General Specifications

DTSXM
Distributed Temperature Sensor
Middle Range System

GS 39J06B45-01E

DTSX®

■ GENERAL

This General Specification (GS) describes the DTSXM Distributed Temperature Sensor Middle Range System. For information on its associated software, read GS 39J02B45-01E.

■ FEATURES

The DTSXM Distributed Temperature Sensor Middle Range System (DTSXM System) measures the temperature distribution over the length of an optical fiber using the optical fiber itself as the sensing element. The module can be combined with appropriate power supply and optical switch modules to configure a required system. It can be accessed using the optional DTSX200 Control Visualization Software (DTAP200) or via the communications interface of a host computer.

- Easy to integrate in process control system
- Wide Temperature range operation
- Compact and low power consumption

■ CONFIGURATION

The following table lists the hardware and software for configuring a DTSXM System.

Component	Quantity	Description
Distributed temperature sensor (DTSX200)	1	Required
Optical switch module (DTOS2, DTOS4, DTOS16)	1	Optional. Select one optical switch module unit for switching between 2, 4 or 16 channels.
Base module (DTSBM10)	1	Required
Power supply module (NFPW426, NFPW441, NFPW442, NFPW444)	1	One power supply module is required (*1). For details, see GS 34P02Q12-01E or GS 34P02Q13-01E.
CPU module (NFCP050)	1	Optional. For details, see GS 34P02Q13-01E.
Rack mount kit (DTRK10)	1	Optional tray for mounting optical fiber cables.
DTSX200 Control Visualization Software (DTAP200)	1	Optional software for configuring measurement and displaying measurement results. For details, see GS 39J02B45-01E.
DTSX200 data conversion software (DTAP200D)	1	Optional software for converting measurement data into WITSML format. For details, see GS 39J02B45-01E.

*1: Dual-redundant configuration is not allowed
for the power supply module.

● **System Application Example**

The DTSXM System performs temperature profile measurement according to instructions from control and monitoring stations.

A control and monitoring station polls the DTSX200 of the DTSXM System constantly and when measurement data is available, it retrieves and displays the data. The DTSX200 can also convert data to WITSML format (when used with the optional DTAP200D data conversion software) for transmission to a host data server.
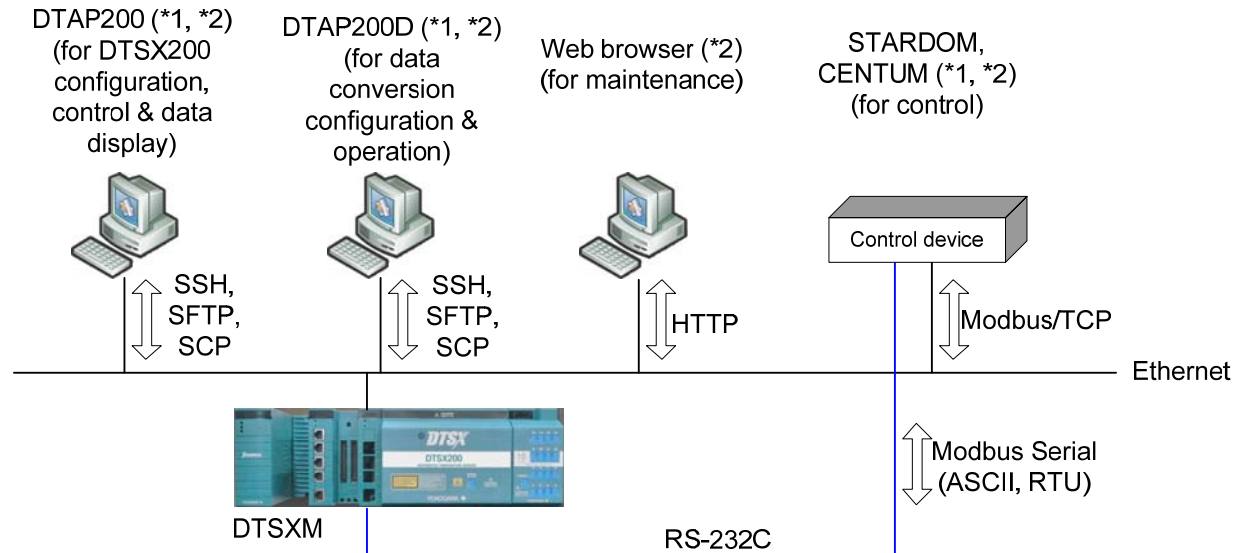
System Configuration Example

(*1) Requires separate purchase.
(*2) Neither hardware nor software is included in this specification.

With built-in support for the Modbus protocol, the DTSX200 can communicate with STARDOM and CENTUM. If a CPU module (NFCP050) is connected to the base module (DTSBM10), the CPU module can communicate with the DTSX200 Distributed Temperature Sensor using the Modbus (Modbus serial or Modbus/TCP) protocol via an RS-232C or Ethernet connection.

● **System Requirements for DTSXM System Maintenance**

The DTSX200 can be accessed using a Web browser for backup, restore, network configuration and other maintenance operations.

■ INSTALLATION REQUIREMENTS (*1)

Item		Specifications
Ambient temperature	Operation	-40 to +65°C (*2)
	Transportation/storage	-40 to +70°C
Ambient humidity	Operation	20 to 80%RH (no condensation)
	Transportation/storage	5 to 85%RH (no condensation)
Rate of change in temperature	Operation	Within ±10°C/h
	Transportation/storage	Within ±20°C/h
Dust		0.3 mg/m^3 or less
Protection class		IP20
Resistance to corrosive gases		ANSI/ISA S71.04 Class G2 (Standard) (ANSI/ISA S71.04 Class G3, option)
Resistance to vibration		0.15mm P-P (5 to 58 Hz), 1 G (58 to 150 Hz)
Resistance to shock		15 G, 11 ms (during power-off, for sine half-waves in XYZ-directions)
Altitude		3000 m or less (*3)
Noise	Electric field	3 V/m or less (26 MHz to 1 GHz)
	Magnetic field	30 A/m (AC) or less, 400 A/m (DC) or less
	Electrostatic discharge	4 kV or less contact discharge, 8 kV or less aerial discharge
Grounding		Type D (100 Ω or less) (*4)
Cooling		Natural air cooling

*1: Not applicable to DTFB10.
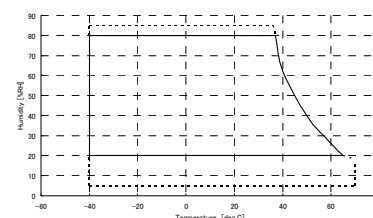*2: 0 to +50°C when optical switch module DTOS16 is used.
   0 to +55°C when power supply module NFPW441, NFPW442 or NFPW444 is used.
   The ambient temperature and humidity range requirements for operation and storage of the DTOS2 and DTOS4 optical switch modules are indicated by solid lines and dashed lines respectively in the figure on the right.
*3: 2000 m or less when power supply module NFPW441, NFPW442 or NFPW444 is used.
*4: Applicable to DTSBM10.

■ COMPLIANT STANDARDS

Item		Specifications (✔:Compliant)	Suffix Code (*13)	
			0:Standard	9:EAC mark
Safety Standards (*1) (*2)		CSA C22.2 No.61010-1-04	✔	
		EN 61010-1:2010	✔	
		EN 61010-2-030:2010 (*14)	✔	
		EN 61010-2-201:2013 (*14)	✔	
		CU TR 004 (*12)		✔
EMC Standards (*1)	CE Marking	EN 55011:2009 +A1 :2010 Class A Group 1 EN 61000-6-2:2005 (*2) (*3) (*4) EN 61000-3-2: 2014 (*10) EN 61000-3-3: 2013 (*10) (*11)	✔	
	RCM	EN 55011:2009 +A1 :2010 Class A Group 1	✔	
	KC Marking	Korea Electromagnetic Conformity Standard	✔	
	EAC Marking	CU TR 020 (*12)		✔
Laser safety (*1) (*5)	Class	IEC 60825-1:2007 Class1M EN 60825-1:2007	✔	✔
	FDA(CDRH)	21CFR Part 1040.10	✔	✔
Standards for Hazardous Location Equipment (*1) (*6) (*7)	FM Nonincendive (*2)	Class I, Division 2, Groups A, B, C, D T4 FM 3600-2011 FM 3611-2004 FM 3810-2005	✔	
	ATEX Type "n" (*8)	II 3 G Ex nA ic [op is] II C T4 Gc X (*9) EN 60079-0: 2012+A11:2013 EN 60079-11:2012 EN 60079-15:2010 EN 60079-28:2015	✔	
	CSA Non-Incendive (*2)	Class I, Division 2, Groups A, B, C, D T4 C22.2 No. 0-10 CAN/CSA-C22.2 No. 0.4-04 C22.2 No. 213-M1987 TN-078	✔	
Restriction of Hazardous Substances	RoHS Directive	EN 50581	✔	

Note: Under EU legislation, the manufacturer and the authorised representative in EEA (European Economic Area) are indicated below:
Manufacturer: YOKOGAWA Electric Corporation (2-9-32 Nakacho, Musashino-shi, Tokyo 180-8750, Japan).
Authorised representative in EEA: Yokogawa Europe B.V. (Euroweg 2, 3825 HD Amersfoort, The Netherlands).

*1: Not applicable to DTRK10 and DTFB10.
*2: To be compliant with these standards, the DTSXM System hardware needs to be installed in a lockable metal cabinet.
*3: For lightning surge immunity, a device such as a lightning arrester needs to be installed externally to Power cable and Network cable.
*4: To be compliant with EMC Standards, Mount three ferrite cores "A1190MN" or "A1193MN" to FG cable, Power cable, Network cable and RS-232-C Communication cables.
*5: Applicable only to DTSX200.
*6: Refer to IM 39J06B45-01E "DTSXM Distributed Temperature Middle Range System Guide" for the products meeting NI.
*7: For modules conforming to explosion-proof standards, refer to the section "List of Modules and Modules Descriptions" of this document.
*8: When DTSXM System is used under the ATEX Type "n" environment, the Instruction Manual, IM 39J06B45-10E "Explosion Protection of DTSXM Distributed Temperature Sensor Middle Range System" is required for safer installation and wiring.
*9: "X" indicates specific condition of use, in a hazardous area of Zone 2, install DTSXM System in a lockable metal cabinet which meets the IP54 or higher protection rating provided in IEC 60529.
*10: Applicable when power supply module NFPW442 is used.
*11: The specified magnitude of the voltage drop determined by the cable wiring length needs be met.
*12: The EAC mark is as follows.

ЕAC

*13: Refer to each suffix code, DTSX200, DTOS2, DTOS4, DTOS16 and DTSBM10.
*14: Applicable when CPU module NFCP050 is used.

■ DISTRIBUTED TEMPERATURE SENSOR (DTSX200)

● General

The DTSX200 measures temperature distribution using a 50/125μmGI optical fiber cable (not included in this specification) as the sensing element.

● Model and Suffix Codes

		Description
Model	DTSX200	DTSX200 Distributed Temperature Sensor
Suffix Codes	-N	Standard type
	0	Standard type
	9	EAC mark
	E	E2000/APC
	N	Basic type
	G	With ISA Standard G3 option
Option Codes	/Z	Tokuchu (*1)

*1: For products whose suffix code contains "/Z" an exclusive document is included. Please read it along with the standard document.

● Specifications

Items			Specifications
Distributed temperature measurements	Distance	Measurement distance range	1 km, 2 km, 3 km, 4 km, 6 km (*1)(*2)
		Sampling resolution	10 cm, 20 cm, 50 cm, 1 m (*1)
		Spatial resolution	1 m (10 to 90%) (*3)
	Temperature	Measurement temperature range	-200 to 300 ° C (*4)
		Temperature resolution	Range Time 1 km 3 km 6 km 10sec 0.5 1.1 4.2 °C 1min 0.3 0.6 2.1 10min 0.1 0.2 0.7 (1sigma, without optical switch) (*5)
Sensor optical fiber	Optical fiber (*6)		50/125 µm GI (No reflection at end of optical fiber)
	Optical connector		E2000/APC
Interface	Serial (RS-232C)		3 ports, non-isolated, RJ45 modular jacks Full duplex, asynchronous
		SERIAL 1	Function: Communication (Modbus) Baud rate: 1.2, 2.4, 4.8, 9.6, 19.2, 38.4 57.6, 115.2 kbps
		SERIAL 2	Function: Communication (Modbus) Baud rate: 1.2, 2.4, 4.8, 9.6, 19.2, 38.4 kbps
		SERIAL 3 (*7)	Function: Maintenance (Private)
	Ethernet interface	LAN	1 port, 10BASE-T (*9) or 100BASE-TX, RJ45 modular jacks, automatic negotiation, automatic MDI, with Network power switch (ON/OFF)
	Display		LEDs: HRDY, RDY, LASER ON
Power supply	Consumption	Operating mode	10 W
		Power save mode	2.1 W
Dimensions (W x H x D)			197.8 x 132.0 x 162.2 mm (6 slots width) (*8)
Weight			2.5 kg

Temperature calibration of the Sensor Optical Fiber for DTSX200 is required before temperature distribution measurement.
*1: Indicated nominal values vary with the length and refractive index of the optical fiber.
*2: Spatial range is selectable from 1, 2 and 3 km when sampling resolution is 10 cm.
*3: The spatial resolution is the distance between the 10% and 90% points on the DTS response to a step temperature change for the near end section of the optical fiber.
*4: If using outside of the described range, please contact our sales representative.
*5: The given values indicate one standard deviation over distance for measurements of constant temperature 20°C with no coupling loss and optical fiber attenuation of 1.25 dB/km for stokes light and 1.465B/km for anti-stokes light. Time values indicate hardware measurement time in fast measurement mode at sampling resolution of 1 meter. A 100 meter section each at the near end and the far end of the optical fiber is excluded.

*6: Fusion splicing of optical fiber with coupling loss of 0.3 dB max. (0.15 dB max. on average)
*7: SERIAL 3 of RS-232C is dedicated for maintenance use.
*8: Dimensions exclude protective cap of optical connector.
*9: A repeater hub cannot connect.

● **Software Functions**

Item		Function
Measurement functions		
	Optical switch control (*1)	Controls channel switching by optical switch DTOS2, DTOS4 or DTOS16.
	Measurement control	Starts measurement and stops measurement
	(Global) measurement settings	Settings for channel combination, measurement sequence, measurement mode (single-ended or double-ended), measurement interval and measurement start time
	Channel settings	Measurement condition settings (repetition rate, measurement time (*2) or averaging times, distance range and sampling resolution)
		Sensor optical fiber settings (optical fiber length, wave number, group index, loss correction, temperature offset correction and winding coefficient (distance-depth conversion factor))
	WITSML data conversion configuration (*3)	WITSML data conversion configuration, destination server configuration for data transfer by HTTP client
	LAS data conversion configuration	LAS data conversion settings and destination server configuration for data transfer by HTTP client
Data processing functions	Temperature data calculation	Calculates temperature by applying various defined corrections.
	Generated data	Temperature distribution data, temperature alarm data and zone temperature data
	Zone temperature data generation (up to 100 zones can be defined)	Data generation zones can be defined with the temperature output data type (average, maximum, minimum, difference or slope) selected for each zone
Detection functions	Temperature alarm settings (Up to 10 alarm zones can be defined)	Alarm detection zones can be defined with temperature high limit, low limit, rise limit, fall limit and difference limit values specified for each zone.
	Optical fiber failure detection	An error and alarm is generated if optical fiber loss exceeds a specified threshold value.
Data management functions	Configuration data	Various settings
	LAS data	Data files in LAS (Log ASCII Standard) format. More than 100 files can be saved. With 1 m sampling over 3 km range, more than 1000 files can be saved.
	WITSML data (*3)	Data files in WITSML (Wellsite Information Transfer Standard Markup Language) format. More than 100 files can be saved. With 1 m sampling over 3 km range, more than 1000 files can be saved.
WITSML data conversion function (*3)		Conversion of configuration and temperature distribution data into WITSML format (WITSML version 1.3.1.1 compatible).
LAS data conversion function		Conversion of configuration and temperature distribution data into LAS format (LAS version 2.0 compatible).
Data transfer functions		Transfers LAS data files or WITSML data files (*3) to HTTP server using PUT or POST.
RAS functions		Fault diagnosis, self-diagnosis, log data generation, error handling and watchdog timer
Maintenance functions		Firmware upgrade, power management, reset processing, time setting and maintenance functions
Authentication functions		SSH, SFTP, SCP and HTTPS; authentication using username and password
User registration functions		Up to 10 users can be registered for use with HTTPS server and SSH server.

*1: Available when DTSX200 is used with optical switch DTOS2, DTOS4 or DTOS16.
*2: The measurement time setting refers to pure measurement time.
   It does not include time for hardware ready, temperature calculation, alarm decision, zone data creation, file creation, data conversion, data transfer and other auxiliary time.
*3: Available when DTSX200 is used with the DTSX200 Data Conversion Software (DTAP200D).

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- **Network Function (Ethernet)**
  Purpose
  Ethernet is used for connecting the DTSX200 to the DTSX200 Control Visualization Software (DTAP200), the DTSX200 Data Conversion Software (DTAP200D), autonomous controllers FCN/FCJ and various types of PLCs. It is also used for maintenance of the DTSX200.

  Communication Functions

	Destination	Maximum Number of Connections (*1)	Description
1	DTSX200 Control Visualization Software (DTAP200)	4	Enables measurement configuration, control and data display for the DTSX200.
2	DTSX200 Data Conversion Software (DTAP200D)	4	Enables configuration of data conversion by DTSX200.
3	Modbus/TCP client	4	The DTSX200 runs as a Modbus/TCP server.
4	SSH client	4	The DTSX200 runs as an SSH server.
5	SFTP client	4	The DTSX200 runs as an SSH server.
6	SCP client	4	The DTSX200 runs as an SSH server.
7	Web browser	No restriction	Enables display of DTSX200 system settings and status. Moreover, modification of system settings, as well as backup/restore and other maintenance operations are allowed when connected with administrator privileges.
8	HTTP server	1	The DTSX200 runs as an HTTP client and transfers measurement data files in LAS format or converted to WITSML format (*2) to the HTTP server using PUT or POST.
9	SNTP server	3	The DTSX200 runs as an SNTP client to synchronize its time with an SNTP server.

  *1: Up to 4 connections of types 1 to 6 combined are allowed.
  *2: Available only when the DTSX200 is used with the DTSX200 Data Conversion Software (DTAP200D).

- **Network Function (serial port)**
  The DTSX200 can exchange data with other devices via the serial port.
  Number of ports: Two (RS-232-C) communications ports
  One port dedicated for maintenance

Destination	Description
Modbus master	The DTSX200 runs as a Modbus serial slave.

- **Modbus Connection Function**
  The DTSX200 can connect with Modbus master devices and Modbus client devices supporting the Modbus communications protocol.

Item	Description
Destination device	Modbus compliant devices
Connection ports	Serial port Ethernet port
Available registers	Input registers (300001 to 365535) Holding registers (400001 to 465535)

  The following communications functions are supported.

Communications Type	Communications Mode	Communications Functions
Serial communications	ASCII mode	Slave
	RTU mode	Slave
Ethernet communications	Modbus/TCP	Server

● **Time Synchronization Function**

The DTSX200 supports time synchronization between SNTP (Simple Network Time Protocol) enabled devices. The DTSX200 can run as an SNTP client.

Item	Client Functions
Communications protocol	SNTP (Simple Network Time Protocol) UDP port: 123
Unicast mode (*1)	Available
Number of connections	3 servers
Time accuracy	±1s
Time correction method	Time retrieval from the server at hourly intervals (unicast mode) (*2)

*1: An SNTP client sends a time request to the SNTP server periodically.
*2: Smooth time transition is adopted to avoid sudden change in time. However, immediate time change (immediate change to specified time) is adopted at startup and exit.

■ CONFIGURATION TOOLS

● **Operating Environment**

The table below shows the system requirements for running configuration tools such as the Maintenance web page on a PC.

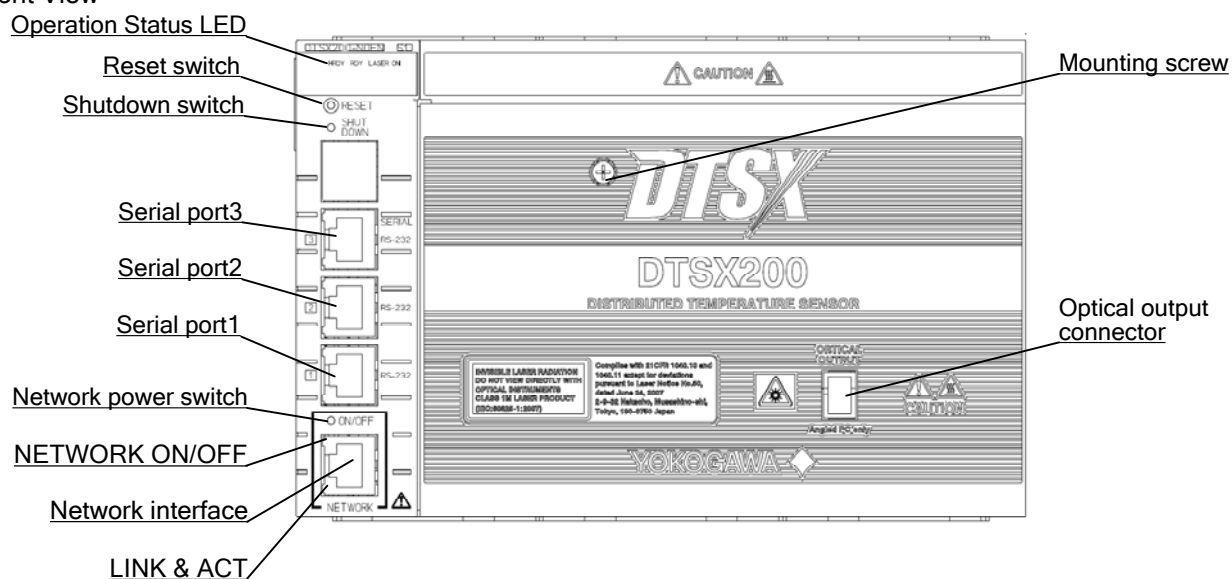| Item	Specification
Personal computer	IBM PC/AT compatible
CPU	Dual-core 32-bit processor 2 GHz or better
RAM	2 GB or more
Hard disk free space	2 GB or more
Ethernet adaptor	100BASE-TX or 10BASE-T
OS	Windows7 Home Premium SP1(x86 / x64) Windows7 Ultimate SP1 (x86 / x64) Windows7 Professional SP1 (x86 / x64) Windows7 Enterprise SP1 (x86 / x64)
Web browser	Internet Explorer 8

● **Software Media**

The DTSX200 user manual, the DTSX200 software and the DTSX200 Configurator are supplied on a CD-ROM.
- DTSX200 user manual (electronic document)
- DTSX200 software
- DTSX200 Configurator

● **Appearance**
Front View

Operation Status LED
Reset switch
Shutdown switch
Serial port3
Serial port2
Serial port1
Network power switch
NETWORK ON/OFF
Network interface
LINK & ACT

Mounting screw
Optical output connector

● **Pin Assignment**
Table Pin Assignment of Serial Port (RS-232)

RJ45 Pin No.	RS-232 Signal Name	Conversion to D-sub Connector	
		D-sub 9pin Male (Straight Cable)	D-sub 9pin Female (Crossover Cable)
1	DCD (Data Carrier Detect)	1	1
2	DSR (Data Set Ready)	6	4
3	RXD (Received Data)	2	3
4	RTS (Request To Send)	7	8
5	TXD (Transmitted Data)	3	2
6	CTS (Clear To Send)	8	7
7	DTR (Data Terminal Ready)	4	6
8	GND (Common Ground)	5	5
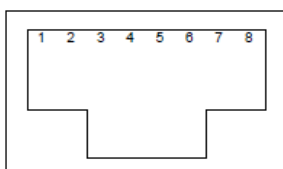
Figure: Front View of RJ45 Connector (RS-232)

● **LEDs**

Status Indicators

LED Indicator	Color	Description
HRDY	Green	Lit when the hardware is operating normally.
RDY	Green	Lit when the system is operating normally.
Laser ON	Green	Lit when the laser is on.

LAN status indicators (near RJ45 modular jacks)

LED Indicator	Color	Description
NETWORK ON/OF	Green	Lit in normal communication mode. Unlit in power down mode.
LINK & ACT	Green	Lit when a LINK is established. Blinks when transmitting or receiving.

● **External Dimensions**

Unit: mm

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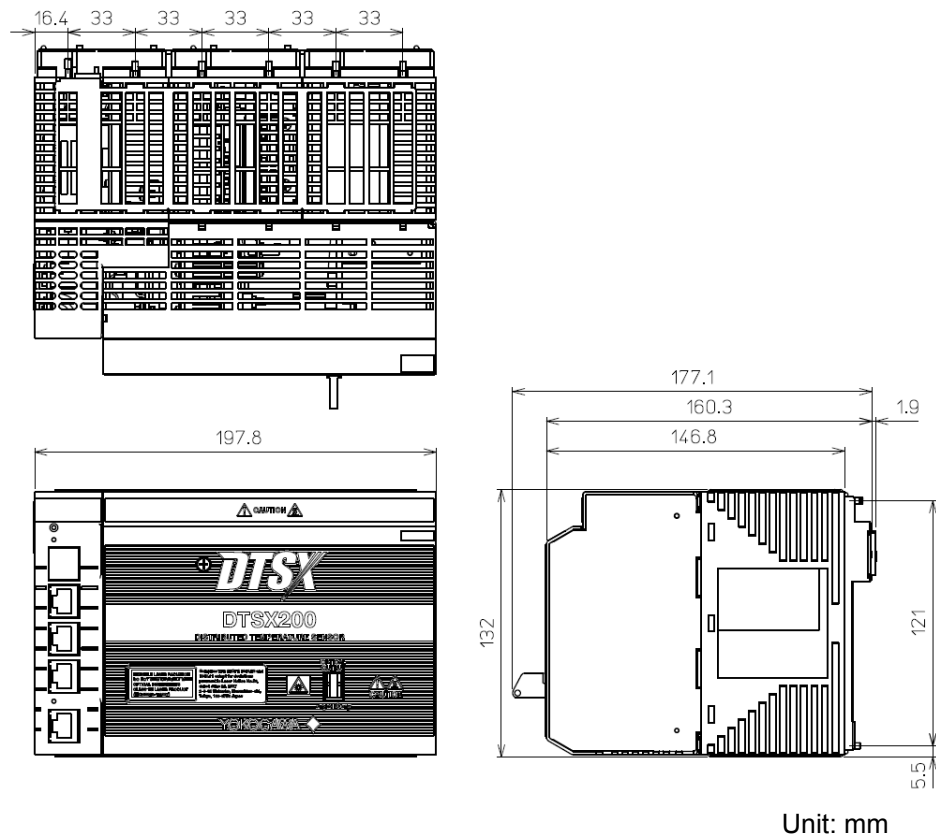
■ OPTICAL SWITCH MODULE (DTOS2, DTOS4, DTOS16)

● General

Installing an optical switch module (2, 4 or 16-channel model) allows monitoring of multiple optical fibers using a single DTSX200.
An optical switch module can also be used in double-ended measurement using DTSX200.

● Model and Suffix Codes

		Description
Model	DTOS2	Optical Switch module 2ch
	DTOS4	Optical Switch module 4ch
	DTOS16	Optical Switch module 16ch
Suffix Codes	-N	Standard type
	0	Standard type
	9	EAC mark
	E	E2000/APC
	N	Basic type
	G	With ISA Standard G3 option
Option Codes	/Z	Tokuchu (*1)

*1: For products whose suffix code contains "/Z" an exclusive document is included. Please read it along with the standard document.

● Specifications

Item		Specifications		
Model		DTOS2	DTOS4	DTOS16
Insertion loss (*1)		0.6 dB (Typical) (*2) 1.4 dB (Max.)	1.0 dB (Typical) (*2) 3.0 dB (Max.)	0.8 dB (Typical) (*2) 1.4 dB (Max.)
Distributed temperature measurements (*3)	Measurement	Single end, Double end		
Sensor optical fiber	Optical fiber	50/125 μm GI, closed end, non refraction required		
	Optical connector	E2000/APC		
	Optical channels	2 channels	4 channels	16 channels
Interface	Control	Controlled by DTSX200		
	Display	LEDs: HRDY, RDY, Alarm, Active channel		
Power supply	Consumption	1 W	1 W	Operating 4.5 W Power save 1 W
Dimensions (W x H x D)　(*4)		65.8 x 130.0 x 160.3 mm (2 slots width)	65.8 x 130.0 x 160.3 mm (2 slots width)	65.8 x 130.0 x 160.3 mm (2 slots width)
Weight		0.6 kg	0.64 kg	0.75 kg

Note: As a guideline, the module should be replaced periodically every 4.7, 6 and 9.5 years for continuous operation of 15-second, 20-second and 30-second measurements, respectively.
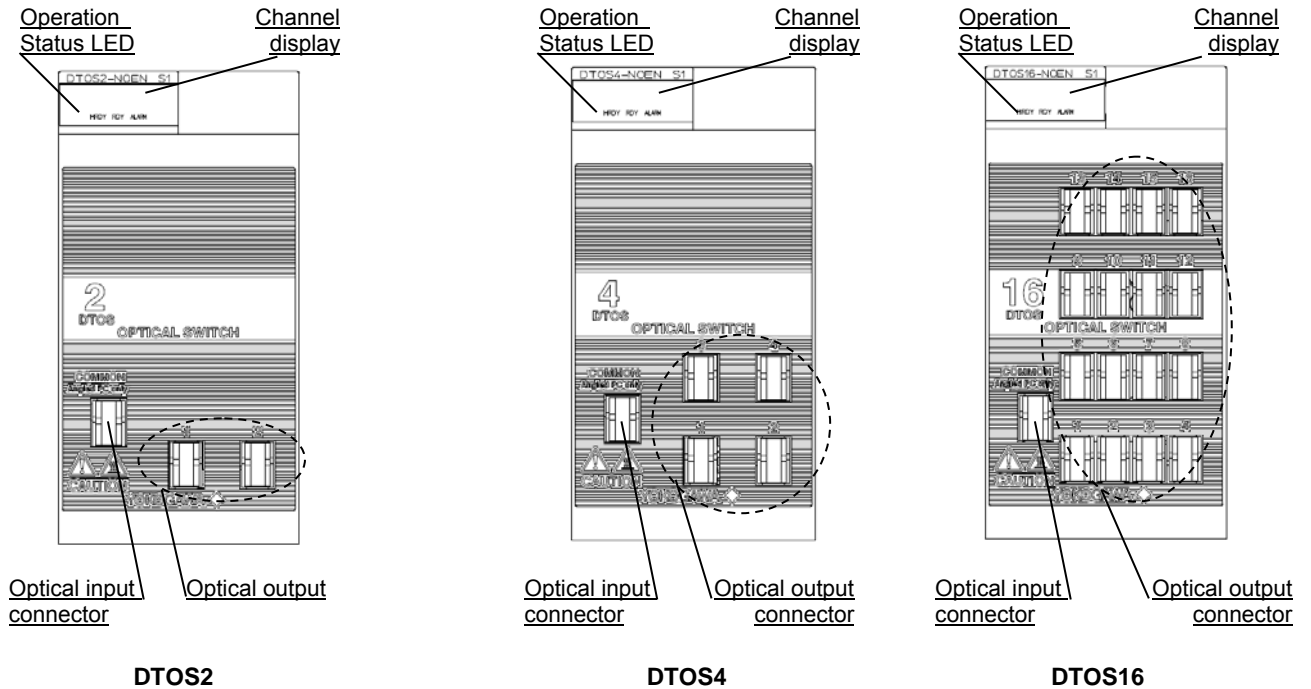*1: One-way loss
*2: These values indicate typical performance at 23°C ambient temperature but are not performance specification values.
*3: When used with DTSX200, the specification and notes of DTSX200 are applicable.
*4: Dimensions exclude protective cap of optical connector.
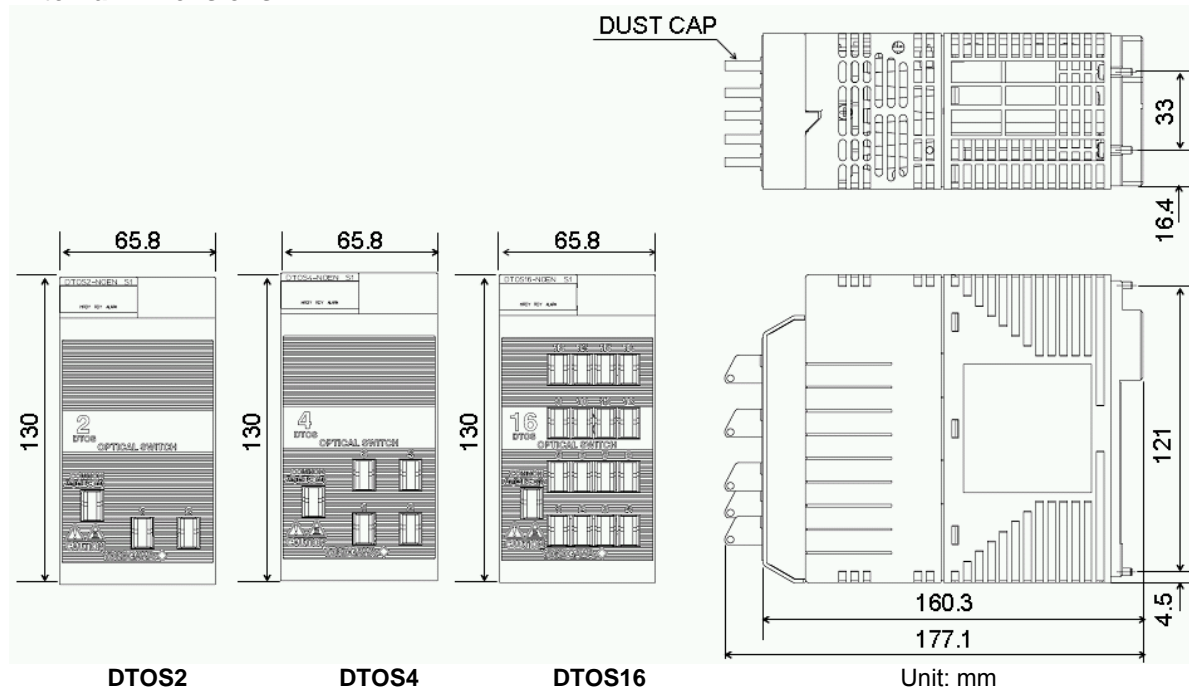
●

● **Appearance**

Front View

DTOS2   DTOS4   DTOS16

● **LEDs**

Status Indicators

LED Indicator	Color	Description
HRDY	Green	Lit when the hardware is operating normally.
RDY	Green	Lit when the system is operating normally.
ALARM	Green	Flashes when an alarm condition is present.
Active Channel	Green	Indicates an active channel.

● **External Dimensions**

DTOS2   DTOS4   DTOS16   Unit: mm

● **Other Information**

The optical switch module cannot be mounted on a STARDOM base module.

■ BASE MODULE FOR DTSX200 (DTSBM10)

● General

The base module for DTSX200 is used for mounting various function modules including the DTSX200 Distributed Temperature Sensor, power supply modules, optical switch modules and CPU modules.
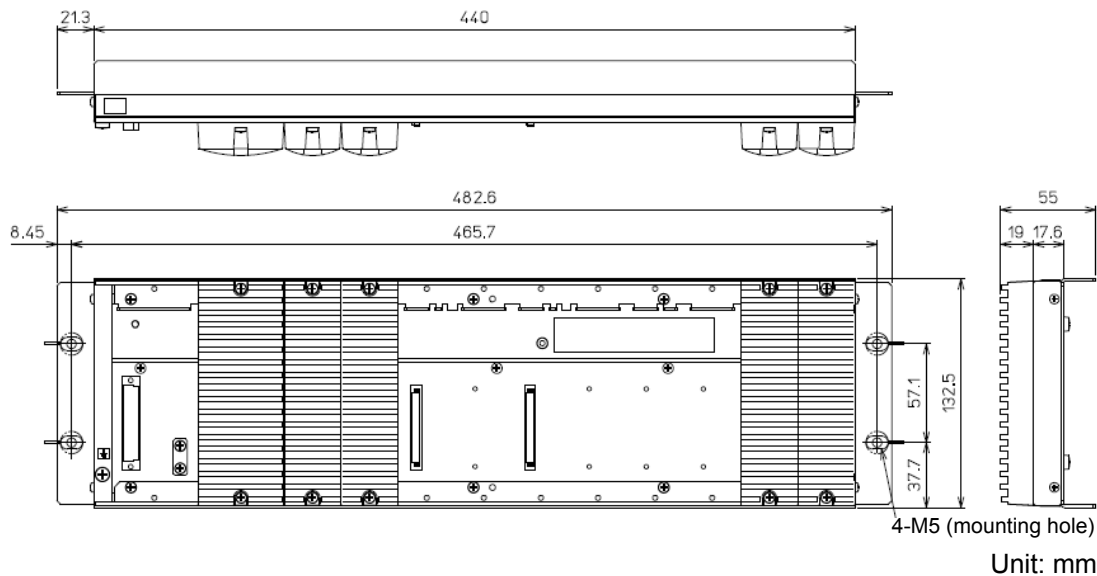
● Model and Suffix Codes

		Description
Model	DTSBM10	Base module for DTSX200
Suffix Codes	-N	Standard type
	0	Standard type
	9	EAC mark
	N	Basic type
	G	With ISA Standard G3 option

● Specification

Item		Specifications
Power supply	Consumption	0.3 W
Dimensions (W x H x D)		482.6 x 132.5 x 55.0 mm
Weight		2.3 kg

● External Dimensions

4-M5 (mounting hole)

Unit: mm

● Other Information

Only power supply modules (NFPW426, NFPW441, NFPW442 and NFPW444) and CPU modules (NFCP050) but no other STARDOM module can be mounted on the base module (DTSBM10).
Dual-redundant configuration for power supply modules and DIN rail mounting are not allowed.

■ RACK MOUNT KIT FOR DTSX200 (DTRK10)

● General
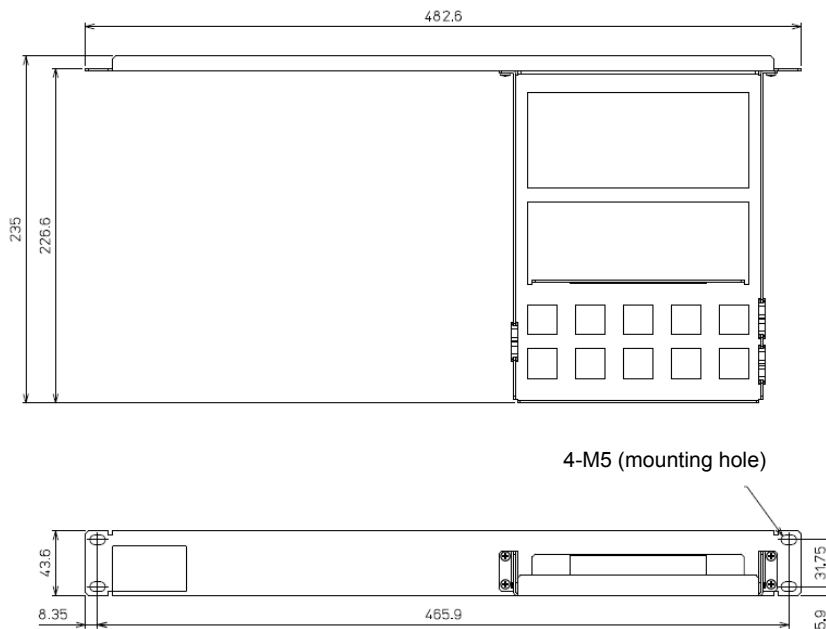The rack mount kit can be used for laying optical fibers in a cabinet.

● Model and Suffix Codes

		Description
Model	DTRK10	Rack Mount kit for DTSX200
Suffix Codes	-N	Basic type
	0	Basic type

● Specifications

Item	Specifications
Dimensions (W x H x D)	482.6 x 235 x 43.6 mm
Weight	0.87 kg

● External Dimensions

4-M5 (mounting hole)

Unit: mm

■ OPTICAL FIBER FOR DTSX (DTFB10)

● General

The optical fiber for DTSX is used for checking the operation of the DTSX200.
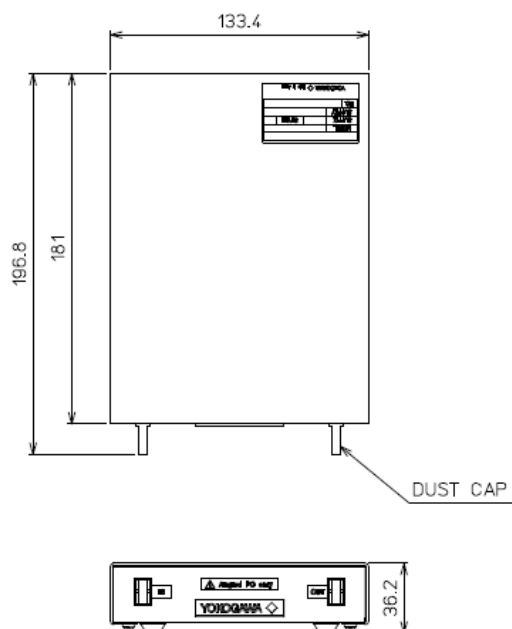
● Model and Suffix Codes

		Description
Model	DTFB10	Optical Fiber for DTSX
Suffix Codes	-N	Basic type
	1	Basic type
	E	E2000/APC

● Specifications

Item	Specifications
Optical Connector	E2000/APC
Optical Fiber	50/125 μm GI
Dimensions (W x H x D)	133.4 x 35.4 x 181 mm (1*)
Weight	0.4 kg

*1: Dimensions exclude protective cap of optical connector

● External Dimensions

Unit: mm

■ POWER SUPPLY MODULE

One of the following power supply modules must be selected when configuring a DTSXM System.
Dual-redundant configuration is not allowed for the power supply module.

Model	Reference (Input voltage range)
NFPW426	10 to 30 VDC
NFPW441	100 to 120 VAC
NFPW442	220 to 240 VAC
NFPW444	21.6 to 31.2 VDC

For the specifications of the power supply modules, see GS 34P02Q13-01E and GS 34P02Q12-01E.

■ CPU MODULE

This is the CPU module for the autonomous controller.
One CPU module of the following model may be optionally installed onto the DTSBM10 base module.

Model	NFCP050

For details on the specifications of the CPU module, see GS 34P02Q13-01E.
Dual-redundant configuration is not allowed for the CPU module.
STARDOM modules including I/O modules, bus repeater modules and serial communication modules cannot be mounted on the DTSBM10 base module.

■ COMBINING SYSTEM COMPONENTS

The tables below show how components can be combined to configure a DTSXM System to suit different applications.

Product	Model	Selection	Operating Temperature Range
DTSX200 Distributed Temperature Sensor	DTSX200	◎	-40 to +65°C
Power supply module	NFPW426	○	-40 to +65°C
	NFPW441	○	0 to +55°C
	NFPW442	○	0 to +55°C
	NFPW444	○	0 to +55°C
Base module	DTSBM10	◎	-40 to +65°C
Optical switch module	DTOS2	▲	-40 to + 65°C
	DTOS4	▲	-40 to +65°C
	DTOS16	▲	0 to +50°C
CPU module	NFCP050	△	-40 to +70°C
Rack mount kit	DTRK10	△	
Optical fiber for DTSX	DTFB10	△	
Control Visualization Software	DTAP200	△	
Data conversion software	DTAP200D	△	

◎: Required

○: Required, select one unit of any model

▲: Optional, select one unit of any model

△: Optional

● Outdoor Selection

DTSX200 Distributed Temperature Sensor	Power supply module	Base module for DTSX200	Optical switch module	CPU module	Rack mount kit	Optical fiber for DTSX	Control Visualization Software	Data conversion software
DTSX200	NFPW426	DTSBM10	DTOS2 DTOS4	NFCP050	DTRK10	DTFB10	DTAP200	DTAP200D
◎	◎	◎	▲	△	△	△	△	△

● Indoor Selection

DTSX200 Distributed Temperature Sensor	Power supply module	Base module for DTSX200	Optical switch module	CPU module	Rack mount kit	Optical fiber for DTSX	Control Visualization Software	Data conversion software
DTSX200	NFPW426 NFPW441 NFPW442 NFPW444	DTSBM10	DTOS2 DTOS4 DTOS16	NFCP050	DTRK10	DTFB10	DTAP200	DTAP200D
◎	○	◎	▲	△	△	△	△	△

● **High Altitude (2000 m to 3000 m) Selection**

DTSX200 Distributed Temperature Sensor	Power supply module	Base module for DTSX200	Optical switch module	CPU module	CPU module	Optical fiber for DTSX	Control Visualization Software	Data conversion software
DTSX200	NFPW426	DTSBM10	DTOS2 DTOS4 DTOS16	NFCP050	DTRK10	DTFB10	DTAP200	DTAP200D
◎	◎	◎	▲	△	△	△	△	△

● **List of Modules and Modules Descriptions**

Type	Model	Function	Explosion Protection		
			FM NI	**ATEX**	**CSA**
				Type "n"	**NI**
DTSX200 Distributed Temperature Sensor	DTSX200	Distributed temperature sensor	∠	∠	∠
Power supply module	NFPW426	Power supply module (10 to 30 V DC input)	∠	∠	∠
	NFPW441	Power supply module (100 to 120 V AC input)	∠	-	∠
	NFPW442	Power supply module (220 to 240 V AC input)	-	-	-
	NFPW444	Power supply module (21.6 to 31.2 V DC input)	∠	∠	∠
Base module for DTSX200	DTSBM10	Base module for DTSX200	∠	∠	∠
Optical switch module	DTOS2	Optical switch module (2ch)	∠	∠	∠
	DTOS4	Optical switch module (4ch)	∠	∠	∠
	DTOS16	Optical switch module (16ch)	∠	∠	∠
CPU module	NFCP050	CPU module	∠	∠	∠
Rack mount kit	DTRK10	Rack mount for optical fiber	N.A.	N.A.	N.A.
Optical fiber for DTSX	DTFB10	Optical fiber for DTSX	N.A.	N.A.	N.A.

∠: conforming
- : Not conforming yet
N.A.: Not applicable
For the details of the power supply modules and the CPU module, see GS 34P02Q13-01E and GS 34P02Q12-01E.

■ CABLING AND INSTALLATION PRECAUTIONS

For details on cable connection and installation procedures, see IM 39J06B45-01E.
For details on how to install power supply modules and CPU modules, also see TI 34P02Q91E.

■ OPTICAL FIBER HANDLING PRECAUTIONS

- Use optical connectors and optical fibers specified in the product specification.
- Clean the endface of the optical connector to remove dirt, dust, oil film and other contaminants before connection.
- Ensure that the endface of the optical connector is free of scratch marks. Otherwise, it may damage the peer optical connector.
- Ensure that optical connectors are securely connected and locked.
- Follow proper procedures when laying optical fiber cables. Do not subject the cable to excessive tension, lateral pressure, tight bending or twisting.

■ ORDERING INFORMATION

Specify the model and suffix codes when placing an order.

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