

No. JSP 5415-065

Date : 24 Jul, 2015



SPECIFICATION

FOR

Fiber-Optic Distributed Temperature Sensing System

OPTHERMO : FTR3000



History of Revisions

No.	Description of revision	Date	Established	Checked	Approved
—	Initial issue	24 Jul. 2015	N.Hashimoto	T.Shioji	K.Hashiba



1. General

1.1 Preface

This specification covers Fiber-Optic Distributed Temperature Sensing System “FTR3000” DTS Unit only.

1.2. Warranty

SEI/JPS warrants that the delivered products meet this specification at the final inspection in productions. If the delivered products do not appear to meet this specification and SEI/JPS agrees such non-conforming condition, SEI/JPS will repair or replace such defective products. SEI/JPS makes no warranty, however, as to the result to be obtained from the use of these products. In no event shall SEI/JPS be liable for removal or installation costs or other indirect or consequential damages.

2. Specification

Model type: FTR3000 Unit

2.1 Environmental condition

FTR3000 shall be placed at an air-conditioned in-door room or non-dipped area. The detail of environmental condition is shown in below.

(1) Operating Temperature	0~40deg.C
(2) Storage Temperature	-20~60deg.C
(3) Relative humidity	less than 85%R.H.(Non-dipping)
(4) Supplied Power	DTS Main Unit: DC10.5V~13.5V AC Adapter: AC90V~264V, 47Hz~63Hz
(5) Power Consumption	DTS Main Unit: 15W (Max) (@DC12V) In the case of using AC adapter: 0.6A (Max) (@AC100V)

2.2 General Specification

(1) Optical Pulse Wavelength	785nm±7nm
(2) Applicable Optical fiber	GI 50/125 MMF (ITU-T Rec. G.651)
(3) Laser Classification	Class1 (IEC60852-1-2001)
(4) Applicable Optical Connector	E2000/APC polished
(5) Dimension	300W x 160D x 37H (mm) (excluding protrusion)
(6) Weight	Approx. 3.0kg (excluding AC/DC adapter)
(7) Communication Interface	LAN: 1 port (RJ45) USB: 1 port (USB1.1 Standard B type)
(8) Storage Media	SD Memory Card (CLASS4 or less , Max. 2GB)
(9) Appearance	Drawing No. JPH401428



2.3 Measurement Performance

- (1) Measurement Range 500/1500/2200m
- (2) Sampling Resolution 1m
- (3) Integration times $2^{16} \sim 2^{23}$ (Approx. 10seconds~4min)
- (4) Temperature Accuracy¹⁾ $\pm 1\text{deg.C} (@2\text{km}, 2^{21})$ (Typ.)
 $\pm 2\text{deg.C} (@2\text{km}, 2^{21})$ (Max.)
- (5) Spatial Resolution²⁾ no more than 3m (10-90%)
- (6) Temperature Resolution³⁾ vs. Measuring Time

Measuring Time ⁴⁾		Distance	500m	1000m	2000m
7sec(2^{17} , 500m Range)	Typ.		1.0deg.C	-	-
	Max.		2.0deg.C		
49sec(2^{21} , 1500m range)	Typ.		0.35deg.C	0.50deg.C	-
	Max.		0.70deg.C	1.0deg.C	
63sec(2^{21} , 2000m Range)	Typ.		0.35deg.C	0.50deg.C	1.0deg.C
	Max.		0.70deg.C	1.0deg.C	2.0deg.C

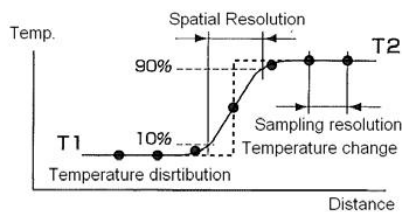
Note:

1) Temperature Accuracy Definition:

The maximum deviation between the true temperature and the average temperature over the valid points (50meters) at full operating temperature range; which measured after system calibration at 20deg.C

2) Spatial Resolution Definition:

Distance from 10% (T1) to 90% (T2) of temperature step change



3) Temperature Resolution Definition:

One standard deviation over space of the valid points (50meters)

4) Measuring time is measured PC with OPTHERMO control software and save Temperature data. In the case of self-monitoring mode and saving temperature data on SD memory card, measuring time increases 8seconds additionally.

※the above performance is measured by optical fiber recommended by our company. And this measurement performance depends on optical fiber specification and number of joint point.

2.4 System Functions

- (1) Measuring Mode PC control mode³⁾ / Self-Monitoring mode⁴⁾
- (2) Temperature Alarm Detection Upper threshold decision: 2 levels
Lower threshold decision: 2 levels
Rate of Rise decision: 2 levels



(3) No. of Applicable Alarm section	Up to 99 sections
(4) Alarm Output ^{1) 2)}	Photo-coupler, 4 outputs Voltage (Max) 280V ON Current (Max) 120mA ON Resistance (standard) 150m
(5) Data contents	Temperature / Raman Stokes & Anti-Stokes selectable
(6) Self-check Function	Fiber break detection / Media storage error / Internal reference temperature error / LD fault / APD fault / Power error / Electric Circuit error / Optical Circuit error

Note:

- 1) In the case of Self-Monitoring mode
- 2) Output information of temperature alarm and system alarm is available
- 3) PC control mode measures temperature distribution and determines alarm condition using control PC with OPTHERMO software. The detail of software function. Refer to Software Specification about the detail of software function.
- 4) Self-monitoring mode measures temperature distribution on its own using measurement parameter preserved on SD Memory card and determines alarm condition without control PC with OPTHERMO software.

2.5 Mechanical Specification

(1) Vibration resistance	10-500Hz, 1.5g, 1.0octave/min, 3axis n, 3axis (Telcordia GR-196-CORE 4.2.2)
(2) Shock resistance ¹⁾	Free fall (height: 760mm) (Telcordia GR-196-CORE 4.2.1)

Note:

- 1) Property in packing form

2.6 OPTHERMO control software

(1) Temp. data display	max. 8 data visible simultaneously (Refer to Fig.1)
(2) Temp. Alarm Detection	Upper threshold decision: 2 levels Lower threshold decision: 2 levels Rate of Rise decision: 2 levels
(3) No. of Applicable Alarm section	Up to 400 sections
(4) Alarm indication	Alarm window Pop-Up / Beep Alarm output contacts (DO board is required on control PC)
(5) Historical Record	Temperature alarm monitoring / System alarm monitoring
(6) Statistical Data	1record/day Temperature (Max, Low, Average) / Location (Max, Low) / time (Max, Low) 1record/trace Temperature (Max, Low, Average) / Location (Max, Low) / time (Max, Low)
(7) Data convert	CSV convert is available

*OPTHERMO control software is included in attached CD-ROM.

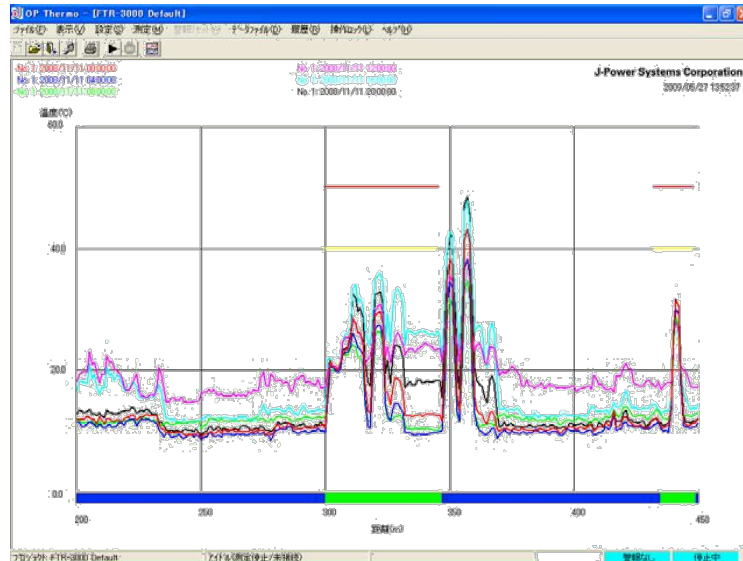


Fig.1. Example: display view

2.7 Attachment

- (1) AC/DC Adapter 1set
- (2) LAN cable (Cross) 2meter x 1set
- (3) USB cable 1.5meter x 1set
- (4) Optical pig-tail cord (E2000 / APC polished) 3meter x 1set
- (5) CD-ROM (OPTHERMO control software, User's manual)

2.8 Notices

USB cable is for temporary monitoring only. In the case of Continuous monitoring, LAN cable connection is recommended.

2.9 Item List

Item list is shown in Table1.

Table1. Item List

No.	Item	Type	Q'ty
1	OPTHERMO	FTR3000	1set
2	OPTHERMO control software	—	1set
3	AC/DC adapter	UNIFIVE	1set
4	LAN cable (Cross)	More than category 5	1set
5	USB cable	USB2.0 Hi-speed1	1set
6	Optical pig-tail cord	E-2000/APC polished	1set



2.10 Packing form

All Products are delivered that Item No.1 to No.6 are housed in cardboard box.



Fig.2 packing form



3. Testing and Inspection

3.1 General Test

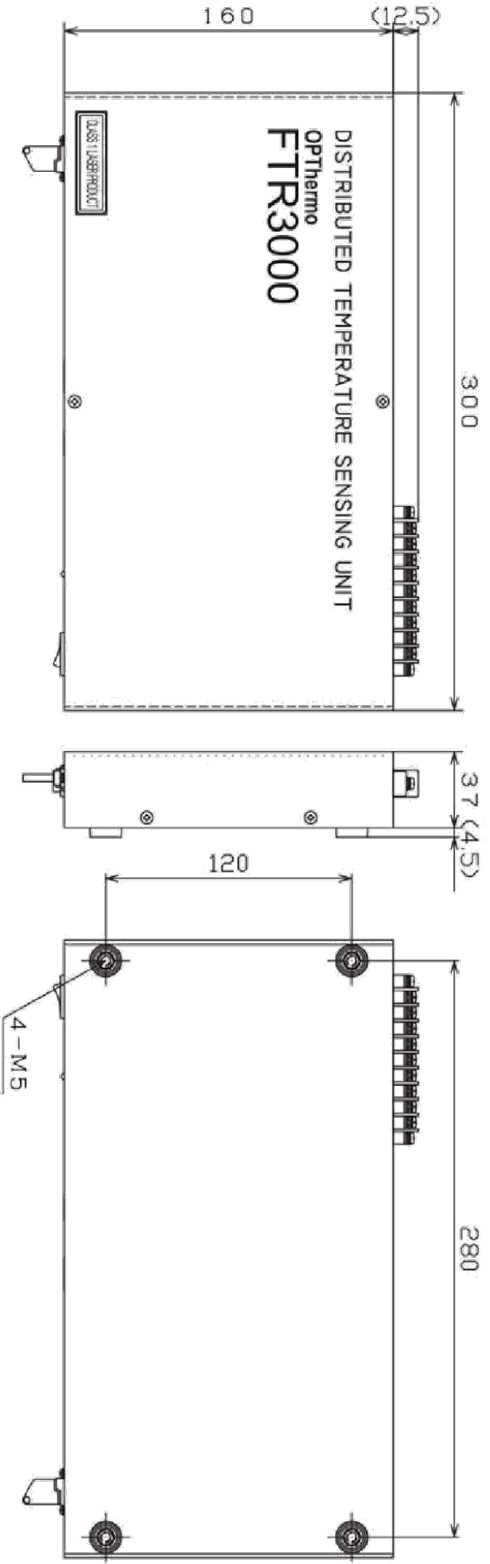
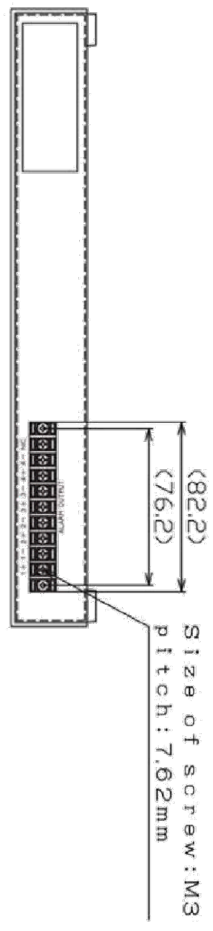
No.	Item	Specification	remark
1-1	Structure	JPH401428	
1-2	Appearance	Visual check	
1-3	Attachments	As specified	

3.2 Performance Test

No	Item	Specification	Definition	Test method				Remark	
				DTS Temp.	Integration times	Distance	Fiber Temp.		Process
1	Measurement Distance	2km	DTS unit shall be measured up to 2km.	Normal temp.	2 [√] 21		Normal temp.		
2	Sampling Resolution	1m	Measurement data shall be displayed every 1meter.	Normal temp.	2 [√] 21		Normal temp.		
3	Temperature Accuracy	<±2.0deg.C	The maximum deviation between the true temperature and the average temperature over the valid points (50meters) at full operating temperature range.	0deg.C 20deg.C 40deg.C	2 [√] 21	Near end 500m 1000m 2000m Far end (reference)	60deg.C (near, far end) 20deg.C (middle)	Average temp. /1trace	
4	Temperature Resolution	500m : <±0.70deg.C 1000m : <±1.0deg.C 2000m : <±2.0deg.C	One standard deviation over space of the valid points (50meters)	0deg.C 20deg.C 40deg.C	2 [√] 21	Near end 500m 1000m 2000m Far end (reference)	60deg.C (near, far end) 20deg.C (middle)	1 ^σ (one standard deviation) 50m/1trace	
5	Spatial Resolution	≤3m	Distance from 10% to 90% of temperature step change.	Normal temp.	2 [√] 21	Near end	Temp. difference: 40deg.C		



REV	DESCRIPTION	DATE	DRAWN	DESIGNED	APPROVED



Main body material: Steel
Painting color: 5Y8/1

DRAWN	Mishimoto	SCALE	1/5
DESIGNED	Tsuno	SCALE	1/5
APPROVED	Kishida	SCALE	1/5
FTR3000			
DRG.No. JPH401428			

SUMITOMO ELECTRIC INDUSTRIES, LTD.