

KEYENCE

96M1321

Touch Panel Display VT2 Series

VT2-12F/10F/10T/10S/8T/7S/5T/5S/5M

Instruction Manual



Preface

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

Before you start to use the Touch Panel Display VT2 Series, be sure to thoroughly read this document in order to fully understand the functions of the Touch Panel Display VT2 Series and 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 VT2 series
- We recommend that you take substantial safety measures to avoid any damage in the event that a problem occurs.
- Do not modify the VT2 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 VT2 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 VT2 as far away as possible from power lines or high-voltage lines. Noise from power lines and high-voltage lines may cause the VT2 to malfunction.
- Fine dots (black dots or bright dots), uneven brightness or crosstalk (appearance of unintended lines or stripes) may occur on the LCD panel depending on the operating conditions.
- Do not continuously display the same screen for a long time. Doing so might cause a residual image to appear due to the characteristics of the LCD panel.

WARNING

The VT2 BUILDER VT2-H1 system disk is a CD-ROM. Never insert this CD-ROM in a CD player for playing back music. Loud noise emitted from this CD-ROM may cause hearing impediments or may damage your speakers.

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.*

Request

When using the VT2 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

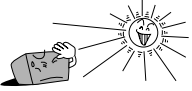

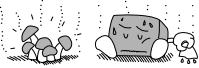
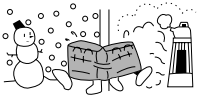





About CE Marking and UL Approval

For details on precautions for CE marking and for UL Approval, see "Precautions for CE Marking" page 18, "Precautions for UL Approval" page 20.

Operating Environment

■ Installation location

Do not install the VT2 in the following places.

Locations subject to direct sunlight	Locations subject to ambient 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 installing the VT2-12F, avoid locations subject to temperatures outside the range 0 to 40°C.



Install the VT2 as far away as possible from locations where radios, etc. are located. Radio waves emitted by the VT2 may cause noise to occur on the radio.

■ Ambient temperature/humidity precautions

Pay attention to the following points when installing the VT2 inside a control panel.

- Do not install the VT2 in a location where the ambient temperature exceeds the 0 to 50°C range (0 to 40°C on VT2-12F) or the ambient humidity exceeds the 35 to 85%RH range.
- If the ambient temperature exceeds the above range, install a forced air cooling fan or air conditioner to keep the ambient temperature within this range.
- Allow as much space as possible between the VT2 and surrounding structures and other components to improve maintainability, operability and ventilation.
- Do not mount the VT2 directly above equipment (e.g. heaters, transformers, inverters and equipment with large resistance) that generate lots of heat.
- Do not use PORT1 (USB) in locations that are subject to vibration or impact. The USB connector is not provided with a locking function, so the USB cable may become loose or disconnected, and disrupt communications.

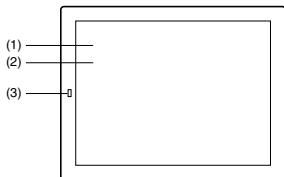
■ Measures for improving noise resistance

- Do not mount the VT2 inside industrial control panels in which high-voltage devices are also located.
- Mount the VT2 as far away as possible from power lines.
- Mount the VT2 as far away as possible when it must be mounted next to devices (e.g. solenoids, choppers) that generate strong magnetic and electrical fields.
- Do not include the VT2's I/O leads in the same ducts as power lines and high-voltage lines. Wire the I/O leads in separate ducts. Noise from power lines and high-voltage lines may cause malfunction on the VT2.
- On VT2 models that are provided with a protective earth terminal and shielded lead, provide a class D earth (maximum resistance of 100 Ohms).

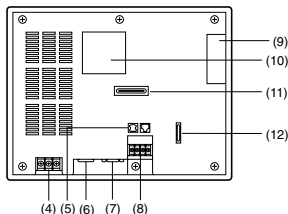
Names of Parts on the VT2

■ VT2-12F/10F/10T/10S

● Front view



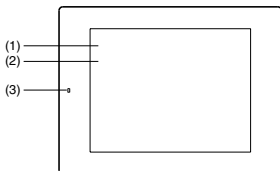
● Rear view of body



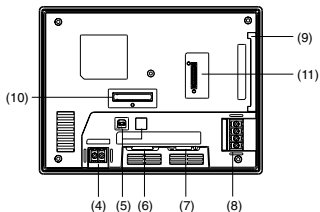
Name		Description
(1)	Display area	Displays setup screens, messages, and data from the PLC and other external devices. VT2-12F/10F: Number of display dots 800 x 600 dots VT2-10T/10S: Number of display dots 640 x 480 dots
(2)	Touch panel	Screens are switched and data is written to PLCs or other external devices by touching the touch switch.
(3)	Power indicator	Lights when the power is ON.
(4)	Terminal block for power supply	This terminal block is for connecting the power supply (100 to 240 VAC±10% 50/60 Hz).
(5)	Serial I/F (PORT1: SERIAL/USB) for personal computer connection	This port is for connecting to a personal computer when writing or reading data to and from VT2 BUILDER.
(6)	Serial I/F (PORT2) for PLC connection	This port supports the RS-232C or RS-422A interface. This is used for connecting to a PLC or other external device.
(7)	Serial I/F (PORT3) for Barcode Reader	This port is for connecting the Keyence Corporation Barcode Reader BL-80RK/200RK. It cannot be connected to other devices.
(8)	Serial I/F (PORT4) for Multi-link/KL link connection	This interface is used for connecting Multi-link Unit VT-L16Z/L16CA and Multi-communications Unit KV-L20 or for using a KL link connection.
(9)	Memory Card slot	Memory Card OP-42254 (128 Mbytes) is inserted in this slot.
(10)	Addon memory	Addon memory OP-42253 (16 Mbytes) is inserted onto a PCB inside the VT2.
(11)	Expansion connector 1	This connector connects Ethernet Unit VT2-E1/E2 or Printer Unit VT2-P1/P2.
(12)	Expansion connector 2 (VT2-12F/10F/10T only)	This connector connects 4-channel Video Unit VT2-V4, 1-channel Video Unit VT2-V1 and RGB Output Unit VT2-R1.

■ VT2-8T/7S

● Front view



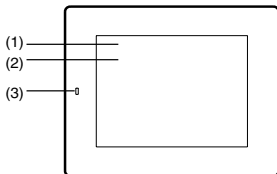
● Rear view of body



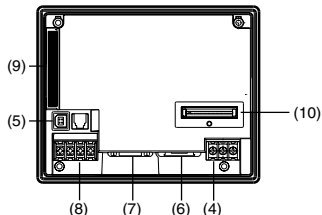
	Name	Description
(1)	Display area	Displays setup screens, messages, and data from the PLC and other external devices. VT2-8T/7S: Number of display dots 640 x 480 dots
(2)	Touch panel	Screens are switched and data is written to PLCs or other external devices by touching the touch switch.
(3)	Power indicator	Lights when the power is ON.
(4)	Terminal block for power supply	This terminal block is for connecting the power supply (24 VDC±10%).
(5)	Serial I/F (PORT1: SERIAL/USB) for personal computer connection	This port is for connecting to a personal computer when writing or reading data to and from VT2 BUILDER.
(6)	Serial I/F (PORT2) for PLC connection	This port supports the RS-232C or RS-422A interface. This is used for connecting to a PLC or other external device.
(7)	Serial I/F (PORT3) for Barcode Reader	This port is for connecting the Keyence Corporation Barcode Reader BL-80RK/200RK. It cannot be connected to other devices.
(8)	Serial I/F (PORT4) for Multi-link/KL link connection	This interface is used for connecting Multi-link Unit VT-L16Z/L16CA and Multi-communications Unit KV-L20 or for using a KL link connection.
(9)	Memory Card slot	Memory Card OP-42254 (128 Mbytes) is inserted in this slot.
(10)	Expansion connector 1	This connector connects Ethernet Unit VT2-E1/E2 or Printer Unit VT2-P1/P2.
(11)	Expansion connector 2 (VT2-8T only)	This connector connects 4-channel Video Unit VT2-V4, 1-channel Video Unit VT2-V1 and RGB Output Unit VT2-R1.

■ VT2-5T/5S/5M

● Front view



● Rear view of body



Name		Description
(1)	Display area	Displays setup screens, messages, and data from the PLC and other external devices. VT2-5T/5S/5M: Number of display dots 320 x 240 dots
(2)	Touch panel	Screens are switched and data is written to PLCs or other external devices by touching the touch switch.
(3)	Power indicator	Lights when the power is ON.
(4)	Terminal block for power supply	This terminal block is for connecting the power supply (24 VDC \pm 10%).
(5)	Serial I/F (PORT1: SERIAL/USB) for personal computer connection	This port is for connecting to a personal computer when writing or reading data to and from VT2 BUILDER.
(6)	Serial I/F (PORT2) for PLC connection	This port supports the RS-232C or RS-422A interface. This is used for connecting to a PLC or other external device.
(7)	Serial I/F (PORT3) for Barcode Reader	This port is for connecting the Keyence Corporation Barcode Reader BL-80RK/200RK. It cannot be connected to other devices.
(8)	Serial I/F (PORT4) for Multi-link/KL link connection	This interface is used for connecting Multi-link Unit VT-L16Z/L16CA and Multi-communications Unit KV-L20 or for using a KL link connection.
(9)	Memory Card slot	Memory Card OP-42254 (128 Mbytes) is inserted in this slot.
(10)	Expansion connector 1 (VT2-5T/5S only)	This connector connects Ethernet Unit VT2-E1/E2 or Printer Unit VT2-P1/P2.

General Specifications

■ VT2-12F/10F/10T/10S

Item	VT2-12F	VT2-10F	VT2-10T	VT2-10S
Rated voltage	100 to 240 VAC±10% (50/60 Hz)			
Power consumption	95 VA max.	70 VA max.	65 VA max.	70 VA 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 80 mins.)
	Frequency	Acceleration	Amplitude	
	10 to 57 Hz	—	0.075 mm	
	57 to 150 Hz	9.8 m/s ²	—	
	Continuous Vibration			
	Frequency	Acceleration	Amplitude	
10 to 57 Hz	—	0.035 mm		
57 to 150 Hz	4.9 m/s ²	—		
Ground	Class D earth (max. resistance of 100 Ω)			
Enclosure rating	Panel built-in type, IP65f equivalent dust-proof, waterjet-proof on only front panel			
Operating atmosphere	Must be free from severe dust and corrosive gas			
Operating surrounding air temperature*1	0 to +40°C	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)			
Overvoltage category	II			
Pollution degree	2			
Weight	Approx. 2800 g	Approx. 2400 g	Approx. 2300 g	Approx. 2700 g

*1 The values indicated above are for when the VT2 series is mounted vertically. For details on other mounting methods, see "Mounting" page 21.

■ VT2-8T/7S

Item	VT2-8T	VT2-7S		
Rated voltage	24 VDC±10%			
Current consumption	1 A max.	900 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 80 mins.)	
	Frequency	Acceleration		Amplitude
	10 to 57 Hz	—		0.075 mm
	57 to 150 Hz	9.8 m/s ²		—
	Continuous Vibration			
	Frequency	Acceleration		Amplitude
10 to 57 Hz	—	0.035 mm		
57 to 150 Hz	4.9 m/s ²	—		
Ground	Class D earth (max. resistance of 100 Ω)			
Enclosure rating	Panel built-in type, IP65f equivalent dust-proof, waterjet-proof on only front panel			
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)			
Overvoltage category	1			
Pollution degree	2			
Weight	Approx. 1400 g			

*1 The values indicated above are for when the VT2 series is mounted vertically. For details on other mounting methods, see "Mounting" page 21.

■ VT2-5T/5S/5M

Item	VT2-5T	VT2-5S	VT2-5M																								
Rated voltage	24 VDC±10%																										
Current consumption	700 mA max.	900 mA max.	700 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	<table border="1"> <thead> <tr> <th colspan="3">Intermittent Vibration</th> </tr> <tr> <th>Frequency</th> <th>Acceleration</th> <th>Amplitude</th> </tr> </thead> <tbody> <tr> <td>10 to 57 Hz</td> <td>—</td> <td>0.075 mm</td> </tr> <tr> <td>57 to 150 Hz</td> <td>9.8 m/s²</td> <td>—</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="3">Continuous Vibration</th> </tr> <tr> <th>Frequency</th> <th>Acceleration</th> <th>Amplitude</th> </tr> </thead> <tbody> <tr> <td>10 to 57 Hz</td> <td>—</td> <td>0.035 mm</td> </tr> <tr> <td>57 to 150 Hz</td> <td>4.9 m/s²</td> <td>—</td> </tr> </tbody> </table>		Intermittent Vibration			Frequency	Acceleration	Amplitude	10 to 57 Hz	—	0.075 mm	57 to 150 Hz	9.8 m/s ²	—	Continuous Vibration			Frequency	Acceleration	Amplitude	10 to 57 Hz	—	0.035 mm	57 to 150 Hz	4.9 m/s ²	—	Compliant with JIS B3502 IEC61131-2 Number of sweeps: 10 times each on X-, Y- and Z-axes (for 80 mins.)
Intermittent Vibration																											
Frequency	Acceleration	Amplitude																									
10 to 57 Hz	—	0.075 mm																									
57 to 150 Hz	9.8 m/s ²	—																									
Continuous Vibration																											
Frequency	Acceleration	Amplitude																									
10 to 57 Hz	—	0.035 mm																									
57 to 150 Hz	4.9 m/s ²	—																									
Ground	Class D earth (max. resistance of 100 Ω)																										
Enclosure rating	Panel built-in type, IP65f equivalent dust-proof, waterjet-proof on only front panel																										
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)																										
Overvoltage category	I																										
Pollution degree	2																										
Weight	Approx. 900 g	Approx. 1050 g	Approx. 900 g																								

*1 The values indicated above are for when the VT2 series is mounted vertically. For details on other mounting methods, see "Mounting" page 21.

Performance Specifications

■ VT2-12F/10F/10T/10S

Item		VT2-12F	VT2-10F	VT2-10T	VT2-10S
Display panel	Display element	TFT color LCD			STN color LCD
	Display color	4096 colors			
	Number of display dots (W x H dots)	800 x 600		640 x 480	
	Effective display area (W x H mm)	246.0 x 184.5	211.2 x 158.4		
	Service life (room temperature and humidity)	Approx. 50000 hours			
Back-light	Method	Cold cathode tube (replaceable)			
	Service life	Approx. 50000 hours			Approx. 30000 hours
Touch switch	Number of switches	50 x 38 per screen		40 x 30 per screen	
	Method	Matrix resistor film			
	Operating force	0.98 N max.			
	Service life	1,000,000 operations min.			
Letter font		Outline font, bitmap font, stroke font			
Communications function	PLC host link	Keyence Corporation, MITSUBISHI ELECTRIC CORPORATION, OMRON Corporation, SHARP CORPORATION, Fuji Electric Co., Ltd., YASKAWA ELECTRIC CORPORATION, Hitachi, Ltd., Matsushita Electric Works, Ltd., Toyoda Machine Works, Ltd., KOYO ELECTRONICS INDUSTRIES CO., LTD., Yokogawa Electric Corporation, TOSHIBA CORPORATION, TOSHIBA MACHINE CO., LTD., FANUC LTD., GE Fanuc Automation Corporation, Rockwell (Allen-Bradley)			
	VT-command communications	By exclusive commands			
Internal storage of screen data	Memory capacity	12 Mbytes (expandable to 28 Mbytes)			
	Number of registerable pages	Max. 1024 pages			
	Number of registerable screens	Max. 1024 screens			
	Registerable page No.	Page No.: 0 to 8999, global window No.: G000 to G999			
Calendar timer		Precision: ± 40 secs/month (at 25°C) Backup: Primary lithium battery (life 5 years min., at 25°C)			
Data backup	Screen data backup	Flash ROM (rewritable 100000 operations)			
	Memory data backup	SRAM backup: Primary lithium battery			

■ VT2-8T/7S

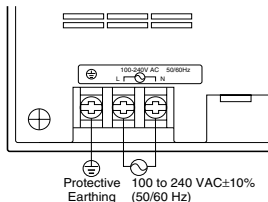
Item		VT2-8T	VT2-7S
Display panel	Display element	TFT color LCD	STN color LCD
	Display color	4096 colors	
	Number of display dots (W x H dots)	640 x 480	
	Effective display area (W x H mm)	170.9 x 128.2	160.4 x 121.1
	Service life (room temperature and humidity)	Approx. 40000 hours	Approx. 50000 hours
Back-light	Method	Cold cathode tube (replaceable)	
	Service life	Approx. 40000 hours	Approx. 30000 hours
Touch switch	Number of switches	40 x 30 per screen	
	Method	Matrix resistor film	
	Operating force	0.98 N max.	
	Service life	1,000,000 operations min.	
Letter font		Outline font, bitmap font, stroke font	
Communications function	PLC host link	Keyence Corporation, MITSUBISHI ELECTRIC CORPORATION, OMRON Corporation, SHARP CORPORATION, Fuji Electric Co., Ltd., YASKAWA ELECTRIC CORPORATION, Hitachi, Ltd., Matsushita Electric Works, Ltd., Toyoda Machine Works, Ltd., KOYO ELECTRONICS INDUSTRIES CO., LTD., Yokogawa Electric Corporation, TOSHIBA CORPORATION, TOSHIBA MACHINE CO., LTD., FANUC LTD., GE Fanuc Automation Corporation, Rockwell (Allen-Bradley)	
	VT-command communications	By exclusive commands	
Internal storage of screen data	Memory capacity	12 Mbytes	
	Number of registerable pages	Max. 1024 pages	
	Number of registerable screens	Max. 1024 screens	
	Registerable page No.	Page No.: 0 to 8999, global window No.: G000 to G999	
Calendar timer		Precision: ± 40 secs/month (at 25°C) Backup: Primary lithium battery (life 5 years min., at 25°C)	
Data backup	Screen data backup	Flash ROM (rewritable 100000 operations)	
	Memory data backup	SRAM backup: Primary lithium battery	

■ VT2-5T/5S/5M

Item		VT2-5T	VT2-5S	VT2-5M
Display panel	Display element	TFT color LCD	STN color LCD	STN black-and-white LCD
	Display color	4096 colors		2-color, black-and-white 8 patterns
	Number of display dots (W x H dots)	320 x 240		
	Effective display area (W x H mm)	111.4 x 83.5	118.2 x 89.4	
	Service life (room temperature and humidity)	Approx. 40000 hours	Approx. 50000 hours	Approx. 20000 hours
Back-light	Method	Cold cathode tube (replaceable)		
	Service life	Approx. 40000 hours	Approx. 20000 hours	
Touch switch	Number of switches	20 x 15 per screen		
	Method	Matrix resistor film		
	Operating force	0.98 N max.		
	Service life	1,000,000 operations min.		
Letter font		Outline font, bitmap font, stroke font		
Communications function	PLC host link	Keyence Corporation, MITSUBISHI ELECTRIC CORPORATION, OMRON Corporation, SHARP CORPORATION, Fuji Electric Co., Ltd., YASKAWA ELECTRIC CORPORATION, Hitachi, Ltd., Matsushita Electric Works, Ltd., Toyoda Machine Works, Ltd., KOYO ELECTRONICS INDUSTRIES CO., LTD., Yokogawa Electric Corporation, TOSHIBA CORPORATION, TOSHIBA MACHINE CO., LTD., FANUC LTD., GE Fanuc Automation Corporation, Rockwell (Allen-Bradley)		
	VT-command communications	By exclusive commands		
Internal storage of screen data	Memory capacity	4 Mbytes		
	Number of registerable pages	Max. 1024 pages		
	Number of registerable screens	Max. 1024 screens		
	Registerable page No.	Page No.: 0 to 8999, global window No.: G000 to G999		
Calendar timer		Precision: ± 40 secs/month (at 25°C) Backup: Primary lithium battery (life 5 years min., at 25°C)		
Data backup	Screen data backup	Flash ROM (rewritable 100000 operations)		
	Memory data backup	SRAM backup: Primary lithium battery		

Power Supply Terminal Block Layouts

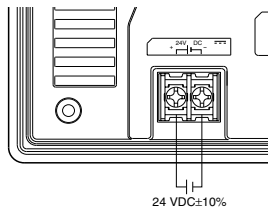
■ VT2-12F/10F/10T/10S



● Terminal block specification

Item	Specifications
Wire gage	AWG12-14
Tightening torque	0.7 Nm (7 kgf·cm)
Wire material	Copper
Lead type	Stranded wire
Rated temperature	60°C

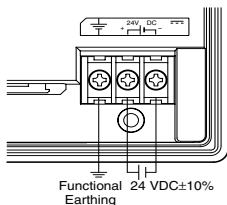
■ VT2-8T/7S



● Terminal block specification

Item	Specifications
Wire gage	AWG14-22
Tightening torque	0.5 Nm (5 kgf·cm)
Wire material	Copper
Lead type	Stranded wire
Rated temperature	60°C

■ VT2-5T/5S/5M



● Terminal block specification

Item	Specifications
Wire gage	AWG14-22
Tightening torque	0.5 Nm (5 kgf·cm)
Wire material	Copper
Lead type	Stranded wire
Rated temperature	60°C

■ Power supply terminal block

As the power terminal block of this unit, use M4 screws on the VT2-12F/10F/10T/10S, and M3 screws for the VT2-8T/7S/5T/5S/5M.

When wiring the power supply using crimped terminals, use crimped terminals that match the following dimensions.

VT2-12F/10F/10T/10S	VT2-8T/7S/5T/5S/5M
a: 8.0 mm max.	a: 6.0 mm max.



■ Wiring

● Wiring the VT2-12F/10F/10T/10S

Connect the 100 to 240 VAC±10% (50/60 Hz) power supply to the power supply terminal block as follows:

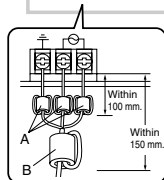
100 to 240 VAC ±10% (50/60 Hz)



Token Corporation

Item	Model No.	Number of Turns
A	ESD-R-16C	3
B	ESD-R-26C	2

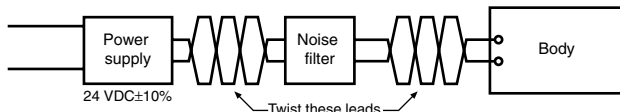
* Not required on VT2-10F



Note: Use a cable of nominal cross-section area 2 mm² square or thicker to prevent voltage drops. Wire using twisted lead.

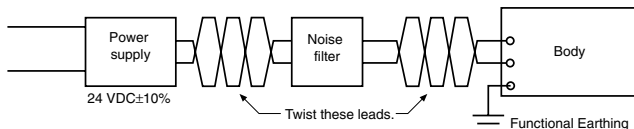
● VT2-8T/7S

Connect the 24 VDC±10% power supply to the power supply input terminal as follows:



● VT2-5T/5S/5M

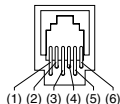
Connect the 24 VDC±10% power supply to the power supply input terminal as follows:



I/O Specifications

■ Serial I/F (PORT1: SERIAL) for personal computer connection

Item	Specifications
Applicable standard	EIA RS-232C compliant
Synchronization mode	Start-stop, full-duplex
Transmission path	15 m
Data length	7/8 bits
Parity	Even/Odd/None
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bit/s

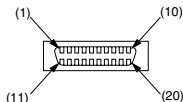


6-pin modular connector
* View from outside of body

Pin No.	Signal name	Name
1	NC	No Connection
2	NC	No Connection
3	RD	Receive Data (input)
4	SG	Signal Ground
5	SD	Send Data (output)
6	NC	No Connection

■ Serial I/F (PORT2) for PLC connection

Item	Specifications
Applicable standard	EIA RS-232C compliant/RS-422A compliant shared
Synchronization mode	Start-stop, full-duplex
Transmission path	15 m (RS-232C)/500 m (RS-422A)
Data length	7/8 bits
Parity	Even/Odd/None
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bit/s



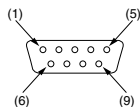
20-pin half-pitch connector
* View from outside of body

Pin No.	Signal name	Name	Pin No.	Signal name	Name
1	NC	No Connection	11	TXDA	RS-422A: Send Data A
2	TXD (SD)	RS-232C: Send Data	12	TXDB	RS-422A: Send Data B
3	RXD (RD)	RS-232C: Receive Data	13	RXDA	RS-422A: Receive Data A
4	RTS (RS)	RS-232C: Request to Send	14	RXDB	RS-422A: Receive Data B
5	CTS (CS)	RS-232C: Clear To Send	15	RTSA	RS-422A: Request to Send A
6	DSR (DR)	RS-232C: Send Data Ready	16	RTSB	RS-422A: Request to Send B
7	SG	Signal Ground	17	CTSA	RS-422A: Clear To Send A
8	TMC1 ^{*1}	Terminator	18	CTSB	RS-422A: Clear To Send B
9	TMC2 ^{*1}	(across (17) and (18))	19	TMR1 ^{*1}	Terminator
10	DTR (ER)	RS-232C: Data Terminal Ready	20	TMR2 ^{*1}	(across (13) and (14))

*1 Termination resistor 100 Ω

Serial I/F (PORT3) for Barcode Reader

Item	Specifications
Applicable standard	EIA RS-232C compliant*1
Synchronization mode	Start-stop, full-duplex
Transmission path	15 m*2
Data length	7 bits
Parity	Even
Baud rate	9600 bit/s



D-sub 9-pin connector

* View from outside of body

Pin No.	Signal name	Name
1	NC	No Connection
2	TXD	Send Data
3	RXD	Receive Data
4	DSR	Send Data Ready
5	SG	Signal Ground
6	DTR	Data Terminal Ready
7	CTS	Clear To Send
8	RTS	Request to Send
9	Vcc (5 V)	Power supply for Barcode Reader (5 VDC)

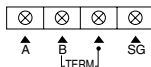
*1 Pin No.9 is assigned to 5 VDC.

*2 When a separate power supply is provided for the Barcode Reader.

Serial I/F (PORT4) for Multi-link/KL link connection

● Multi-link connection

Item	Specifications
Applicable standard	RS-485
Synchronization mode	Start-stop, half-duplex
Transmission path	Total length within 500 m
Baud rate	19200, 38400, 57600, 115200 bit/s



Terminal block

Terminal block specification

Item	Specifications
A	Multi-link communications line A
B	Multi-link communications line B
TERM	Multi-link communications line terminator setting
SG	Multi-link communications line SG

Item	Specifications
Wire gage	AWG14-22
Tightening torque	0.5 Nm {5 kg*cm}
Wire material	Copper
Lead type	Stranded wire

● KL link connection

Item	Specifications
Coding system	f, f/2 coding
Control system	Autonomous distributing token bus control
Connection mode	T-branch, multi-drop
Baud rate	5 Mbit/s, 2.5 Mbit/s, 625 kbit/s, 156 kbit/s
Communications medium	Exclusive cable KPEV-SB (1P) (w/ 2-core twisted shield cable) * Conductor cross-sectional area 0.5 to 1.25 mm ²
Max. number of connected units	129 (including master, excluding KL-T1)
Error checking	Vertical parity, checksum, duplicate sampling, burst noise detection

Communications distance

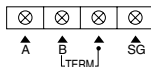
Baud Rate	Max. Trunk Length (m)	Max. Branch Length (m)
5 Mbit/S	50	20
2.5 Mbit/S	120	40
625 Kbit/S	500	150
156 Kbit/S	1200	350

Communications cable

Communications Cable Conductor Cross-sectional Area (mm ²)	Max. Extension Distance (m)
0.5	1000
0.75	1200
0.9	1200
1.25	1200

Terminal block specification

Item	Specifications
A	KL link communications line A
B	KL link communications line B
TERM	KL link communications line terminator setting
SG	KL link communications line SG



Terminal block

Item	Specifications
Wire gage	AWG14-22
Tightening torque	0.5 Nm {5 kgf•cm}
Wire material	Copper
Lead type	Stranded wire

Precautions for CE Marking



The VT2-12F/10F/10T/10S/8T/7S/5T/5S/5M is a Class A device (for general industrial use). If the VT2-12F/10F/10T/10S/8T/7S/5T/5S/5M is used for general households, it may cause electromagnetic interference.

Keyence Corporation has evaluated compliance with the requirements of the EU Directive when the following conditions were satisfied, and have confirmed that VT2-12F/10F/10T/10S/8T/7S/5T/5S/5M satisfies those requirements. (Note, however, that this excludes instances where one of the VT2-V4/V1/R1 is used in combination with the VT2-12F/10F, and where the VT2-R1 is used in combination with the VT2-10T/8T.)

Accordingly, be sure to satisfy the following conditions when using VT2-12F/10F/10T/10S/8T/7S/5T/5S/5M in EU countries.

■ Precautions for EMC Directives (89/336/EEC)

Note: The following shows the details evaluated for VT2 only internally by Keyence Corporation, and do not guarantee compliance with EMC directives for machinery devices. The user must judge compliance with EMC directives for machinery devices.

● Applicable standard

Applicable standard: EN55011 class A, EN61000-6-2

● Applicable ferrite core

Excluding the power lead, all ferrite cores should be inserted at a position within 100 mm from ports and connectors.

VT2-12F/10F/10T/10S/8T/7S/5T/5S/5M

Port/Connector	Ferrite Core	Number of Turns	Cable/Equipment
Power supply terminal block	"Power Supply Terminal Block Layouts" (page 13) *		
PORT1: SERIAL	Made by TDK Corporation, ZCAT3035-1330	2	OP-26487
PORT1: USB			OP-35331
PORT2			Shielded cable
PORT3			BL-80RK/200RK
PORT4		1	OP-30591/30592

*1 A ferrite core need not be used on the VT2-10F/8T/7S/5T/5S/5M.

VT2-V4/V1/R1/E1/P1/E2/P2

Port/Connector	Ferrite Core	Number of Turns	Cable/Equipment
CH1 to CH4 video input	Made by TDK Corporation, ZCAT3035-0930	2	Shielded video cable
Console output	Made by TDK Corporation, ZCAT3035-1330		OP-42290
RGB input	—	—	Co-axial cable 75 Ω
RGB output			RGB cable with ferrite core
Ethernet I/F	Made by TDK Corporation, ZCAT3035-1330	2	Shielded cable
Printer I/F			62 Ω compatible printer cable
Printer I/F (USB)			OP-35331

■ Precautions for Low-voltage Directives (73/23/EEC)

- Note:**
- The following shows the details evaluated for VT2 only internally by Keyence Corporation, and do not guarantee compliance with low-voltage directives for machinery devices. The user must judge compliance with low-voltage directives for machinery devices.
 - For details on mounting, wiring and installation methods, see "Operating Environment" page 2, "Mounting" page 21, and "Grounding Precautions" page 24.
-

● Applicable standard

Applicable standard: EN61010-1

● Precautions

VT2-12F/10F/10T/10S

Use the device in an installation site that satisfies the following criteria:

- Installation category (overvoltage category) II
- Pollution degree 2

The VT2-12F/10F/10T/10S is designed as a Class I device. Be sure to connect the protective earthing terminal on the VT2-12F/10F/10T/10S to the protective earthing conductor in the building.

When installing the VT2-12F/10F/10T/10S, be sure to provide a switch or circuit breaker for turning the power OFF near the unit.

VT2-8T/7S/5T/5S/5M

Devices subject to low-voltage directives are devices having an input or output of 50 to 1000 VAC or 75 to 1500 VDC.

As the VT2-8T/7S/5T/5S/5M has only inputs or outputs of less than 75 VDC, these devices are not subject to low-voltage directives.

Precautions for UL Approval

VT2-12F/10F/10T/10S/8T/7S/5T/5S/5M have UL/C-UL certificate under the following details.

■ Applicable standard

Applicable standard:

UL508: Industrial Control Equipment
UL1604: Electrical Equipment for Use in Class I and Class II, Division 2, and Class III Hazardous (Classified) Locations

UL File No.: UL508: E207185
 UL1604: E226570



4LA4
IND. CONT. EQ. FOR HAZ. LOC.

UL Category: UL508: NRAQ, NRAQ7
 UL1604: NRAG, NRAG7

■ Precautions

VT2-12F/10F/10T/10S/8T/7S/5T/5S/5M is suitable for use in Class I, Division 2, Group A, B, C and D Hazardous Locations or Non-Hazardous Location Only. If VT2 Series are used in Class I, Division 2, input and output wiring shall be in accordance with Class I, Div.2 wiring methods and in accordance with the authority having jurisdiction.

The above hazardous locations are specified in the NEC (National Electrical Code NFPA70) of the United States. For details, refer to the NFPA70.

USB Port is used for corrective maintenance only and not for permanent use.

When using the VT2-8T/7S/5T/5S/5M, use a power supply having Class 2 output specified in the NEC (National Electrical Code NFPA70) of the United States.

WARNING

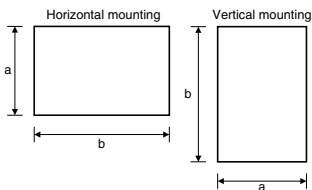
- *Explosion Hazard — Substitution of components may impair suitability for Class I, Division 2.*
- *Explosion Hazard — Do not disconnect equipment unless power has been switched off or the area is known to be Non-Hazardous.*

Mounting

This section describes how to mount the VT2 series onto a industrial control panel from its front.

Mounting fixtures are required for mounting.

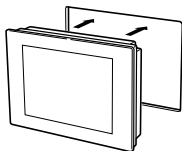
1 Cut open a mounting space at the size shown below for fitting the VT2 into.



Model No.	a	b
VT2-12F	227.5 ⁺¹ ₋₀	301.5 ⁺¹ ₋₀
VT2-10F/10T/10S	217.5 ⁺¹ ₋₀	295.5 ⁺¹ ₋₀
VT2-8T	167.5 ⁺¹ ₋₀	226.5 ⁺¹ ₋₀
VT2-7S	165.0 ⁺¹ ₋₀	207.0 ⁺¹ ₋₀
VT2-5T/5S/5M	126.0 ⁺¹ ₋₀	157.0 ⁺¹ ₋₀

Unit: mm

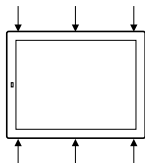
2 Insert the VT2 into the opening of the industrial control panel for mounting.



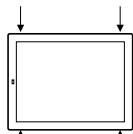
3 Fix the VT2 onto the panel using the mounting fixtures.

Attach the mounting fixtures on the long side of the VT2 at the locations indicated by the arrows in the following figure.

Horizontal mounting

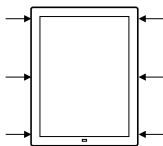


VT2-12F

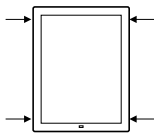


VT2-10F/10T/10S/8T/7S/5T/5S/5M

Vertical mounting



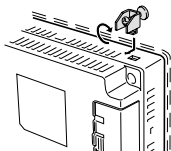
VT2-12F



VT2-10F/10T/10S/8T/7S/5T/5S/5M

4 Tighten the screws on the mounting fixtures.

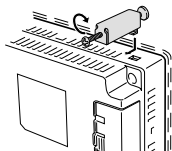
VT2-12F/10F/10T/10S



Tightening Torque

0.2 Nm {2 kgf•cm}

VT2-8T/7S/5T/5S/5M



Tightening Torque

0.2 Nm {2 kgf•cm}

CAUTION

- When mounting vertically, install the unit so that the **POWER** indicator is facing down.
- If the unit is mounted on the body's short side, **IP65f** cannot be assured.
- On the VT2-12F, tighten the mounting fixture using the mini screwdriver (supplied).

■ Panel thickness



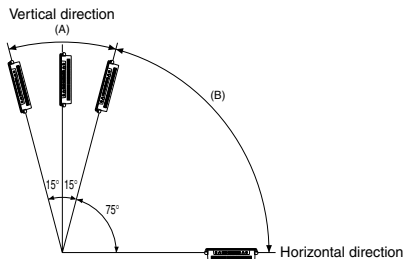
Panel thickness requirement

Panel thickness

1.6 to 4.0 mm

■ Mounting angle

The mounting angle is restricted by ambient operating temperature, environment-resistant cover (VT2-B12/B10/B8/B7/B5), and backlight adjustment. Adjust the mounting angle to suit the mounting circumstances.



Type	Operating Ambient Temperature			
	Range A		Range B	
	W/out environmental protective cover	W/ environmental protective cover	W/out environmental protective cover	W/ environmental protective cover
VT2-12F	0 to 40°C (during ★★★)		0 to 40°C (★★, at 100 VAC*1)	
VT2-10F	0 to 50°C (during ★★★)		0 to 50°C (during ★★★)	
VT2-10T	0 to 50°C (during ★★★)	0 to 40°C (during ★★★) 0 to 50°C (during ★★★)*2	0 to 40°C (during ★★★) 0 to 50°C (during ★★)	0 to 40°C (during ★★★) 0 to 50°C (during ★)
VT2-10S	0 to 40°C (during ★★★) 0 to 50°C (during ★)*3	0 to 40°C (during ★★★)*4 0 to 50°C (during ★)	0 to 40°C (during ★★)	0 to 40°C (during ★)
VT2-8T	0 to 40°C (during ★★★) 0 to 50°C (during ★)		0 to 40°C (during ★★) 0 to 50°C (during ★)	
VT2-7S	0 to 40°C (during ★★★) 0 to 50°C (during ★)		0 to 40°C (during ★)	
VT2-5T	0 to 40°C (during ★★★) 0 to 50°C (during ★)*2		0 to 50°C (during ★)	
VT2-5S	0 to 40°C (during ★★★) 0 to 50°C (during ★)		0 to 50°C (during ★)	
VT2-5M	0 to 40°C (during ★★★) 0 to 50°C (during ★)		0 to 40°C (during ★★★) 0 to 50°C (during ★)	

★ indicates the "Back Light Power" setting in the System mode.

VT2 Series Hardware Manual "Back Light Power" page 5-10

*1 100 VAC±10% (50/60 Hz)

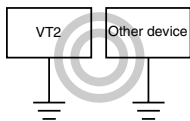
*2 When vertically mounted, 0 to 50°C (during ★★★)

*3 When vertically mounted, 0 to 50°C (during ★★)

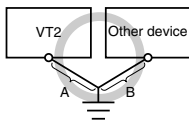
*4 When vertically mounted, 0 to 40°C (during ★★)

■ Grounding Precautions

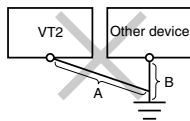
- Provide an exclusive ground of class D earth (maximum resistance of $100\ \Omega$) when grounding the shielded lead on the protective earth terminal.
- If an exclusive ground cannot be obtained, share the ground with another device.



Class D earth
(max. resistance of $100\ \Omega$)



A = B
Class D earth
(max. resistance of $100\ \Omega$)



A > B
A < B

- Use a cable of nominal cross-section area $2\ \text{mm}^2$ square or thicker as the grounding cable.
- Keep the grounding point as close as possible to the VT2, and keep the ground lead as short as possible.
- If the ground lead must be extended, use thick insulating cable and pass the ground lead through a duct before grounding.
- If grounding is likely to cause malfunction to the VT2, disconnect the protective earth terminal shielded lead from the ground.

Maintenance and Inspection

■ Maintenance

- Inspect the VT2 once every six months to one year. Inspect the VT2 at shorter inspection periods if it is used in extremely high-temperature and/or high-humidity or dusty environments.
- If the display surface or frame becomes dirty, wipe with a soft, dry cloth.
- If wiping with a soft, dry cloth does not remove the dirt, wipe the display surface or frame with a firmly wrung cloth moistened with watered down neutral detergent.
- If rubber, vinyl products or adhesive tape are left attached to the VT2 for a long period of time, the VT2 may become stained. Remove any of these during cleaning if attached to the VT2.
- Do not touch the touch panel (touch switches) with sharp-pointed objects such as a pen or screwdriver. Doing so might scratch or damage the touch panel.

CAUTION

Never wipe the display with paint thinner, organic solvents or chemical treated fabric. Doing so might cause the display surface or frame to deform.

■ Periodic Inspection

Inspection Item		Description
Power supply	Voltage fluctuation at power terminal	Must be within allowable range VT2-12F/10F/10T/10S: 100 to 240 VAC±10% (50/60 Hz) VT2-8T/7S/5T/5S/5M: 24 VDC±10%
Ambient operating conditions	Ambient temperature (in-panel temperature)	Must be within ambient operating temperature *1 VT2-12F: 0 to 40°C VT2-10F/10T/10S/8T/7S/5T/5S/5M: 0 to 50°C
	Ambient humidity (in-panel humidity)	Must be within ambient operating humidity 35 to 85%RH
	Dust	Dust must not be collecting.
Mounting state	Mounting fixture	Fixture must not be loose.
	Connector cable connections	Connectors must be completely inserted, locked and not loose.
	Terminal block screws	Screws must not be loose.
	External connector cables	Must be free from abnormalities such as almost disconnected connections.
Parts having a service life	Brightness of backlight	Must be sufficiently bright. Service life of backlight *2: the cycle when brightness is reduced by half VT2-12F/10F/10T: Approx. 50000 hours VT2-10S/7S: Approx. 30000 hours VT2-8T/5T: Approx. 40000 hours VT2-5S/5M: Approx. 20000 hours (room temperature and humidity, and vertical mounting in each case)

*1 Mounting dimensions are subject to restrictions. see "Mounting angle" page 23

*2 The service life of parts varies slightly according to the operating environment. (Indicated service life values are average values.)

★ indicates the "Back Light Power" setting in the System mode.

VT2 Series Hardware Manual "Back Light Power" page 5-10

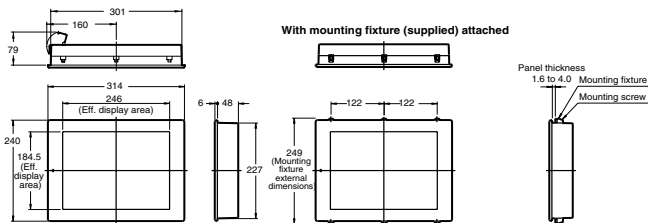
■ Cautions during VT2 Replacement

Pay attention to the following points when replacing the VT2:

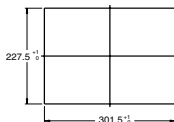
- Always turn the power OFF before replacing the VT2.
- After replacing the VT2, check the new VT2 for any abnormalities.
- When repairing the VT2 due to trouble, enter a description of the defect in as much detail as possible, and send the details to your agent.

External Dimensions

■ VT2-12F

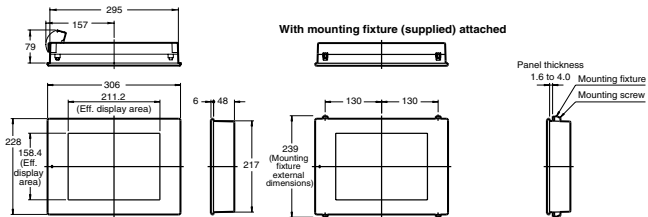


Panel cutout dimensions



(Unit: mm)

■ VT2-10F/10T/10S

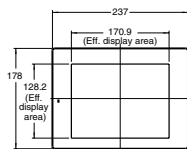


Panel cutout dimensions

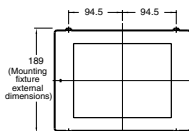
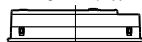


(Unit: mm)

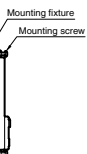
■ VT2-8T



With mounting fixture (supplied) attached



Panel thickness
1.6 to 4.0

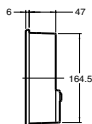
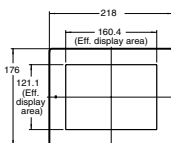
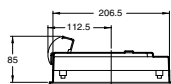


Panel cutout dimensions

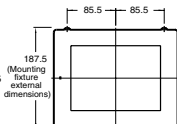
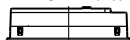


(Unit: mm)

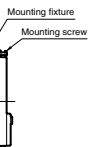
■ VT2-7S



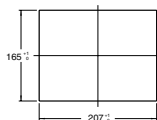
With mounting fixture (supplied) attached



Panel thickness
1.6 to 4.0

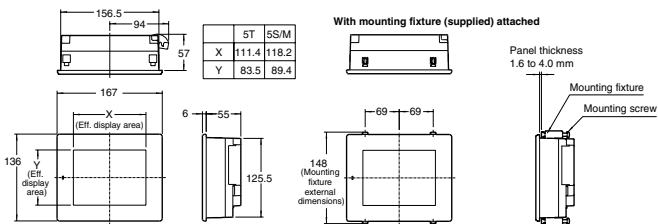


Panel cutout dimensions

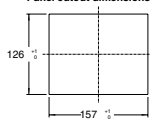


(Unit: mm)

■ VT2-5T/5S/5M



Panel cutout dimensions



(Unit: mm)

This page left intentionally blank

Warranty

1. Warranty Period

The warranty period for this product shall be one year from the date of purchase at the specified location.

2. Scope of Warranty

(1) If a malfunction due the liability on the part of KEYENCE CORPORATION arises during the above warranty period, this product shall be repaired free of charge. However, instances that fall under the following categories shall be excluded from the scope of warranty:

- (1) Malfunctions due to inappropriate conditions, environment, handling, and method of use other than described in the operation manual, user's manual, and other separately exchanged specifications, etc.
- (2) Malfunctions due to a cause other than a KEYENCE CORPORATION product such as a customer's device or software design
- (3) Malfunctions due to remodeling and repair other than KEYENCE CORPORATION
- (4) Malfunctions recognized as being preventable if consumables listed in the operation manual and user's manual, for example, are maintained and replaced correctly
- (5) Malfunctions due to unforeseen causes in scientific and technical standards before shipment
- (6) Other malfunctions due to fire, earthquake, water damage, and other disasters, and external factors such as abnormal power voltage that are not the liability of KEYENCE CORPORATION

(2) (1) above shall be set as the restriction for the scope of warranty, and secondary damages (damage to devices, mechanical loss, profit due to defects, etc.) on the part of the customer due to malfunction of a KEYENCE CORPORATION product and any other damages whatsoever shall be outside the scope of warranty.

3. Scope of Application of This Product

KEYENCE CORPORATION products are designed and manufactured as general-purpose equipment for general industrial applications. Use in applications such as nuclear power generation, aircraft, railways, and medical equipment, for example, where excessive influence is expected on human life and property shall be outside of the scope of application of this product. Note, however, that use of this product in applications where the user has understood the specifications of this product after prior consultation with KEYENCE CORPORATION shall be within the scope of application of this product. (Even in this instance, the scope of application of this warranty shall be the same as described above.)

KEYENCE

KEYENCE CORPORATION

1-3-14, Higashi-Nakajima, Higashi-Yodogawa-ku,
Osaka, 533-8555, Japan

PHONE: +81-6-6379-2211 FAX: +81-6-6379-2131