

Hand Gesture Unit

HG

Model: HG-RL6U2C01

Instruction Manual

DMC Co., Ltd.

<https://www.dush.co.jp/english/>

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1 Introduction

Thank you very much for purchasing DMC products.
Please read the manual carefully and use the product properly.
This manual describes Hand Gesture Unit.
In this manual, Hand Gesture Unit will be referred to as the “Unit”.

2 Notes

- Reproduction and/or duplication of this product and/or this manual, in any form, in whole or in part, without prior 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, please contact us if you find any errors or omissions or if you have any questions.
- 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 Safety Precautions

Precautions are noted in this manual in order for the product to be used safely.
Read carefully both this manual and the related documents to adequately understand the correct handling and functions of the Unit.

Safety Symbols

The following safety symbols listed below are noted throughout this manual to ensure the proper use of the Unit.

The precautions indicated stand for important safety-related 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

Warning!

Warnings for Design

- ⊘ Using this product as a switch that may cause human injuries or property damage is strictly prohibited.
Unintentional output signals due to malfunctions of the Unit, and/or cables can lead to serious accidents.
Please design the system so that switches with major operations are equipped on devices other than the Unit itself.
- ⊘ Do not use the Unit as a safety switch related to the safety of a device.
Safety-related switches such as emergency stop switches must be made on other separate hardware.
- ❗ Design the system so that a device will not be malfunctioned due to communication errors between the Unit and a host controller.
Failure to do so may result in injuries to human bodies or damages to properties.
- ⊘ Do not use the Unit for a critical warning device that may cause injuries/ serious material damages, and or production stoppage. Critical warning indications and control devices related to critical warnings should be structured on an independent and redundant hardware or a mechanical interlock.
- ⊘ The Unit is not intended for use in applications that require extremely high reliability and safety, such as aircraft equipment, aerospace equipment, trunk line communications equipment, nuclear power control equipment, and medical equipment that concerns life support.
The Unit cannot be used for these applications.
- ❗ When using the Unit for purposes that require high reliability and safety in terms of function and accuracy, such as transportation equipment (trains, automobiles, ships, 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.

Warnings for Handling

- ⊘ Do not modify/disassemble the Unit. Doing so may cause fires 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 fires and/or electric shocks.
- ❗ Prevent direct sunlight and/or ambient light including infrared rays from auto-focus cameras and other sources. Failure to do so may result in false detection.

Warnings for Wiring

- ❗ For wiring and installation, please refer to both this manual and the related documents 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 a power source. Failure to do so may cause electrical shocks
- ⊘ Do not use power voltage other than the specified voltage. Doing so may cause fires 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

Caution!

Cautions for Installation

- ❗ Make sure the connectors on both sides of the cable are securely connected to the Unit side and the host side at the same time to avoid incorrect input and output due to loose connection.
- ⊘ Make sure to prevent the Unit from falling. To avoid any injuries caused by falling it, we recommend installing it at height 2m or less.

Cautions for When Turning the Power On and During Maintenance

- ⊘ Do not turn off the power of the Unit or connect/disconnect the connection cable while writing from the set-up tool. Doing so may destroy the data in the Unit.

Cautions for Wiring

- ❗ Make sure foreign objects such as chips and scraps do not enter the Unit. 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 front of the Unit with hard objects. Doing so will damage the sensors and may result in accidents.
- ⊘ Installing the Unit in areas outside the range of the specified temperature may cause malfunctions.
- ⊘ Avoid using in areas where temperature may build up rapidly. Failure to do so may cause malfunctions.
- ⊘ Avoid using in areas where rapid temperature change could cause condensation. Failure to do so may cause malfunctions.
- ⊘ Do not put water and/or any kind of liquid, and conductive objects such as metal parts, inside the Unit. Doing so may cause failures or electric shocks.
- ⊘ Do not use or store the Unit in locations exposed 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 Unit gets dirty, a soft cloth moistened by neutral detergent diluted with water, wring it tightly and wipe the Unit. Do not wipe with thinner or organic solvents.
- ⊘ The sensor in the front of the Unit may deteriorate by ultraviolet rays. Do not use or store in areas exposed to strong ultraviolet rays.
- ⊘ The sensor in the front of the Unit may malfunction if exposed to strong light.
Avoid using in areas near strong light sources.
- ❗ Storing in areas other than the specified ambient storing temperature may cause sensor failure. Please store within the specified temperature range.
- ❗ After turning off the power of the Unit, leave it off for a while before turning the power back on. It may not operate normally if failed to do so.
- ❗ Be sure to back up the Unit setting in case it is lost in an unexpected accident.

4 Packaged Contents

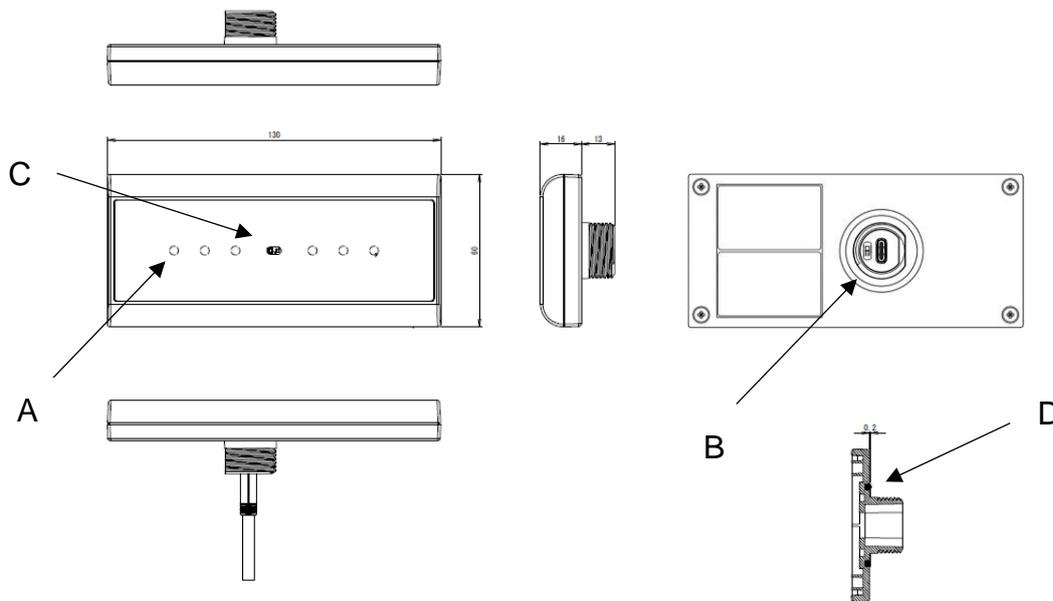
Below are included in the package. Please check before use.

Content	Specification
Unit	HG-RL6U2C01:1unit/box
Accessories	Resin nut :1 / Packing:1 (Attach to the Unit) / Product information sheet:1

<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



- A: LED lamp
- B: USB Type C Interface/ Switch
- C: Gesture Sensor
- D: Packing

6 Specification

6-1 General Specification

Items		Specifications	
Interface	USB*1	Type C (Socket) USB2.0 Full Speed Device (Connect to Host PC)	
	LED	RGB-24bit 6pcs Light up at start up, light or blink when gesture is detected (Depending on your select LED pattern).	
	Gesture Sensor*2	Detection distance	Min0cm/Max 15cm (Recommended gesture distance: 5 - 15cm)
		Detection angle	Diagonal: 60°
Switch		1	

*1 Use a USB cable with cable length of 4m or shorter

*2 Proximity gestures may not be detected due to the size of the moving object.

6-2 Power

Items		Specifications
Power	Rated Voltage	5VDC (power received from USB Host I/F)
	Voltage Tolerance	5VDC±5%
	Power Consumption*1	5VDC 500mA

*1 Conforms to the USB 2.0 standards. However, depending on the gesture sensor sensitivity setting and/or the connection environment, the power consumption may momentarily exceed. If any operation issues occur due to this exceeding, use external power, such as a USB HUB that supports self-power, for power supply.

6-3 Environment

Items	Specifications
Ambient operating temperature (Inside cabinet and front side)	0 to 55°C
Ambient storage temperature	-20 to +60°C
Ambient operating humidity	10 to 80%RH (Non-condensing. Wet-bulb temperature is 39°C or less)
Ambient storage humidity	10 to 80%RH (Non-condensing. Wet-bulb temperature is 39°C or less)
Dust	0.1mg/m ³ or under (conductive dust prohibited)
Corrosive gas	Corrosive gas prohibited
Pollution degree	Pollution Degree 2, for Indoor use
Pressure resistance (Altitude)	800 to 1114hPa (Altitude of 2000m or lower)
Vibration resistance	5 to 9Hz Single amplitude 3.5mm 9 to 150Hz Fixed acceleration 9.8m/s ² X, Y, Z each direction 10 times (100 minutes) (JIS B 3502, IEC61131-2 compliant)

6-4 Installation

Items	Specifications
Structure*1	Protective structure: JIS C0920:2003 IP65 equivalent*1 (front side of panel installation) Installation: Panel installation (fasten by nut)
Cooling	Natural cooling
Weight	App 110g (the Unit only)
External dimension	130(W) x 60(H) x 16(D) mm (Not including protrusion of fixation)
Panel cut-out dimensions	φ22.3+0.3/-0 mm (refer to panel cut-out dimension)
Mounting panel thickness	1 to 3 mm
Unit color	Black

*1 For protective structure of the front part when the Unit is installed to a panel.

Does not guarantee use in all environments.

Please check the installed environment before use.

Also, the original level of the protection cannot be guaranteed for the packing that has been used for a long time. To maintain the original protection level, be sure to replace the packing regularly.

7 Installation

7-1 Installing Conditions

Please use the product within the ambient operating temperature and humidity specified in this manual. (Ambient operating temperature refers to the temperature for both inside the cabinet and the front side.)

The detection area of the sensor is limited, so please install it in an area where it can be operated safely, such as the operator facing it.

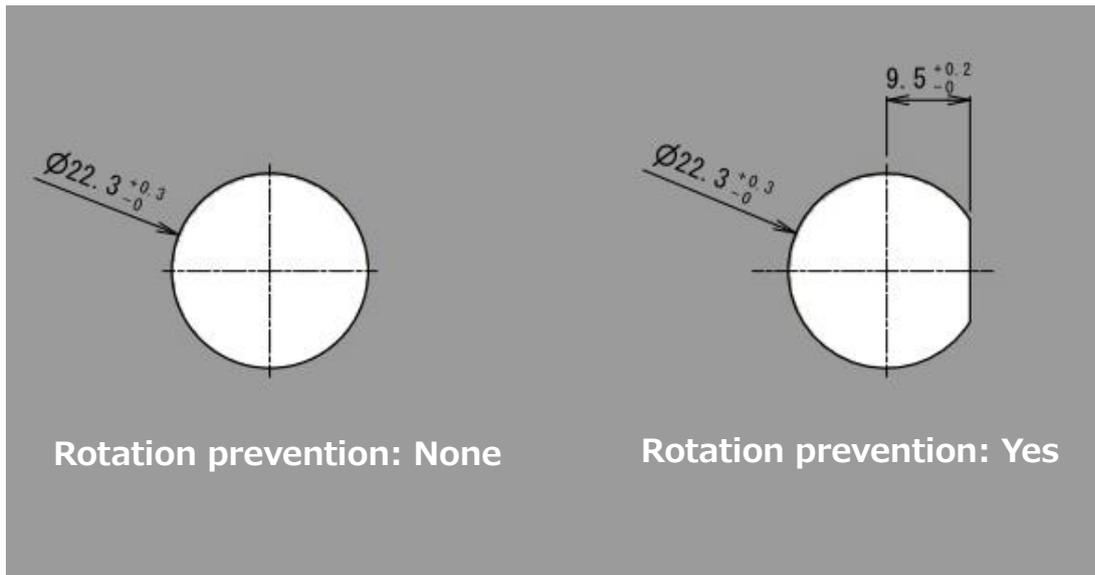
7-2 Installing Instructions

Please refer to the panel opening example and the precautions described in this manual. Also, be sure to verify and evaluate the actual product with the completed design due to the fact that the appropriate structure will vary depending on the chassis design and the factors of its operating environment.

7-2-1 Panel Opening Example

Design the chassis according to the actual installing method.

*View from the back side of the panel (nut side). (panel thickness $t=1 - 3\text{mm}$)



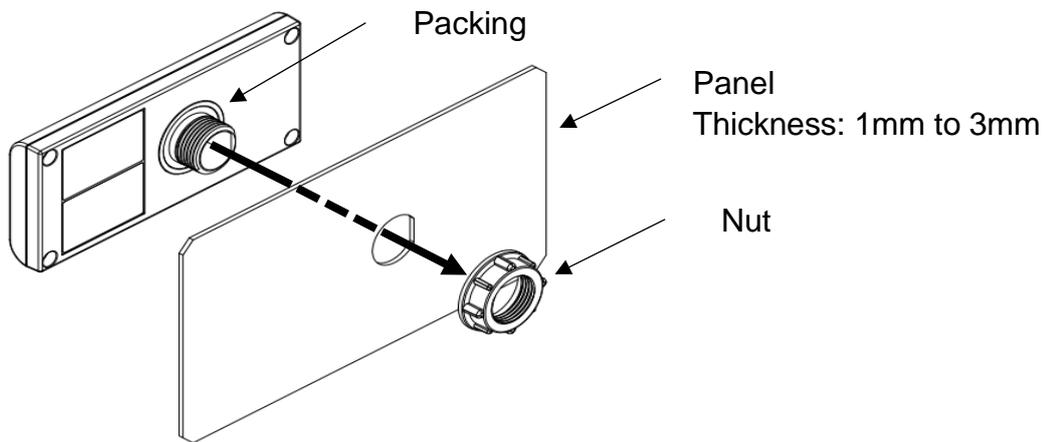
7-2-2 Installing and Wiring

Insert the Unit into the mounting hole of the panel.
Tighten the nut with torque of 1.0 N-m (8.85 lb-in).

Assembly Instructions

1. Separate the nut from the Unit.
2. Confirm that the packing is properly fitted in the groove of the Unit.
3. Insert the Unit in the hole from the front side of the mounting panel.
4. Attach the nut to the Unit from the back side of the mounting panel and tighten the nut slowly to prevent exceeding the required torque value.

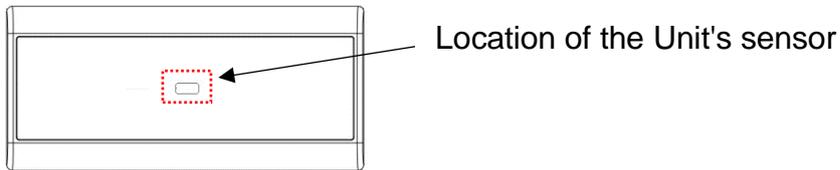
Recommended tightening torque: 1.0 N-m



8 Gesture

8-1 Gesture Sensor

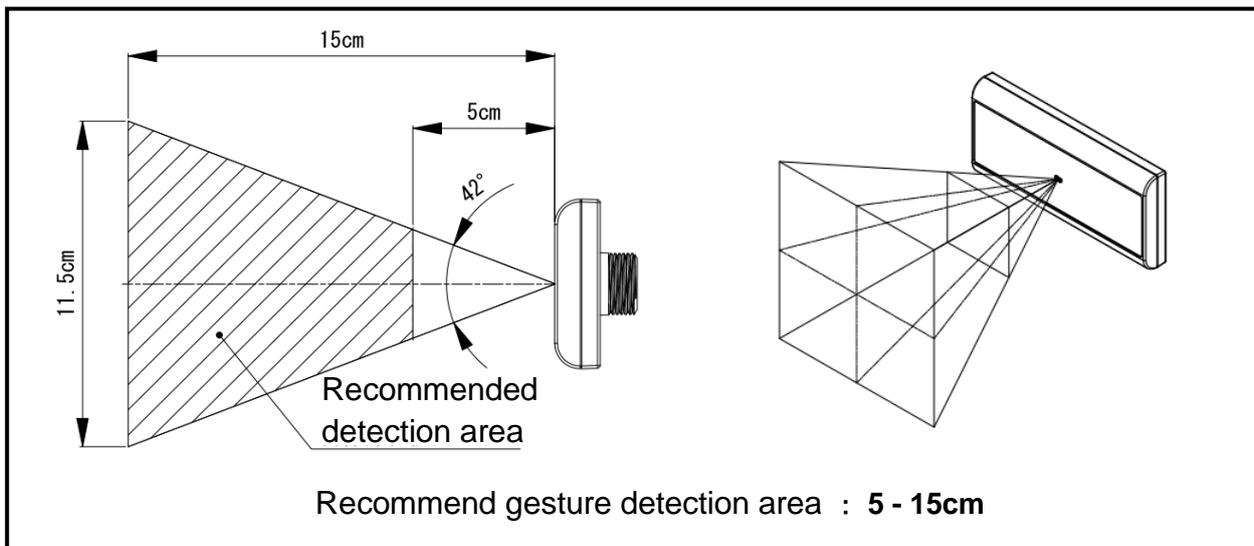
The specification of the gesture sensor is as below.



Items	Specifications
Detection Range	0 to 15 cm (Recommended gesture distance: 5 - 15cm)
Viewing Angle (Diagonal)	60degrees

Detection Area of Gesture Sensor

The area indicated by the square pyramid in the figure below is the detection area of the sensor.



Exemplary Gesture Operation

Gesture operation is the best detected with large targets, such as palms, and large movements.

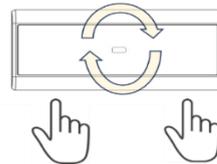
Movements such as moving the palms horizontally or vertically over the detection area of the sensor is the most suitable.

For clockwise/counterclockwise rotation movement, moving the palm of your hand in circular motion within the detection area of the sensor is the most suitable.

Left/right movement

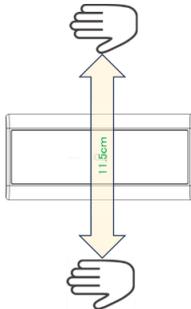


Clockwise/counterclockwise rotation movement

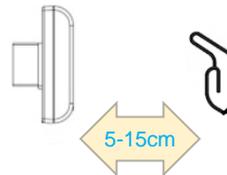


Recommend rotating finger motion within the detection area (approx. 10 cm in diameter)

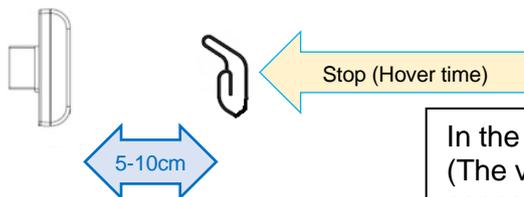
Up/down movement



Distance from the Unit (when moving/rotating)



Hovering action

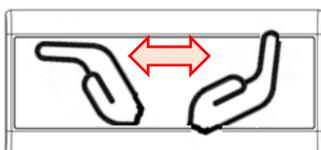


In the default setting, the stop position is about 5 cm. (The value will vary from 5 to 10 cm depending on the sensor sensitivity setting)

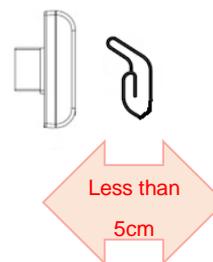
Gesture Operation Not Suitable

Small targets, such as fingers or the side of hand, and small movements will be hard to detect and are not suitable for gesture operations.

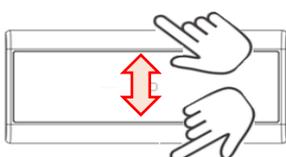
Gestures using side of hand



Distance from the Unit is too near (when moving/rotating)



Gestures using fingers.



8-2 Gestures

The types and the statuses of the hand gestures are as follows.

Gesture Type/Status	Gesture Movement	USB HID Keycode* ¹	LED Pattern	
			LED Action	Color
Up	Move hand vertically from down to up.	↑[0x52]	Spread to left and right from center.	White
Down	Move hand vertically from up to down.	↓[0x51]	Gather from left and right to center.	White
Left	Move hand horizontally from right to left.	←[0x50]	Flow from center to left.	White
Right	Move hand horizontally from left to right.	→[0x4F]	Flow from center to right.	White
Clockwise	Move hand in clockwise movement.	Ctrl+y[0x1C] ²	Flow from left to right, then back to left.	Yellow
Counterclockwise	Move hand in counterclockwise movement.	Ctrl+z[0x1D] ²	Flow from right to left, then back to right.	Yellow
Hover	Hold hand over the sensor for a specific period of time. Holding time can be changed accordingly.	Enter[0x28]	All LEDs blink.	Cian
Hovering	Hold hand over the sensor. If held for a specific period of time, the keycode registered to “Hover” will be sent.		Flow from left to right.	Cian
Waiting	Normal unlocked status. Each gesture can be detectable.		Rightmost LED blinks.	Blue
Locked	Locked status. All gestures other than those set with “Interlock” will be ignored.		Leftmost LED blinks.	Red
Detection	Hand itself was detected in standby status, but any specific gestures were not detected.		Rightmost LED lights up.	Green

[Default Setting]

*1 This is a unique ID to identify the key to be sent from the USB connected HID device to the host device. This is represented as a hexadecimal number (0x**).

*2 Ctrl·Shift·Alt will be processed as the modifier key of USB keyboard HID report.

8-3 HG Setting Tool : Setting Tool

The setting of USB HID keycode and LED pattern of each gesture type and status can be changed with HG Setting tool.

Please refer to “HG Setting Tool Instruction Manual” for details.

9 Maintenance

9-1 Maintenance

If the Unit gets dirty, a soft cloth moistened by neutral detergent diluted with water, wring it tightly and wipe the Unit.

- ⊘ Do not use thinner, organic solvents, or strong acidic solvents.

9-2 Regular Maintenance

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

Surrounding Environment Check

- 1) Ambient temperature is within specification range. (0 to 55°C)
- 2) Ambient humidity is within specification range. (10 to 80%RH)
- 3) Operating pressure is within specification range. (800 to 1114hpa)

Installation Check

- 1) The connector of the cables is inserted securely and firmly.
- 2) The resin nut of this product must be securely tightened without looseness.
- 3) The packing is free of deterioration.

10 Warranty and Repairs

10-1 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 serial number, the issues and the symptoms noted.

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

10-2 Warranty

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

The warranty for defects of the same repaired part is limited to 3 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 conditions, environments, or methods other than those described in this product manual, specification, catalogs, or others.
- (4) Replacement of consumables.

- (5) Any malfunctions and damages caused by failure of other connected equipment or inappropriate consumables and medias.
- (6) Any malfunctions caused by science or technology that could not be predicted at the time of sales.
- (7) Other malfunction, damage, and/or defect that is considered to be caused by the user.

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

10-3 Product Discontinuance

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

10-4 Repair Conditions

- (1) Only DMC products can be repaired. Options are exempt.
- (2) Programs and data might be lost during repair. Please be sure to back it 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.

11 Others

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

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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)

URL: <https://www.dush.co.jp/english/>

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