

KEYENCE

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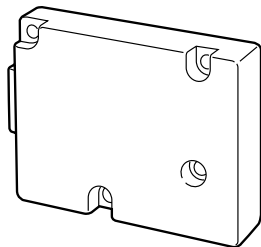
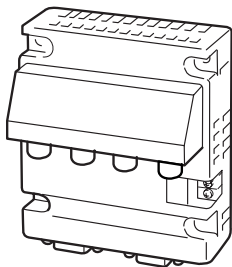
***Touch Panel Display
VT Series***

Extension Unit

VT3-VD4/VD1/R1/E3 (for VT3 Series)

VT2-E1/P1/E2/P2 (for VT3/VT2 Series)

Instruction Manual



Preface

This document describes how to install and set up the Touch Panel Display VT3/VT2 Series hardware.

Before you start to use the Touch Panel Display VT3 Series, be sure to thoroughly read this document in order to fully understand the functions of the Touch Panel Display VT3/VT2 Series and VT STUDIO/VT2 BUILDER.

Store this document in a safe place so that you can retrieve it whenever necessary.

Symbols

This manual uses the following symbols to alert you to important information.



Failure to follow these instructions may lead to death or serious injury.



Failure to follow these instructions may lead to injury.



Failure to follow these instructions may lead to physical damage (product malfunction, etc.).

Important: Provides additional information on precautions and restrictions that must be followed in operation.

Note: Provides additional information on proper operation.

[Tip]

Indicates useful information or information that aids understanding of text descriptions.

Request

- (1) No part of this instruction may be reprinted or reproduced without the prior written permission of KEYENCE CORPORATION.
- (2) The contents of this manual are subject to change without notice.
- (3) Every effort has been made in preparing this document. If, however, you find any unclear points, errors, omissions or other inconsistencies, please feel free to contact us.
- (4) Note that KEYENCE CORPORATION shall not be liable for any influence resulting from operation of the VT series regardless of item (3) above.
- (5) We shall replace any missing or incorrectly collated pages.

Trademarks

- Windows is a registered trademark of Microsoft Corporation of the United States.
- Pentium is a registered trademark of Intel Corporation.
- Other company names, product names, and model names used in this manual are trademarks or registered trademarks of their respective companies.
- UNLHA32 and DLL are public domain software made by Micco.

Safety Precautions

General Precautions

- At startup and during operation, be sure to monitor the functions and performance of the VT3 series
- We recommend that you take substantial safety measures to avoid any damage in the event that a problem occurs.
- Do not modify the VT3 series or use it in any way other than described in the specifications. The functions and performance of products used or modified in this way cannot be assured.
- When the VT3 series is used in combination with other instruments, functions and performance may be degraded, depending on operating conditions and the surrounding environment.
- Do not subject instruments including peripheral devices to sudden changes in temperature. Doing so might cause condensation which may cause the instrument or device to malfunction.
- Mount the VT3 as far away as possible from power lines or high-voltage lines. Noise from power lines and high-voltage lines may cause the VT3 to malfunction.

WARNING

The VT STUDIO VT-H5G/VT-H5J system disc is a DVD. Do not play this disc in an audio player. Otherwise, your hearing and/or the speakers may be damaged by sudden high volume sound.

CAUTION

- *Do not use the touch panel (touch switches), cross-key pads or push-button switches on the switch unit to make switches that may affect human life or lead to product damage. Also, design a system that is adaptable to touch panel (touch switches), cross-key pad or push-button switches on the switch unit malfunction.*
- *Do not touch the touch panel or touch switches with a sharp-pointed object such as a pen or screwdriver. Doing so might scratch the touch panel or touch switches or cause them to malfunction.*
- *Do not subject the touch panel (touch switches), cross-key pad or push-button switches on the switch unit to shock or impact, or touch them with more than necessary force. Doing so might damage them.*
- *Never wipe the display with paint thinner or organic solvents. Doing so might damage the display. When wiping the display, use a soft cloth moistened with watered down neutral detergent.*
- *Do not copy copyrighted fonts and image data onto this unit for use as this infringes on the copyright.*
- *If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.*

Request

When using the VT3 series under conditions and environment indicated below, use with sufficient margin with respect to ratings and functions, adopt safety countermeasures such as fail-safe measures, and consult your sales representative.

- Use under conditions and environment not described in this manual
- Use for nuclear power control, railroad facilities, aircraft facilities, vehicles, combustion units, medical equipment, amusement machines, and safety devices
- Use in applications where a major influence on human life or property is anticipated, and where safety in particular is required

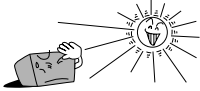

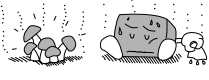
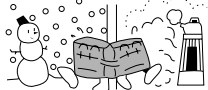





About CE Marking and UL Approval

For details on precautions for CE marking and for UL Approval, refer to the VT3 Series Hardware Manual "3-1 Operating Environment", and the VT2 Series Hardware Manual "3-1 Operating Environment".

Operating Environment

■ Installation location

Do not install the VT3 in the following places.

Locations subject to direct sunlight	Locations subject to surrounding air temperature out of 0 to 50°C* range	Locations subject to ambient humidity out of 35 to 85%RH range
		
Locations subject to condensation caused by sudden temperature change	Locations subject to corrosive and flammable gases	Locations subject to large amounts of dirt and dust, salt, iron and oil smoke
		
Locations directly subject to vibration and shock	Locations that may be splashed with water, oil or chemical mist	Locations where strong magnetic and electrical fields are generated
		

* When the ambient temperature is higher than 40°C, please use it at a maximum absolute humidity of 85% RH at 40°C.

⚠ CAUTION

Install the VT3 as far away as possible from locations where radios, etc. are located. Radio waves emitted by the VT3 may cause noise to occur on the radio.

List of Supported Devices

Option		VT3 Series										VT2 Series										
		X15(D)	S12(D)	S10	V10(D)	V8	V7	V6H(G)	Q5H(G)	Q5T(W)/Q5T(W/A)	Q5S(W)	Q5M(W)/Q5M(W/A)	W4	12F	10F	10T	10S	8T	7S	5T	5M	
Video Unit	VT3-VD1	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	VT3-VD4	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	VT3-R1*	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethernet Printer Unit	VT2-E1/P1	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	VT2-E2/P2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	VT3-E3	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

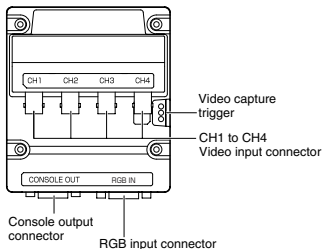
* VT3-R1 can only be used with the VT3 system of version 2.23 or higher.

Video Unit (VT3-X15(D)/S12(D)/S10/V10(D)/V8)

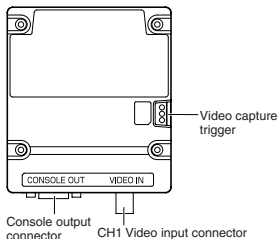
The Video Unit can be used to display images from external CCD camera, VTR, PC or other devices on VT3 screen, or to project screens currently displayed on the VT3 on the RGB monitor.

Names of Parts

4ch Video Input Unit VT3-VD4

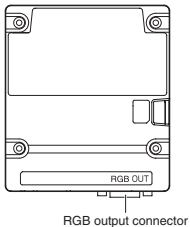


1ch Video Input Unit VT3-VD1



Name	Function
Video input connector	Used for connecting to devices having an NTSC composite video signal output
RGB input connector	Used for connecting to devices having an analog RGB output
Console output connector	Used for connecting to the CV Series made by Keyence Corporation
Video capture trigger	Used for saving image data that is input to video input connector or RGB input connector to Memory Card. When the video capture output destination is set to the printer, output is from a PictBridge-compatible printer.

RGB Output Unit VT3-R1



Name	Function
RGB output connector	Used for connecting to devices having an analog RGB input.

■ Specifications

● 4-channel/1-channel Video Input Unit VT3-VD4/VD1 Specifications General Specifications

Item	VT3-VD4	VT3-VD1		
Rated voltage	5 VDC±5%			
Current consumption	1080 mA max.	470 mA max.		
Noise resistance	1500 Vp-p pulse width 1μsec (by common mode noise simulator)			
Withstand voltage	1500 VAC for 1 minute (across power terminal and housing)			
Insulating resistance	5 MΩ or more by 500 VDC megger (across power terminal and housing)			
Vibrating resistance	Intermittent Vibration		Compliant with JIS B3502 IEC61131-2 Number of sweeps: 10 times each on X-, Y- and Z-axes (for 100 mins.)	
	Frequency	Acceleration		Amplitude
	5 to 9 Hz	—		3.5 mm
	9 to 150 Hz	9.8 m/s ²		—
	Continuous Vibration			
	Frequency	Acceleration		Amplitude
5 to 9 Hz	—	1.75 mm		
9 to 150 Hz	4.9 m/s ²	—		
Operating atmosphere	Must be free from severe dust and corrosive gas			
Operating surrounding air temperature*1	0 to +50°C			
Operating surrounding air humidity	35 to 85%RH (condensation not allowed)			
Storage ambient temperature	-10 to +60°C (icing not allowed)			
Storage ambient humidity	35 to 85%RH (condensation not allowed)			
Weight	Approx. 230 g	Approx. 160 g		

*1 Prevent the operating ambient temperature of the VT3 from being exceeded.

Performance Specifications

Video input

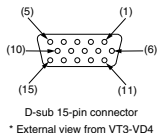
Item	VT3-VD4	VT3-VD1
Display colors	Color: 260000 colors, Black-and-white: 256 tones	
Signal method	NTSC composite video signal	
Display size (W x H dots)	640 x 480, 480 x 360, 320 x 240, 160 x 120 600 x 480, 500 x 400, 400 x 320, 300 x 240	
Number of input channels	4	1

RGB input

Item	VT3-VD4	
Display colors	Color: 260000 colors	
Signal method	Analog RGB	
Horizontal synchronizing frequency	VGA: 31.4 to 43.3 kHz XGA: 48.4 kHz	SVGA: 35.1 to 46.9 kHz
Vertical synchronizing frequency	VGA: 59.0 to 85.1 Hz XGA: 60.0 Hz	SVGA: 56.0 to 75.0 Hz
Display size (W x H dots)	VGA: 640 x 480, 480 x 360, 320 x 240, 160 x 120 SVGA: 800 x 600, 600 x 450, 400 x 300, 200 x 150 XGA: 1024 x 768, 768 x 576, 512 x 384, 256 x 192	
Number of input channels	1	

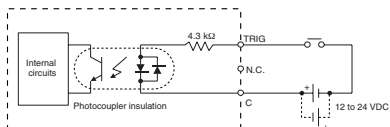
Pin assignments (RGB input)

Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name
1	R	6	R_GND	11	NC
2	G	7	G_GND	12	NC
3	B	8	B_GND	13	H_SYNC
4	NC	9	NC	14	V_SYNC
5	GND	10	GND	15	NC

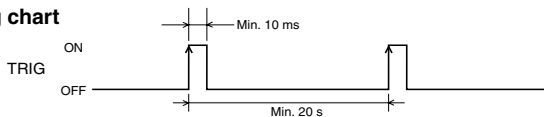


● Video capture trigger

Internal circuit



Timing chart



- Set TRIG input to ON for at least 10 msec. The VT3 captures the displayed video image in up to 500 msec after the trigger input.
- It takes about 20 seconds for each channel to write the captured video image to the Memory Card.
- When triggers are input sequentially, the second trigger is stored in the buffer area and suspended until the first captured image is written to the Memory Card. Once the data is written, the suspended trigger input becomes valid. While a trigger is stored in the buffer area, the subsequent triggers are invalid.
- If the location to which the captured video image is sent is set to "Printer", the time it takes for printing depends on the printer.

Note: Even when the next trigger is input while a captured video image is being processed, the video image that will be displayed is the one that was being processed when the trigger was input.

Terminal block specification

Item	Specifications
Wire gage	AWG28-16
Wire strip length	5.5 mm
Wire type	Stranded wire
Rated temperature of wire	60°C
Tightening torque	0.3 Nm (3.1kgf•cm)
Wire material	Copper

● RGB Output Unit VT3-R1 Specifications

General Specifications

Item	VT3-R1			
Rated voltage	5 VDC±5%			
Current consumption	80mA max.			
Noise resistance	1500 Vp-p pulse width 1μsec (by common mode noise simulator)			
Withstand voltage	1500 VAC for 1 minute (across power terminal and housing)			
Insulating resistance	5 MΩ or more by 500 VDC megger (across power terminal and housing)			
Vibrating resistance	Intermittent Vibration			Compliant with JIS B3502 IEC61131-2 Number of sweeps: 10 times each on X-, Y- and Z-axes (for 100 mins.)
	Frequency	Acceleration	Amplitude	
	5 to 9 Hz	—	3.5 mm	
	9 to 150 Hz	9.8 m/s ²	—	
	Continuous Vibration			
	Frequency	Acceleration	Amplitude	
5 to 9 Hz	—	1.75 mm		
9 to 150 Hz	4.9 m/s ²	—		
Operating atmosphere	Must be free from severe dust and corrosive gas			
Operating surrounding air temperature*1	0 to +50°C			
Operating surrounding air humidity	35 to 85%RH (condensation not allowed)			
Storage ambient temperature	-10 to +60°C (icing not allowed)			
Storage ambient humidity	35 to 85%RH (condensation not allowed)			
Weight	Approx. 150 g			

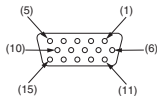
*1 Prevent the operating ambient temperature of the VT3 from being exceeded.

Performance Specifications

Item	VT3-R1	
Signal method	Analog RGB	
Horizontal synchronizing frequency	VGA: 31.5 kHz XGA: 48 kHz	SVGA: 37.9 kHz
Vertical synchronizing frequency	VGA: 59.9 Hz XGA: 59.9 Hz	SVGA: 60.3 Hz
Display size (W x H dots)	VGA: 640 x 480 XGA: 1024 x 768	SVGA: 800 x 600
Number of output channels	1	

Pin assignments

Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name
1	R	6	R_GND	11	NC
2	G	7	G_GND	12	NC
3	B	8	B_GND	13	H_SYNC
4	NC	9	NC	14	V_SYNC
5	GND	10	GND	15	NC



D-sub 15-pin connector
* External view from VT3-R1

Ethernet Unit/Printer Unit

Various VT3/VT2 data can be printed using the Ethernet Unit or Printer Unit. Alternately, VT3/VT2 can be used via Ethernet by the Ethernet Unit.

Names of Parts

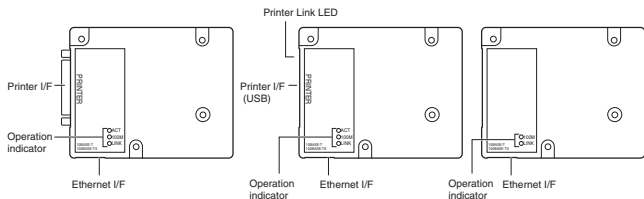
Ethernet Unit VT2-E1/E2, VT3-E3

Printer Unit VT2-P1/P2

VT2-E1/P1

VT2-E2/P2

VT3-E3



Name	Function
Operation indicator*1	ACT: Blinks when data is being sent or received.*4 100M: Indicates the baud rate. Lit: 100 Mbps operation Out: 10 Mbps operation LINK: Lights when the device is linked to a peer device.
Ethernet I/F*1	Used for connecting to Ethernet. For both 10BASE-T and 100BASE-TX.
Printer I/F*2	Used for connecting to a printer. For both color printers and thermal printers.
Printer I/F (USB)*3	Used to connect to a PictBridge-compatible printer.
Printer Link LED*3	Lit when a connection is established with a PictBridge-compatible printer. Out when a connection is not established with a PictBridge-compatible printer. Blinks when a warning or error has occurred on the printer.

*1 VT2-E1/E2, VT3-E3 only *2 VT2-E1/P1 only *3 VT2-E2/P2 only

*4 This indicator is not available on VT3-E3 units that have a serial number ending in A or a later letter (A, B, C, etc.).

Note: • When the Ethernet Unit is connected and turned ON for the first time, the message "Invalid IP setup. Please touch the display." is displayed. Touch the screen, and make the Ethernet Setup in "Option Setup" in the System mode.

After making the Ethernet settings, move to the Data Transmission mode. VT3 Series Hardware Manual "Data Transmission" page 5-33

- Do not use the printer I/F (USB) at sites subject to strong vibration or impact. The USB connector does not have a lock function, and so the cable may fall off or a communications error may occur.
- Do not connect the personal computer to the VT2-E2/P2 by the USB cable.
- VT3-E3 with "A" or a following letter as the last letter of the serial number requires that the VT3 system program be Ver. 4.51 or later.
- VT3-E3 with "A" or a following letter as the last letter of the serial number supports MDI/MDI-X automatic switching function.

■ Specifications

● Ethernet Unit VT2-E1/E2, VT3-E3 / Printer Unit VT2-P1/P2 Specifications General Specifications

Item	VT2-E1	VT2-P1	VT2-E2	VT2-P2	VT3-E3
Rated voltage	5 VDC±5%				
Current consumption	200mA max.		400mA max.		200mA max.
Noise resistance	1500 Vp-p pulse width 1 μ sec (by common mode noise simulator)				
Withstand voltage	1500 VAC for 1 minute (across power terminal and housing)				
Insulating resistance	5 M Ω or more by 500 VDC megger (across power terminal and housing)				
Vibrating resistance	Intermittent Vibration			Compliant with JIS B3502 IEC61131-2 Number of sweeps: 10 times each on X-, Y- and Z-axes (for 100 mins.)	
	Frequency	Acceleration	Half amplitude		
	5 to 9 Hz	—	3.5 mm		
	9 to 150 Hz	9.8 m/s ²	—		
	Continuous Vibration				
	Frequency	Acceleration	Half amplitude		
5 to 9 Hz	—	1.75 mm			
9 to 150 Hz	4.9 m/s ²	—			
Operating atmosphere	Must be free from severe dust and corrosive gas				
Operating surrounding air temperature*	0 to +50°C				
Operating surrounding air humidity	35 to 85%RH (condensation not allowed)				
Storage ambient temperature	-10 to +60°C (icing not allowed)				
Storage ambient humidity	35 to 85%RH (condensation not allowed)				
Weight	Approx. 135 g	Approx. 125 g	Approx. 150 g	Approx. 140 g	Approx. 130 g

- * Prevent the operating surrounding air temperature of the VT3/VT2 from being exceeded.

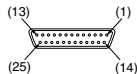
Performance Specifications

Printer output (VT2-E1/P1)

Item	Printer type	VT2-E1/P1
Color printer	ESC/P raster 2	Made by EPSON SALES JAPAN CORPORATION PM-930C/940C/870C PM-3700C/4000PX
	ESC/P raster	Made by EPSON SALES JAPAN CORPORATION PM-950C/890C/840C/830C/740C/730C PM-3500C/2200C
	LIPS IV raster	Made by CANON Inc. LIPS IV-compatible Color/black-and-white laser printer
Thermal printer	Thermal printer	Made by CITIZEN SYSTEMS Corporation CBM-293, CT-P293

Pin assignment (printer output)

Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name
1	nStrobe	10	NC	19	GND
2	Data1	11	Busy	20	GND
3	Data2	12	NC	21	GND
4	Data3	13	NC	22	GND
5	Data4	14	NC	23	GND
6	Data5	15	NC	24	GND
7	Data6	16	NC	25	GND
8	Data7	17	NC		
9	Data8	18	GND		



D-sub 25-pin connector

* External view from VT2-E1/P1

Printer output (VT2-E2/P2)

Item	Printer type	VT2-E2/P2
PictBridge-compatible printer	PictBridge	Made by EPSON SALES JAPAN CORPORATION PM-A650/A700/A750/A850/A870/A890/A900/A950/ PM-D600/D750/D770/D800/D1000
		Made by CANON Inc. PIXUS 80i/455i/560i/860i/960i/990i/IP90/IP3100/IP8600

Ethernet

Item	VT2-E1/E2, VT3-E3	
	10BASE-T	100BASE-TX
Compliant standard	IEEE802.3	
Baud rate	10 Mbit/s	100 Mbit/s
Transmission medium*1	STP or UTP of Category 3 or higher	STP or UTP of Category 5 or higher
Max. cable length	100 m	
Max. number of hub connections	4	2
Max. number of connections	PC application*2: 3 FTP: 4	

*1 STP: Shielded Twisted Pair cable, UTP: Unshielded Twisted Pair cable

*2 "PC application" refers to VT STUDIO or DATA BUILDER.

Pin assignment (Ethernet)

Pin No.	MDI signal name	Function
1	TD+	Send data (+)
2	TD-	Send data (-)
3	RD+	Receive data (+)
4	—	—
5	—	—
6	RD-	Receive data (-)
7	—	—
8	—	—



RJ-45 modular connector

* External view from VT2-E1/E2 and VT3-E3

Printer output (VT2-E1/E2, VT3-E3)

Item	Printer type	VT2-E1/E2, VT3-E3 Ethernet connection
Color printer	ESC/P-R Ethernet	Seiko Epson ESC/P-R and ESC/Page compatible color/monochrome printers
	ESC/Page Ethernet	

* Can only be used on the VT3 Series and printer connected to the Ethernet.
The VT3 System Program must be in Ver. 4.81 or above.

Attaching the Video Unit/Ethernet unit/Printer Unit

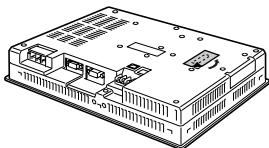
■ Video Unit (VT3-VD4/VD1/R1)

The following example shows how to attach the VT3-VD1 on the VT3.

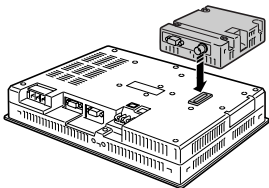


Before attaching extension units on the VT3, be sure to turn the VT3 OFF. Also, make sure that screws are firmly secured before using the VT3 again.

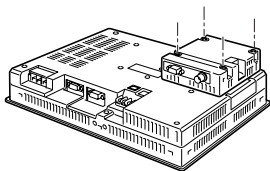
1 Remove the seal of extension connector 2 on the rear of the VT3.



2 Align the Video Unit with the VT3 as shown in the figure below, and gently insert the Video Unit vertically into the VT3 while confirming the position of extension connector 2.



3 Secure the Video Unit onto the VT3 using four screws.



Tightening Torque

0.4 Nm {4 kgf•cm}

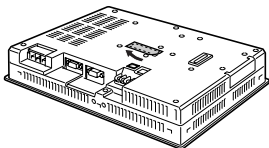
■ Ethernet Unit (VT2-E1/E2, VT3-E3)/Printer Unit (VT2-P1/P2)

The following example shows how to attach the VT2-E1 on the VT3.

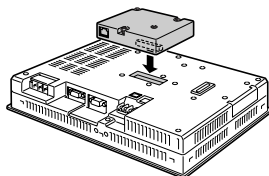


*Before attaching extension units on the VT3, be sure to turn the VT3 OFF.
Also, make sure that screws are firmly secured before using the VT3 again.*

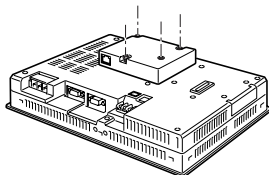
1 Remove the seal of extension connector 1 on the rear of the VT3.



2 Align the Ethernet Unit with the VT3 as shown in the figure below, and gently insert the Ethernet Unit vertically into the VT3 while confirming the position of extension connector 1.



3 Secure the Ethernet Unit onto the VT3 using four screws.

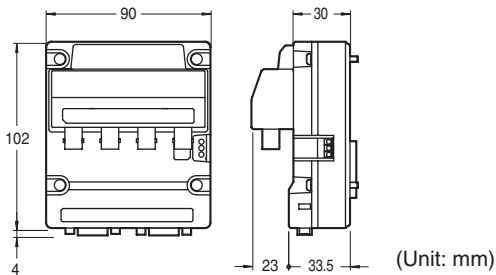


Tightening Torque

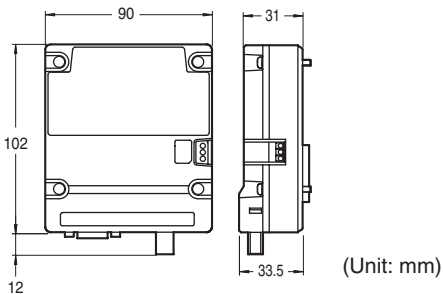
0.4 Nm {4 kgf•cm}

External Dimensions of the Extension Units

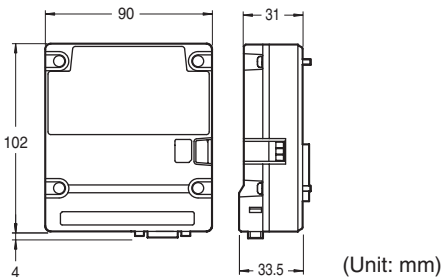
■ VT3-VD4



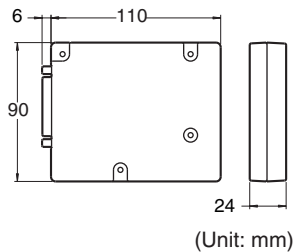
■ VT3-VD1



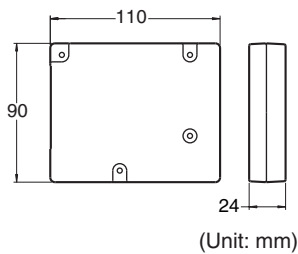
■ VT3-R1



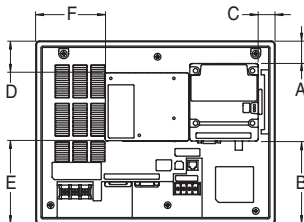
■ VT2-E1/P1



■ VT2-E2/P2, VT3-E3



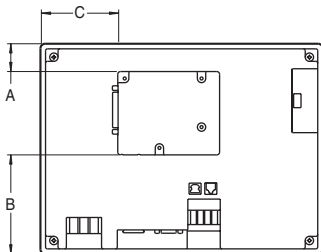
VT3 body mounting position



Model	X15(D)	S12(D)	S10/V10(D)	V8	V7	Q5T(W)/ Q5T(W)A/ Q5S(W)	Q5M(W)/ Q5M(W)A
A	10.5	29.0	18.5	9.0	—	—	—
B	182.5	108.5	107.5	67.0	—	—	—
C	52.0	21.5	20.5	17.5	—	—	—
D	22.5	41.0	30.5	21.0	19.0	7.0	—
E	182.5	108.5	107.5	67.0	67.0	39.0	—
F	143.0	90.5	84.0	18.0	19.0	48.5	—

(Unit: mm)

VT2 body mounting position



Model	12F	10F/10T	10S	8T	7S	5T/5S	5M
A	41.5	30.5	30.5	21.0	19.0	7.0	—
B	108.5	107.5	107.5	67.0	67.0	39.0	—
C	92.5	83.5	83.5	18.0	19.0	48.5	—

(Unit: mm)

MEMO

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