Changes for the Better

MITSUBISHI ELECTRIC

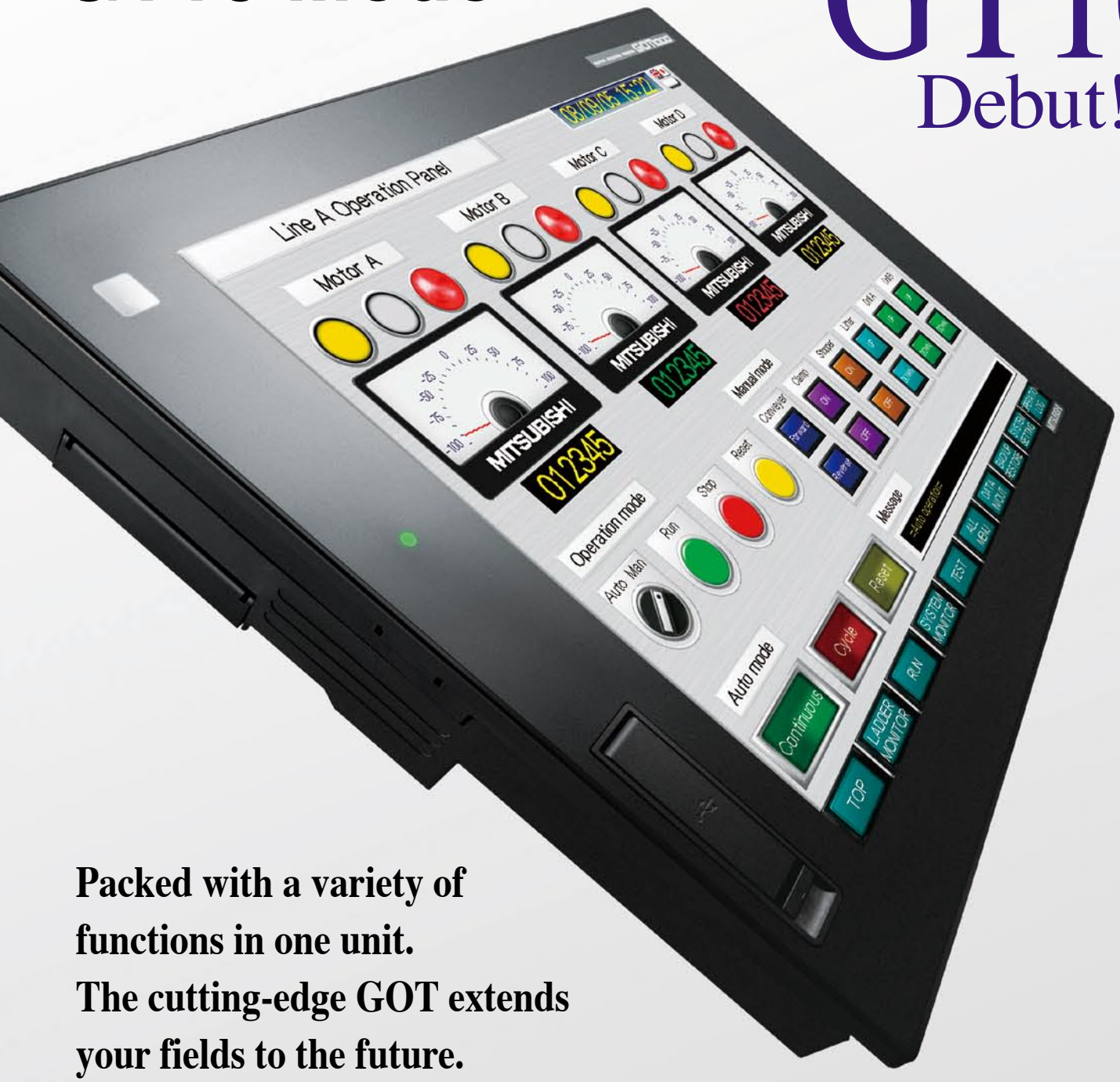
Mitsubishi Graphic Operation Terminal
GOT1000 Series

October 2008 **New Product Release**

GRAPHIC OPERATION TERMINAL GOT1000

GT16 Model

GT16 Debut!



Packed with a variety of functions in one unit.
The cutting-edge GOT extends your fields to the future.

Mitsubishi Electric Corporation Nagoya Works is certified to the environment management system ISO 14001 and the quality management system ISO 9001.

CC-Link IE

MELFANS web
MITSUBISHI ELECTRIC FA NETWORK SERVICE ON WORLD WIDE
http://MitsubishiElectric.co.jp/melfansweb/english/

MELSOFT

iQ Platform

ISO 14001 JACO EC97J1113 UKAS ENVIRONMENTAL MANAGEMENT 051

ISO 9001 BUREAU VERITAS Certification UKAS QUALITY MANAGEMENT 008

Excellent connection flexibility. A variety of functions without using optional devices. The GT16 pioneers a new field in the world of HMI.

GT16 Debut! Greatly increased memory capacity! Requiring no optional function boards.

■ Enables to utilize real parts without making you worry about the memory capacity.

The user memory is increased from the standard 9 MB to 15 MB.
The optional function board for memory expansion is not necessary.
See page 4 for details.

■ Useful functions are available while requiring no optional function boards.

Requiring no optional function boards that were necessary when using the multi-channel function, the document display, and the Q/QnA ladder monitor function.

GT16 Debut! A full-flat face equipped with USB host and USB device.

■ USB host (Type-A)

Hooking up a USB memory here enables to store resource data such as operating systems, project data and alarm logs and backup/restoration data such as sequence programs. The data communication is simple and easy between the GOT main unit and a CF card.

■ USB device (Mini-B)

Connecting to a personal computer enables to transfer operating systems and project data without opening the panel, and to modify sequence programs using the FA transparent function.

GT16 Debut! Various interfaces are available as standard features, including Ethernet, RS-422/485 and RS-232.

■ Ethernet enables to simultaneously monitor two or more PLCs of different manufacturers.

The built-in Ethernet interface enables connection up to four kinds of PLCs of different manufacturers.

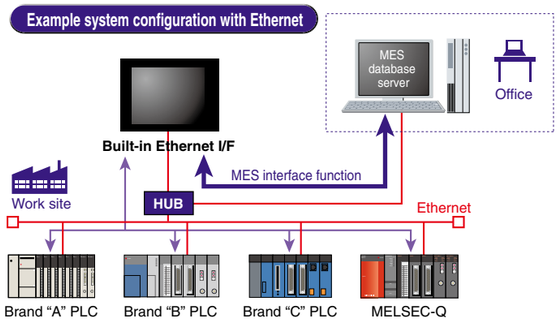
■ Ethernet helps extend systems.

The built-in Ethernet interface connects to the CPU of a PLC with a built-in Ethernet and a host system easily and simultaneously while requiring no optional communications unit.

■ A variety of built-in interfaces

The built-in interfaces (Ethernet, RS-422/485 and RS-232) enable connection to up to four kinds of FA equipment simultaneously without installing an additional optional communications unit.

Example system configuration with Ethernet



*: Connection to a micro computer and third party PLCs will be partially supported soon. For more details, see the GOT1000 series catalog <L(NA)08054-E>.
*: While being connected to Ethernet, when connecting to a device compatible with 10BASE(-T/2/5), use the switching hub in a network environment where “10 Mbps” and “100 Mbps” can coexist.

GT16 Debut! All the models are compatible with multi-media and video/RGB units.

■ Compatible with recording and playing back high resolution motion images.

The multi-media function capable of recording and playing back smooth motion images enables to visually check and monitor conditions at a worksite in an emergency and give instructions by way of motion image manuals.

■ The 15-inch model is also compatible with video/RGB.

Even when displaying motion images from four video cameras in four respective windows simultaneously on a screen, the GT16 displays natural, smooth and large motion images without skipping image cells.

GT16 Debut! Featuring an analog touch panel.

■ Flexible layout to design screens any way you like.

With objects such as touch switches laid out freely, you can design your own desired screens.
The crystal clear display without grids makes it easy to recognize pictures and characters.

More useful functions are available.

- The seven-segment font display and a variety of fonts are for creative, expressive display work.
- Newly added functions such as “Guideline” makes GT Designer2 easier to use.
- The successive phrase conversion function makes easy Kana and Kanji data entry.
- The batch self check function makes traceable the GOT operation history.

GRAPHIC OPERATION TERMINAL GOT1000

A stylish full-flat face. Equipped with a variety of communications and multi-media functions, the GT16 hints at what the HMI of tomorrow should be.

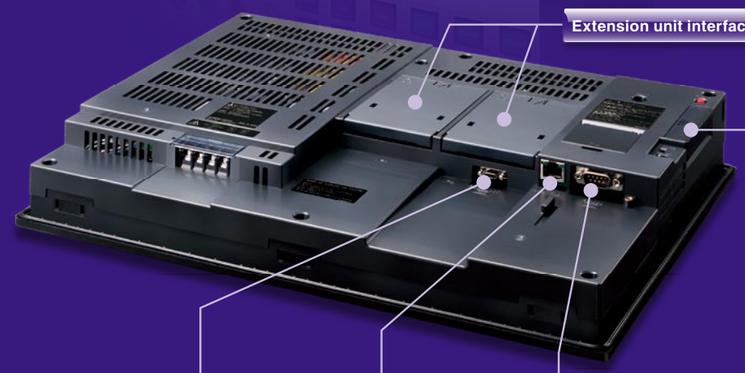
An eye-catching, aesthetic display screen and a stylish, full-flat face are not all that the GT16 has to show.
A variety of communications interface devices provided on the front and rear faces of the display, including USB devices and host and Ethernet make you feel the new possibilities of HMI.
The GT16 is here to debut to meet your expectations.
The GT16 is an all-in-one GOT packed with all that have been established and improved since the birth of the GOT1000.

Human sensor

Automatically senses an approaching person. Contributing to reducing energy consumption and running cost.

USB host and USB device

Aesthetically good looking and completely flat surface with a full-flat USB environmental protection cover.
Just one touch to open the cover, and there is no need to use a screwdriver.



Extension unit interface

For mounting a multi-media unit, a video/RGB unit and a communications unit, etc.

CF card

RS-422/485 **Ethernet** **RS-232**

GT16 Debut!

Nothing but GOT1000 that always excels GOT1000 with a variety of improved, sophisticated functions.

GT16 Debut!

The high-speed response develops a new era of the GOT.

Drawing, computing, and communication. A triad of high-speed response functions.

The GOT1000 series offers faster response in drawing, computing and communication, reducing monitoring and operation stress.

High-speed drawing — **Equipped with an ultra high-speed graphics chip**

- The GT16 draws pictures even faster.
- Sharply and quickly drawing complex, multiple-layered component screens, and detailed photographic data in 65,536 colors.

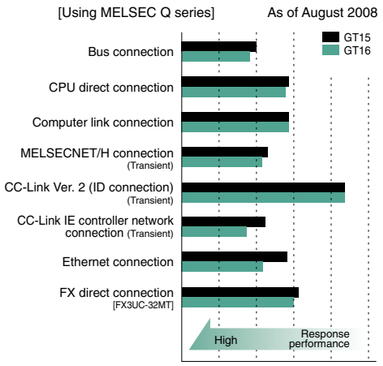
High-speed computing — **Equipped with a high-performance 64-bit super-scalar RISC processor**

- Ultra-high performance processing power to satisfy the most complex and demanding applications.

High speed communication

- Greatly improved response performance.
- High-speed communication is available for connections with both Mitsubishi and third party PLCs.

Response comparison of GT16



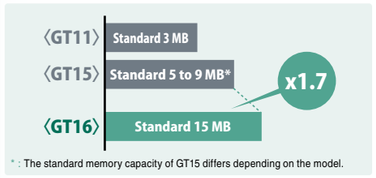
The monitor screen includes about 250 points of word devices.

GT16 Debut!

Designing and using functions without memory limitations.

Increased memory capacity

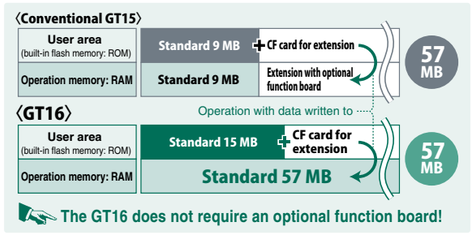
- The GT16 has increased the user area (built-in flash memory: ROM) to 15 MB as a standard feature, enabling to operate many optional functions at the same time.



* : The standard memory capacity of GT15 differs depending on the model.

- The GT16 has increased the operation memory (RAM) to 57 MB as a standard feature, enabling to use up to 57 MB without an optional function board.

- Where the total of project data, optional function operating systems and other data exceeds the user area (built-in flash memory capacity), the GT16 stores the data in a CF card to extend the user area up to 57 MB.



The GT16 does not require an optional function board!

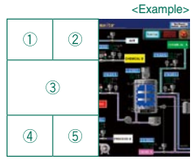
GT16 Debut!

Increased flexibility and efficiency in designing screens.

Overlap window extension

- Displaying up to 5 overlapped windows on a screen at one time. (Up to 2 for models other than the GT16)
- More information appears simultaneously on the screen, improving flexibility in screen design.

<Example>

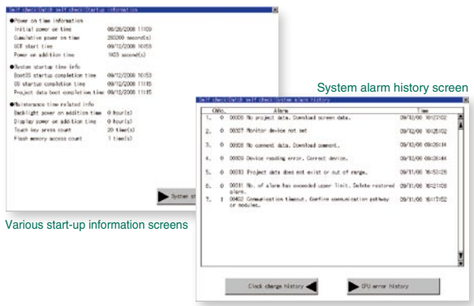


With the window title bars hidden, the windows fit in screen segments as shown in the example, greatly improving flexibility in screen design.

Operation history for detecting causes of failure and problems.

Batch self check function

- Easy to check operation history of the GOT on the utility screen, helping identify a problem cause.
- Immediate, on-the-spot check is available on the utility screen anytime you need it, without any settings in GT Designer2.



Production line made more useful and functional. GT16 ... New, useful applications one after another.

GT16 Debut!

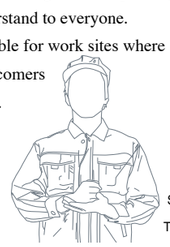
Solution 1: Multi-media functions

Smooth, crystal clear motion images are useful in various scenes.

Case 1: To improve efficiency of process monitoring!

Playing back operating procedures in motion images

Motion images show operating instructions that are easy to understand to everyone.
Suitable for work sites where new comers work.



Smooth, crystal clear images are easy to view and understand!
The VGA size screen makes it even better!
(QVGA: 30 FPS, VGA: 15 FPS)

Creating motion image data

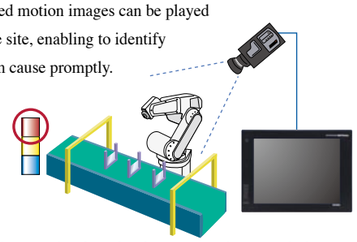
- Commercially available software programs can create motion image data.

<Applicable software programs>
• QuickTime 7 Pro
<Compatible file formats>
• 3GP • MP4

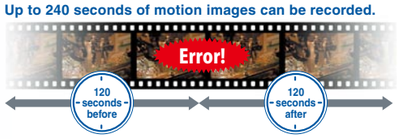
Case 2: To identify cause of problem!

Recording motion images before and after problem occurrence

The recorded motion images can be played back on the site, enabling to identify the problem cause promptly.



Up to 240 seconds of motion images can be recorded.



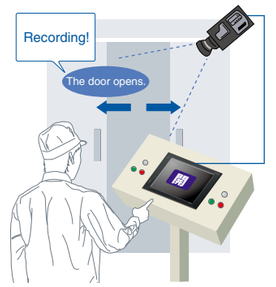
Case 3: To enhance security!

Starting to record when a person approaches

Combined with the operation log function, any incorrect operation is recorded.

Recording by operating the GOT

Can be used to enhance security by controlling personnel entry and exit for example.



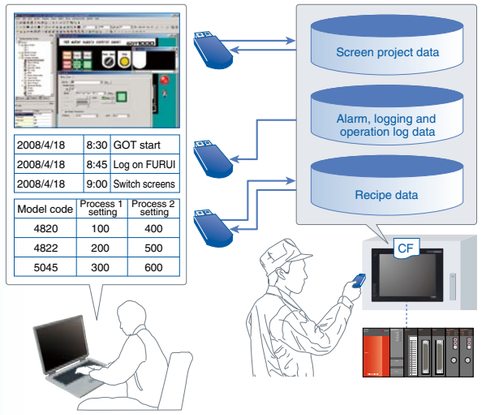
GT16 Debut!

Solution 2: USB host on front face as standard feature

The USB port on the front face makes data transfer easy.

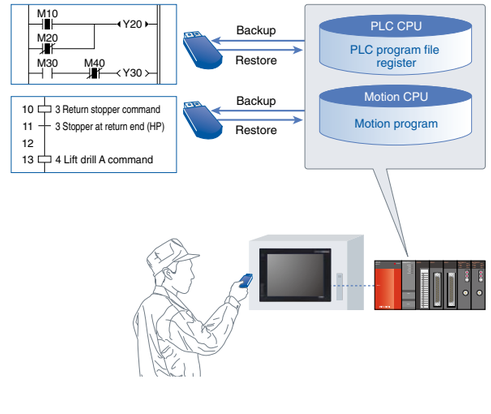
Case 1: For GOT data communication!

A USB memory makes it easy to transfer motion image data, resource data (alarm, logging and operation log data), and recipe data.



Case 2: To back up and restore PLC programs!

A USB memory enables to easily back up and restore CPU programs of the Q series PLC and the motion controllers.



General specifications

Item		Specification					
Operating ambient temperature*1	Display	0 to 50˚C					
	Other than display	0 to 55˚C					
Storage ambient temperature		–20˚C to 60˚C					
Operating ambient humidity		10 to 90% RH, no condensation					
Storage ambient humidity		10 to 90% RH, no condensation					
Vibration resistance	Conforming to JIS B 3502 and IEC 61131-2		Frequency	Acceleration	Half amplitude	Sweep count	
		Under intermittent vibration	5 to 9 Hz	–	3.5 mm	10 times in each of X, Y and Z directions	
			9 to 150 Hz	9.8 m/s²	–		
		Under continuous vibration	5 to 9 Hz	–	1.75 mm		
			9 to 150 Hz	4.9 m/s²	–		
Impact resistance		Conforming to JIS B 3502 and IEC 61131-2 (147 m/s², 3 times in each of X, Y and Z directions)					
Operating atmosphere		No corrosive gas					
Operating altitude*2		2,000 m or lower					
Installation location		In control panel					
Overvoltage category*3		Ⅱ or lower					
Contamination level*4		2 or less					
Cooling method		Self-cooling					
Grounding		Class D grounding (100 ? or less). Connect to panel if unable to ground.					

*1: When installing a MELSECNET/H communication unit (GT15-J71LP23-25 or GT15-J71BR13), a CC-Link communication unit (GT15-J61BT13) or a multimedia unit (GT16M-MMR), the operating ambient temperature is 5˚C lower than the maximum temperatures shown in the general specification table.
*2: Do not operate or store the GOT unit in pressurized environments where the pressure exceeds the 0 m elevation atmospheric pressure, as this could result in abnormal operation.
*3: Assuming that the device is connected at some point between a public power distribution network and local system equipment. Category Ⅱ applies to devices that are supplied with power from fixed equipment. The surge withstand voltage is 2,500 V for devices with ratings up to 300 V.
*4: Index that indicates the level of foreign conductive matter in the operating environment of device. Contamination level 2 denotes contamination by non-conductive matter only, though momentary conductivity may occur due to occasional condensation.

Do not use or store the GOT under direct sunlight or in an environment with excessively high temperature, dust, humidity or vibration.

Power supply specifications

Item	Specification			
	GT1695M-XTBA	GT1685M-STBA	GT1695M-XTBD	GT1685M-STBD
Input power supply voltage	100 to 240 V AC (+10%, –15%)		24 V DC (+25%, –20%)	
Input frequency	50/60Hz ±5%		–	
Input maximum voltampere	150 VA (at max. load)	110 VA (at max. load)	–	
Power consumption	64 W or less	46 W or less	60 W or less	40 W or less
With backlight off	38 W or less	32 W or less	30 W or less	26 W or less
Inrush current	26 A or less (4 ms, at max. load)	26 A or less (4 ms, at max. load)	12 A or less (75 ms, at max. load)	11 A or less (40 ms, at max. load)
Permissive instantaneous failure time	Within 20 ms (100 V AC or more)		Within 10 ms	
Noise resistance	Noise voltage 1,500 Vp-p, and noise width 1 µs, by noise simulator with noise frequency 25 to 60 Hz		Noise voltage 500 Vp-p, and noise width 1 µs, by noise simulator with noise frequency 25 to 60 Hz	
Withstand voltage	1,500 V AC for 1 minute between power supply terminals and ground		500 V DC for 1 minute between power supply terminals and ground	
Insulation resistance	10 M? or higher with an insulation resistance tester (500 V DC between power supply terminals and ground)			
Applicable wire size	0.75 to 2 [mm²]			
Clamp terminal	Clamp terminals for M3 screw RAV1.25-3, V2-S3.3, V2-N3A and FV2-N3A			
Tightening torque (terminal block's terminal screws)	0.5 to 0.8 [N·m]			

Performance specifications

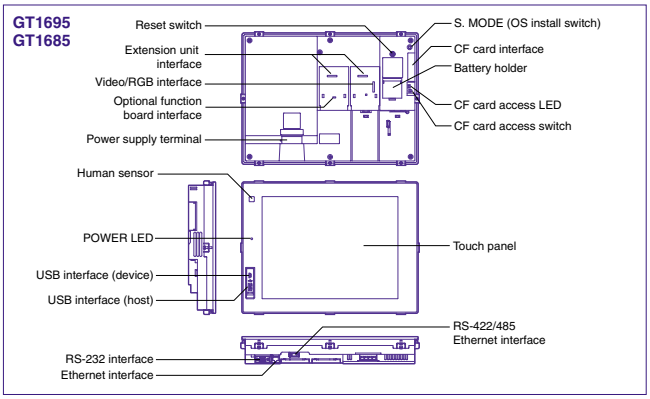
Item		Specification	
		GT1695M-XTBA GT1695M-XTBD	GT1685M-STBA GT1685M-STBD
Display*1	Type	TFT color LCD (high-brightness, wide viewing angle)	
	Screen size	15"	12"
	Resolution	XGA: 1024 x 768 [dots]	SVGA: 800 x 600 [dots]
	Display size	304.1(W) x 228.1(H) [mm]	246(W) x 184.5(H) [mm]
	Number of displayed characters	16-dot standard font: 64 chars. x 48 lines (2-byte) 12-dot standard font: 85 chars. x 64 lines (2-byte)	16-dot standard font: 50 chars. x 37 lines (2-byte) 12-dot standard font: 66 chars. x 50 lines (2-byte)
	Display colors	65,536 colors	
	View angle*2	Right/left: 75˚, Up: 50˚, Down: 60	Right/left: 80˚, Up: 60˚, Down: 80
	Intensity	450 [cd/m²]	470 [cd/m²]
	Intensity adjustment	8-step adjustment	
	Life	Approx. 52,000 hours (Operating ambient temperature: 25˚C)	
Backlight		Cold-cathode fluorescent tube (replaceable), with backlight OFF detection function Backlight off time and screen save time can be set.	
	Life*3	Approx. 50,000 hours or more	Approx. 50,000 hours or more
		(Time for display intensity reaches 50% at operating ambient temperature of 25˚C)	
Touch panel	Type	Analog resistive touch display	
	Key size	Min. 2 x 2 [dots] (per key)	
	No. of simultaneous touch points	Simultaneous touch prohibited*4 (1 point touch only)	
	Life	1,000,000 times or more (operating force 0.98 [N] or less)	
Human sensor	Detection distance	1 [m]	
	Detection range	Left/right/up/down: 70˚ each	
	Detection delay time	0 to 4 [sec]	
	Detection temperature	Difference between human temperature and ambient temperature is 4˚C or more	
Memory*5	C drive	15 MB built-in flash memory (for saving project data and extended function OS/optional function OS)	
	Life (No. of writings)	100,000 times	

*1: On LCD screens, bright dots (permanently lit) and black dots (not to be lit) generally appear. Because the large number of display elements exist on an LCD screen, it is not possible to reduce appearance of the bright and black dots to zero. Flickering may occur depending on the display colors. Note that the existence of bright and black dots is a standard characteristic of LCD screens, and it does not mean that the products are defective or damaged.
*2: LC panels have characteristics of tone reversal. Note that even within the indicated view angles, the screen display may not be clear enough depending on the display color.
*3: Using the GOT screen save/backlight OFF functions prevents screen burn-in and extends the backlight life.

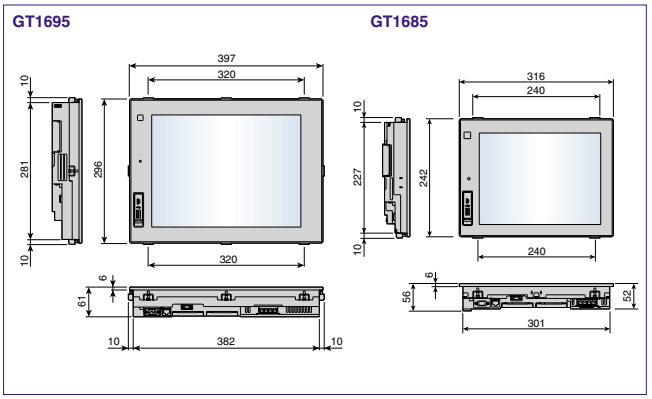
Item		Specification	
		GT1695M-XTBA GT1695M-XTBD	GT1685M-STBA GT1685M-STBD
Battery	Backed up data	GT15-BAT type lithium battery	
	Life	Clock data, maintenance time notification data, system log data	
Built-in interface	RS-232	Approx. 5 years (operating ambient temperature: 25˚C)	
	RS-422/485	RS-232, 1 ch, Transmission speed: 115,200/57,600/38,400/19,200/9,600/4,800 bps, Connector shape: D-sub 9-pin (male), Application: communication with connected devices, connection to personal computer (Project data upload/download, OS installation, FA transparent function)	
	Ethernet	RS-422/485, 1 ch, Transmission speed: 115,200/57,600/38,400/19,200/9,600/4,800 bps, Connector shape: 14-pin (female), Application: communication with connected devices	
	USB	Data transmission system: 100BASE-TX, 1 ch, Connector shape: RJ-45 (modular connector), Application: communication with connected devices, gateway function	
		USB (Full Speed 12 Mbps), host 1 ch, Connector shape: Type-A, Application: data transfer, data storage	
		USB (Full Speed 12 Mbps), device 1 ch, Connector shape: Mini-B, Application: connection to personal computer (Project data upload/download, OS installation, FA transparent function)	
	CF card	Compact flash slot 1ch., Connector shape: Type I, Application: data transfer, data storage, GOT startup	
	Optional function board	For installing optional function board, 1 ch	
	Extension unit	2 ch for communication unit/optional unit installation	
Buzzer output		Single tone (tone length adjustable)	
Protective construction		JEM1030, Front: IP67f*6, In panel: IP2X	
External dimensions (without USB port cover)		397 (W) x 296 (W) x 61 (D) [mm]	316 (W) x 242 (W) x 52 (D) [mm]
Panel cut dimensions		383.5 (W) x 282.5 (H) [mm]	302 (W) x 228 (H) [mm]
Weight (excluding mounting brackets)		5.0 [kg]	2.7 [kg]
Applicable software packages	Screen design software	GT Designer2 Version 2.90U	
	Simulation software	GT Simulator2 Version 2.90U	

*4: An analog resistive touch display is used. When 2 points on the screen are touched simultaneously, if a switch is located the middle of the 2 points then the switch will be activated. Therefore, avoid touching 2 points on the screen simultaneously.
*5: The memory is a ROM that permits overwriting of new data without having to delete the existing data.
*6: With the USB environmental protection cover is on, pressing firmly the portion marked "△" makes it conform to IP67f (JEM1030). (The USB interface conforms to IP2X (JEM1030) when a USB cable or a USB memory is connected.) However, this does not guarantee protection in all users' environments. The unit may not be used in an environment where it is exposed to splashing oil or chemicals for a long time or it is soaked with full of oil mist.

Component names



External dimensions



Product lineup

Model			Screen size [Resolution]	Display	Display color	Power supply	Memory capacity	Remarks
GT16	GT1695	GT1695M-XTBA	15" XGA [1024 x 768 dots]	TFT color LCD (high brightness, wide viewing angle)	65,536 colors	100 to 240 V AC	15MB	Compatible with multi-media, video/RGB
		GT1695M-XTBD				24 V DC		
	GT1685	GT1685M-STBA	12.1" SVGA [800 x 600 dots]	TFT color LCD (high brightness, wide viewing angle)	65,536 colors	100 to 240 V AC	15MB	Compatible with multi-media, video/RGB
		GT1685M-STBD				24 V DC		

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS: 1-14, YADA-MINAMI 5, HIGASHI-KU, NAGOYA, JAPAN

USA ····· +1-847-478-2100
Brazil ····· +55-11-3285-1840
Germany ····· +49-2102-486-0
UK ····· +44-1707-276100
Italy ····· +39-39-60531
Spain ····· +34-93-565-3131
France ····· +33-1-5568-5568
South Africa ····· +27-11-928-2000
Hong Kong ····· +852-2887-8870
China ····· +86-21-6121-2460
Taiwan ····· +886-2-2299-2499
Korea ····· +82-2-3660-9552
Singapore ····· +65-6470-2480
Thailand ····· +66-2-906-3238
Indonesia ····· +62-21-663-0833
India ····· +91-20-2712-3130
Australia ····· +61-2-9684-7777

When exported from Japan, this manual does not require application to the Ministry of International Trade and Industry for service transaction permission.

L(NA)08136-A 0810(MDOC)

New publication, effective October 2008
Specifications subject to change without notice.