

Programmable Operator Interface

# MONITOUCH

Consolidating Essential Functionality  
while Enhancing Operability and Visibility

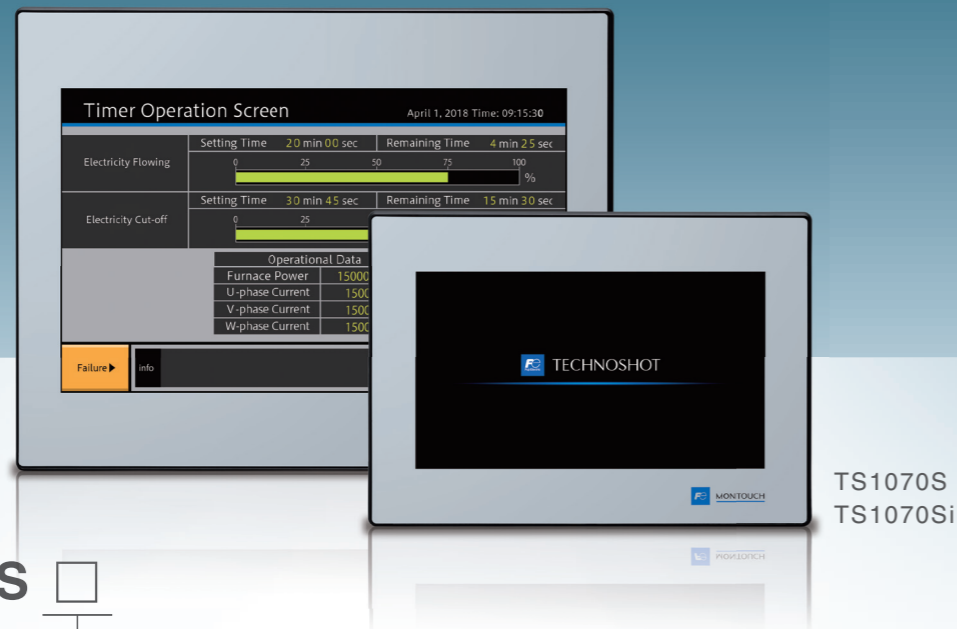


TECHNOSHOT

# TS1000 Smart Series

# TECHNOSHOT TS1000 Smart Series

- Supports remote operation via VNC server
- Complies with several global standards (CE/KC/UL/cUL)
- Expands FROM capacity 220%\*(26 MB) \*Compared to TS1000 series



## Model

TS1   0 S

Display size  
07: 7.0" widescreen  
10: 10.2" widescreen

Interface  
i : Built-in Ethernet port  
None : No built-in Ethernet port

## Specifications

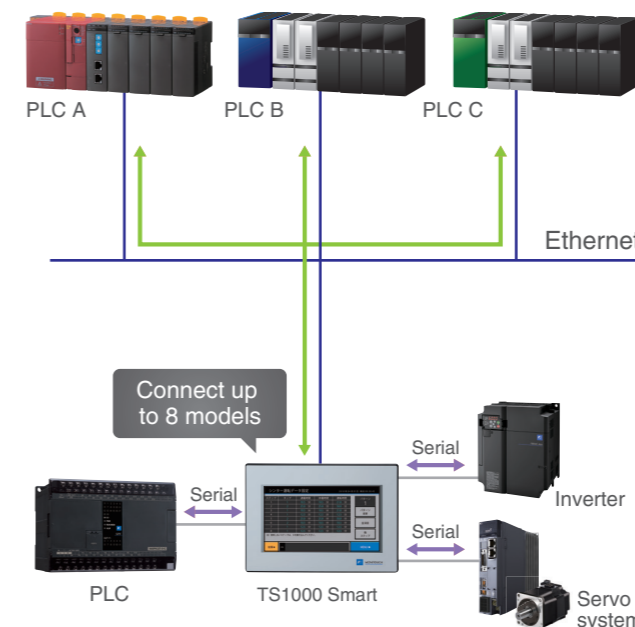
Item	TS1070S	TS1070Si	TS1100Si
Main unit	Screen size	7.0" widescreen	
	Display device	TFT color	
	Resolution	800 x 480 dots	
	Colors	65,536 colors	
	Backlight	LED	
	Touch screen	Analog resistive	
	Certifications	CE/KC/UL/cUL	
User memory	FROM	26MB	
	SRAM	128KB	
External interface	COM1 D-Sub9 pin (female)	RS-422/RS-485 (4-wire/2-wire) Data length: 7, 8 bits Parity: Even, odd, none Stop bits: 1, 2 dots Baud rate: 4,800, 9,600, 19,200, 38,400, 57,600, 76,800, 115,200, 187,500*1 bps	
	COM2/COM3 D-Sub9 pin (male)	COM2: RS-232C COM3: RS-422/RS-485 (2-wire) Data length: 7, 8 bits Parity: Even, odd, none Stop bits: 1, 2 bits Baud rate: 4,800, 9,600, 19,200, 38,400, 57,600, 76,800, 115,200 bps	
	Ethernet	-	1 ch
	USB-A	1 ch	
	USB mini-B	1 ch	
Power supply	Permissible range of voltage	DC24V±10%	
	Power consumption (max. rating)	11 W or less	12 W or less
Physical environment	Ambient temperature	0 to 50°C*2	
	Ambient humidity	85% RH or less (without dew condensation)*2	
	Contamination level	2	
	Operation altitude	2,000 m or less	
	Atmosphere	No exposure to corrosive gas or conductive dust	
	Ambient storage temperature	-10 to 60°C*2	
Installation conditions	Protective structure	IP65 equivalent (when using waterproof gasket*)/IP40 equivalent (when not using a waterproof gasket*)	
	Dimensions WxHxD	198.8 x 141.8 x 38.0 mm	266.8 x 206.8 x 38.0 mm
	Panel cutout	189.0 x 134.0 (+0.5/-0) mm	257.0 x 199.0 (+0.5/-0) mm
	Case color	Black	

\*1 187,500 bps is only for Siemens MPI/PPI communications. \*2 Use at a wet-bulb temperature of 39°C or less because higher temperatures may cause failure. \*3 This is an optional accessory.

# Lineup of Usability Enhancing Features

## 01 8-Way Communication

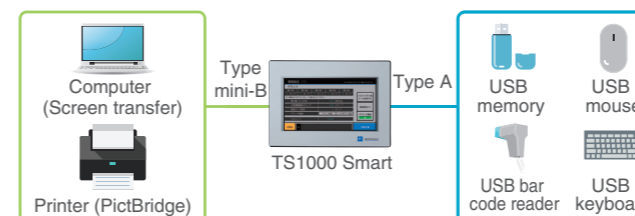
Connect up to eight types of PLC or other devices of various models from multiple manufacturers at the same time via both an Ethernet and serial connection.



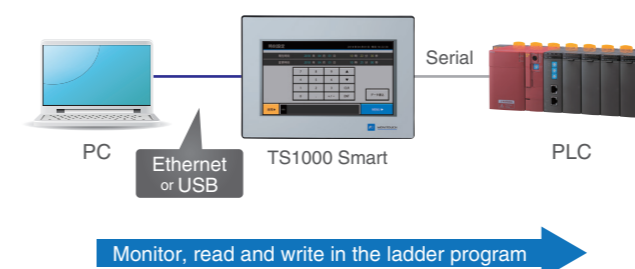
\* With TS1070S, up to 3 models can be connected.

## 02 Expanded Connectivity

- USB port (USB Ver. 2.0 compatible)  
USB port is built-in standard. Use the Type A and Type mini-B to connect to a wide range of devices.



- Ladder transfer  
Monitor, read and write in the ladder program by computer via TS1000 Smart.  
Choose from either Ethernet or USB to connect between the computer and TS1000 Smart.



## 03 Trend Sampling

TS1000 Smart series chronologically records a broad-range of data that changes over time to display as trend graphs.

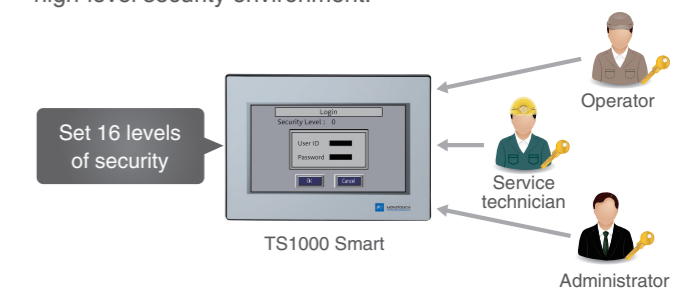
- Enlarged Display Support

Enlarge the display for a particular area of the screen to verify changing waveforms of trend graphs in even more detail.



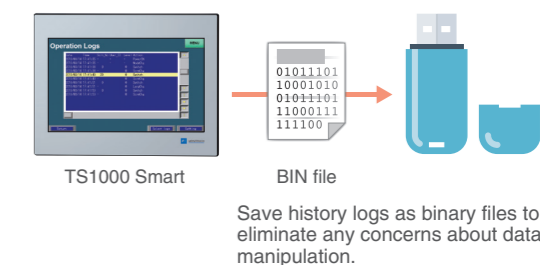
## 04 Security Features

Restrict functions according to the user to configure a high-level security environment.



## 05 Operation Log

Record chronological on-screen input, from switch operations to numerical inputs. Combine the operation log with security features and review attribution information to assist in identifying the cause of errors as well as aid in other diagnostics.



## 06 Multilanguage

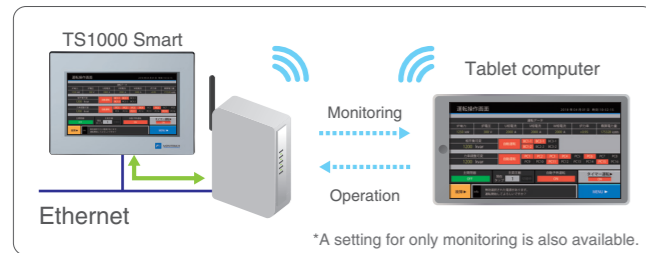
Easily toggle between up to 16 on-screen languages from a single screen to eliminate the need to sort and manage files for each language.



Compatible fonts:  
Japanese, English/Western Europe, Chinese (Traditional), Chinese (Simplified), Korean, central European alphabets, Cyrillic alphabets, Greek, Turkish, and Baltic alphabets

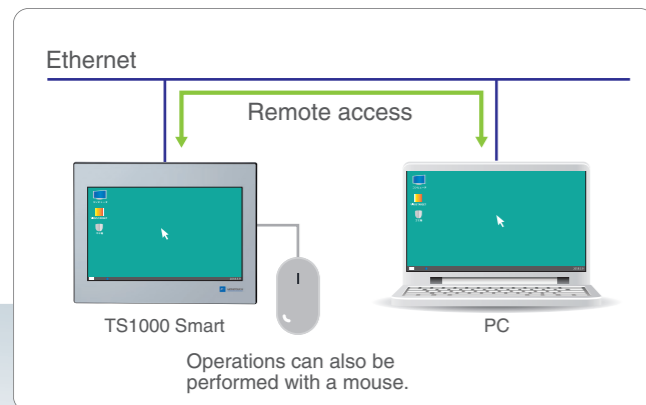
## 01 VNC Server

Easily setup the VNC viewer tool on a computer to monitor and operate TS1000 Smart screens on the factory floor via the same computer over Ethernet connection. In addition, monitoring and operations can be easily conducted from a tablet device over wireless router.



## 02 Remote Desktop\*

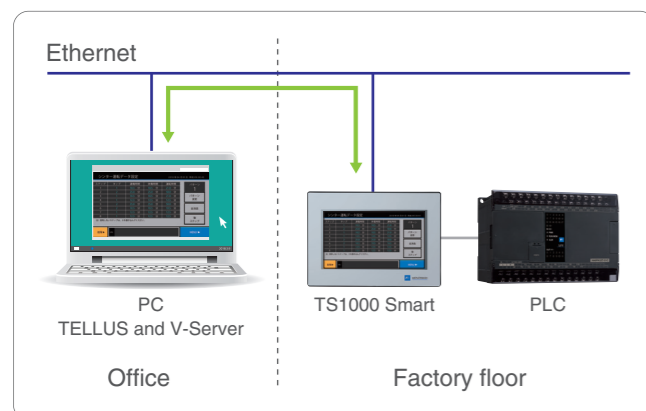
Connect via Ethernet to display and operate the server directly using TS1000 Smart.



\*A license for V-RemoteDT (usage license) is required.

## 03 Remote Maintenance

Use the TELLUS application software to easily monitor and operate TS1000 Smart screen and PLC information remotely at low cost.



# A Wealth of Network Features to Connect via Ethernet

\*None of the features on this page are included with TS1070S.

TS1070Si

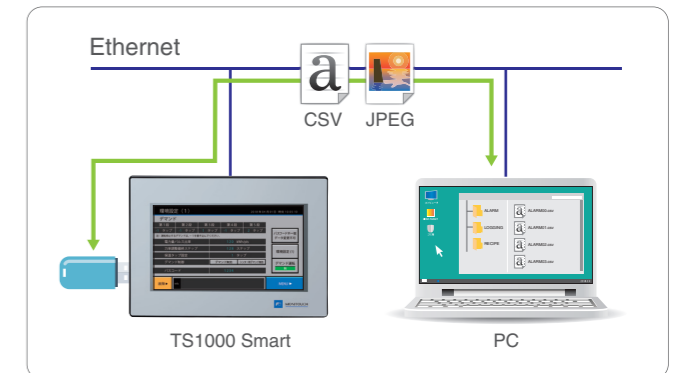


TS1100Si



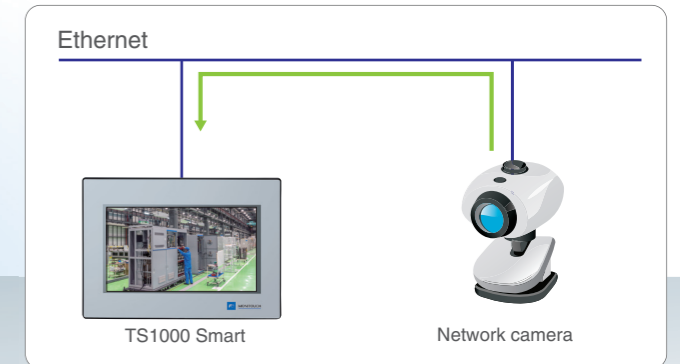
## 04 FTP Server

Use FTP client tools on a computer to read and write to USB memory mounted on TS1000 Smart.



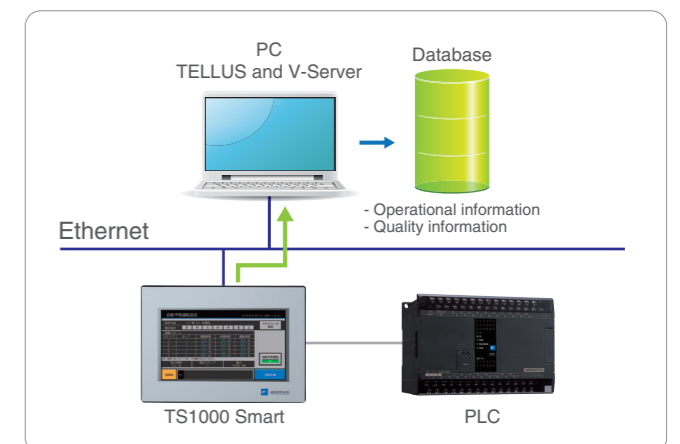
## 05 Network Camera

Display video from a network camera connected via Ethernet with TS1000 Smart. TS1000 Smart can also monitor factory floors.



## 06 MES (Manufacturing Execution System)

Collect broad information to store in the server database from production performance to defects and the causes of stoppages with TS1000 Smart through the V-Server.



Application software to connect offices and factory floors at minimal cost

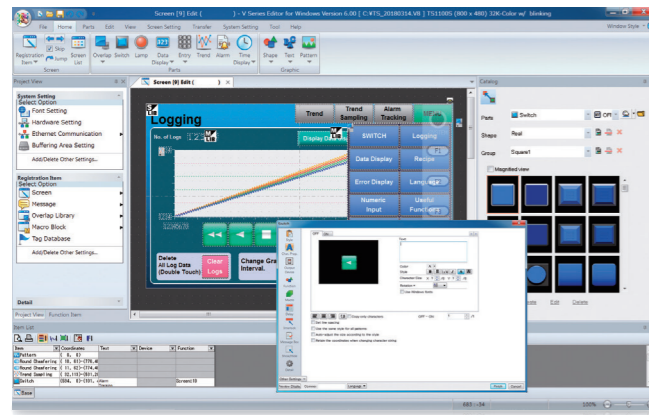
## TELLUS and V-Server

The VNC server feature is a remote monitoring and management system able to collect real-time information about factory floors, including data aggregation and data management, via the Internet whether at the office or from overseas.



Catalog No. 9022NE2

# Achieve Sleeker Screens with Easy-to-Understand Operations



## V-SFT Ver. 6

### 01 Sophisticated Line-up of Icons

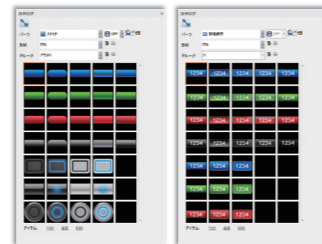
V-SFT Ver. 6 offers a combination of real sign and plain icons that allow users to easily create more sophisticated screens than ever before.



Realizing the Creation of Sophisticated Screens

#### Plain Icons

A wide range of icon designs have been newly added with a design that closely resembles smartphones and other familiar devices.



#### Real Icons

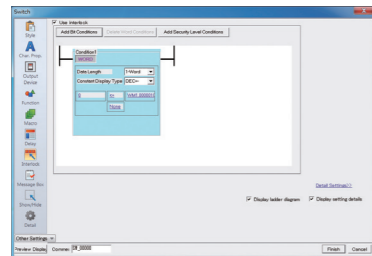
V-SFT expands conventional real icons even further.



Icons with a flat design

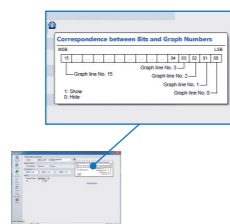
### 02 Expands Interlock Settings

Set the interlock via the ladder diagram display. The condition settings are easy to understand and convenient even when setting multiple conditions.



### 03 Supports Configuration with Tool Hints

Comprehensive tool hints throughout the software support the programming of applications. Easily configure settings without a manual by simply moving the mouse close to a setting to automatically display a supplementary description.

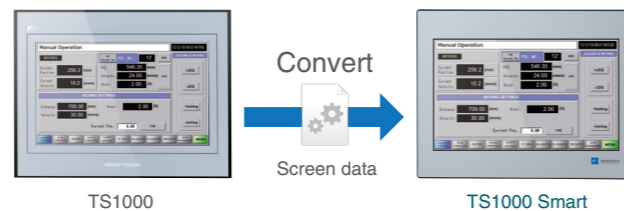


Computer	PC/AT compatible computer running Windows
Operating system*	Windows XP/XP 64Edition/Windows Vista (32bit, 64bit)/Windows 7 (32bit, 64bit)/Windows 8 (32bit, 64bit)/Windows 8.1 (32bit, 64bit)/Windows 10 (32bit, 64bit)
CPU	Pentium 4 2.0 GHz or higher is recommended
Memory	2.0 GB or higher
Hard disc	When installed: 2.0 GB or higher
Disc device	DVD-ROM drive
Display	1,024 x 768 (XGA) resolution or higher
Display colors	High color (16 bits) or higher
Other	Microsoft .NET Framework 4.0 or 4.5 (Microsoft .NET Framework 4.0 is installed automatically on computers that do not have either Microsoft .NET Framework 4.0 or 4.5 installed.)

\*Administrator privileges are required for installation.

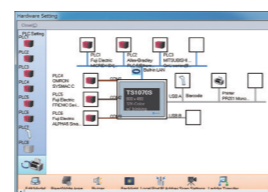
### 04 Supports Conversion from TS1000 Series

Screen data from previous models created in older versions of V-SFT can be converted in its present form to data for the current model. This allows users to leverage their screen data assets from previous models.



### 05 Intuitively Capture the Connection Device Configuration

The visual representation of the hardware settings make clear which devices are connected to TS1000 Smart.



# Motion System Driving the Best Performance Together with TS1000 Smart Series

Programmable Controller **MICREX-SX Series**

## SPF

Achieves excellent cost performance  
Flexibly supports machine based systems

- ◆ High-speed, high-functioning computing performance
- ◆ Variety of options for flexible applications
- ◆ 200kHz, compatible with up to 4-axis servo systems



Catalog No. 22B1-E-0019



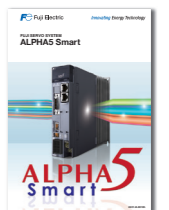
MICREX-SX SPF Plus provides advanced motion control, such as synchronous and circular interpolation controls.

Fuji Servo System

## ALPHA5 Smart

Servo System with Enhanced Ease-of-Use

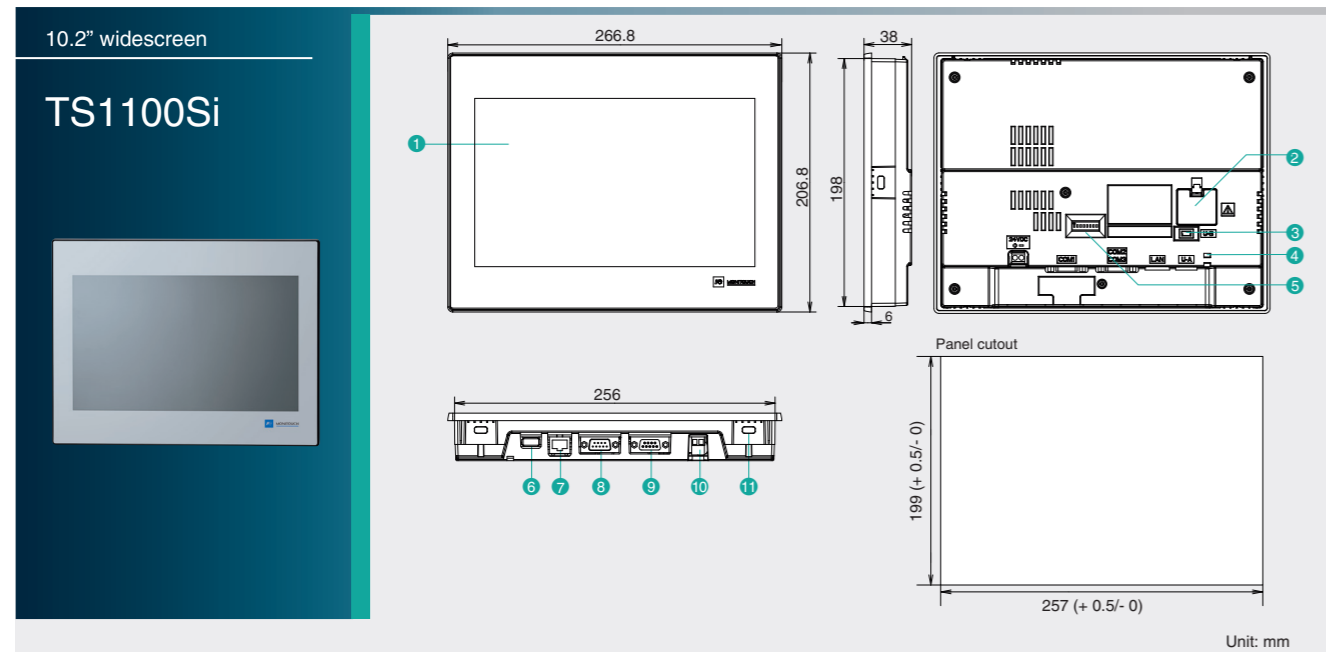
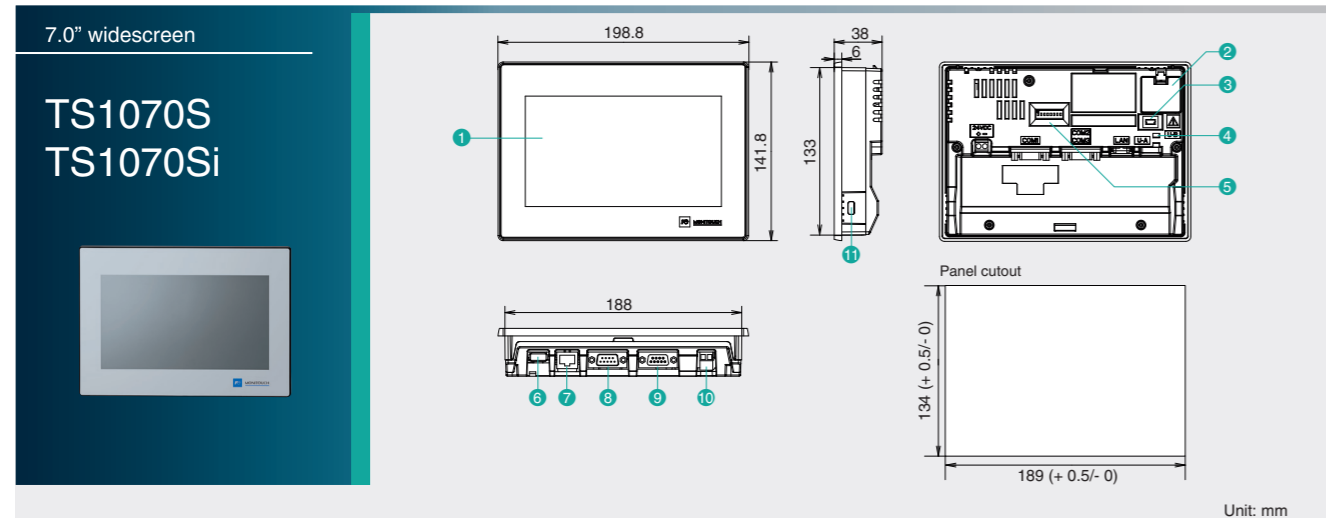
- ◆ High-speed, high precision positioning
  - Frequency response 1500Hz
  - Max motor speed 6000r/min
  - High resolution encoder
    - 18bit ABS/INC 262,144 pulse
    - 20bit INC 1,048,576 pulse
- ◆ Higher cost performance with original main feature
- ◆ New servo operator offers improved usability



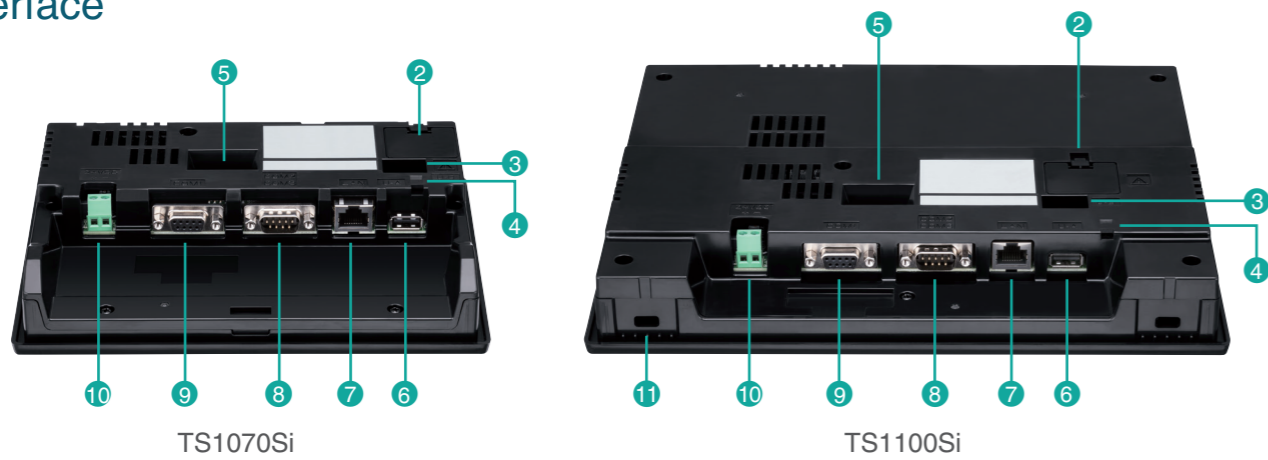
Catalog No. 24C1-E-0010



## Dimensions

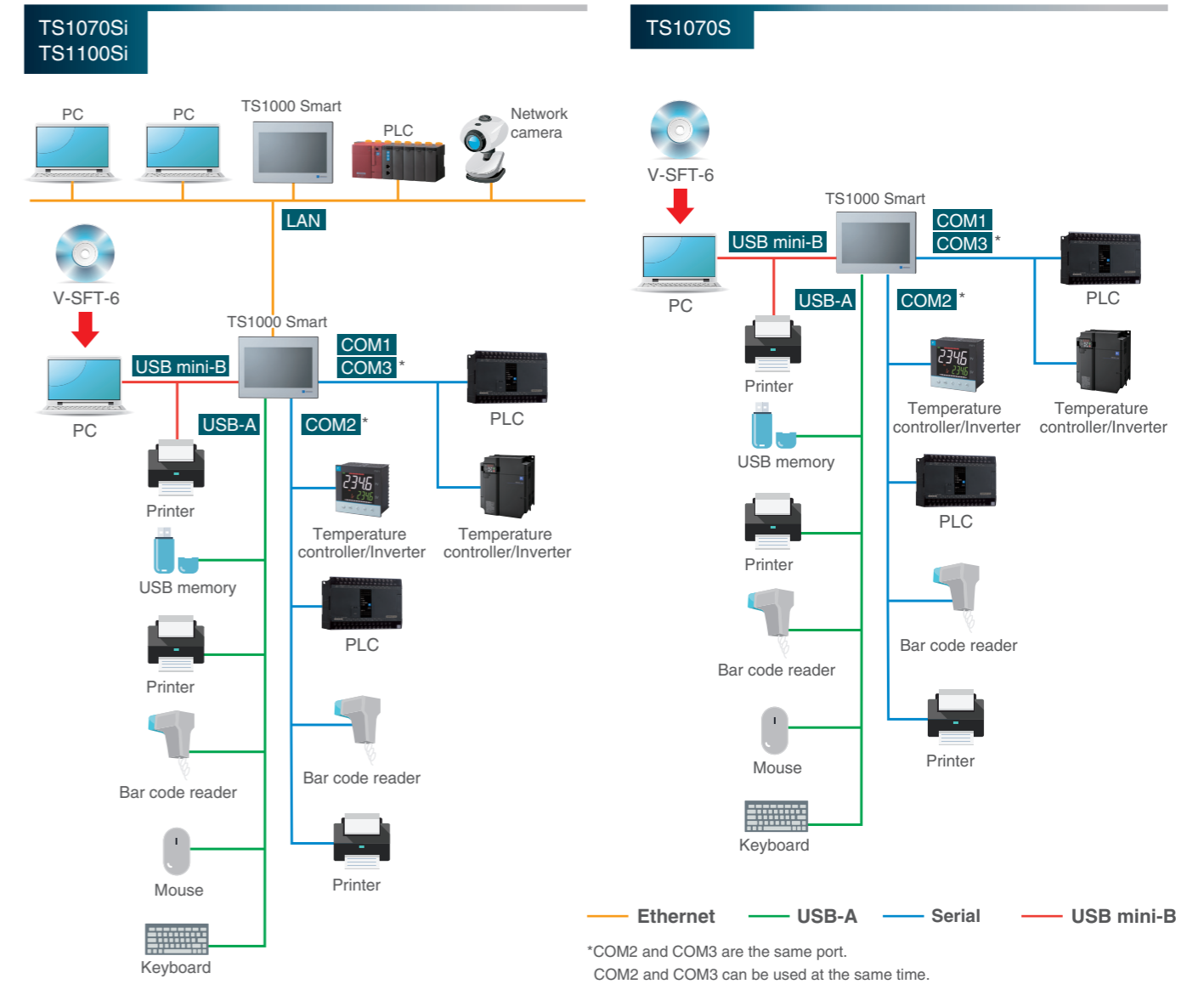


## Interface



- 1 Display
- 2 Battery compartment
- 3 USB mini-B (U-B)
- 4 USB cable retention
- 5 DIP switch
- 6 USB-A (U-A)
- 7 100BASE-TX/10BASE-T connector (LAN)  
\*Only TS1070Si/TS1100Si
- 8 RS-232C/RS-422/RS-485 connector (COM2/COM3)
- 9 RS-422/RS-485 connector (COM1)
- 10 Power input terminal block
- 11 Mounting point

## System Configuration



## Optional Accessories

### Terminal Converter TC-D9

Use the terminal converter if the communication device is connected with TS1000 Smart series via the RS-422/485 block. (COM1)



### Waterproof Gasket TS1070S-WP/TS1100S-WP

Use the waterproof gasket if an IP65 protective structure is necessary. This gasket can be used regardless of the Ethernet connection.



### Cable for USB-A Port UA-FR

The cable is used when connecting the USB-A (sleeve) port via the board. (Cable length: 1 m)



# Connection Device List (PLC)

Manufacturer	Models
Fuji Electric	MICREX-F series
	MICREX-F series V4-compatible
	SPB (N mode) & FLEX-PC series
	SPB (N mode) & FLEX-PC CPU
Allen-Bradley	MICREX-SX SPH/SPB/SPM/SPE/SPF series
	MICREX-SX SPH/SPB/SPM/SPE/SPF CPU
	MICREX-SX (Ethernet)
	PLC-5
Automationdirect	PLC-5 (Ethernet)
	SLC500
	SLC500 (Ethernet TCP/IP)
	NET-ENI (SLC500 Ethernet TCP/IP)
	NET-ENI (MicroLogix Ethernet TCP/IP)
	MicroLogix
	MicroLogix (Ethernet TCP/IP)
	ControlLogix / CompactLogix
	ControlLogix (Ethernet)
	Micro800 Controllers
Azbil	Micro800 Controllers (Ethernet TCP/IP)
	Direct LOGIC (K-Sequence)
	Direct LOGIC (Ethernet UDP/IP)
	Direct LOGIC (MODBUS RTU)
BECKHOFF	MX series
	BMx-x-PLC
CIMON	ADS protocol (Ethernet)
	BP series
DELTA	CP series
	S series
EATON Cutler-Hammer	S series (Ethernet)
	DVP series
EMERSON	DVP series (MODBUS ASCII)
	DVP series (MODBUS TCP/IP)
FANUC	ELC
	EC10/20/20H (MODBUS RTU)
FATEK Automation	Power Mate
	FACON FB series
FESTO	FEC
	APC series Controller
GE Fanuc	90 series
	90 series (SNP-X)
	90 series (SNP)
	90 series (Ethernet TCP/IP)
Hitachi	RX3i (Ethernet TCP/IP)
	HIDIC-S10/2a,S10mini
	HIDIC-S10/2a,S10mini (Ethernet)
	HIDIC-S10/4a
Hitachi Industrial Equipment Systems	HIDIC-S10V
	HIDIC-S10V (Ethernet)
	HIDIC-H
	HIDIC-H (Ethernet)
HYUNDAI	HIDIC-EHV
	HIDIC-EHV (Ethernet)
	HIS Robot (MODBUS RTU)
	H14 Robot (MODBUS RTU)
IDEC	MICRO 3
	MICRO Smart
Jetter	MICRO Smart pentra
	JetControl series2/3 (Ethernet UDP/IP)
JTEKT	TOYOPUC
	TOYOPUC (Ethernet)
	TOYOPUC (Ethernet PC10 mode)
	TOYOPUC-Plus
KEYENCE	TOYOPUC-Plus (Ethernet)
	TOYOPUC-Nano (Ethernet)
	KZ series Link
	KZ-A500 CPU
	KZ/KV series CPU
	KZ24/300 CPU
	KV10/24 CPU
	KV-700
	KV-700 (Ethernet TCP/IP)
	KV-1000
KV-1000 (Ethernet TCP/IP)	
KOYO ELECTRONICS	KV-3000/5000
	KV-3000/5000 (Ethernet TCP/IP)
	KV-7000 (Ethernet TCP/IP)
	SU/SG
LS	SR-T (K protocol)
	SU/SG (K-Sequence)
	SU/SG (MODBUS RTU)
	MASTER-KxxxS
None	MASTER-KxxxS CNET
	MASTER-K series (Ethernet)
	GLOFA CNET
	GLOFA GM7 CNET
	GLOFA GM series CPU
	GLOFA GM series (Ethernet UDP/IP)
	XGT/XGK series CNET
	XGT/XGK series CPU
	XGT/XGK series (Ethernet)
	XGT/XGI series CNET
XGT/XGI series CPU	
MITSUBISHI ELECTRIC	XGT/XGI series (Ethernet)
	A series link
	QnA series link
	QnA series (Ethernet)
	QnH (Q) series link
	QnH (Q) series CPU
	QnU series CPU
	Q00J/00/01 CPU
	QnH (Q) series (Ethernet)
	QnH (Q) series link (multi CPU)
QnH (Q) series (multi CPU) (Ethernet)	
QnH (Q) series CPU (multi CPU)	
QnH (Q) series (Ethernet ASCII)	
QnH (Q) series (multi CPU) (Ethernet ASCII)	
QnU series (built-in Ethernet)	
L series link	
L series (built-in Ethernet)	
L series CPU	
FX2N/1N series CPU	
FX1S series CPU	
FX series link (A protocol)	

As of April 2018

Manufacturer	Models
MITSUBISHI ELECTRIC	FX-3U/3UC/3G series CPU
	FX-3U/3GE series (Ethernet)
	FX-3U/3UC/3UG series link (A protocol)
	FX-5U/5UC series
	FX-5U/5UC series (Ethernet)
	A-link + Net10
	Q170MCP (multi CPU)
	Q170 series (multi CPU) (Ethernet)
	iQ-R series (Built-in Ethernet)
	iQ-R series link
MODICON	iQ-R series (Ethernet)
	MODBUS RTU
MOELLER	PS4
	SYSMAC C
OMRON	SYSMAC CV
	SYSMAC CS1/CJ1
	SYSMAC CS1/CJ1 DNA
	SYSMAC CS1/CJ1 (Ethernet)
	SYSMAC CS1/CJ1 (Ethernet Auto)
	SYSMAC CS1/CJ1 DNA (Ethernet)
	NJ Series (EtherNet/IP)
	FP series (RS232C/422)
	FP series (TCP/IP)
	FP series (UDP/IP)
Panasonic	FP-X (TCP/IP)
	FP7 series (RS232C/422)
RS Automation	FP7 series (Ethernet)
	NX7/NX Plus series (70P/700P/CCU+)
SAIA	N7/NX series (70/700/750/CCU)
	NX700 series (Ethernet)
SAMSUNG	X8 series
	X8 series (Ethernet)
SHARP	PCD
	PCD S-BUS (Ethernet)
Siemens	SPC series
	N plus
SINFONIA TECHNOLOGY	SECNET
	JW series
	JW100/70H COM port
	JW20 COM port
	JW series (Ethernet)
	JW300 series
	JW311/312/321/322 series (Ethernet)
	JW331/332/341/342/352/362 series (Ethernet)
	S5 PG port
	S7
TECO	S7-200 PPI
	S7-200 (Ethernet ISOTCP)
Telemeccanica	S7-300/400 MPI
	S7-300/400 (Ethernet ISOTCP)
TOSHIBA	S7-300/400 (Ethernet TCP/IP protocol)
	S7-1200/1500 (Ethernet ISOTCP)
TOSHIBA MACHINE	TI500/505
	TI500/505 V4 Compatible
TOYO DENKI	SELMART
	TP-03 (MODBUS RTU)
Ultra Instruments	TSX Micro
	T series /V series (T compatible)
VIGOR	T series /V series (T compatible) (Ethernet UDP/IP)
	EX series
WAGO	nv series (Ethernet UDP/IP)
	TC200
XINJE	μ GPCsx series
	μ GPCsx CPU
Yaskawa Electric	μ GPCsx series (Ethernet)
	BL series Distributed I/O (MODBUS TCP/IP)
Yokogawa Electric	UIC CPU (MODBUS ASCII)
	M90/M91/Vision series (ASCII)
	Vision series (ASCII Ethernet TCP/IP)
	M series
	750 series (MODBUS RTU)
	750 series (MODBUS Ethernet)
	XC series (MODBUS RTU)
	Memobus
	CP9200SH/MP900
	MP2300 (MODBUS TCP/IP)
CP/MP expansion memobus (UDP/IP)	
None	MP2000 series
	MP2000 series (UDP/IP)
	MP3000 series
	MP3000 series (Ethernet UDP/IP)
	MP3000 series expansion memobus (Ethernet)
	FA-M3
	FA-M3R
	FA-M3/FA-M3R (Ethernet UDP/IP)
	FA-M3/FA-M3R (Ethernet UDP/IP ASCII)
	FA-M3/FA-M3R (Ethernet TCP/IP)
FA-M3/FA-M3R (Ethernet TCP/IP ASCII)	
FA-M3V	
FA-M3V (Ethernet)	
FA-M3V (Ethernet ASCII)	
Universal serial	
Without PLC Connection	
MODBUS RTU	
MODBUS RTU EXT Format	
MODBUS TCP/IP (Ethernet)	
MODBUS TCP/IP (Ethernet) Sub Station	
MODBUS TCP/IP (Ethernet) EXT Format	
MODBUS ASCII	

# Connection Device List (Temperature Controller/Servo/Inverter)

Manufacturer	Models
Fuji Electric	PYX (MODBUS RTU)
	PXR (MODBUS RTU)
	PXF (MODBUS RTU)
	PXG (MODBUS RTU)
	PXH (MODBUS RTU)
	PUM (MODBUS RTU)
	F-MPC04P (loader)
	F-MPC series/FePSU
	FVR-E11S
	FVR-E11S (MODBUS RTU)
	FVR-C11S (MODBUS RTU)
	FRENIC5000 G11S/P11S
	FRENIC5000 G11S/P11S (MODBUS RTU)
	FRENIC5000 VG7S (MODBUS RTU)
	FRENIC-Ace (MODBUS RTU)
	FRENIC-Eco (MODBUS RTU)
	FRENIC-HVAC/AQUA (MODBUS RTU)
	FRENIC-MEGA (MODBUS RTU)
	FRENIC-MEGA SERVO (MODBUS RTU)
	FRENIC-Mini (MODBUS RTU)
FRENIC-Multi (MODBUS RTU)	
FRENIC-VG1 (MODBUS RTU)	
FRENIC series (loader)	
HFR-C9K	
HFR-C11K	
HFR-K1K	
PPMC (MODBUS RTU)	
FALDIC-α series	
FALDIC-W series	
PH series	
PHR (MODBUS RTU)	
WA5000	
APR-N (MODBUS RTU)	
ALPHA5 (MODBUS RTU)	
ALPHA5 Smart (MODBUS RTU)	
WE1MA (Ver. A) (MODBUS RTU)	
WE1MA (Ver. B) (MODBUS RTU)	
WSZ series	
WSZ series (Ethernet)	
4263 series	
Stepping Motor	
SDC10	
SDC15	
SDC20	
SDC21	
SDC25/26	
SDC30/31	
SDC35/36	
SDC45/46	
SDC40A	
SDC40G	
DMC10	
DMC50 (COM)	
AHC2001	
AHC2001+DCP31/32	
DCP31/32	
NX (CPL)	
NX (MODBUS RTU)	
NX (MODBUS TCP/IP)	
AD4402 (MODBUS RTU)	
AD4404 (MODBUS RTU)	
Presence PLUS (Ethernet/IP (TCP/IP))	
Indra Drive	
LT400 series (MODBUS RTU)	
DP1000	
DB1000B (MODBUS RTU)	
KR2000 (MODBUS RTU)	
LT230 (MODBUS RTU)	
LT300 (MODBUS RTU)	
LT830 (MODBUS RTU)	
PMAC	
PMAC (Ethernet TCP/IP)	
Gammaflux	
TTC2100	
High-Pressure Gas Industry	
R-BLT	
SJ300 series	
SJ700 series	
X-SEL controller	
ROBO CYLINDER (RCP2/ERC)	
ROBO CYLINDER (RCS/E-CON)	
PCON/ACON/SCON (MODBUS RTU)	
IBFL-TC	
Servo Drive 9400 (Ethernet TCP/IP)	
FR-*500	
FR-V500	
MR-J2S-*A	
MR-J2S-*CL	
MR-J3-*A	
MR-J3-*T	
MR-J4-*A	
FR-E700	
J124-04x series	
R1M series (MODBUS RTU)	
E5AK	
E5AK-T	
E5AN/E5EN/E5CN/E5GN	
E5AR/E5ER	
E5CK	
E5CK-T	
E5CN-HT	
E5EK	
E5ZD	
E5ZE	
E5ZN	
V600/620/680	
KM20	
KM100	
V680S (Ethernet TCP/IP)	
High-efficiency AR series (MODBUS RTU)	
CRK series (MODBUS RTU)	
LP-400	
KW series	

As of April 2018

Manufacturer	Models
Panasonic	MINAS A4 series
	SR-Mini (MODBUS RTU)
	CB100/CB400/CB500/CB700/CB900 (MODBUS RTU)
	SR-Mini (Standard Protocol)
RKC	REX-F400/F700/F900 (Standard Protocol)
	REX-F9000 (Standard Protocol)
	SRV (MODBUS RTU)
	MA900/MA901 (MODBUS RTU)
RS Automation	SRZ (MODBUS RTU)
	FB100/FB400/FB900 (MODBUS RTU)
SANMEI	CSD5 (MODBUS RTU)
	Moscon-F50 (MODBUS RTU)
SanRex	Cuty Axis
	DC AUTO (HKD type)
SHARP	DS-30D
	DS-32D
SHIMADEN	SHIMADEN standard protocol
	C series
SHINKO TECHNOS	FC series
	GC series
	DCL-33A
	JCx-300 series
	PC-900
	PCD-33A
	ACS-13A
	ACD/ACR series
	WCL-13A
	S120 (Ethernet ISOTCP)
XA-A*	
TOHO	TTM-000
	TTM-00BT
Tokyo Chokoku Marking Products	TTM-200 (MODBUS RTU)
	MB3315/1010
TOSHIBA	VF-S7
	VF-S9
	VF-S11
	VF-S15
	VF-A7
	VF-AS1
	VF-P7
	VF-PS1
	VF-F51
	VF-MB1
VF-nC1	
VF-nC3	
TOSHIBA MACHINE	VELCONIC series
	G-TRAN series
UNIPULSE	F340A
	F371
	F800
	F720A
YAMAHA	F805A
	RCX142
Yaskawa Electric	DX200 (High-Speed Ethernet)
	UT100
	UT750
	UT550
	UT520
	UT350
	UT320
	UT2400/2800
	UT450
	UT32A/35A (MODBUS RTU)
UT52A/55A (MODBUS RTU)	
UT75A (MODBUS RTU)	
None	μR10000/20000 (Ethernet TCP/IP)
	MODBUS RTU
	MODBUS TCP/IP (Ethernet)

\*The names of the companies and products included in this document are the trademarks or registered trademarks of their respective companies.  
\*TS1070S does not support an Ethernet connection.

## **Safety Considerations**

- For safe operation, read the instruction manual or user manual that comes with the product carefully or consult the distributor from which you purchased the product, before using the product.
- Products introduced in this catalog have not been designed or manufactured for such applications in a system or equipment that will affect human bodies or lives.
- Customers, who want to use the products introduced in this catalog for special systems or devices such as for atomic-energy control, aerospace use, medical use, passenger vehicle, and traffic control, are requested to consult the Hakko Overseas Sales Section.
- Customers are requested to prepare safety measures when they apply the products introduced in this catalog to such systems or facilities that will affect human lives or cause severe damage to property if the products become faulty.
- For safe operation, wiring should be conducted only by qualified engineers who have sufficient technical knowledge about electrical work or wiring.

## **Notes to consider before purchasing**

- Appearance and specifications are subject to modification without prior notice due to technical improvements.
- Colors in the catalog may differ from the actual colors due to printing inaccuracies.
- Consult your distributor or us for further information about products in this catalog.

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