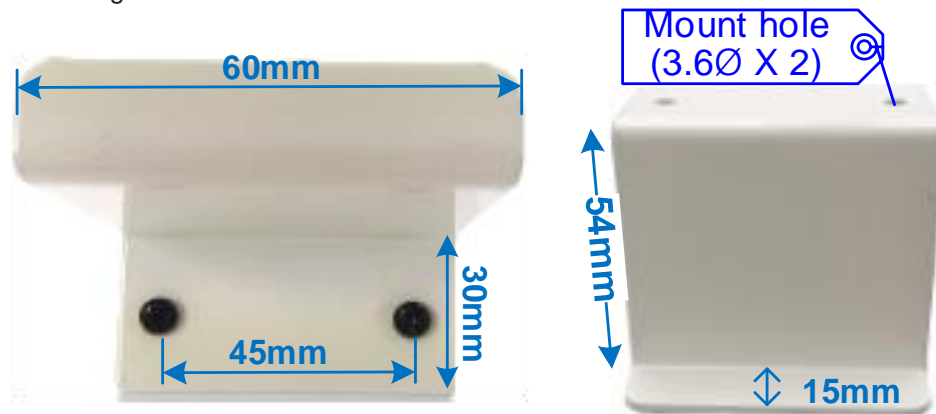


[Figure 7-6] VGA terminal block diagram

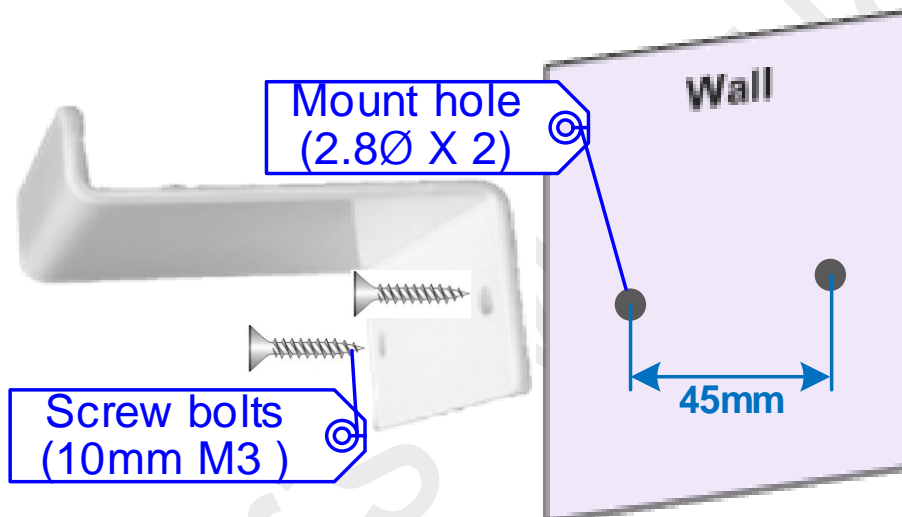
8. Accessories

8.1. Wall Bracket

The bracket for mounting the DTP7H-D to the wall.



[Figure 8-1] Wall Bracket Mechanical dimensions



[Figure 8-2] Drill holes dimensions

- The 2 hole(2.8Ø) spacing of 45mm is required for mounting.
- Use M3(10mm) screw type bolts.



[Figure 8-3] Wall mounted appearance

8.2. Holder

This is the holder that the DTP7H-D Mounting on a desk.



[Figure 8-4] holder

8.3. Protective caps for switches



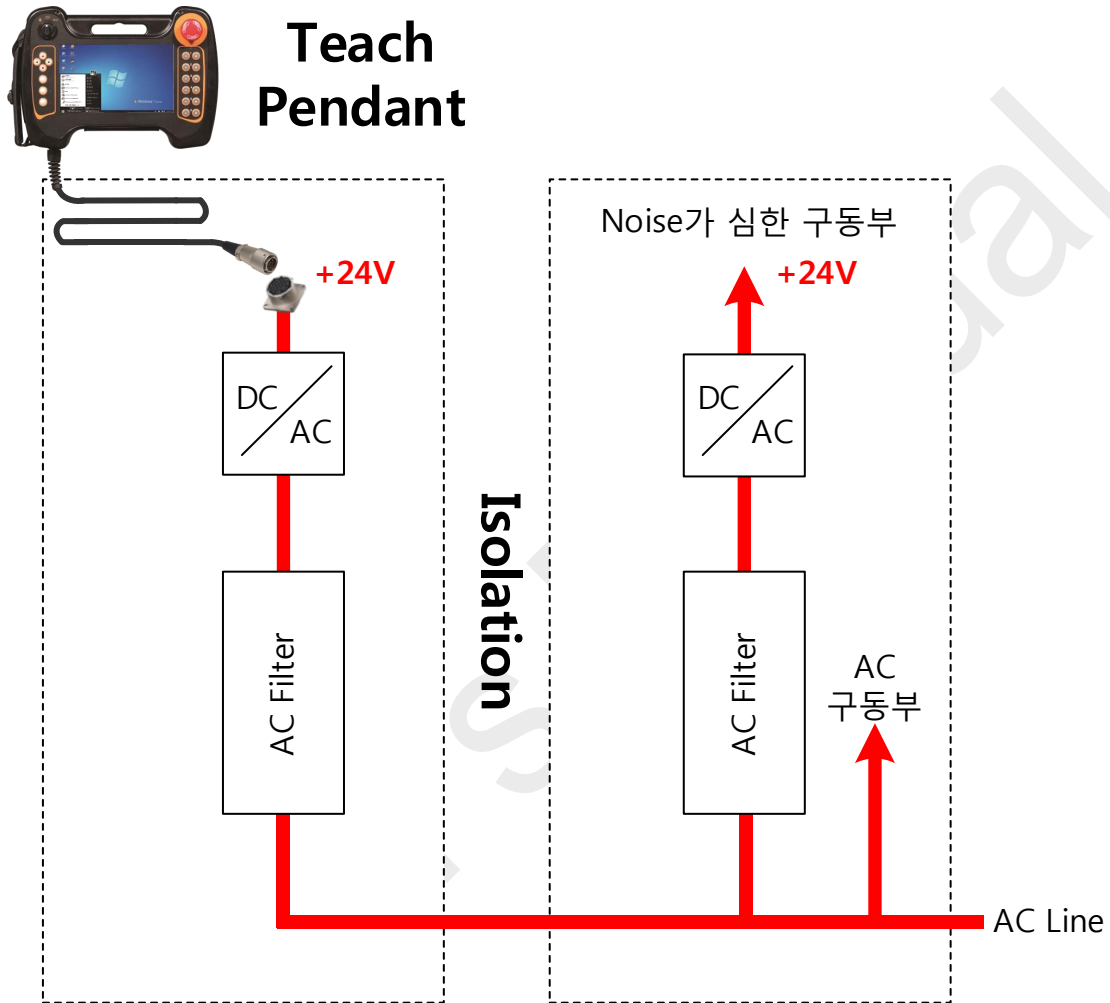
[Figure 8-5] Protective caps for switches

9. Installation guide

Thank you for purchasing the DTP7H-D Teaching pendant. Please install the device after you understand in detail the contents of the document.

This document contains recommendations for wiring, to reduce noise emissions generated by the driven components.

9.1. Power connection



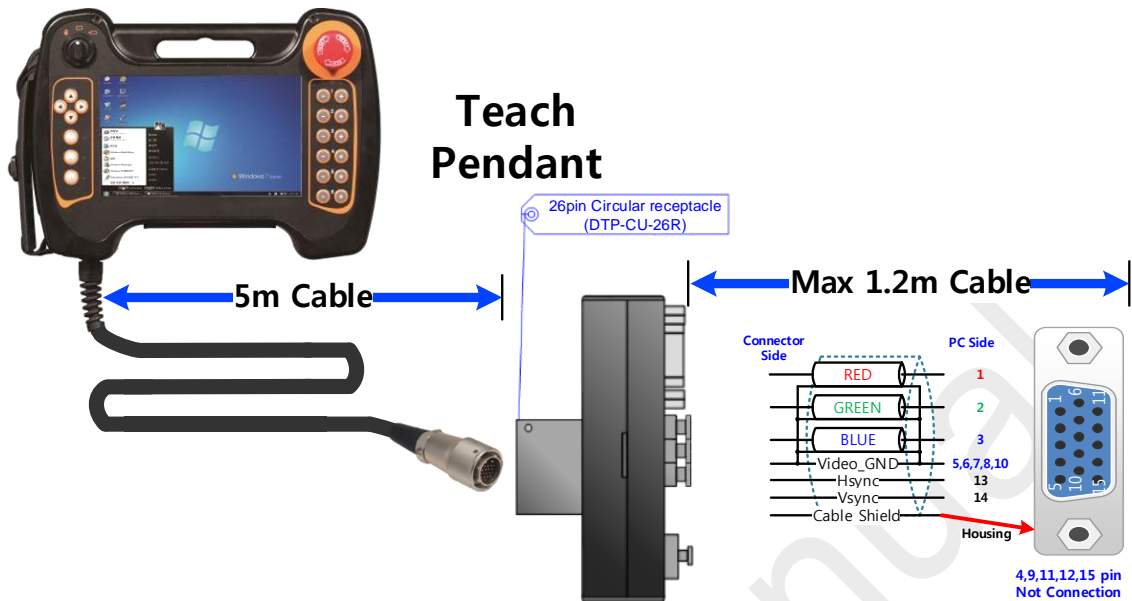
[Figure 9-1] Power and Noise Reduction Installation Example

Please connect the power supply supplied to the teach pendant so that a clean power supply separated from the power supply of the driving unit with high noise is supplied as shown in the figure.

⚠ If the supplied power supply is seriously noisy, noise may flow into the video line with cables, causing distortion, flickering, inclination, etc. of the screen.

9.2. VGA connect

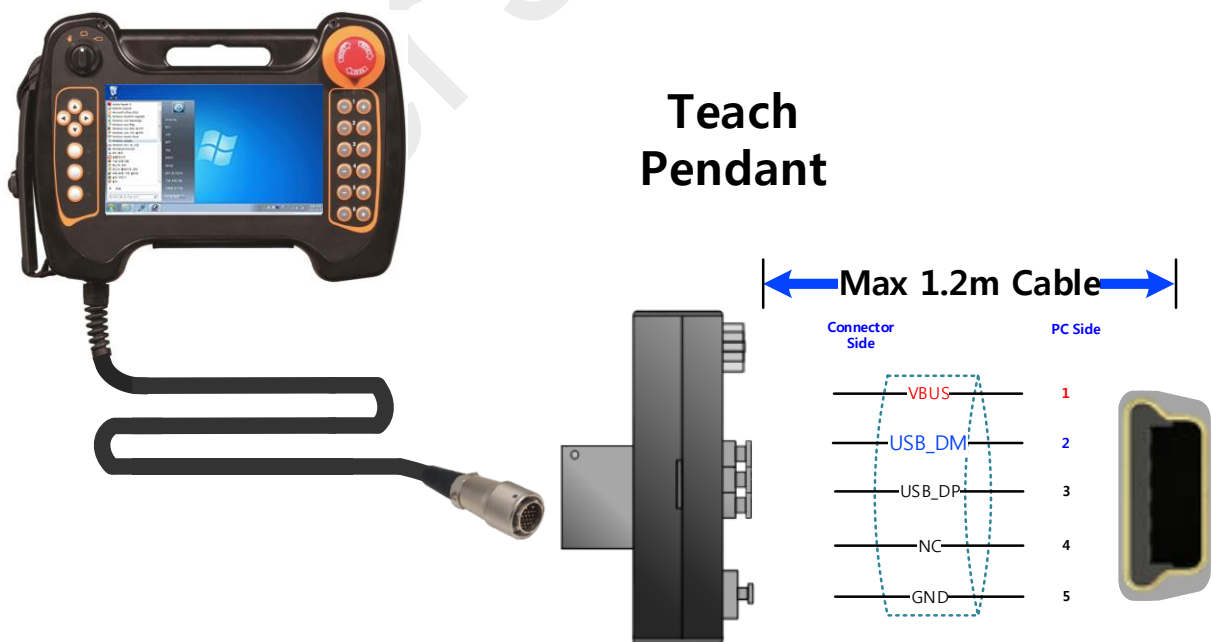
After turning off the main power supply, connect the system cable of DTP7H-D. Connect RGB cable to junction box and PC.



[Figure 9-2] VGA connection Example

- For VGA connection, please use standard video cable to connect.
- Using HDMI to VGA, you must use a cable that supports EDID.
- When connecting, connect each shielded wire of the analog video to the video ground and connect it to the VGA connector 5, 6, 7, 8, 10 pin as shown.
- The teach pendant shield must be connected to the VGA connector (housing) body.
- It is recommended to wire within 6.2m of cable length.

9.3. USB Cable (Touch, Key) connection



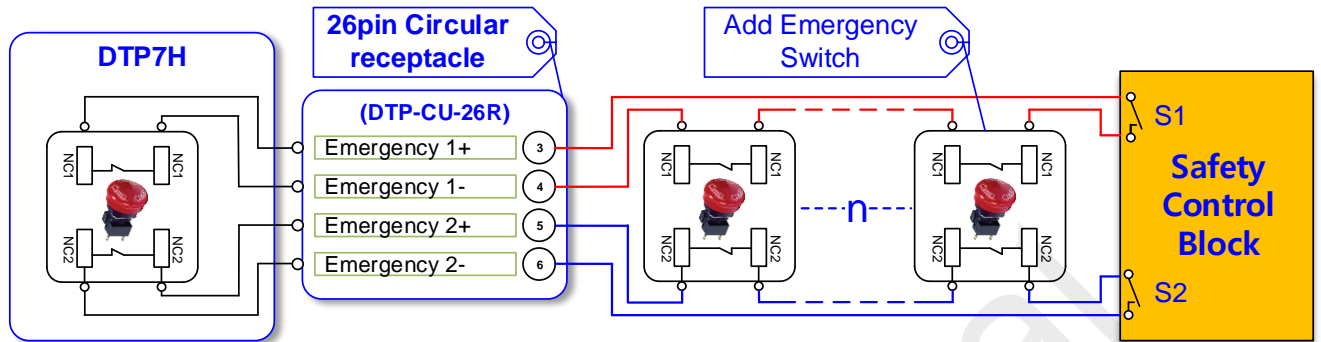
[Figure 9-3] Example of USB cable connection

- Wire the cable length up to 1.2m.

9.4. Wiring

9.4.1. Emergency stop switch wiring

The emergency stop switch applied to DTP7H-D has a redundant structure. Emergency stop switch is B contact type.

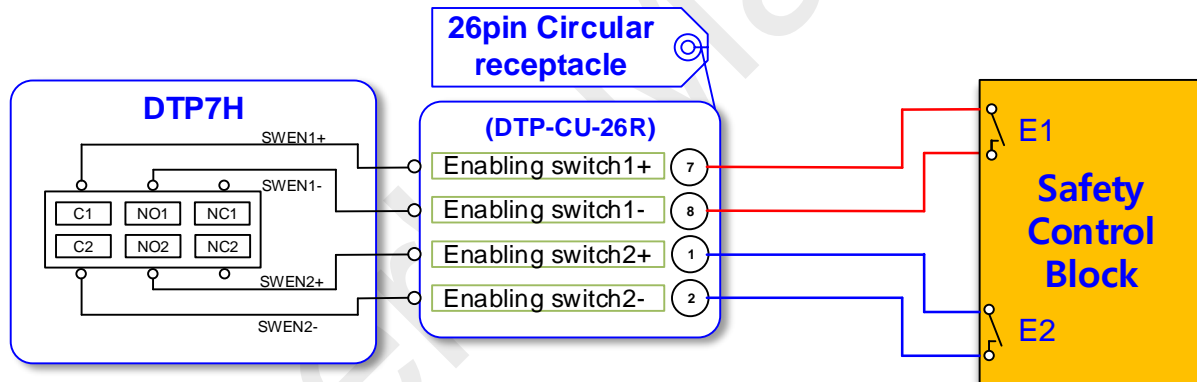


[Figure 9-4] Emergency switch wiring example

As shown in the figure, connect it serially to the safety control block.

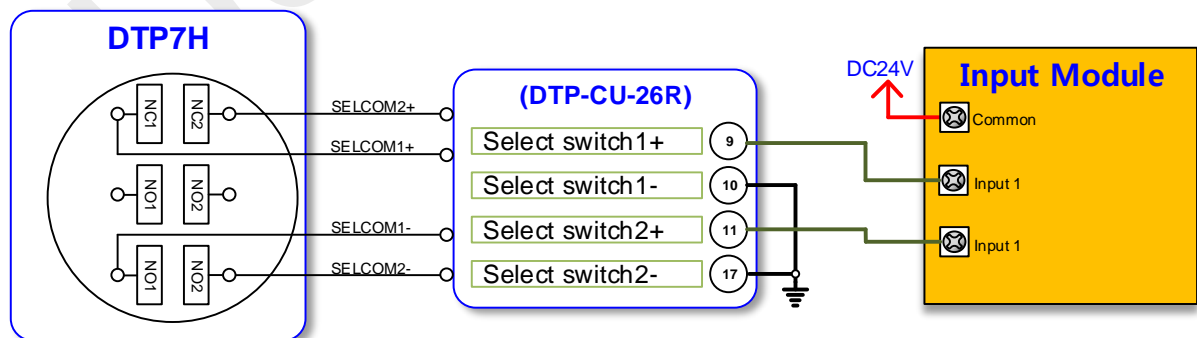
9.4.2. Enabling switch wiring

The enabling switch applied to DTP7H-D has a redundant structure. The enabling switch is a contact direct connection structure.



[Figure 9-5] Enabling switch wiring example

9.4.3. Select switch wiring



[Figure 9-6] Select switch wiring example

9.4.4. Power

- The power supply is DC24V. Voltage regulation should be within $\pm 5\%$.
- Power lines are twisted as densely as possible, and should be connected as short as possible.
- If Noise is more or larger, use an isolation transformer or Noise Filter.
- (If noise is severe, use an isolation transformer or noise filter.)
- Power-line should be used the thickest (2mm or more). So that no voltage fluctuations.
- Separate the motor wiring and the DC power and signal line wiring as far as possible. Please drop as possible over 100mm.
- Please wire the DC24V power line separately from the motor line.
- Lightning-proof Surge absorber should be used to safety from such as lightning strikes and surges. Install the surge protector.



[Figure 9-7] Surge absorber

Note: Surge absorber should be selected to allow the voltage is higher than the maximum input voltage.

9.4.5. Method wiring

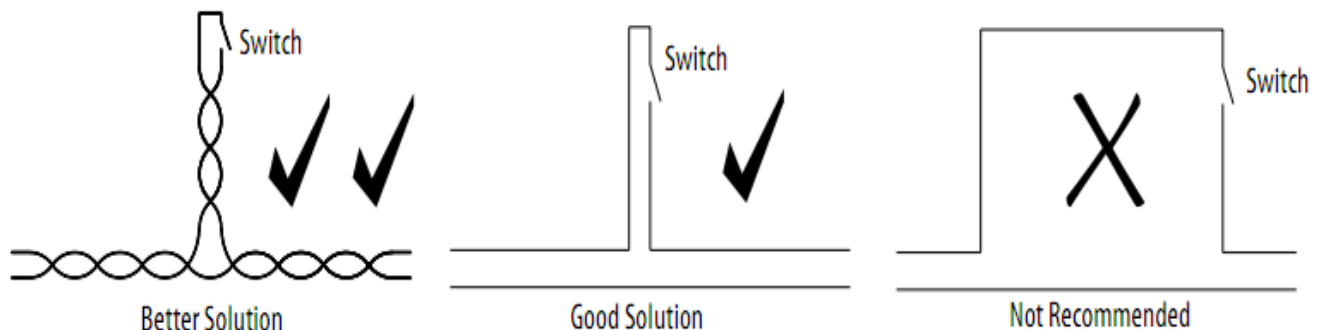
- (1) Signal and communication cables is placing a high-voltage cable or power line over a distance of 10cm, please not affected by the noise and magnetic field
- (2) If possible use separate ducts for power cables and control lines.
- (3) All cable should be the Shield cable.



Note

According to the NFPA79 approved by the United States, when the shielded wire is not used for wiring between a servo amplifier and a servo motor, the wiring must be insulated from wiring of other control or signal circuits.
(Example: 100 mm or more for 20 A or less)

(4) Minimizing the loops

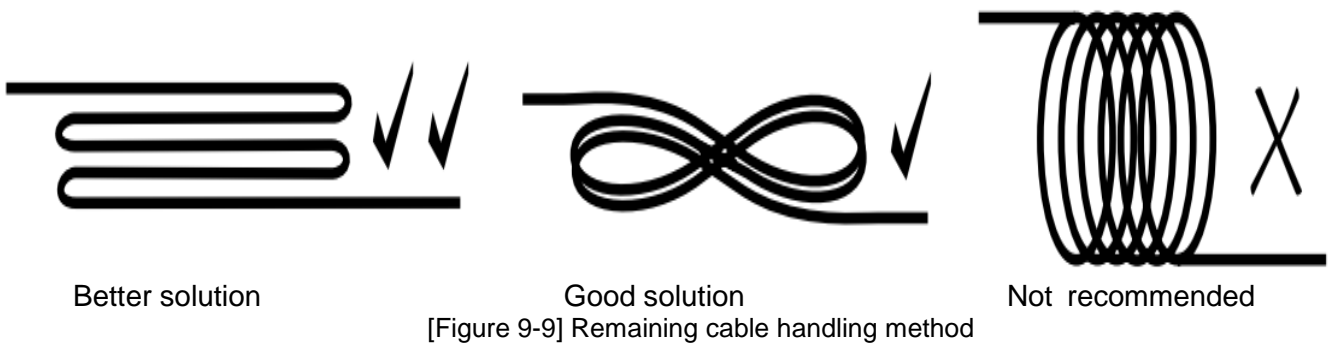


[Figure 9-8] Avoiding loops in wiring designs



Note: This applies to victim wiring too. Antennae work equally well in receive and transmit modes.

(5) Excess cable

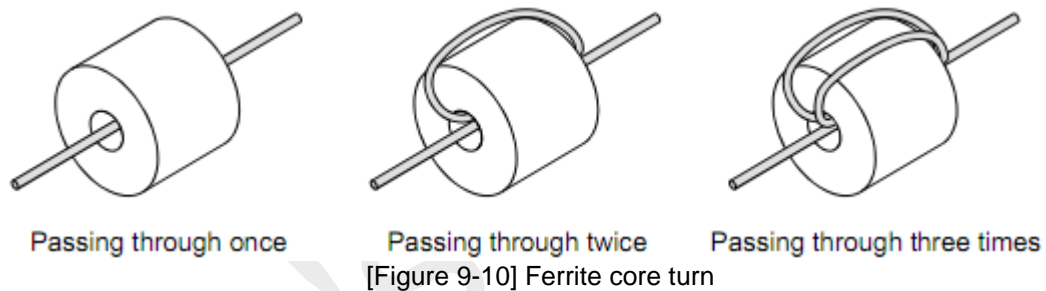


(6) Cabling instructions:

- Do not coil excess cable of different types (for example, motor power and feedback) together. An efficient transformer is formed at HF.
- Cable lengths should ideally be trimmed to fit the application.
- If excess cable cannot be trimmed, it should be laid in an 'S' or figure eight pattern (refer to the figure below).

(7) Ferrite core

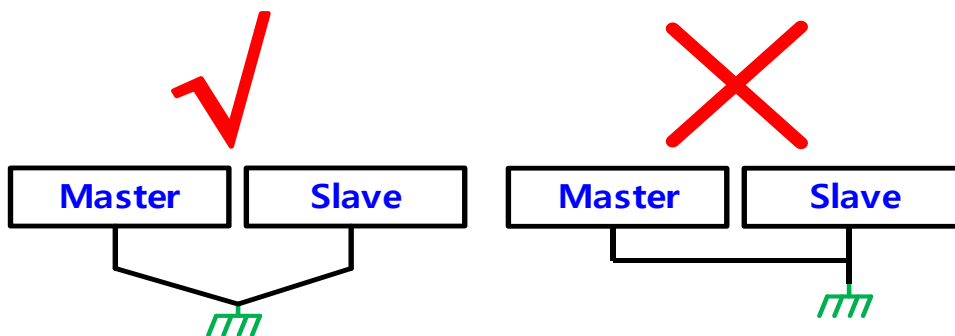
Ferrite core turn



Note: Using ferrite cores, increase the maximum number of turns around the ferrite for optimum results.

9.4.6. Earthing

- The F.G pin in a circle Connector must be wired to the F.G terminal of the SMPS.
- Earth pin on LAN1 and LAN2 is a signal Shield.
- Earth wire should be used more than 2 mm.
- The length of the ground line is as short as possible.
- AC Power Earth and control system Ground are must be isolated.



[Figure 9-11] Earth wiring methods

10. Package

10.1. Packing list

DTP7H-D purchase the package configuration is shown below.

■ Basic parts

Item	Photo	Description	Quantity
DTP7H-D		Basic configuration ✓ System cable : 5m ✓ USB to Mini USB cable (Touch, Key) ✓ VGA	1
System Cable DTP7-CU-26P- ***M 1.5M 3M 5M cn		Length option : 1.5 ~ 5m Connector option :  26pin connector  Raw Cable	1
Development CD DTP7H-D		*Option	1
Junction Box DTPH-CUE-JB		Ivory color or Dark black Random Color	1

■ Option and accessories Parts

Item	photo	Description	Quantity
Emergency switch cap DTP7-CAP-EMG		*Option	1
Select switch cap DTP7-CAP-SEL		*Option	1
VGA Cable		*Option	-
DTP7-holder		*Option	1
DTP7- Wall Bracket		*Option	1

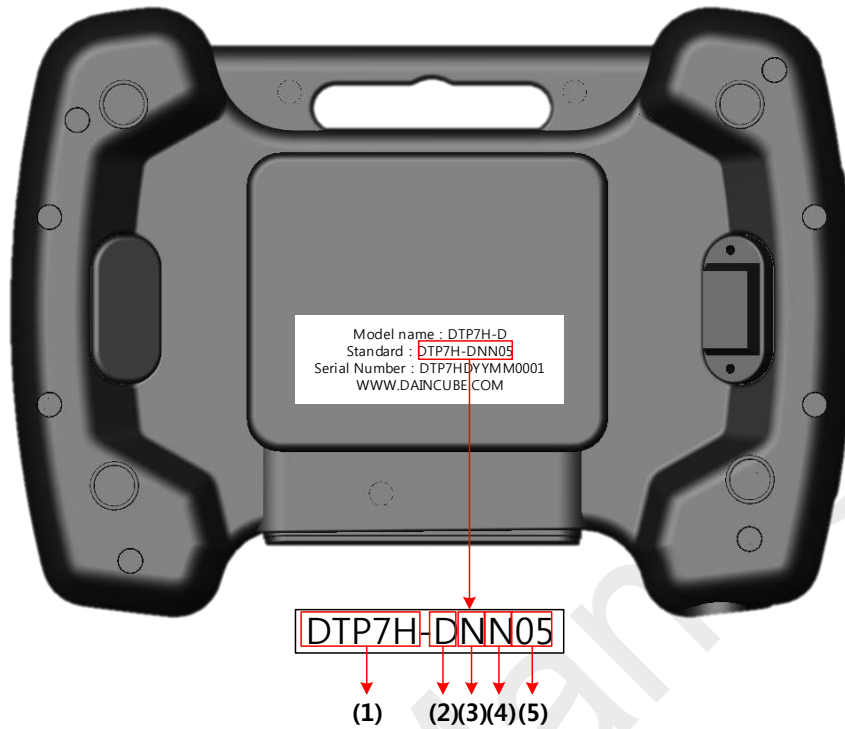
[Table 10-1] Packing list

 **Note:** Please make sure there are no missing parts of the items listed in the checklist above

 **Note:** Available for individual purchase by package

10.2. Packing & label

10.2.1. Label

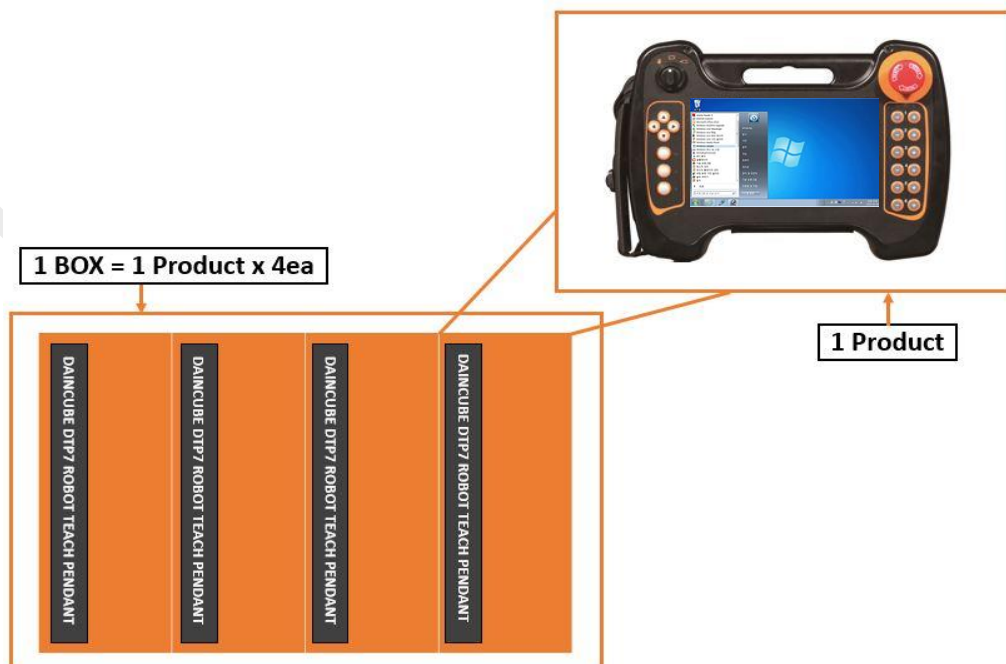


[Figure 10-1] Labeling position

(1) Model name	(2) Item	(3) O/S	(4) Communication	(5) Cable length
◆ DTP7H-D(Display)	◆ D(Display)	◆ N(None)	◆ N(None)	◆ 01(1.5M) ◆ 03(3M) ◆ 05(5M) ◆ CN(Optional)

[Table 10-2] Labeling rules

10.2.2. Packing product: 1Box = 1Product x 4ea



[Figure 10-2] Carton box

11. General care and maintenance

Your device is a product of superior design and craftsmanship and should be treated with care.



The following suggestions will help you.

- Keep the device dry. Precipitation, humidity, and all types of liquids or moisture can contain minerals that will corrode electronic circuits. If your device does get wet, allow it to dry completely.
- Do not use or store the device in dusty, dirty areas. Its moving parts and electronic components can be damaged.
- Do not store the device in hot areas. High temperatures can shorten the life of electronic devices, damage cable, and warp or melt certain plastics.
- Do not store the device in cold areas. When the device returns to its normal temperature, moisture can form inside the device and damage electronic circuit boards.
- Do not attempt to open the device.
- Do not drop, knock, or shake the device. Rough handling can break internal circuit boards and fine mechanics.
- Do not paint the device. Paint can clog the moving parts and prevent proper operation.
- Unauthorized modifications or attachments could damage the device and may violate regulations governing radio devices.

11.1. Cleaning

To clean the pendant, use a soft cloth dampened with a small amount of water or a mild cleaning agent.

12. EC directives and standards

The list of safety standards on the robot. This section does not cover the safety design methods and safety equipment installation.

12.1. EC directives

2006/42/EC Directive for the safety of machinery with the application MD 2006/42/EC

2004/108/EC EMC directive

2011/65/EC RoHS directive

12.2. Standards

EN ISO 12100: Safety of machinery - General principles for design – Risk assessment and risk reduction

EN ISO 13849-1: Safety of machinery, safety related parts of control systems

-Part 1: General principles for design

EN ISO 13850: Safety of machinery - Emergency stop - Principles for design

EN ISO 10218-1: Robots for industrial environments - Safety requirements -Part1 Robot

EN ISO 9787: Robots and robotic devices -- Coordinate systems and motion nomenclatures

EN ISO 9283: Manipulating industrial robots, performance criteria, and related test methods

EN ISO 13732-1: Ergonomics of the thermal environment - Part 1

EN 61000-6-4(2007+A1:2011): Terminal disturbance voltage, Radiated disturbance

EN 61000-3-2:2014: Harmonic Distortion

EN 61000-3-3:2013: Voltage fluctuations & flicker

EN 61000-6-2:2005: Include below test types

EN 61000-4-2:2009: Electrostatic discharge

EN 61000-4-3:2006 +A1:2008+A2:2010: Radiated, radio-frequency, electromagnetic field
 EN 61000-4-4:2004 +A1:2010: Electrical fast transient / burst
 EN 61000-4-5:2006: Surge
 EN 61000-4-6:2009: Conducted disturbances, induced by radio-frequency fields
 EN 61000-4-8:2010: Power frequency magnetic field
 EN 61000-4-11:2004: Voltage dips, short interruptions and voltage variations

Korea Standard

KN 61000-6-3 : Conducted tests (mains port), electromagnetic conduction test (communication ports)
 KN 14-1 : Discontinuous disturbance test
 KN 61000-6-3 : Electromagnetic radiation test
 KN 61000-6-1, KN 61000-4-2: Electrostatic discharge immunity test
 KN 61000-6-1, KN 61000-4-3: Radiated RF electromagnetic field immunity test
 KN 61000-6-1, KN 61000-4-4: EFT/Burst immunity test
 KN 61000-6-1, KN 61000-4-5: Surge immunity test
 KN 61000-6-1, KN 61000-4-6: Conducted immunity test
 KN 61000-6-1, KN 61000-4-8: Power frequency magnetic field immunity test
 KN 61000-6-1, KN 61000-4-11: Voltage drop and momentary power failure immunity test

13. Reference list

Please refer to the documents below for more details.

- Mitsubishi -EMC Installation Guidelines for General-Purpose AC Servo.
- YASKAWA: AC Servo Drive Technical Manual
- LS Industrial Systems: AC Servo Drive user's Manual
- Control Techniques: Motor Drives Installer's Guide.
- DELTA: EMC Standard Installation Guide for AC Motor Drives.
- Electrical design method considering EMC
- Rockwell Automation : Servo Drive Installation



Check the local regulations for disposal of electronic products.

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste.

Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment.

The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.



We hereby declare that the product is in compliance with the essential requirements and other relevant provisions of European Directive 2014/30/EC (The Electromagnetic Compatibility Directive).



We hereby declare that the product is in compliance with the essential requirements and other relevant provisions of Korea Directive (EMC standards)

Standard: Information Communication equipment such notice with regard to the assignment and management of the laboratory