



Manufacturer

TLV CO., LTD.

Kakogawa, Japan

is approved by LRQA Ltd. to ISO 9001/14001



Instruction Manual

(Information for use in hazardous locations)

iTrapSensor Monitoring System
Surface Temperature/Ultrasound Sensor
iT5-FF-SUN-H/L-PD Series

For ENTITY Field Device

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Introduction

Thank you for purchasing the TLV monitoring system, iT5.

When the product is delivered, before doing anything else, check the specifications and external appearance to make sure nothing is out of the ordinary. Also be sure to read this manual carefully before use and follow the instructions to be sure of using the product properly.

To ensure safe and correct use of this product, be sure to observe the safety precautions listed in this manual as they relate to installation, operation, maintenance and repair of the product. Please keep it in a safe place for future reference.

TLV accepts no responsibility for incorrect use of the product by the customer or any third-party, malfunction occurring during use, other defects and any damage caused by this product, excluding cases in which it is under obligation to pay reparations by law.

This product has undergone strict quality management and product inspection before being shipped from the factory. However, in the event of malfunction or defects, please contact your local TLV representative or the TLV customer service center.

This instruction manual and product are subject to modification without notice, for the purpose of improvement.

Unauthorized reprinting or reproduction, in whole or in part, of this instruction manual or contents of the hardware/software of the product is strictly prohibited.

Safety Considerations

- Read this section carefully before use and be sure to follow the instructions.
- Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.
- The precautions listed in this manual are designed to ensure safety and prevent equipment damage and personal injury. For situations that may occur as a result of erroneous handling, three different types of cautionary items are used to indicate the degree of urgency and the scale of potential damage and danger: DANGER, WARNING and CAUTION.
- The three types of cautionary items above are very important for safety: be sure to observe all of them as they relate to installation, use, maintenance, and repair. Furthermore, TLV accepts no responsibility for any accidents or damage occurring as a result of failure to observe these precautions.

Symbols

	Indicates a DANGER , WARNING or CAUTION item.
	Indicates an urgent situation which poses a threat of death or serious injury
	Indicates that there is a potential threat of death or serious injury
	Indicates that there is a possibility of injury or equipment / product damage
	Do not disassemble or modify. Failure to observe this precaution could result in personal injury, electrocution, ignition or fire.
	Do not wipe/rub the surfaces of this product with a dry cloth etc. There is the danger of electrostatically charging the unit, which may result in ignition or explosions, especially in hazardous locations.
	Do not use this product in hospitals or airplanes. Failure to observe this precaution could result in malfunction of medical equipment, instrumentation, etc.
	Ensure the specifications for the intrinsically safe structure of this product meet the requirements for installation in hazardous locations. Specifications for the intrinsically safe structure of this product are described in the "Specifications" section.
	Aluminum is used in this product. Do not expose the product to impact or friction. Exposure to impact or friction may result in ignition or accidental explosions.
	When installing or working at high elevations, take measures to ensure against dropping the product or parts. Failure to take such measures could result in personal injury if persons passing below are struck by a falling object, or other accidents.

Continued on the next page

 DANGER	The equipment contains non-metallic materials and that the user should consider the performance of these materials with respect to chemicals which may be present in the hazardous area. If in doubt, please contact the manufacturer.
	In order to change from the normal communication mode to simulation mode, turn the TEST switch on, however do not operate the switch or use in hazardous areas when the TEST switch is on.
 WARNING	As this is an industrial product, it is not to be used on consumer applications nor in residential areas.
	Do not substitute components, as this may impair the intrinsic safety of the product.
	Do not install this product on objects exceeding maximum allowable operating temperature. Overheating could result in damage to internal parts, excessive heat generation, rupture or ignition.
	Do not subject the unit to strong shocks or throw it against anything. Failure to observe this precaution could result in damage to internal parts, excessive heat generation, rupture, ignition or personal injury.
	Do not place device in microwave ovens or high-pressure vessels, or in the vicinity of electromagnetic devices. Such handling could result in excessive heat generation, smoke, damage to circuitry, battery fluid leakage, rupture or ignition.
 CAUTION	Do not allow any foreign matter to enter the unit. In areas with small foreign matter such as metal dust, use the product after taking measures to prevent foreign matter entering the unit. Failure to observe this precaution could result in fire or malfunction.
	Do not let the unit become immersed in water. If liquid gets inside the unit, it may result in excessive heat generation, electrical shock or unit malfunction. Be mindful of the location of use and handling.

Règles de sécurité

- Lire attentivement cette section avant l'utilisation et respecter les instructions données.
- Toute installation, inspection, entretien, réparation, démontage, ajustement et ouverture/fermeture de vanne doit être fait uniquement par une personne formée à l'entretien.
- Les précautions reprises dans ce manuel ont pour but de garantir la sécurité et de prévenir tout dommage matériel et blessure humaine. Pour les situations potentiellement dangereuses qui pourraient survenir à la suite d'un maniement impropre, trois types de signaux sont utilisés pour indiquer le degré d'urgence et de dégât potentiel: DANGER, AVERTISSEMENT et ATTENTION.
- Les trois types de symboles énumérés ci-dessous sont très importants pour votre sécurité: n'oubliez pas de les respecter, car ils concernent aussi bien l'installation et l'utilisation que l'entretien et les réparations. D'autre part, TLV n'accepte aucune responsabilité pour tout accident ou dégât survenant à la suite d'un non-respect de ces précautions.

Symboles

	Indique un signal DANGER, AVERTISSEMENT ou ATTENTION.
	Indique une situation d'urgence avec risque de mort ou de blessure grave.
	Indique une situation pouvant entraîner la mort ou des blessures graves.
	Indique un risque de blessure ou de dégât matériel au produit et/ou aux installations.
	Ne pas démonter ou modifier le produit. Le non-respect de cette règle peut entraîner des blessures, chocs électriques, brûlures, incendies. Ne pas frotter/essuyer la surface du produit avec un chiffon sec. Il y a un risque de charger en électricité statique l'appareil. Cela peut provoquer un incendie ou une explosion, particulièrement dans des zones dangereuses. Ne pas utiliser ce produit dans un hôpital ou un avion. Le non-respect de cette règle pourrait provoquer le dysfonctionnement d'équipements médicaux, d'instrumentations, etc. Assurez-vous que les spécifications à sécurité intrinsèque de ce produit répondent aux exigences pour l'installation dans des zones dangereuses. Les spécifications à sécurité intrinsèque de ce produit sont décrites dans la section « Spécifications ». Ce produit contient de l'aluminium. Ne pas soumettre au choc ni au frottement. Cela pourrait provoquer un incendie ou une explosion.

Suite à la page suivante

 DANGER	Lors de l'installation ou de l'utilisation dans des lieux en hauteur, prenez des mesures pour éviter de laisser tomber le produit ou des pièces. Le non-respect de cette règle pourrait entraîner des blessures si des personnes passaient en dessous et étaient attentes par un objet tombant ou autres accidents. Cet appareil contient des matériaux non-métalliques. L'utilisateur doit prendre en considération les interactions possibles de ces matériaux avec des produits chimiques dans une zone dangereuse. Pour tous renseignements complémentaires, veuillez vous adresser au fabricant. Pour passer du mode de transmission normal au mode simulation, actionnez l'interrupteur TEST. Ne pas actionner l'interrupteur ou utiliser l'appareil en mode simulation dans une zone dangereuse.
 AVERTISSEMENT	Comme il s'agit d'un produit industriel, il ne doit pas être utilisé pour des applications grand public ni dans les zones résidentielles. Ne pas remplacer les composants du produit, au risque de compromettre sa sécurité intrinsèque. Ne pas installer le produit sur des objets dépassant la température maximum admissible d'opération. Une surchauffe pourrait entraîner des dommages aux pièces internes, générer une chaleur excessive, une rupture ou une inflammation. Ne pas soumettre l'appareil à des chocs violents ni le projeter. Le non-respect de cette précaution pourrait entraîner des dommages aux pièces internes, provoquer une chaleur excessive, la rupture, l'inflammation ou des blessures. Ne pas placer l'appareil dans un four à micro-onde ou un récipient sous haute pression, ni à proximité de dispositifs électromagnétiques. Cela pourrait entraîner une génération excessive de chaleur, de la fumée, des dégâts aux circuits, des fuites de liquide de la batterie, une rupture ou une inflammation.
 ATTENTION	Faire en sorte qu'aucun corps étranger ne pénètre dans l'appareil. Dans les zones avec des particules fines telles que la poussière métallique, prendre des mesures pour éviter que les corps étrangers ne pénètrent dans l'appareil. Le non-respect de cette précaution pourrait entraîner un incendie ou un dysfonctionnement. Ne pas immerger l'équipement dans l'eau. Si un liquide pénètre dans l'appareil, cela peut entraîner une chaleur excessive, un choc électrique ou un dysfonctionnement. Prêter toujours attention au lieu où vous manipulez l'appareil.

Conditions of safe use (Information for use in hazardous locations)

- Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. This is particularly important if the equipment is installed in a zone 0 or Division 1 location. In addition, the equipment shall only be cleaned with a damp cloth.
- The enclosure is manufactured from aluminum alloy. In rare cases, ignition sources due to impact and friction sparks could occur. This shall be considered during installation, particularly if the equipment is installed in a zone 0 or Division 1 location.
- Maximum ambient temperature is different depending on measuring surface temperature and model type. Read ambient temperature range in specification chart carefully before use.

Conditions d'utilisation sans danger (information pour l'utilisation du produit dans des zones dangereuses)

- Dans certaines situations extrêmes, les pièces non métalliques intégrées dans cet équipement peuvent générer un niveau de charge électrostatique capable de provoquer des inflammations. Par conséquent, l'équipement ne doit pas être installé dans un lieu où les conditions externes sont propices à l'accumulation de charges électrostatiques ; en particulier, si l'équipement est installé dans une zone 0 ou un espace classé division 1. De plus, l'équipement ne doit être nettoyé qu'avec un chiffon humide.
- Le boîtier de l'équipement est constitué d'alliage d'aluminium. Dans certains cas, des chocs et des frictions causant des étincelles peuvent provoquer des inflammations. Cela doit être pris en compte lors de l'installation, en particulier si l'équipement est installé dans une zone 0 ou un espace classé division 1.
- La température ambiante maximale dépend de la mesure de la température superficielle et du modèle. Lisez attentivement la plage de température ambiante utilisable dans le tableau de spécifications avant utilisation.

Intrinsic Safety Specifications

This instrument complies with the “Constructional Requirements for Electrical Equipment for Explosive Atmospheres” (Japan) as an “Intrinsically safe explosion-proof structure” and has been fitted with a nameplate describing the required specifications for intrinsic safety.

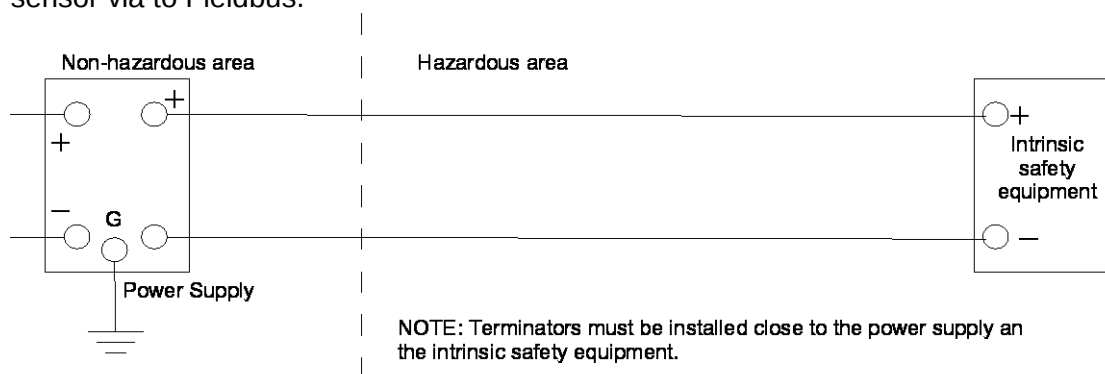
Check these specifications, and use the instrument accordingly.

Operation

This monitoring system sensor (surface temperature/ultrasound sensor) connects via FOUNDATION™ Fieldbus.

This instrument periodically measures the ultrasonic vibration and surface temperature of steam traps mounted on steam-using equipment in industrial environments and, and transmits the data to the fieldbus.

The following figure shows the common connection method when connecting the sensor via to Fieldbus.

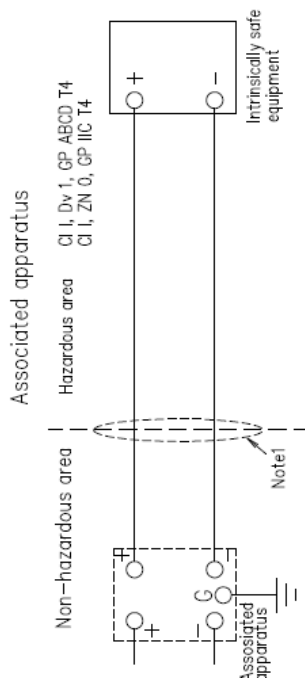


Fieldbus connection diagram

Assembly and Disassembly

In order to maintain intrinsic safety and waterproof performance, do not assemble or disassemble the instrument. Contact TLV for inquiries related to maintenance.

Control Drawing (UL/cUL)



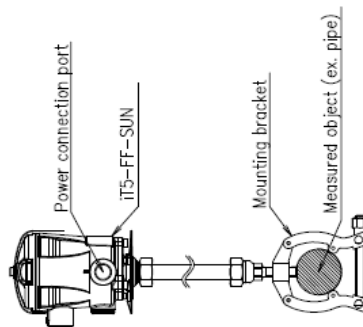
Note : Terminators must be installed close to the power supply and the intrinsically safe equipment.

Note¹: The wiring is intrinsically safe and must be installed and routed in accordance with article 504 of the NEC.
Also include CEC.

(ENTITY model)

This instrument is constructed as follows.

Intrinsic Safe Entity Parameters	
U _i = 24V	C _i = 0nF
I _i = 250mA	L _i = 10μH



Resistance (Rc)	$15.0/\text{km} \leq R_c \leq 150.0/\text{km}$
Inductance (Lc)	$0.4 \text{ mH}/\text{km} \leq L_c \leq 1 \text{ mH}/\text{km}$
Capacitance (Cc)	$45 \text{ nF}/\text{km} \leq C_c \leq 200 \text{ nF}/\text{km}$
Lw = Lc x cable length	
Cw = Cc x cable length	

Power supply connected with this equipment shall satisfy the following conditions.

Voltage of intrinsically safe circuit	24V max.
Current of intrinsically safe circuit	250mA max.
Classification	ia
Group	II C
Allowable inductance of intrinsically safe equipment (L ₀)	(10uH + L _w) min.
Allowable capacitance of intrinsically safe equipment (C ₀)	(negligible low + C _w) min.

Ambient temperature range and Max. measurement temperature.

Maximum Measurement Temperature	IT5–FF–SUN–L: 250°C (482°F)	
	IT5–FF–SUN–H: 400°C (752°F)	
If the measurement temperature exceeds 135°C (275°F), the maximum permitted equipment ambient temperature is reduced as below.		
Ambient Temperature Range	Measurement Temp.	Max. permissible ambient temp.
	IT5–FF–SUN–L	
	$-40^{\circ}\text{C} \leq \bar{T}_m < 135^{\circ}\text{C}$ ($-40^{\circ}\text{F} \leq \bar{T}_m < 275^{\circ}\text{F}$)	80°C (176°F)
	$135^{\circ}\text{C} \leq \bar{T}_m < 200^{\circ}\text{C}$ ($275^{\circ}\text{F} \leq \bar{T}_m < 392^{\circ}\text{F}$)	75°C (167°F)
	$200^{\circ}\text{C} \leq \bar{T}_m \leq 250^{\circ}\text{C}$ ($392^{\circ}\text{F} \leq \bar{T}_m \leq 482^{\circ}\text{F}$)	67°C (152°F)
	IT5–FF–SUN–H	
	$-40^{\circ}\text{C} \leq \bar{T}_m < 135^{\circ}\text{C}$ ($-40^{\circ}\text{F} \leq \bar{T}_m < 275^{\circ}\text{F}$)	80°C (176°F)
	$135^{\circ}\text{C} \leq \bar{T}_m < 200^{\circ}\text{C}$ ($275^{\circ}\text{F} \leq \bar{T}_m < 392^{\circ}\text{F}$)	75°C (167°F)
	$200^{\circ}\text{C} \leq \bar{T}_m < 300^{\circ}\text{C}$ ($392^{\circ}\text{F} \leq \bar{T}_m < 572^{\circ}\text{F}$)	67°C (152°F)
	$300^{\circ}\text{C} \leq \bar{T}_m \leq 400^{\circ}\text{C}$ ($572^{\circ}\text{F} \leq \bar{T}_m \leq 752^{\circ}\text{F}$)	67°C (143°F)

Associated apparatus output current must be limited by a resistor such that the output voltage-current plot is a straight line drawn between open-circuit voltage and short-circuit current.

The intrinsically safe device does not provide 500 V isolation with respect to earth. Associated apparatus used must be galvanically isolated or dual channel shunt zeroer diode barriers with linear outputs used channel to channel.

Selected associated apparatus must be third party listed as providing intrinsically safe circuits for the application, and have Voc or Vt not exceeding Vmax (or Uo not exceeding Ui), Isc or It not exceeding Imax (or Io not exceeding Ii), and the Po of the associated apparatus must be less than or equal to the Pmax or Pi of the intrinsically safe equipment, as shown in Table 1.

Capacitance and inductance of the field wiring from the intrinsically safe equipment to the associated apparatus shall be calculated and must be included in the system calculations as shown in Table 1. Cable capacitance, C_c , plus intrinsically safe equipment capacitance, C_e , must be less than the marked capacitance, C_a (or C_o), shown on any associated apparatus used. The same applies for inductance (L_c , L_e , L_a and L_o , respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used: $C_{\text{cable}} = 60 \text{ pF/ft}$, $L_{\text{cable}} = 0.2 \text{ }\mu\text{H/ft}$.

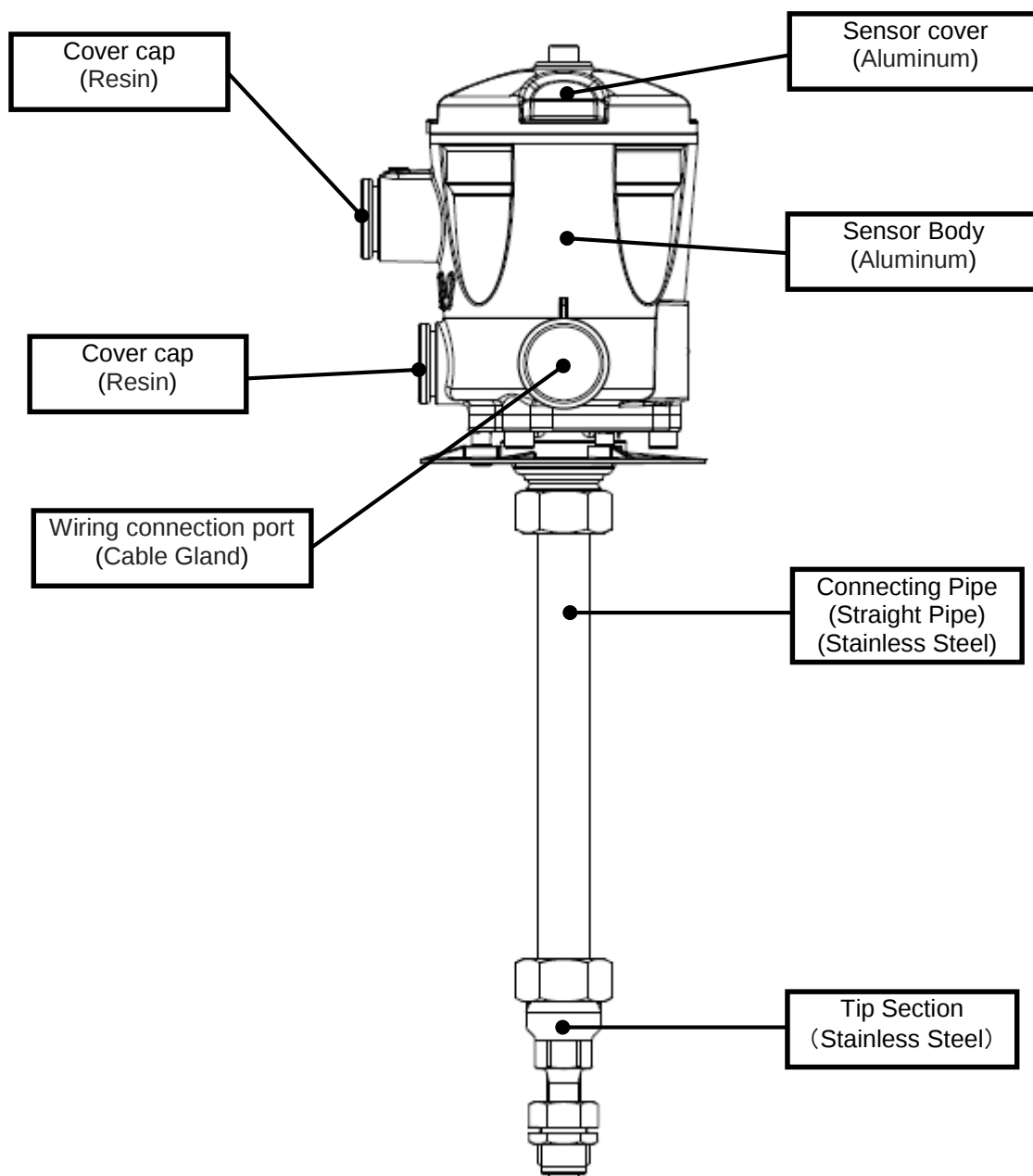
TABLE 1:

U.S. Equipment	Associated Apparatus
V max (or U)	≥ Voc or Vt (or Uo)
I max (or I)	≥ Isc or It (or Io)
P max (or P)	≥ Po
Q + Coable	≤ Ca (or Co)
L + Leable	≤ La (or Lo)

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Maintenance

Make sure that parts shown in the figure below are not damaged.
If any damages are found, contact TLV.



Installation



Ensure the specifications for the intrinsically safe structure of this product meet the requirements for installation in hazardous locations. Specifications for the intrinsically safe structure of this product are described in the "Specifications" section.

Aluminum is used in this product, therefore do not expose the product to impact or friction. Exposure to impact or friction may result in ignition or accidental explosions.

Do not wipe/rub the surfaces of this product with a dry cloth etc. There is the danger of electrostatically charging the unit, which may result in ignition or explosions, especially in hazardous locations.

The equipment contains non-metallic materials and that the user should consider the performance of these materials with respect to chemicals which may be present in the hazardous area. If in doubt, please contact the manufacturer.



Assurez-vous que les spécifications à sécurité intrinsèque de ce produit répondent aux exigences pour l'installation dans des zones dangereuses. Les spécifications à sécurité intrinsèque de ce produit sont décrites dans la section « Spécifications ».

Ce produit contient de l'aluminium. Ne pas soumettre au choc ni au frottement. Cela pourrait provoquer un incendie ou une explosion.

Ne pas frotter/essuyer la surface du produit avec un chiffon sec. Il y a un risque de charger en électricité statique l'appareil. Cela peut provoquer un incendie ou une explosion, particulièrement dans des zones dangereuses.

Cet appareil contient des matériaux non-métalliques. L'utilisateur doit prendre en considération les interactions possibles de ces matériaux avec des produits chimiques dans une zone dangereuse. Pour tous renseignements complémentaires, veuillez vous adresser au fabricant.

NOTE: Install in accordance with National Electric Code, Canadian Electrical Code or other applicable Local Codes.

Installing the sensor on iTrap

1. Remove the plug from the sensor mounting seat on the iTrap body or sensor mounting socket.
2. Place the sensor mounting union into the sensor mounting seat and tighten it to the proper torque. (Torque: 20 N·m (15 lbf·ft))
 - Check the base of the sensor mounting seat, and remove any dirt or foreign matter if present.
 - Lift the locknut as far as possible while placing the sensor tip into the seat, then tighten the sensor mounting union.

If the locknut is not lifted properly, the tip of the sensor (the sensing part) may not touch the base of the sensor mounting seat.
3. Tighten the locknut making sure it is firmly secured.

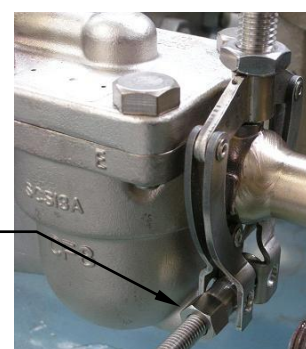


Installing the sensor on non-iTraps

1. Temporarily secure the mounting bracket to the inlet side of the trap.
2. Screw the sensor tip into the threaded portion of the mounting bracket and adjust the installation height.
3. Secure the mounting bracket by tightening the clamp nut on the lower part of the mounting bracket. (Torque: 8 N·m (6 lbf·ft))



Clamp Nut



Wiring



Ensure the specifications for the intrinsically safe structure of this product meet the necessary intrinsically safe requirements for the installation location. Specifications for the intrinsically safe structure of this product are described in the "Specifications" section.

In order to change from the normal communication mode to simulation mode, turn the TEST switch on, however do not operate the switch or use in hazardous areas when the TEST switch is on.



Assurez-vous que les spécifications à sécurité intrinsèque de ce produit répondent aux exigences pour l'installation dans des zones dangereuses. Les spécifications à sécurité intrinsèque de ce produit sont décrites dans la section « Spécifications ».

Pour passer du mode de transmission normal au mode simulation, actionnez l'interrupteur TEST. Ne pas actionner l'interrupteur ou utiliser l'appareil en mode simulation dans une zone dangereuse .

Refer to the "System Engineering Guidelines (AG-181) Ver 3.2.1" issued by the Fieldbus Foundation for details of FOUNDATION™ Fieldbus.

1. Usage of the instrument in combination with a barrier (power supply)

This instrument has the intrinsic safety specification (intrinsically safe ia IIC), therefore use a barrier (power supply) with intrinsic safety specification ia IIC.

2. Cable to be used

Single-twisted pair stranded tinned copper cables that are individually shielded and overall shielded (Type A), 0.8 mm² (#18 AWG) are recommended.

If the ambient temperature is greater than or equal to 60 °C (140 °F), use heat-resistant wire rated at 80 °C (176 °F) or more.

3. Wiring

Isolate the wiring from other cables to prevent any effect on intrinsic safety and measurement performance from contact with other cables or electromagnetic induction, etc.

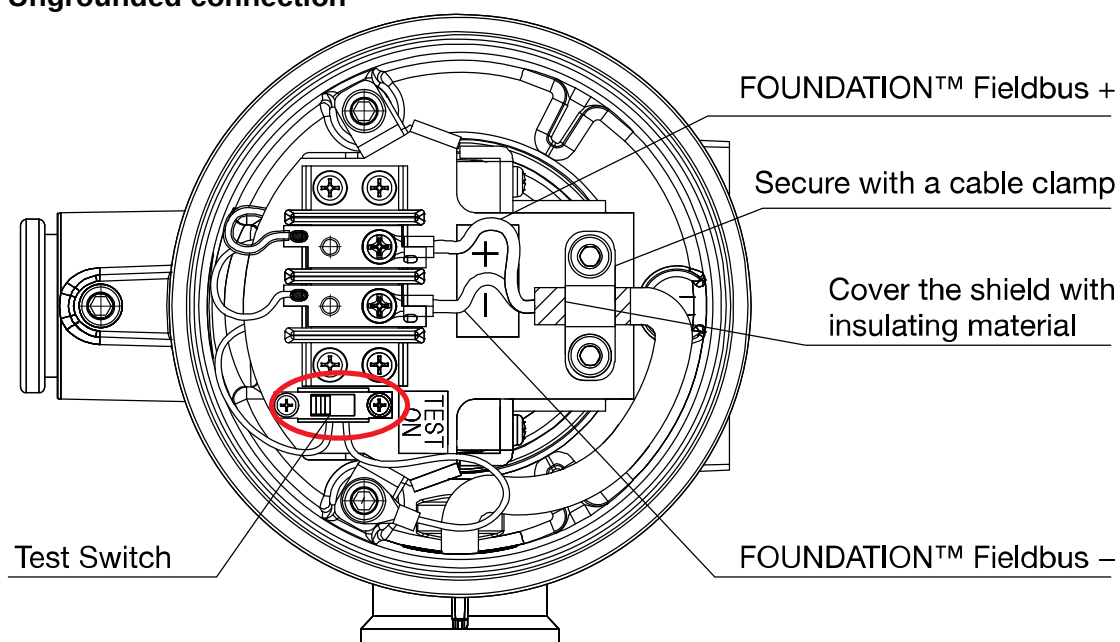
If necessary, use a protective metal tube or duct.

The wiring connection port is fitted with a G¹/₂ (CTG-16) cable gland. Ensure an air-tight connection.

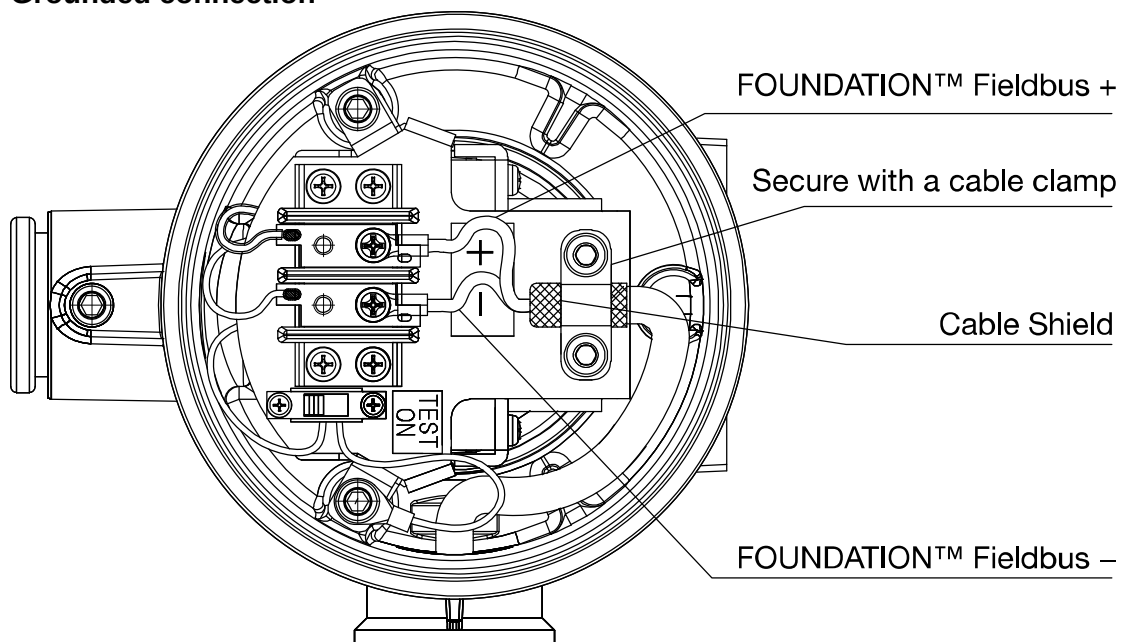
4. Terminal connection

Connect terminals as in the figure below.

Ungrounded connection



Grounded connection

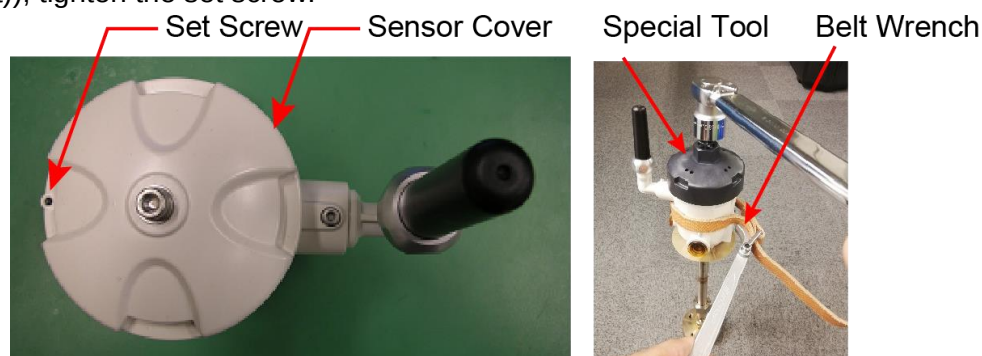


5. Opening/Closing the sensor cover

Make sure to use the special tool (sold separately) to open/close the IS sensor cover. Select a belt wrench with a belt width of 20 mm ($13/16$ in) or less, including 90 mm ($39/16$ in) in the range of use.

Loosen the set screw and remove the sensor cover with a special tool.

After installing the sensor cover using the special tool (tightening torque: 15 N·m (11 lbf·ft)), tighten the set screw.



Adjustment

This instrument has been calibrated at the factory. No adjustments are required when installing.

Calibration

Although this product is thoroughly inspected before shipping, periodic calibration is recommended according to the installation environment to ensure the quality of measurement.

Frequency: Annual inspection is recommended. However, requirements may vary depending on the installation environment, therefore inspection guidelines should be set by the purchaser.

Calibration can only be performed with special equipment at TLV's factory.

Contact your local TLV representative or your regional TLV office for details.

Specifications

Type	iTrapSensor Monitoring System – Sensor		
Model	iT5-FF-SUN-*-PD		
Classification Markings of Hazardous Locations	ATEX:	CE ₂₇₇₆  II 1 G Ex ia IIC T4 Ga (Certificate No.: CML 16ATEX2362X)	
	UL/cUL:	Class I, Division 1, Groups A, B, C and D Class I, Zone 0, Group IIC T4, AEx ia IIC T4 Ex ia IIC T4 (File No.: E160655)	
	IECEx:	Ex ia IIC T4 Ga (Certificate No.: IECEx CML 16.0133X)	
	Mark for certified electrical equipment	Ex	—
	Type of Protection	ia	Intrinsically safe structure (can be used in especially hazardous locations)
	Applicable Gas Groups	IIC	Applicable to gases (Hydrogen, Acetylene, etc.) with minimum ignition current ratio is less than 0.45.
	Temperature Class	T4	Applicable when maximum surface temperature of the unit is 130 °C (266 °F) and gas ignition temperature is 135 °C (275 °F) or more.
Applicable Standards	EPL (Equipment protection Level)	Ga	This equipment can be used in Zone 0.
	ATEX: • EN 60079-0:2018 • EN 60079-11:2012 UL/cUL: • UL 913 STANDARD FOR INTRINSICALLY SAFE APPARATUS AND ASSOCIATED APPARATUS FOR USE IN CLASS I, II, III, DIVISION 1, HAZARDOUS (CLASSIFIED) LOCATIONS – Edition 8 • UL 60079-0 EXPLOSIVE ATMOSPHERES – PART 0: EQUIPMENT – GENERAL REQUIREMENTS – Edition 6 • UL 60079-11 EXPLOSIVE ATMOSPHERES – PART 11: EQUIPMENT PROTECTION BY INTRINSIC SAFETY 'I' – Edition 6 • UL 61010-1 SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE – PART 1: GENERAL REQUIREMENTS – Edition 3 • CSA C22.2 NO. 60079-0 EXPLOSIVE ATMOSPHERES – PART 0: EQUIPMENT – GENERAL REQUIREMENTS – Edition 3 • CSA C22.2 NO. 60079-11:14 EXPLOSIVE ATMOSPHERES – PART 11: EQUIPMENT PROTECTION BY INTRINSIC SAFETY 'I' – Edition 2 • CSA C22.2 NO. 61010-1 SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE - PART 1: GENERAL REQUIREMENTS – Edition 3 IECEx: • IEC 60079-0:2011, Edition 6 • IEC 60079-11:2011, Edition 6		

Continued on the next page

Nameplate	ATEX/IECEX: TLV iT5-(A)-SUN-(B)-PD-ZZ-(C)-ZZ CE 2503 II 1 G Ex ia IIC T4 Ga CML 16ATEX2362X IECEX: Ex ia IIC T4 Ga IECEX CML 16.0133X Tamb=-40C to +80C max. (Refer to certificate for Tamb limitations) POTENTIAL ELECTROSTATIC CHARGING HAZARD - SEE INSTRUCTIONS S.NO (Entity field device) Ui=24V, Ii=0.25A, Li=10μH, Ci=negligible 〒675-8511 Kakogawa Japan UL/cUL: TLV iT5-(A)-SUN-(B)-PD-ZZ-(C)-ZZ For Use in. Cl I, Dv 1, GP ABCD Cl I, Zn 0, AEx ia IIC T4 Ga Ex ia IIC T4 Ga Proc. Cont. Eq. for Use in Haz. Loc. Tamb=-40C(-40F) to 80C(176F) max. Ui=24V, Ii=0.25A, Li=10μH, Ci=negligible (Entity field device) Impact or Friction Hazard Danger en cas de choc ou frottement - SEE /VOIR INSTRUCTIONS 172-65671MAF-03 S.NO Control Drawing : E-E551-SYS-ENTITY(02)-UL 〒675-8511 Kakogawa Japan																				
Rating	Power circuit Allowable voltage: 24 V Allowable current: 250 mA Internal inductance: 10uH, Internal capacitance: negligible																				
Enclosures	IP67 (Evaluation for intrinsic safety rating is carried out under IP20)																				
Maximum Measurement Temperature	iT5-FF-SUN-L-PD-ZZ-*(See note on the next page)-ZZ: 250 °C (482 °F) iT5-FF-SUN-H-PD-ZZ-*(See note on the next page)-ZZ: 400 °C (752 °F)																				
Ambient Temperature Range	If the measurement temperature exceeds 135 °C (275 °F), the maximum permitted equipment ambient temperature is reduced as follows. <table><tr><td>Measurement Temp. Tm</td><td>Max. permissible ambient temp.</td></tr><tr><td colspan="2">iT5-FF-SUN-L-PD / iT5-PR-SUN-L-PD</td></tr><tr><td>-40 °C ≤ Tm < 135 °C (-40 °F ≤ Tm < 275 °F)</td><td>80 °C (176 °F)</td></tr><tr><td>135 °C ≤ Tm < 200 °C (275 °F ≤ Tm < 392 °F)</td><td>75 °C (167 °F)</td></tr><tr><td>200 °C ≤ Tm ≤ 250 °C (392 °F ≤ Tm ≤ 482 °F)</td><td>67 °C (152 °F)</td></tr><tr><td colspan="2">iT5-FF-SUN-H-PD / iT5-PR-SUN-H-PD</td></tr><tr><td>-40 °C ≤ Tm < 135 °C (-40 °F ≤ Tm < 275 °F)</td><td>80 °C (176 °F)</td></tr><tr><td>135 °C ≤ Tm < 200 °C (275 °F ≤ Tm < 392 °F)</td><td>75 °C (167 °F)</td></tr><tr><td>200 °C ≤ Tm < 300 °C (392 °F ≤ Tm < 572 °F)</td><td>67 °C (152 °F)</td></tr><tr><td>300 °C ≤ Tm ≤ 400 °C (572 °F ≤ Tm ≤ 752 °F)</td><td>62 °C (143 °F)</td></tr></table>	Measurement Temp. Tm	Max. permissible ambient temp.	iT5-FF-SUN-L-PD / iT5-PR-SUN-L-PD		-40 °C ≤ Tm < 135 °C (-40 °F ≤ Tm < 275 °F)	80 °C (176 °F)	135 °C ≤ Tm < 200 °C (275 °F ≤ Tm < 392 °F)	75 °C (167 °F)	200 °C ≤ Tm ≤ 250 °C (392 °F ≤ Tm ≤ 482 °F)	67 °C (152 °F)	iT5-FF-SUN-H-PD / iT5-PR-SUN-H-PD		-40 °C ≤ Tm < 135 °C (-40 °F ≤ Tm < 275 °F)	80 °C (176 °F)	135 °C ≤ Tm < 200 °C (275 °F ≤ Tm < 392 °F)	75 °C (167 °F)	200 °C ≤ Tm < 300 °C (392 °F ≤ Tm < 572 °F)	67 °C (152 °F)	300 °C ≤ Tm ≤ 400 °C (572 °F ≤ Tm ≤ 752 °F)	62 °C (143 °F)
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Continued on the next page

Material	Sensor body / Sensor cover: Aluminum alloy die castings (ADC3, SG100A) Tip Section: Stainless Steel (SUS304) Heat Shield Plate: Heat-resistant Resin (Polyetheretherketone (PEEK))
Dimensions	(Unit: mm (in))
Weight	Approx. 1,200 g (2.7 lb)

Note: Regarding symbols for connecting pipes:

Connecting pipe	S: 150 mm (6 in) Straight pipe F: 150 mm (6 in) Flexible pipe
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TLV EXPRESS LIMITED WARRANTY

Subject to the limitations set forth below, TLV CO., LTD., a Japanese corporation (“**TLV**”), warrants that products which are sold by it, TLV International Inc. (“**TII**”) or one of its group companies excluding TLV Corporation (a corporation of the United States of America), (hereinafter the “**Products**”) are designed and manufactured by TLV, conform to the specifications published by TLV for the corresponding part numbers (the “**Specifications**”) and are free from defective workmanship and materials. The party from whom the Products were purchased shall be known hereinafter as the “**Seller**”. With regard to products or components manufactured by unrelated third parties (the “**Components**”), TLV provides no warranty other than the warranty from the third party manufacturer(s), if any.

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