DMC
DMC Co., Ltd.

D SH

4.3" Wide (WQVGA)

Resistive Touchscreen Display

Simple Set

TK-S Series

Model:　　　TK-SRA043WQ-101

Simplified Specification

DMC Co., Ltd.

https://www.dush.co.jp/

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1 GENERAL DESCRIPTION

1-1 OVERVIEW

TK-SRA043WQ-101 is a 4.3" (4.3" diagonal) a-Si & transmissive type thin film transistor liquid crystal display (TFT-LCD) module with RGB interface. The module is composed of a TFT-LCD panel, driver circuit, backlight unit and resistive touchscreen.
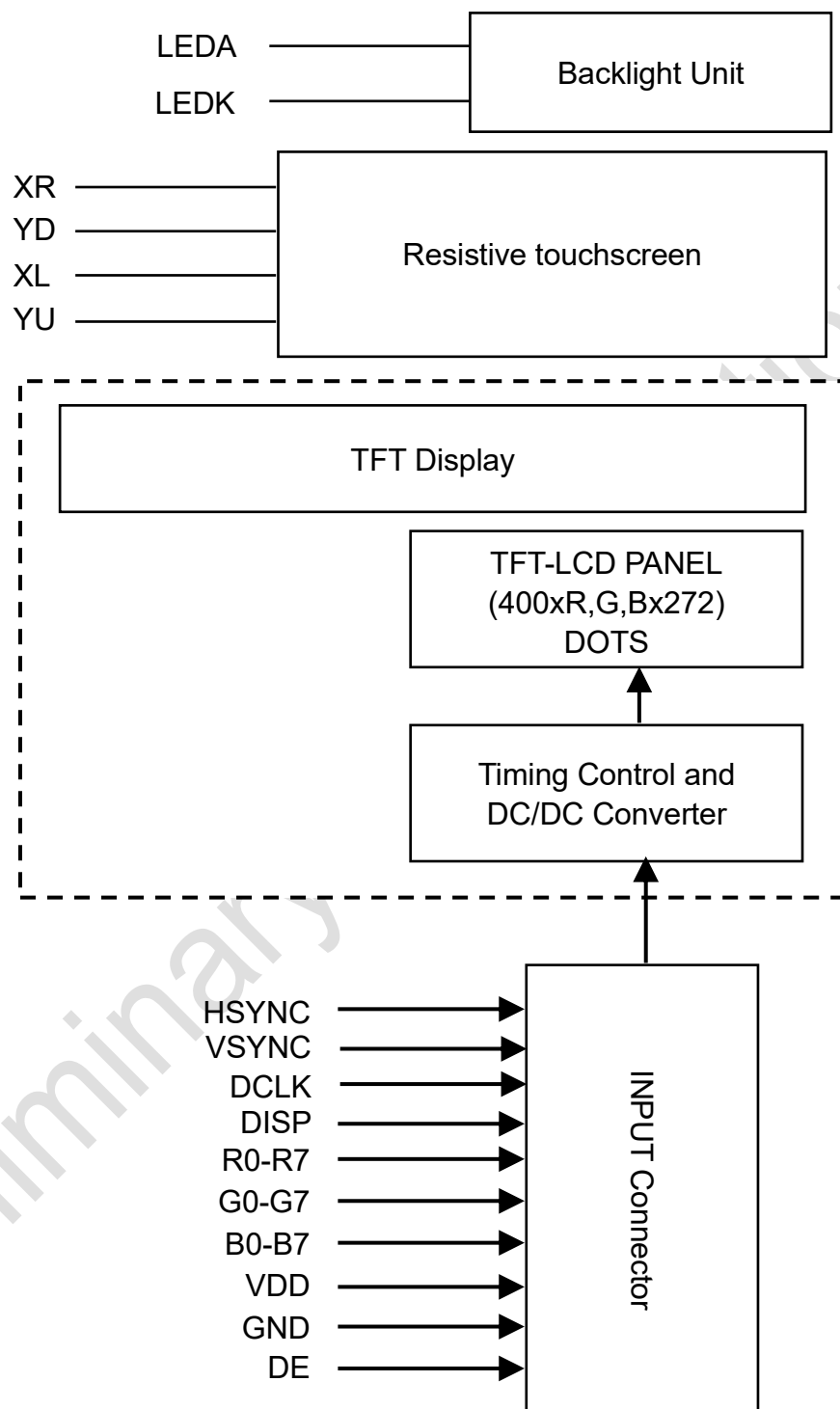
1-2 TFT LCD MODULES SPECIFICATIONS

The following items are characteristics summary on the table under 25℃ condition :

Parameter	Specifications	Unit
Screen Size	4.3(diagonal)	inch
LCD Outline Dimension	105.4 (H) x 67.1 (V) x 3.9 (D)	mm
LCD Active Area	95.04 (H) x 53.856 (V)	mm
Resolution	480 (H) x (R,G,B) x 272 (V)	
Pixel Pitch	0.198 (H) x 0.198 (V)	mm
Pixel Arrangement	R.G.B. Stripe	
Display Mode	Normally Black	
Display Colors	16.7M	
View direction	All	
Luminance, White	460 (T.B.D)	cd/m^2
LCD Interface	RGB (3.3V CMOS)	
Surface treatment	Glare	
Weight	(T.B.D)	g
RoHS Compliance	Yes	

1-3 TOUCHSCREEN SPECIFICATIONS

Parameter	Specifications	Unit
Method	Analog 4-Wire Resistive	
Touchscreen controller	Supported Controllers (Optional) TSC-54/U-L, TSC-54/RU, TSC-52/U	

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2 BLOCK DIAGRAM

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3 ABSOLUTE MAXIMUM RATINGS

3-1 ABSOLUTE RATINGS OF ENVIRONMENT

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Operating temperature	TOP	-20	70	°C	Ambient temperature
Storage temperature	TST	-30	80	°C	Ambient temperature

4 TFT LCD MODULE SPECIFICATIONS

4-1 ELECTRICAL ABSOLUTE RATINGS

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Power Supply voltage	V_{DD}	-0.3	4	V	

4-2 ELECTRICAL CHARACTERISTICS
4-2-1 TFT LCD MODULE

Ta=25°C

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply voltage	V_{DD}	3.0	3.3	3.6	V	
Power Supply Current	I_{DD}		TBD		mA	V_{DD} =3.3V
"H" level logical input voltage	V_{IH}	0.7VDD	--	VDD	V	
"L" level logical input voltage	V_{IL}	0	--	0.3VDD	V	

4-2-2 BACKLIGHT UNIT SPECIFICATION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED Forward voltage	V_F	-	-	30.5	V	Note1
LED Forward current	I_F	-	20	-	mA	Note1
LED dice Life Time		-	50,000	-	hr	

Note 1 under room temperature (25 °C, Humidity 30-60% RH,) and IF=20mA.

LEDA   LEDK

LED circuit

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4-3 PIXEL FORMAT IMAGE

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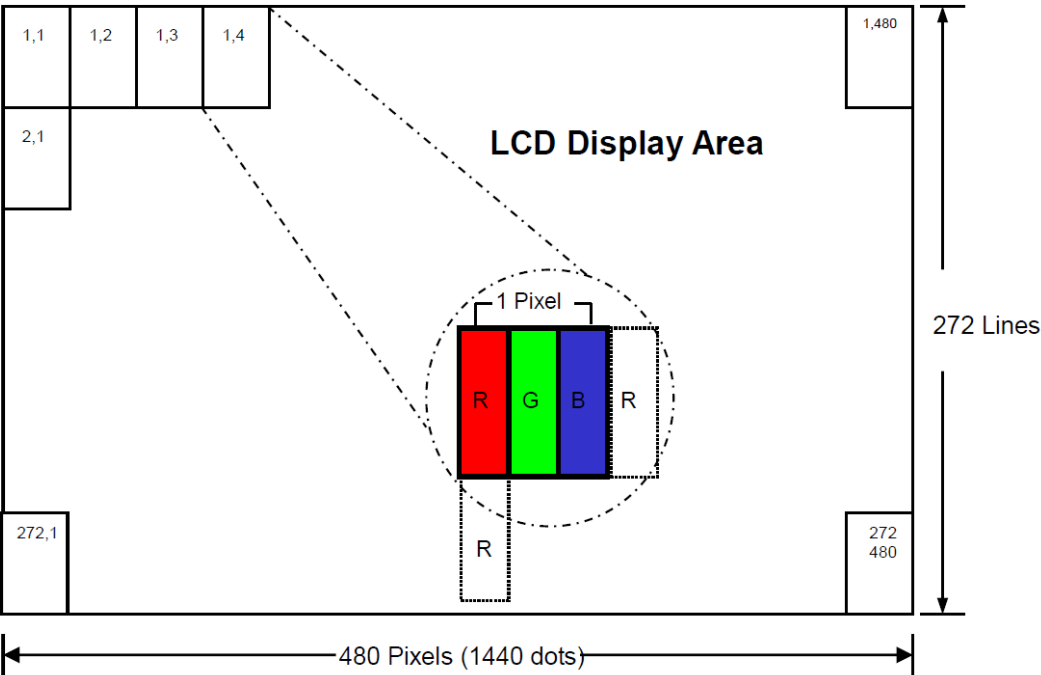
4-4 INTERFACE CONNECTION

Pin No.	Symbol	Function
1	LEDK	LED Power Supply Cathode
2	LEDA	LED Power Supply Anode
3	GND	Ground
4	VDD	Power supply for LCD module
5	R0	RED data 0
6	R1	RED data 1
7	R2	RED data 2
8	R3	RED data 3
9	R4	RED data 4
10	R5	RED data 5
11	R6	RED data 6
12	R7	RED data 7
13	G0	GREEN data 0
14	G1	GREEN data 1
15	G2	GREEN data 2
16	G3	GREEN data 3
17	G4	GREEN data 4
18	G5	GREEN data 5
19	G6	GREEN data 6
20	G7	GREEN data 7
21	B0	BLUE data 0
22	B1	BLUE data 1
23	B2	BLUE data 2
24	B3	BLUE data 3
25	B4	BLUE data 4
26	B5	BLUE data 5
27	B6	BLUE data 6
28	B7	BLUE data 7
29	GND	Ground
30	DCLK	Pixel clock signal Data latched at falling edge of this signal.
31	DISP	Display ON/OFF Control ON=H(VDD), OFF=L(GND)
32	HSYNC	Horizontal synchronous signal
33	VSYNC	Vertical synchronous signal
34	DE	Data enable signal
35	NC	Not connect
36	GND	Ground
37	XR	TP RIGHT
38	YD	TP BOTTOM
39	XL	TP LEFT
40	YU	TP TOP

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5 TOUCHSCREEN SPECIFICATIONS

5-1 MECHANICAL CHARACTERISTICS

Parameter	Value	
Activations Force	0.6N Max	
Operating Life	Input (finger)	1,000,000 hits
	Character Input (pen)	100,000 characters
Light Transmittance	Min 80%	
Surface Hardness	(T.B.D)	

5-2 ELECTRICAL CHARACTERISTICS

Parameter	Value	
Operating Voltage	Max. DC 10V	
Linearity	$\pm$1.5% or less	
Circuit close resistance	X	400Ω – 1050Ω
	Y	100Ω – 450Ω
Circuit open resistance	20MΩ at DC25V or more	
Contact bounce	15ms or less	

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6 OPTICAL SPECIFICATIONS

6-1 OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time		Tr	$\theta=0°$	-	20	30	ms	Note 4
		Tf		-	10	15		
Contrast ratio		CR	At optimized viewing angle	640	800	-		Note 5
Viewing angle	Top	Θy+	CR≥10	70	80	-	Deg.	Note 6
	Bottom	Θy-		70	80	-		
	Left	Θx-		70	80	-		
	Right	Θx+		70	80	-		
Luminance of white			$\theta=0°$	370	460	--	cd/m2	Note 7,8
Uniformity				75	80	--	%	Note 8,9
White chromaticity	X		$\theta=0°$	0.27	0.32	0.37		Note 7
	y			0.28	0.33	0.38		

Note 1: Ambient temperature =25°C. LED current IF= 20mA.

Note 2: To be measured in the dark room.

Note 3: To be measured on the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7A, after 2 minutes operation.

Note 4: Definition of response time:

The output signals of photo-detector are measured when the input signals are changed from "white" to "black" (rising time) and from "black" to "white" (falling time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as shown below.
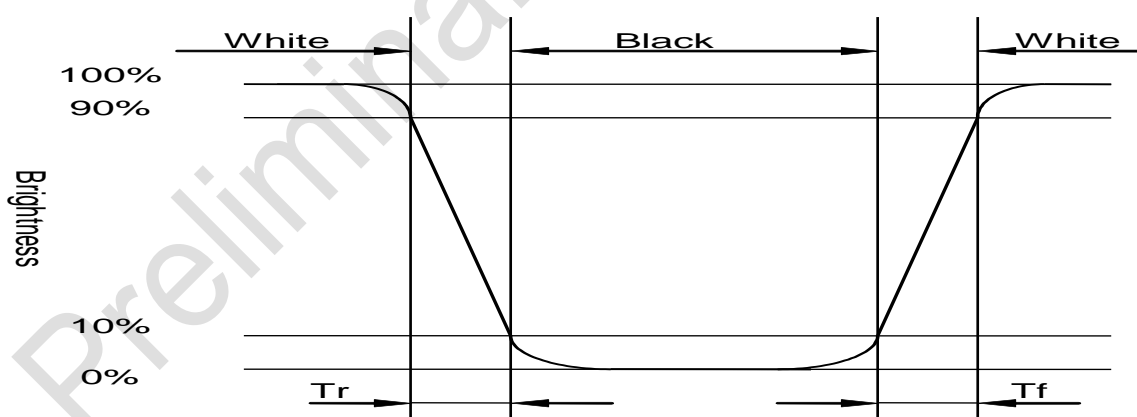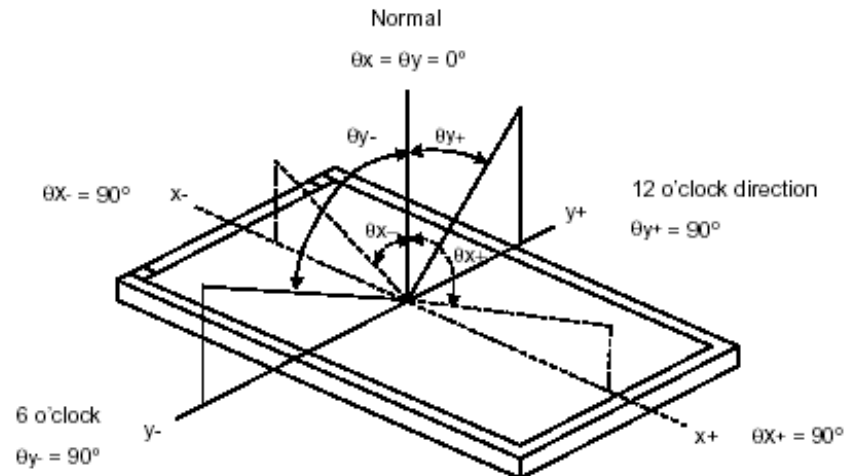

Note5: Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)}=\frac{\text{Photo-detector output when LCD is at "White" state}}{\text{Photo-detector output when LCD is at "Black" state}}$$

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Note 6: Definition of viewing angle:
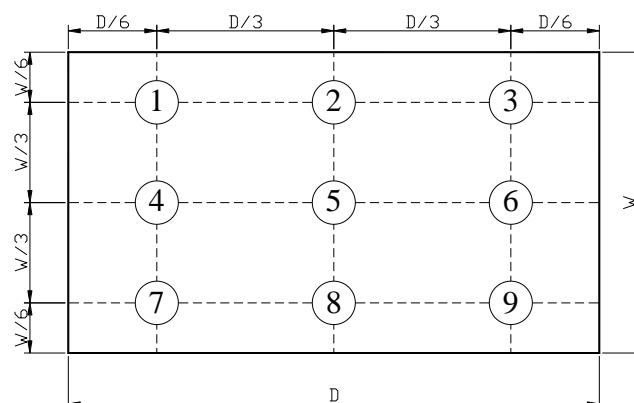   Refer to figure as below.

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note8: The method of optical measurement
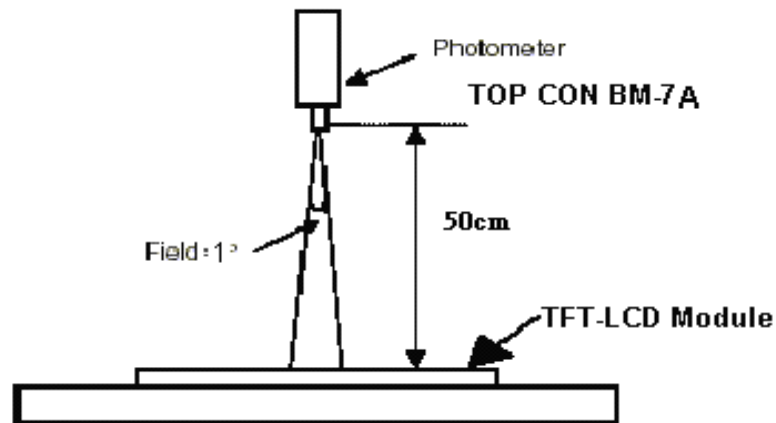
Note 9: Definition of Brightness Uniformity (B-uni):

$$B\text{-uni} = \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9points}} \quad \text{(Note 9).}$$

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7   MECHANICAL SPECIFICATIONS

7-1   OUTLINE DRAWING

(T.B.D)

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8 PACKAGING

(T.B.D)

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9 PRECAUTION

9-1 HANDLING PRECAUTIONS

(1) The module should be assembled into the system firmly by using every mounting hole. Be careful not to twist or bend the module.

(2) Be sure to fix the LCD when mounting the module to a chassis. Since the LCD and the touchscreen are attached with double-sided tape, the LCD may fall off if only the touchscreen side is fixed.

(3) For stable brightness and display, connect the GND via the mounting hole on the LCD.

(4) Make sure the specified temperature and humidity between the module and other structures or parts are taken into consideration to secure ventilation.

(5) While assembling or installing modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.

(6) Use fingerstalls or soft gloves in order to keep the display clean during the incoming inspection and assembly process.

(7) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they are left on panel for a long time.

(8) The LCD contains irritants inside. If by any chance the liquid should flow out due to damage and come in contact with the skin, wash immediately under running water for more than 15 minutes and consult a physician.

(9) LCD may have uneven brightness depending on the contents displayed. Please note that this is not a malfunction.

(10) LCD elements may have spots (black spots/ bright spots). This is a characteristic of the LCD and not a malfunction.

(11) When the screen is viewed outside the viewing angle, the color displayed may appear to change. This is a basic characteristic of the LCD and not a malfunction.

(12) When the same image is displayed for a certain long period of time, the image may remain as an afterimage. This is a basic characteristic of the LCD.
In order to avoid afterimages, use a screensaver or other similar functions to periodically change the displayed image and avoid displaying the same image for a long period of time.

(13) Protect the module from static electricity, it may cause damage to the C-MOS Gate Array IC.

(14) Operators should take anti-static measures such as wearing earthing bands for grounding.

(15) To prevent malfunction or damage, make sure the connectors of the connecting cables are inserted securely.

(16) Remove the protection sheet on the touchscreen when installing.

(17) Do not disassemble the module.

(18) Do not pull or fold the LED wire.

(19) Pins of I/F connector should not be touched directly with bare hands.

(20) This product is intended for use in general electronic equipment and is not intended for use in special environments such as a corrosive gas atmosphere. If use in a special environment is anticipated, please evaluate thoroughly or take precautions not to expose the LCD to corrosive gases, etc.

(21) This product is intended for use in standard applications (office equipment, industrial, communication, household equipment, etc.). Do not use the products for special applications that require extremely high reliability (e.g., aerospace, nuclear power control, medical applications for life support, etc.) or where malfunctions or failures may directly cause injuries

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to the human body.

(22) Do not rub or press the product with hard or sharp objects.

(23) Keep away from flames/fire.

(24) Avoid wiping the product with excessive pressure.

(25) Avoid locally rubbing the product with strong pressure. It may cause damage to the function of the touchscreen.

(26) Do not pull off or disassemble the product.

(27) When handling the product, hold the main unit and not the touchscreen FPC (tail).

(28) The touchscreen is made of glass. Glass can easily break if scratched.
    Please handle the touchscreen so that glass does not hit other glasses or hard objects.

(29) Handle the edge of the glass with care as it may cause injuries.

9-2 STORAGE PRECAUTIONS

(1) High temperature or humidity may reduce the performance of the module. Please store LCD module at room temperature: 25+/-5℃, humidity: 30~65%.

(2) It is dangerous that moisture comes into or contacts the LCD module, because the moisture may damage LCD module when it is operating.

(3) It may reduce the display quality if the ambient temperature is lower than 10 ºC. For example, the response time will become slow and the starting voltage of LED will be higher than the room temperature.

(4) When storing the product, use the packing box and keep the product within the specified storage temperature and humidity and in an environment where it is free of excessive pressure and loads.

9-3 OPERATION PRECAUTIONS

(1) Do not pull the I/F connector in or out while the module is operating.

(2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.

(3) Applications that require to press the same point on the touchscreen for a long time may cause malfunction due to the structure of the touchscreen.
    The touchscreen is made of glass. Glass is easily damaged when scratched.
    Please handle the touchscreen so that glass does not come in contact with other glass or hard objects.

(4) Due to the characteristics of the touchscreen, the area slightly outside the display area may be detected as the coordinates of the edge of the touchscreen. Please design your application with this in mind.

(5) The coordinates of the touchscreen may shift over time or depend on the environment in which it is used. If the touchscreen coordinates get misaligned, please perform the coordinate calibration.

(6) When used outside the specification standards, it may significantly affect the product quality and service life, such as degradation of display quality and generation of air bubbles. Please be sure to use it within the standards.

(7) When operating the product, please avoid striking it with a hard object.

(8) Avoid using the product in direct sunlight.

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10 Warranty

The warranty period is limited to 12 months (1 year) from the date of shipment. Any defects that occur upon normal use under conditions specified herein will be repaired (factory repair) free of charge. (Warranty for any repair needed to the same repaired part of the same product is three months.)

You will be liable for all repair fees even within the warranty period for any conditions listed below.
(1) Any malfunctions, defects, and/or damages that occurred during transport, transfer, or mishandling by the user after delivery.
(2) Any malfunctions, defects, and/or damages caused by natural or man-made disaster.
(3) If the product is used under any condition, environment, or method other than those specified in the specifications, catalogs, manuals, notes, and/or other documents.
(4) Any malfunctions, defects, and/or damages caused by connected equipment and/or usage of inappropriate consumables and media.
(5) If the product is repaired, remodeled, modified, or disassembled by a party other than DMC Co., Ltd, or if a serial number label cannot be verified.
(6) Any failure, damage, or malfunction is deemed to be caused on your behalf.

This warranty covers only the product itself. No warranty is provided for damage, on-site repair, or replacement resulting from product failure.

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