

EMP Series
Teaching Pendant
With Linux Embedded Touchscreen

EMP

Model: EMP-W207A7-0024-207

Instruction Manual

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1. Introduction

Thank you for choosing DMC products.

Please read this manual carefully and use our product correctly.

This manual describes the teaching pendant equipped with 7" LCD and analog resistive touchscreen.

In this manual, the teaching pendant will be referred to as EMP.

2. Notes

- Reproduction and/or duplication of this product and/or this manual, in any form, in whole or in part, without permission is strictly prohibited.
- Contents of this product and/or this manual are subject to change without prior notice.
- Although all efforts have been made to ensure the accuracy of this product and/or the contents in this manual, should you notice any errors or have any questions, please contact and notify us.
- DMC shall not be held liable in any way for damages or losses, nor be held responsible for any claims by a third party as a result of using this product.

3. Precautions for Safe Use

Precautions are noted in this manual for the product to be used safely. Read this manual along with other related manuals carefully to understand the correct handling and functions of the EMP.

Safety Symbol Legends

Safety symbols listed below are noted throughout this manual for the EMP to be used correctly. These symbols stand for important safety information as noted below.

 Warning	Indicates a procedure, condition, or statement that, if not strictly observed, could result in severe human injuries or loss of life.
 Caution	Indicates a procedure, condition, or statement that, if not strictly observed, could result in human injuries or property damage.
	Indicates a procedure, condition, or statement that is strictly prohibited for correct use of the equipment. (Forbidden)
	Indicates a procedure, condition, or statement that must be strictly followed for correct use of the equipment. (Mandatory)

3-1 Warnings



Warnings for Design

- ⊘ Designing switches that might cause human injuries and/or property damages on the touchscreen is strictly prohibited.
Unintentional output signals due to malfunction of the main body, units, and/or cables, etc. can cause serious injuries. Please design the system so that switches with major functions are equipped on device other than the EMP.
- ⊘ Designing equipment safety related switches on the touchscreen is prohibited
For safety related switches, such as emergency stop switches, use a hardware switch from a different system.
- ❗ Design the system so that the machine will not malfunction due to communication abnormalities between the EMP and the host controller.
Failure to do so may result in injuries to the human body or property damages.
- ⊘ Do not use EMP as a major warning system that may cause injuries/ serious property damages, and or production stoppage. Control devices related to critical warning displays and warnings should be structured by an independent, redundant hardware system or a mechanical interlock.
- ⊘ EMP is not intended for use for aircraft equipment, aerospace instruments, trunk line communication equipment, nuclear power control equipment, and medical equipment that concerns life support, and or other equipment that concerns high reliability and safety. It cannot be used for these purposes.
- ❗ When using the EMP for purposes that concern high reliability and safety functions and accuracy such as transport equipment (trains, automobiles, ship, etc.), crime/disaster prevention devices, various safety devices, and medical equipment that does not concern life support, be sure to have safety features including redundancy and false operation prevention measures incorporated into the entire system.
- ⊘ Display will black out when the backlight goes out. If mistakenly operated in this condition, it might result in improper operation. Do not design touch-switches that might cause human injuries and property damages on the EMP.
Following phenomenon as below will occur when the backlights go out:
(1) Display will go out even if the Backlight OFF function is not set.
(2) Display does not recover at touch after the backlight goes off while the Backlight OFF function is set.

Warnings for Handling

- ⊘ Do not modify/disassemble the EMP. Doing so may cause fire and/or electric shocks.
- ⊘ Do not use around flammable gas. Doing so may cause explosions.
- ⊘ Do not put any kind of liquid, such as water, or metal into the product. Doing so may cause fire and/or electric shocks.

Warnings for Wiring

- ❗ For wiring and installation, please refer to the manual and specifications in order to conduct it correctly. Failure to do so may cause fires and/or electric shocks.
- ❗ Before installing the power cable, make sure power is not being supplied from power source. Failure to do so may cause electrical shocks.
- ⊘ Do not use power voltage other than the voltage specified. Doing so may cause fire and/or electric shocks.

Warnings for When Turning the Power ON and During Maintenance

- ⊘ Do not connect/disconnect the communication cable with the host while the power is ON.

3-2 Cautions



Cautions for Installation

- ❗ Make sure cables are securely connected to connectors to avoid incorrect input and output due to loose connection.

Cautions for Wiring

- ❗ Make sure foreign objects such as chips and scraps do not enter the EMP. Failure to do so may cause fires, damages, and/or malfunctions.

Cautions for Disposal

- ❗ When disposing the product, please treat it as industrial waste.

To Avoid Malfunctions

- ⊘ Do not press down hard on the display area of the EMP with hard objects. Doing so may break the touchscreen LCD panel and may cause injuries. Also, do not press down on the panel with sharp objects such as mechanical pencils and drivers. Doing so may cause damages.
- ⊘ Installing the EMP in areas outside the range of the specified temperature may cause failures.
- ⊘ Avoid using in areas where temperature may build up rapidly. Failure to do so may cause failures.
- ⊘ Avoid using in areas where rapid temperature change could cause condensation. Failure to do so may cause failures.
- ⊘ Do not put water, any kind of liquid, and conductive objects such as metal parts, inside the EMP. Doing so may cause failures or electric shocks.
- ⊘ Do not use or keep EMP in locations with exposure to direct sunlight, high temperatures, fine particles, humidity, and /or vibration.
- ⊘ Avoid using and storing in areas where chemicals are vaporized and emanating in the air, or in places where chemicals can adhere to the product.
 - Acids, Alkalis, and other saline chemicals: May cause failures due to corrosion.
 - Organic solvents: May cause fires.
- ⊘ If the surface of EMP gets dirty, wipe with a dry, soft cloth dampened with a neutral detergent then wrung dry. Do not wipe with thinner or organic solvents.
- ⊘ The liquid crystal in the display will deteriorate by ultraviolet rays. Do not use or keep in areas with strong ultraviolet rays.
- ❗ When stored in sub-ambient storage temperature, the liquid crystal in the display may coagulate and damage the panel. If stored in over-ambient storage temperature, the liquid crystal will turn isotropic liquid and will not turn back to its original state. Please store in the specified ambient temperature range.
- ❗ After turning off the power of EMP, leave it off for a while before turning the power back on. It may not function normally if failed to do so.
- ❗ Be sure to take back-up of the data in the EMP assuming the loss of data in an event of an unexpected accident.

3-3 Handling of LCD Panels

- 1) The LCD contains skin-irritating materials. If liquid materials flow or spill out due to damages and comes in contact with the skin, immediately wash the area under running water for at least 15 minutes and consult a physician.
- 2) The LCD might have uneven brightness according to the contents being displayed. Please note that this is not a malfunction.
- 3) Minute spots (black or bright) may occur in the LCD elements. Please note that this is a basic characteristic of LCD and not a malfunction.
- 4) When the display of the LCD is viewed from outside the specified viewing angle, the displayed color might seem different. Please note that this a basic characteristic of the LCD.
- 5) When a same image is displayed for a long period of time, it may remain as an afterimage. Please note that this is a basic characteristic of the LCD.

To avoid afterimages, follow the below procedures:

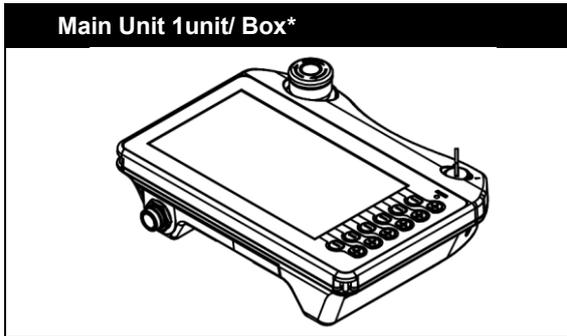
1. When leaving the same image displayed, use the "Display OFF" function.
2. Change the image displayed periodically and do not display the same image for a long period of time.

3-4 Handling of Touchscreens

- 1) Please be warned that applications that require for one point to be pressed for a prolonged time may cause failures due to the touchscreen s structural characteristics.
- 2) The touchscreen is made of glass. Glass breaks easily if scratched. Please handle with care and avoid glass from coming in contact each other and hard objects.
- 3) Due to the characteristics of the touchscreen, touching slightly outside the display area may be detected as the coordinates of the edge of the touchscreen. Please consider the above when designing the application.
- 4) Touchscreen coordinates may shift due to aging or depending on its operating environment. If the touchscreen coordinate shifts, conduct calibration of the touchscreen to correctly set the coordinates.
- 5) Please be careful when handling the glass. The glasses are not chamfered and can easily cause injuries.

4. Packaged Contents

Below are included in the package. Please check before use.

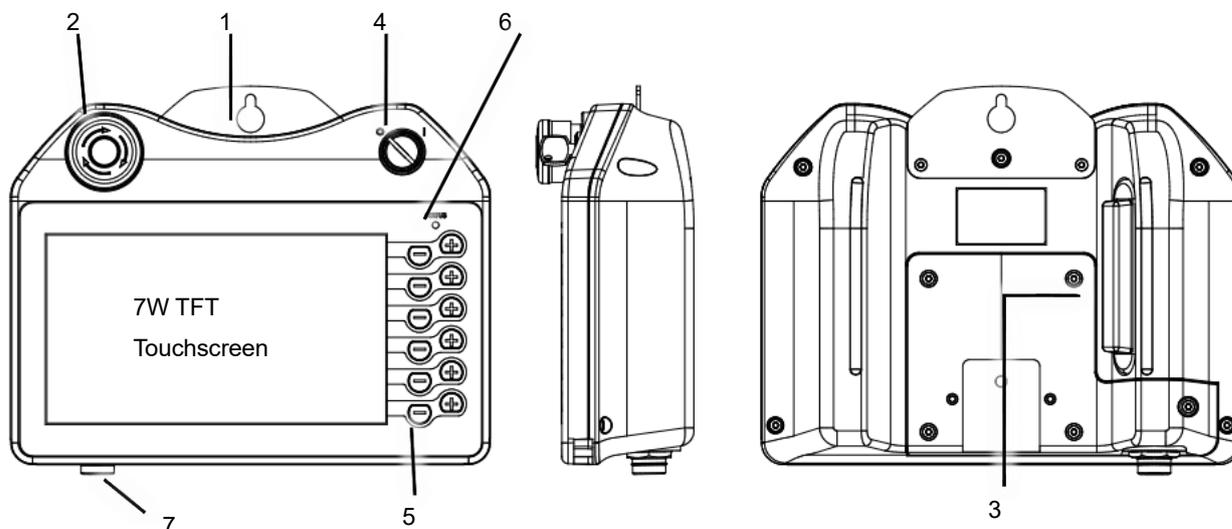


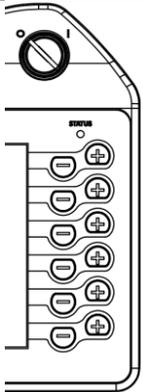
*Maximum number of units that could be stored: 1unit

<Note>

Although all efforts have been made to ensure the quality and packaging at shipment, should you notice any damage or shortage of parts, please contact your dealer or DMC for additional instructions before use.

5. Name of Parts



No	Name	Contents
1	Hole for hooks to hang on walls*1	Bracket for temporarily hanging the EMP on walls
2	Emergency Stop Switch	Emergency Stop Switch Contact Output <ul style="list-style-type: none"> Device side output Form B contact x 2 Internal use *2 Form B contact x 1
3	Enable Switch	Enable Switch 3 position type switch: not pressed (released), pressed to the middle position, pressed completely (closed). Contact output <ul style="list-style-type: none"> Device side output 3 position contact x 2 Internal use*2 Recovery monitor contact x 1, Push-in monitor contact x 1
4	Selector Switch	MODE Changing Switch Contact Output <ul style="list-style-type: none"> Device side output Form B contact x 2 Internal use *2 Form C contact x 1
5	Membrane Sheet Key Switch 12 points	 <p>Key layout</p> <ul style="list-style-type: none"> ⑫F12 ⑪F11 ⑩F10 ⑨F9 ⑧F8 ⑦F7 ⑥F6 ⑤F5 ④F4 ③F3 ②F2 ①F1 <p>Recognized as function keys F1~F12*2</p>
6	Status LED*3	LED Status color: 2 (Red, Green)
7	External Interface (Power/ communication/ contact output I/F)	Interface to connect power (24VDC), communication (ethernet), and contact output

*1: Please do not operate or wire the EMP hung on a wall. Doing so may cause the EMP to drop and cause injury or damage to the equipment.

*2: Can be detected by software. Please read the software manual for details

*3: Can be controlled by software. Please read the software manual for details.

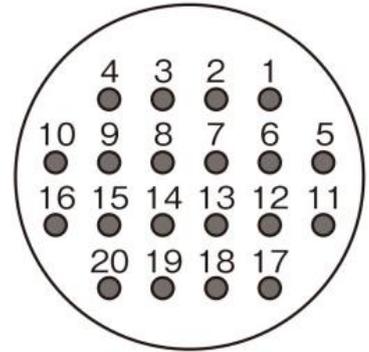
6. External Interface

6-1 Power/ Communication/ Contact Output I/F

Round Connector: HR22-12WTRA-20pc (73) (by HRS)

Contact: Gold plated

Pin No	Signal	Remarks
1	LAN_RXD+	Ethernet
2	LAN_RXD-	
3	LAN_TXD+	
4	LAN_TXD-	
5	NC	Not connected
6	S_NC1	Selector contact 1
7	S_C1	(Form B contact)
8	S_NC2	Selector contact 2
9	S_C2	(Form B contact)
10	NC	Not connected
11	A_NC1	Emergency stop contact 1
12	A_C1	(Form B contact)
13	A_NC2	Emergency stop contact 2
14	A_C2	(Form B contact)
15	E_NO1	Enable contact 1
16	E_C1	(Form A contact)
17	DC24V-(GND)	DC24V Power
18	DC24V+	
19	E_NO2	Enable contact 2
20	E_C2	(Form A contact)



Round connector pin number

6-1-1 Emergency Stop Switch Output

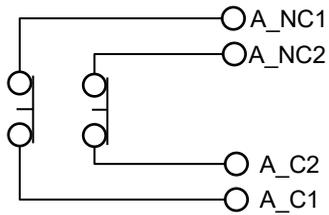
Contact	Signal	Details
Emergency Stop Contact 1	A_NC1	Form B contact Contact rating: 1A/DC30V (Resistive load), 1A/DC30V (Inductive load) (Reference value Minimum applicable load DC5V 1mA)
	A_C1	
Emergency Stop Contact 2	A_NC2	Form B contact 1A/DC30V (Resistive load), 1A/DC30V (Inductive load) (Reference value Minimum applicable load DC5V 1mA)
	A_C2	

Activating the emergency stop switch will contact output.

To deactivate the emergency stop (lock), pull the button forward or turn in the direction of the arrow.

The conduction state of A_NC1-A_C1 and A_NC2-A_C2 when the emergency stop switch is pressed is as follows:

Contact	Signal	Deactivated	Activated
Emergency Stop Contact 1	A_NC1	Close	Open
	A_C1		
Emergency Stop Contact 2	A_NC2	Close	Open
	A_C2		



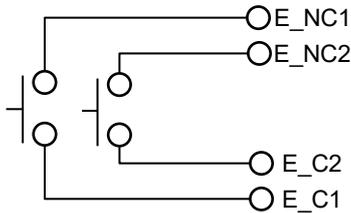
6-1-2 Enable Switch Output

Contact	Signal	Details
Enable Contact 1	E_NC1	Form A contact [3 position] Contact rating: 1A/DC30V (Resistive load), 0.7A/DC30V (Inductive load) (Reference value Minimum applicable load DC5V 1mA)
	E_C1	
Enable Contact 2	E_NC2	Form A contact [3 Position] Contact rating: 1A/DC30V (Resistive load), 0.7A/DC30V (Inductive load) (Reference value Minimum applicable load DC5V 1mA)
	E_C2	

There are three positions for the enable switch: not pressed (released), pressed to the middle, and fully pressed (fully closed).

The conduction state of E_NC1-E_C1 and E_NC2-E_C2 at each switch position are as follows:

Contact	Signal	Not pressed	Pressed to the middle	Fully pressed
Enable Contact 1	E_NC1	Open	Close	Open
	E_C1			
Enable Contact 2	E_NC2	Open	Close	Open
	E_C2			



6-1-3 Selector Switch Output

Contact	Signal	Details
Selector Contact 1	S_NC1	Form B contact
	S_C1	Contact rating: 1A/DC30V (Resistive load), 0.7A/DC30V (Inductive load) (Reference value Minimum applicable load DC5V 1mA)
Selector Contact 2	S_NC2	Form B contact
	S_C2	Contact rating: 1A/DC30V (Resistive load), 0.7A/DC30V (Inductive load) (Reference value Minimum applicable load DC5V 1mA)

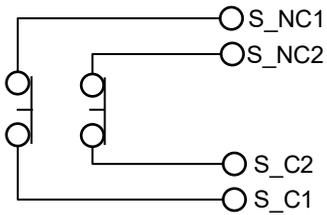
Switching the selector switch will contact output.

Selector Switch can be manually switched between 2 notches: [O(left)], [| (right)].

The conduction state of A_NC1-A_C1 and A_NC2-A_C2 when selector switch is switched are as follows:

Contact	Signal	O(left)	(right)
Selector Contact 1	S_NC1	Close	Open
	S_C1		
Selector Contact 2	S_NC2	Close	Open
	S_C2		

*Key can be pulled out from both sides.

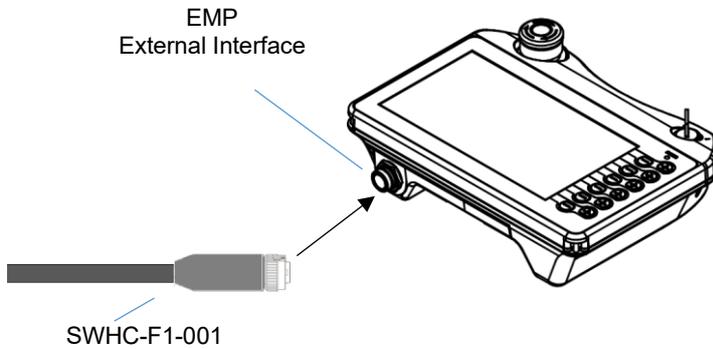


7. Wiring

7-1 EMP Connection

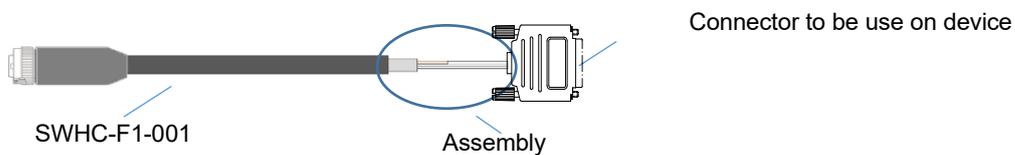
Connecting with external interface.

- Compatible connector: HR22-12WTPA-20SC (by HRS) (Contact: gold plated)
- *Option cable 'SWHC-F1-001' can be used.

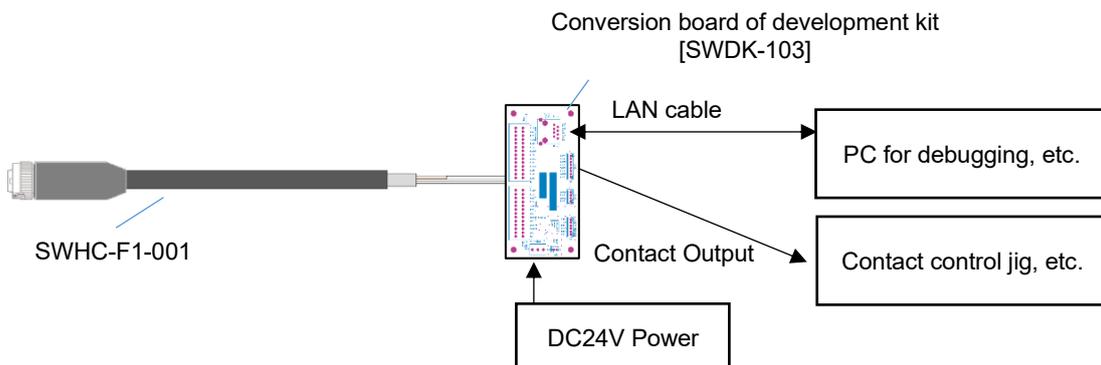


- When inserting and removing the connector, be sure to turn off the power of the circuit.
- Be sure to engage the screw lock mechanism when using the connector (Tighten the screw securely and completely).

When using the option cable, freely assemble the connector so it will suit the device to be used.



Power, communication, and contact output can be easily connected by using the conversion board included in our development kit [SWDK-103]



8. Calibration

8-1 Touchscreen Coordinate Calibration

If there is a large misalignment between the pressed location and the detected coordination, please conduct calibration.

9. Boot-up

Make sure the power wiring is complete before turning the power ON.

After the startup screen appears, the OS will start up.

10. Maintenance

10-1 Display

When the surface or the frame of the display gets dirty, wipe with a soft cloth dampened in diluted neutral detergent and wrung tightly.

-  Do not use thinner, organic solvents, or strong acid solvents

10-2 Regular Maintenance

To use the EMP in its best condition, please conduct maintenance on a regular basis.

Surrounding Environment Check

- (1) Ambient temperature is within specification range (0°C to 40°C).
- (2) Ambient humidity is within specification range (10 to 90%RH).
- (3) Operating pressure is within specification range (800 to 1114hpa).

Electronic Specification Check

- (1) Voltage is within permissible range (24VDC±20%).

Installation Check

- (1) Make sure the connection cables are inserted firmly and completely.

11. Optional Items

■Development Kit

Model	Specifications (Configuration)
SWDK-103	1 Conversion board with composite cable terminal block 1 set of IS-APP Development Environment

■Option Cable

Model	Specifications (Configuration)
SWHC-F1-001	1 Cable (length: 5m) Separated wire on HOST connection side (with semi-stripped tip)

12. Warranty and Repairs

12-1 Inquiries

In case of failures or when repair is needed for DMC products, feel free to contact us.

When making inquiries, please confirm the issue or the symptom beforehand. Also, when shipping the product, please include a fully filled "Repair Request" form with the issues or the symptoms noted.

Please make sure the product is well packaged so it will not get damaged during shipment.

12-2 Warranty

The warranty period is limited to 12 months from the date of shipment. Any defects that occur under the environmental conditions noted within the specification will be repaired free of charge (factory repair).

The warranty for defects of the same repaired area is limited to three months.

You will be liable for all repair fees even within the warranty period for any conditions listed below.

- (1) Any malfunctions and/or damages caused by dropping or impact during transportation and transferring of the product after delivery.
- (2) Any malfunctions and damages caused by natural or human-made disaster.
- (3) If the product is used under any condition, environment, or method other than those described in the product specification, catalogs, manuals, or others.
- (4) Replacement of consumables.
- (5) Any malfunctions and damages caused by failure of associated equipment and inappropriate consumables and medias.
- (6) Any malfunctions caused by science or technology that could not be predicted at the time of sales.
- (7) Other malfunctions, damages, and/or defects that is considered to be caused by the user.

The warranty covers only the delivered product and does not cover the damages caused by the failure of the product and/or on-site repairs and replacements.

12-3 Production Discontinuance

In the event of production discontinuance, an announcement will be made six months prior to the last possible order reception date

12-4 Repair Condition

- (1) Only DMC products can be repaired. Options are exempt.
- (2) Programs and data might be lost during repair. Please be sure to take back-up in advance. DMC will not be held liable for programs or data lost during repair.
- (3) Although all user information stored in our product will be handled and managed with much care, we ask that any important confidential/security information be delete before repair.
- (4) Repairs will be performed in our factory workshop. All shipping costs to our factory will be charged to the customer.
- (5) DMC will have all ownership of the parts exchanged at repair.

13. Others

For comments or inquiries, feel free to contact us via e-mail.

North South America area

✉ technical-global@dush.co.jp

Asia Pacific area

✉ technical-global-asia@dush.co.jp

Europe, Middle East, Africa area

✉ technical-global-eu@dush.co.jp

FAQ

 www.dush.co.jp/english/support/faq/

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DMC Co., Ltd.

Office hours: 9:00a.m to 5:00 p.m. (JST)

(Except Saturdays, Sundays, national holidays, and year-end and New Year holidays)

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