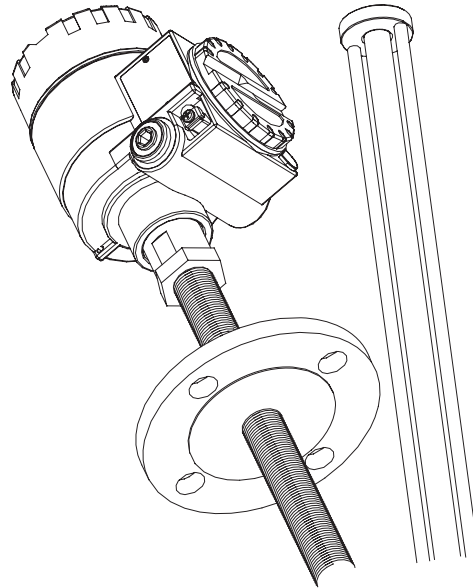


4539 Average Temperature/Water Bottom Sensor and Converter (ATC)

Varec[®]

Installation and Operations Manual



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Safety Precaution Definitions

Caution! Damage to equipment may result if this precaution is disregarded.

Warning! Direct injury to personnel or damage to equipment which can cause injury to personnel may result if this precaution is not followed.

Safety Precautions

Read and understand this instruction manual before installing, operating or performing maintenance on the Varec 4539 Average Temperature/Water Bottom Sensor and Converter. Follow all precautions and warning noted herein when installing, operating or performing maintenance on this equipment.

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1 Introduction

1.1 Function and system design

The 4539 ATC is the successor of the former 4535 ATC Ex i version. For proper migration, the 4539 ATC has inherited all the functionality and specifications of the 4535 ATC, including process connections, cable entries and wiring method.

A detailed description of the function groups, functions and parameter is given in the Operating manual and Description of Instrument Functions for the 4539 ATC.

1.1.1 Connection with 6000 Series Servo Tank Gauge

Since the 6000 Servo Tank Gauge already provides water interface measurement, the 4539 ATC Converter + average temperature may be the best version when used in combination with the 6000 STG. However if the converter + WB + average temperature version is used in combination with the 6000 STG, the product in the tank will be thoroughly managed with level, continuous average temperature and water interface measurement.

All the necessary configuration and parameter settings for the 4539 ATC are performed on both the 6000 STG and ToF Tool.

The 4539 ATC receives liquid level data from the 6000 STG, then calculates liquid and gas phase average temperature. Calculated data and basic information, including raw data for each temperature element and device status, are transmitted to the 6000 STG.

From the 6000 STG or 4590 TSM, all sensor data are sent to the interface unit via V1 communication protocol.

1.1.2 Connection with the 4590 TSM

The 4539 ATC converter + temp. + WB is utilised most effectively in combination with radar level gauging. Water interface, temperature and level measurement, with data collection and calculations via the 4590 TSM, allows for optimal inventory control. Basic functionality and data access can be performed by the ToF Tool.

The 4539 ATC receives radar level data from the 4590 TSM and then calculates liquid and gas phase average temperature. Calculated and standard data, included temperature element raw data and device status, are transmitted to the 4590 TSM.

Depending on the size of the tank farm and data processing functionality, measurement data can be transmitted to various interface units via V1 protocol or other industry standard communication protocols (see the 4590 TSM technical information).

All gathered data in the interface unit is sent to inventory management software, such as Varec's FuelsManager, or directly sent to the customer's specific DCS or PLC.

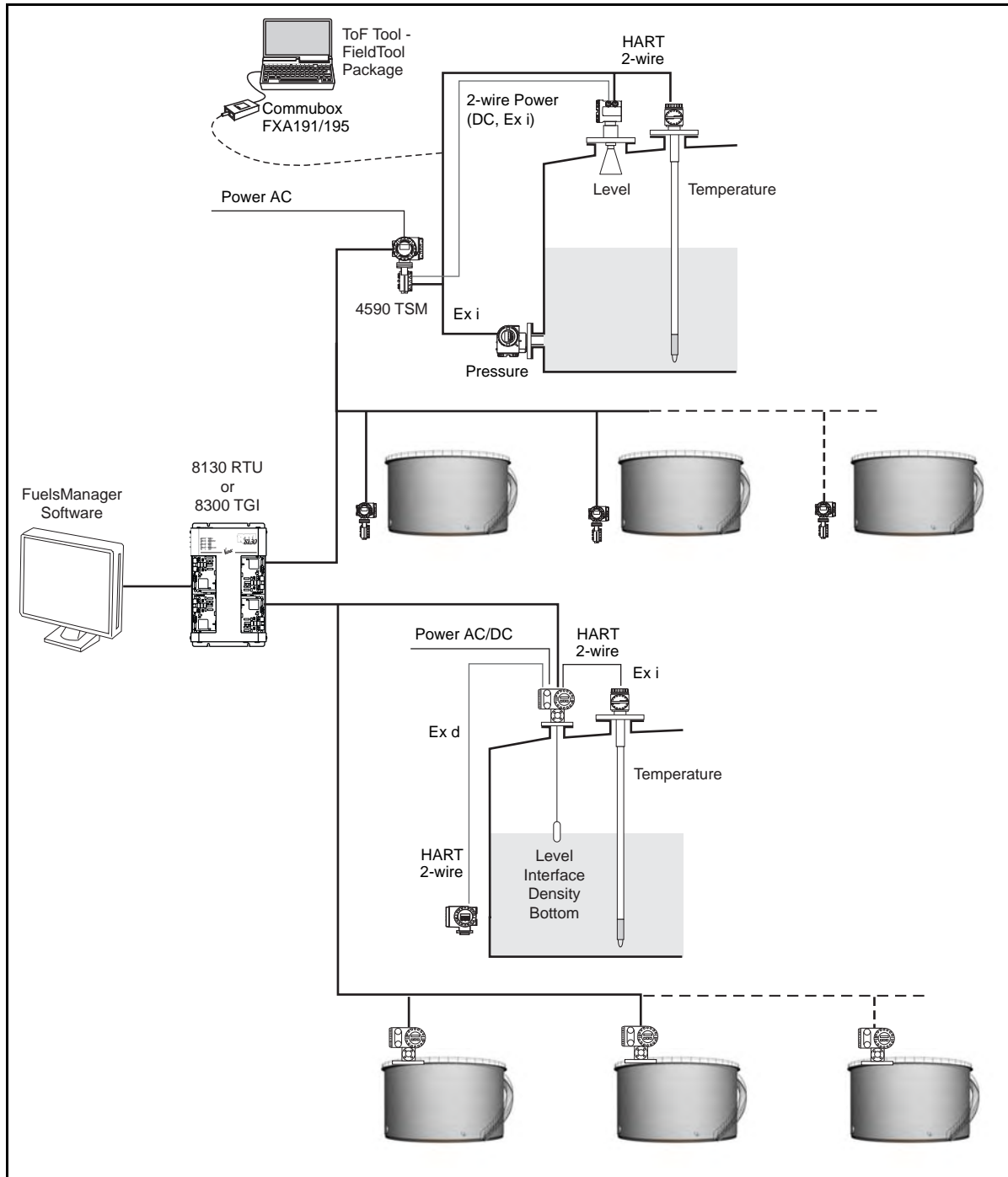


Figure 1-1: Connection with 7500 Series Radar Tank Gauge and 6000 STG, and 4590 Tank Side Monitor

2 Safety instructions

2.1 Designated use

The 4539 ATC is a multi-spot Pt100 average thermometer combined with a HART signal converter to meet the demand of temperature measurement for both custody transfer and inventory control applications. One unique feature is the implementation of capacitance water / oil interface measurement (Water Bottom) for radar tank gauging applications together with Varec 7500 Series Radar Tank Gauges and the 4590 TSM. Mounted on the tank top, the 4539 ATC provides both temperature and water interface information on the two wire, intrinsically safe (i.s.) powered local HART loop. The designated host controller can be either the Varec 4590 TSM or 6000 STG.

2.2 Installation, commissioning and operation

- Mounting, electrical installation, start-up and maintenance of the instrument may only be carried out by trained personnel authorized by the operator of the facility.
- Personnel must absolutely and without fail read and understand these installation instructions before carrying out the procedures.
- The instrument may only be operated by personnel who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed without fail.
- The installer must make sure that the measuring system is correctly wired according to the wiring diagrams. The measuring system is to be grounded.
- Observe all provisions valid for your country and pertaining to the opening and repairing of electrical devices.

2.3 Product Requirements

2.3.0.1 Hazardous areas

Measuring systems for use in hazardous environments are accompanied by separate "Ex documentation", which is delivered with the instrument as a separate document. Strict compliance with the installation instructions and ratings as stated in this supplementary documentation is mandatory.

- Ensure that all personnel are suitably qualified.
- Observe the specifications in the certificate as well as national and local regulations.

2.3.0.2 FCC approval

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution! Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

2.4 Return

The following procedures must be carried out before the 4539 ATC is sent to Varec for repair:

- Always enclose a duly completed "Declaration of Contamination" form. Only then can Varec transport, examine and repair a returned device.
- Enclose special handling instructions if necessary, for example, safety data sheet as per EN 91/155/EEC.
- Remove all residue which may be present. Pay special attention to the gasket grooves and crevices where fluid may be present. This is especially important if the fluid is dangerous to health, e.g. corrosive, poisonous, carcinogenic, radioactive, etc.

Caution!

- No instrument should be sent back for repair without all dangerous material being completely removed first, e.g. in scratches or diffused through plastic.
- Incomplete cleaning of the instrument may result in waste disposal or cause harm to personnel (burns, etc.). Any costs arising from this will be charged to the operator of the instrument.






2.5 Disposal




In case of disposal, separate the different components according to their material consistency.

2.6 Notes on safety conventions and symbols

To highlight safety-relevant or alternative operating procedures in the manual, the following conventions have been used, each indicated by a corresponding symbol in the margin.

2.6.1 Safety conventions

Symbol	Meaning
Warning!	Warning! A warning highlights actions or procedures which, if not performed correctly, will lead to personal injury, a safety hazard or destruction of the instrument.
Caution!	Caution! Caution highlights actions or procedures which, if not performed correctly, may lead to personal injury or incorrect functioning of the instruments.
Note!	Note! A note highlights actions or procedures which, if not performed correctly, may indirectly affect operation or may lead to an instrument response which is not planned.
	Device certified for use in explosion hazardous area If the device has this symbol embossed on its name plate it can be installed in an explosion hazardous area.
	Explosion hazardous area Symbol used in drawings to indicate explosion hazardous area. – Devices located in and wiring entering areas with the designation "explosion hazardous areas" must conform to the stated type of protection.
	Safe area (non-explosion hazardous area) Symbol used in drawings to indicate, if necessary, non-explosion hazardous areas. – Devices located in safe areas still require a certificate if their outputs run into explosion hazardous areas.
	Direct voltage A terminal to which or from which a direct current or voltage may be applied or supplied
	Alternating voltage A terminal to which or from which an alternating (sine-wave) current or voltage may be applied or supplied

	Grounded terminal A grounded terminal, which as far as the operator is concerned, is already grounded by means of an earth grounding system.
	Protective grounded (earth) terminal A terminal which must be connected to earth ground prior to making any other connection to the equipment.
	Equipotential connection (earth bonding) A connection made to the plant grounding system which may be of type e.g. neutral star or equipotential line according to national or company practice

3 Identification

3.1 Device designation

3.1.1 Nameplate

The follow technical data are given on the instrument nameplate:

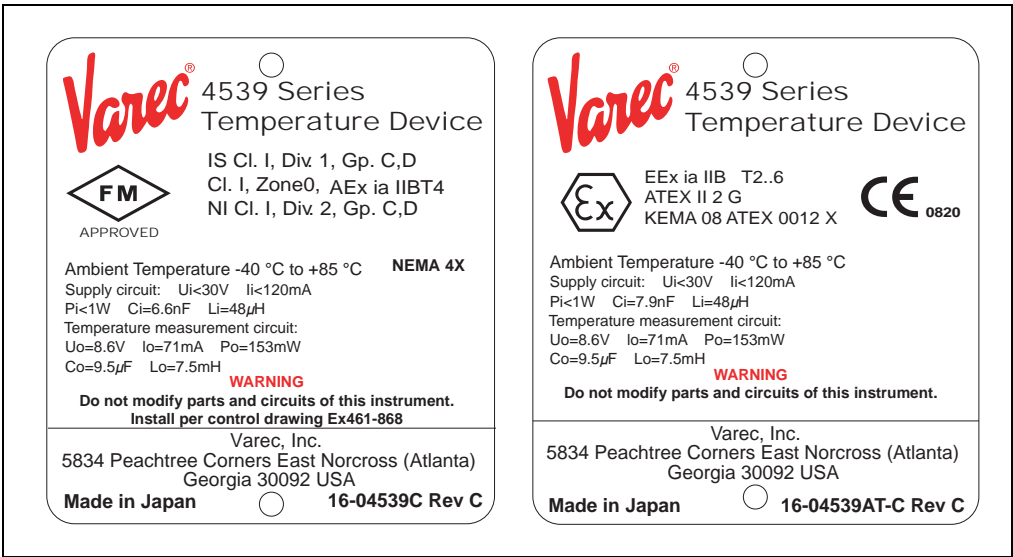


Figure 3-1: Product label for 4539 ATC Converter-only version

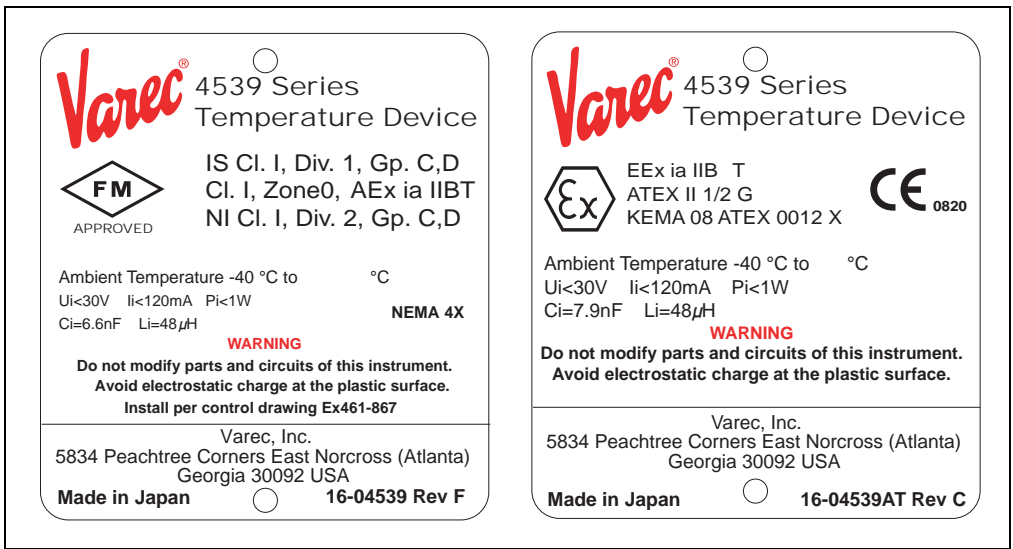


Figure 3-2: Product label for 4539 ATC Converter+average temperature probe version

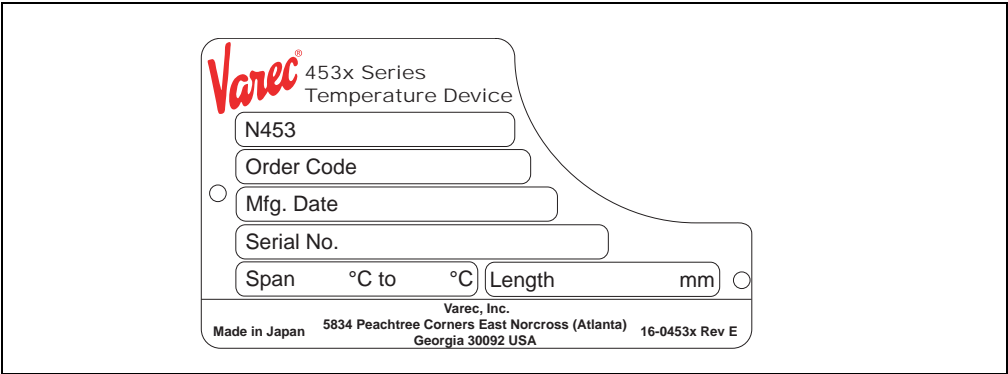


Figure 3-3: Product label for 453x average temperature devices

4 Installation

4.1 Incoming acceptance, transport, storage

4.1.1 Incoming acceptance

Check the packing and contents for any signs of damage.

Check the shipment, make sure nothing is missing and that the scope of supply matches your order.

4.1.2 Transport

Caution! Follow the safety instructions and transport conditions for instruments of more than 4kg. Do not lift the measuring instrument by its housing.

4.1.3 Storage

Pack the measuring instrument so that is protected against impacts for storage and transport. The original packing material provides the optimum protection for this. The permissible storage temperature is -40°C to $+85^{\circ}\text{C}$ (-40°F to $+185^{\circ}\text{F}$)

4.2 Installation conditions

4.2.1 Dimensions

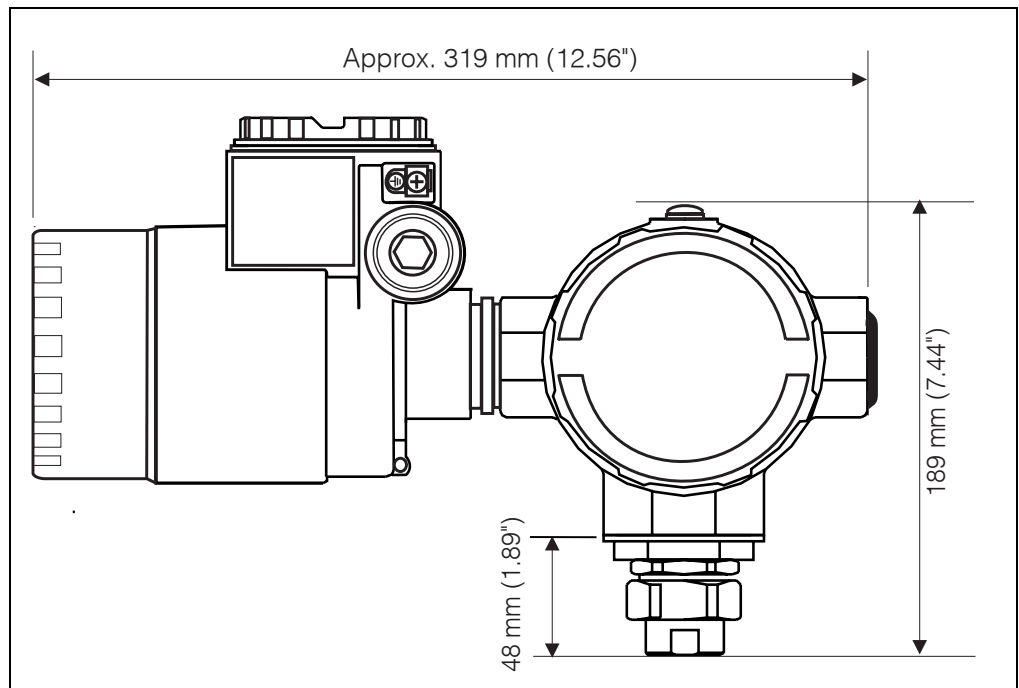
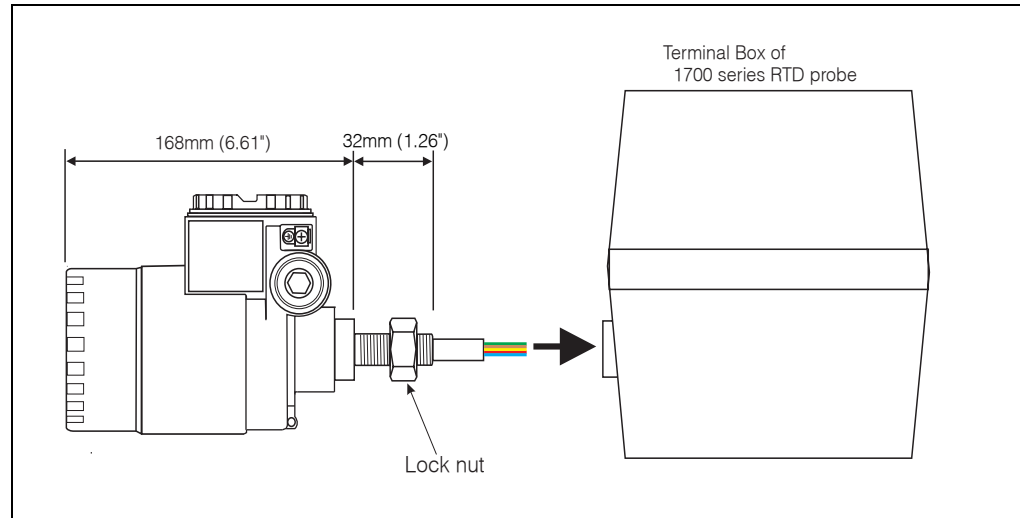


Figure 4-1: Type 1 Converter-only version
[Standard PF(NPS) $\frac{3}{4}$ " universal coupling connection]



*Figure 4-2: Type 2 Converter-only version
(for the Varec 1700 win M20 threaded connection)*

Note! UK Special is only designed to connect with the Whessoe Varec 1700 series average temperature probe. Water bottom data accessibility is no longer available at the 4539 ATC.

4.2.2 Mounting of UK Special version M20 connection to Varec 1700 terminal box

Use seal tape on the threaded gauge to terminal box connection. Slip a bunch of cable (RTD signal inlet cable) into the terminal box female thread connection. Turn the entire 4539 ATC gauge head clockwise and screw in the connection at least 10 complete turns. Finally, secure with lock nut against terminal box.

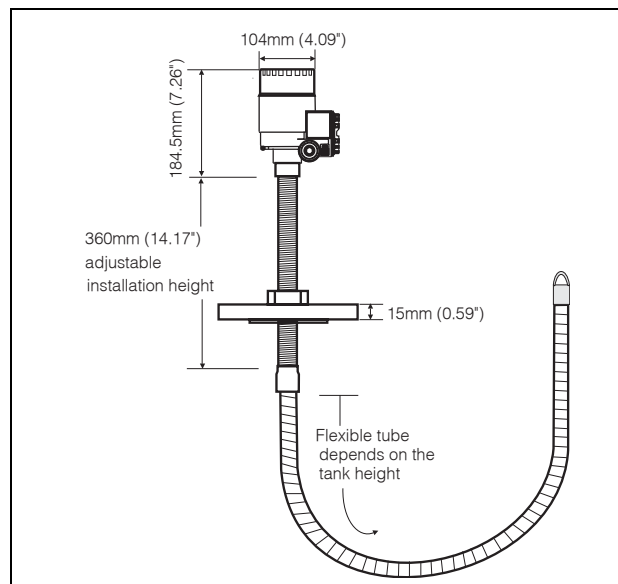


Figure 4-3: Converter + average temperature probe version

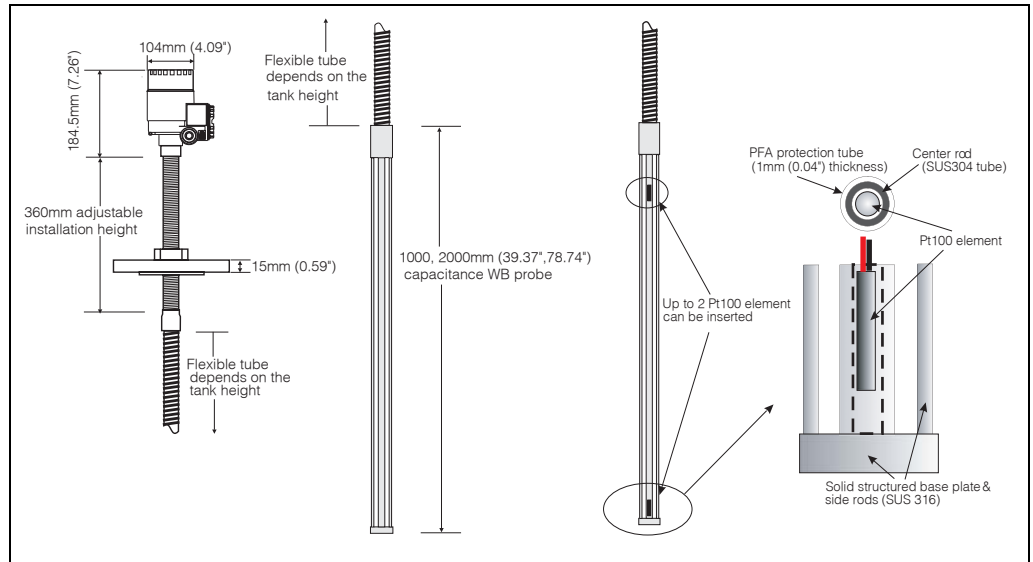
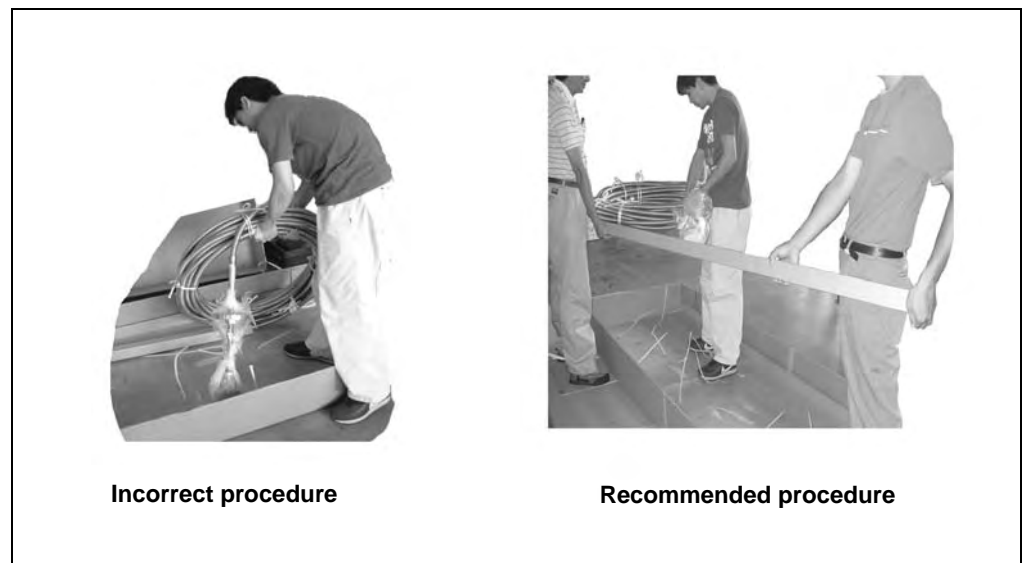


Figure 4-4: Converter + WB probe version and Converter + Temp. + WB probe version

4.3 Procedure

4.3.1 Unpacking procedure

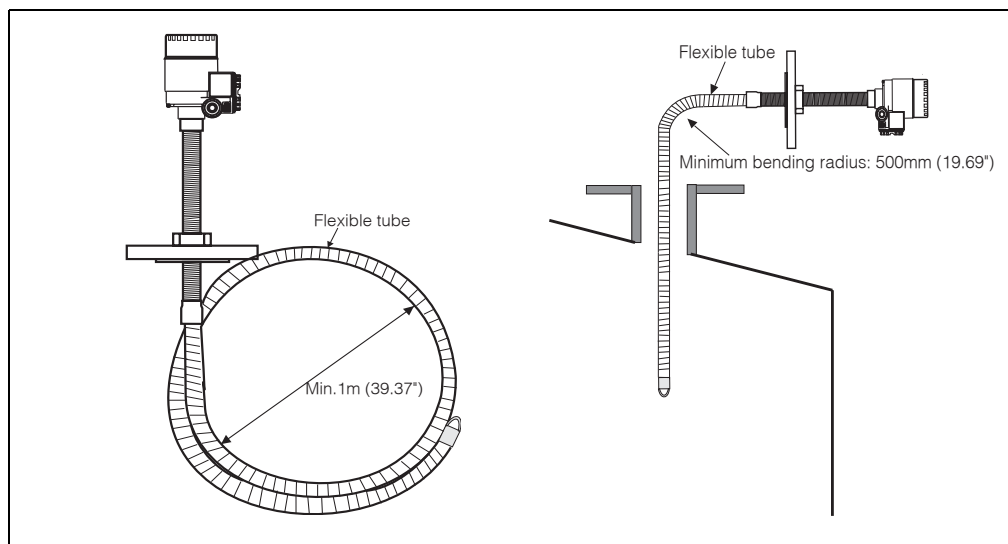
Note! When unpacking, be careful not to allow the flexible tube to bend and twist. Use the recommended procedure, illustrated below.



4.3.2 Flexible tube procedure

Note! When taking out and winding the flexible tube, keep the length a minimum of 1 meter in diameter.

When attaching and bending the flexible tube, the radius of curvature must be at least 500mm (19.69") at any bend portion.



Caution! If the flexible tube is bent to a radius of curvature of 500mm (19.69") or less, the tube or the measuring element may be seriously damaged or broken.

4.3.3 Mounting the equipment

The flexible tube length of the 4539 ATC is defined for the customer's specifications. Before mounting, check as follows:

- The tag number (if available) on the body of the 4539 ATC. The length of the flexible tube
- The number of measuring points
- The intervals between measuring points

Mount the 4539 ATC at least 500mm (19.67") away from the tank shell. This ensures that the measurement is not influenced by changes in ambient temperature.

For all installations, the flexible tube head is mounted on the tank top as show in Figure 4-5. The mounting nozzle should have a diameter of 50mm (2") on standard.

The procedure for mounting the 4539 ATC on a tank depends on the type of tank. The next chapter explains the procedures for a fixed roof tank and for a floating roof tank.

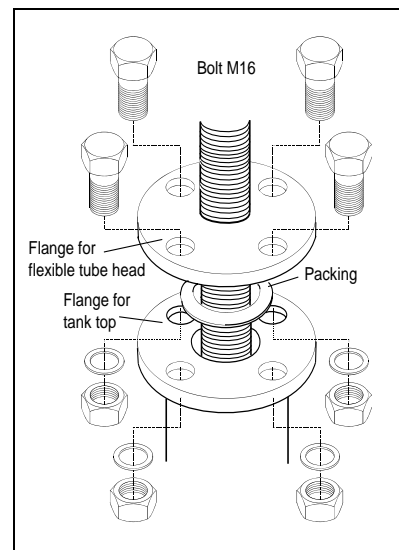


Figure 4-5: Mounting for tube head

Caution! If a gas-tight connection at the flange is required, wrap at least 30mm (1.18") of the threads with Teflon tape. Excessive tension may cause internal breaking in the flexible tube. Limit tension on the tube to 16kg or less.

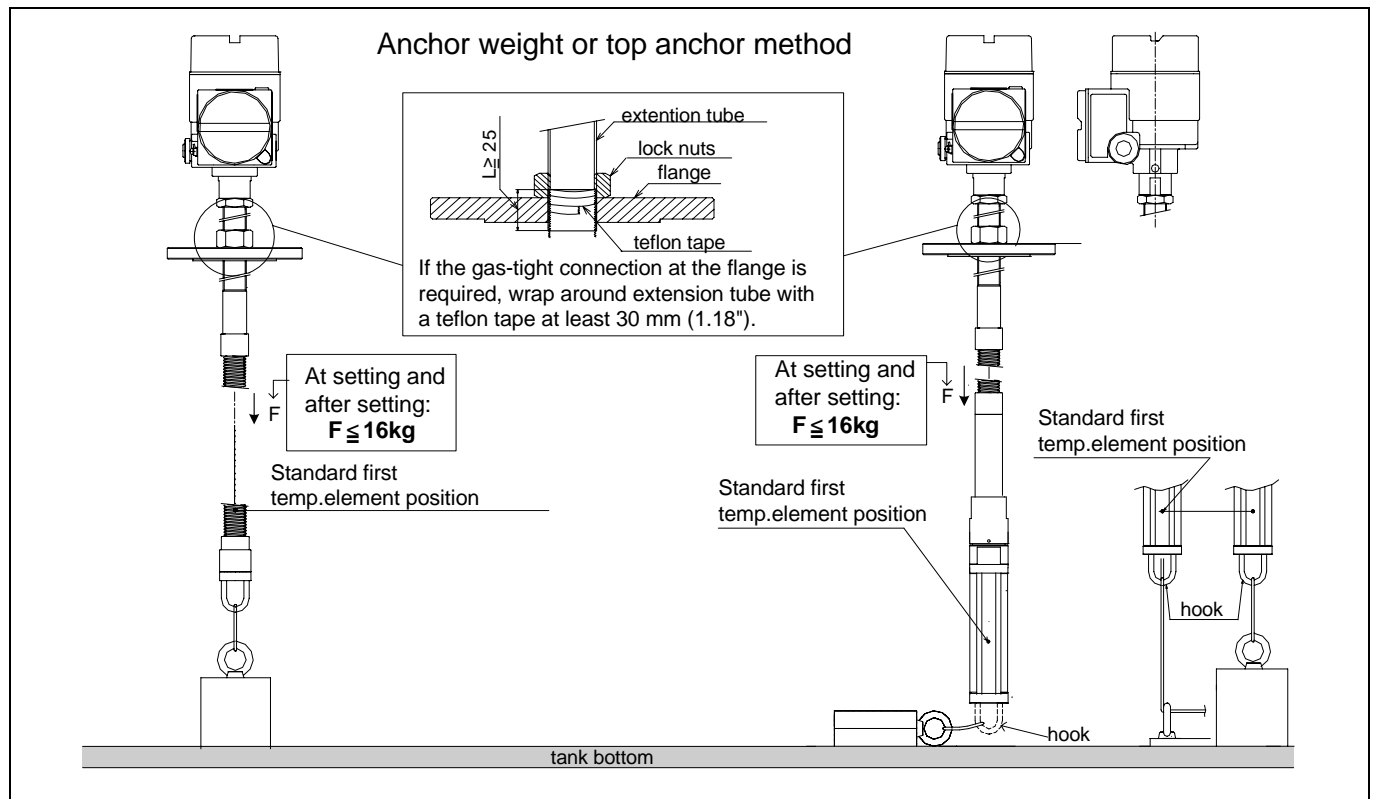


Figure 4-6: Anchor weight or top anchor mounting method

4.3.4 Installation for flexible tube and/or WB probe

Use the recommended installation procedure, illustrated in Figure 4-7.

Caution! Catching or scraping the flexible tube or WB probe against the edge of the nozzle hole could cause damage. Lower the tube carefully without excessive bending.



Figure 4-7: Flexible tube / WB probe installation

4.3.5 Installation Instructions

Note! The level sensor circuit is connected to ground and is infallibly galvanically isolated from the supply and output circuit and from the temperature measurement circuit.

All metal parts of the sensor and the transmitter shall be electrically conductive and securely be connected to the potential equalization system within the hazardous area.

4.3.6 Special conditions for safe use

To exclude ignition sources due to sparks caused by impact or friction, even in the event of rare incidents, do not subject the temperature sensor tube to environmental stress, such as impact from moving parts. Also, make sure the bottom part is secured.

5 Mounting

5.1 Mounting on a fixed roof tank

There are three methods for mounting the 4539 ATC on a fixed roof tank:

- 1) Top anchor method
- 2) Thermo well method converter + temp.
- 3) Anchor weight method

Note! If the tank bottom has a heating coil, the clearance from the flexible tube or probe bottom hook to the tank bottom must increase according to the heating coil type.

5.1.1 Top anchor method

The flexible tube and water bottom sensor are stabilized by a wire hook and a top anchor.

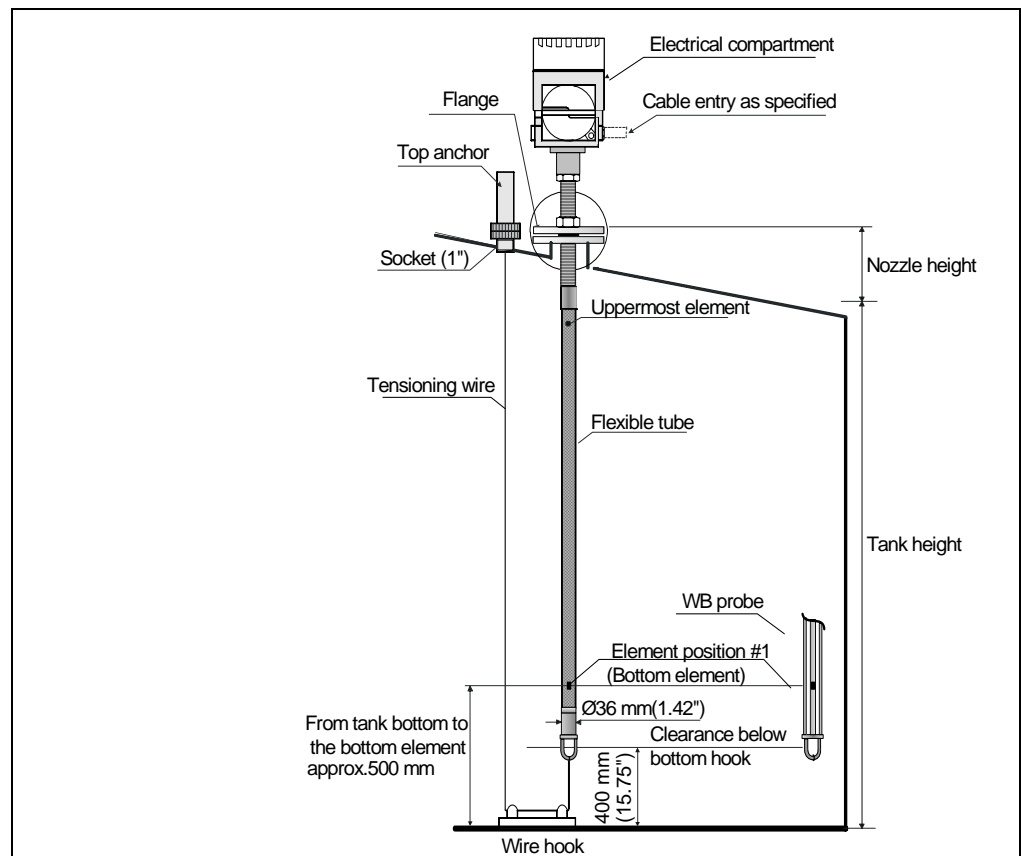


Figure 5-1: Flexible tube and water bottom sensor installation

1. Insert a gasket and lower the flexible tube and/or WB probe from the nozzle on the tank top.

Caution! Catching or scraping the flexible tube or WB probe against the edge of the nozzle hole could cause damage. Lower the tube carefully without excessive bending, as illustrated in Figure 4-7.

2. Rotate the 4539 ATC so that you can set up the cabling in the most convenient way.
3. Straighten the tensioning wire, fix the wire end to the top anchor temporarily and lower the wire.
4. Draw the tensioning wire through the wire hook on the tank bottom.
5. Wind the tensioning wire twice around the hitch, tighten it and wrap a commercial wire around it (see Figure 5-2).

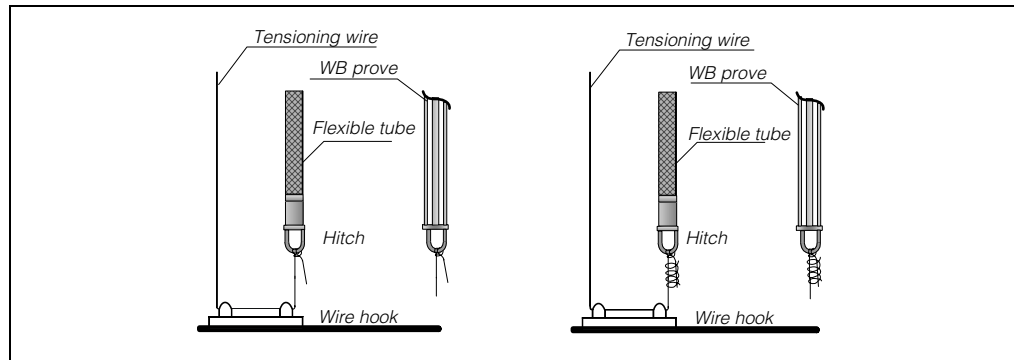


Figure 5-2: Tensioning wire installation

6. Bolt the mounting flange of the 4539 ATC to the nozzle on the tank top.

Caution! Limit the compression of the spring to 35mm to 37 mm (1.38" to 1.47"). If you compress the spring beyond 35 to 37mm, it may cause internal breakage or damage in the flexible tube.

7. Pull the end of the tensioning wire as tight as possible by hand and foot (see Figure 5-3).

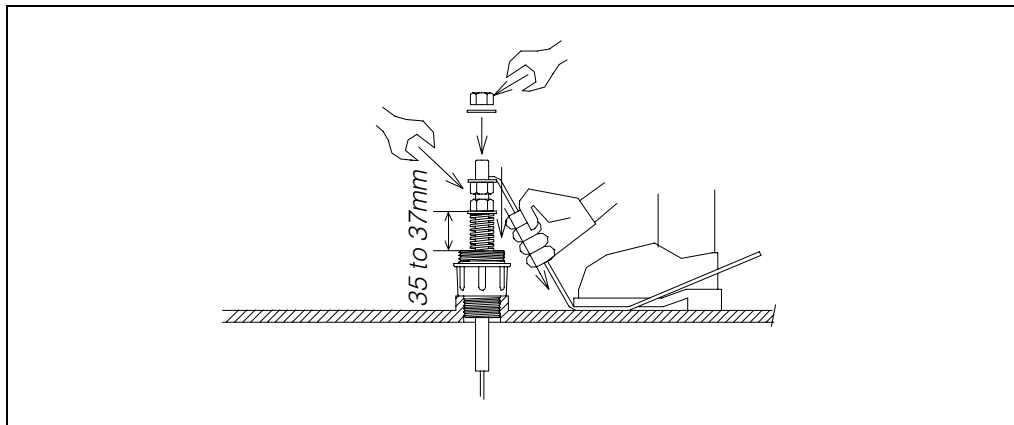


Figure 5-3: Tensioning wire installation

8. Bend the wire and fix it using the nut.
9. Cut the excess wire.
10. Screw the bolt and press down the spring of the top anchor 35 to 37mm.
11. Cover the top anchor.

5.1.2 Thermo well method

The flexible tube and/or WB sensor are inserted into a thermo well with a diameter of 2" or more.

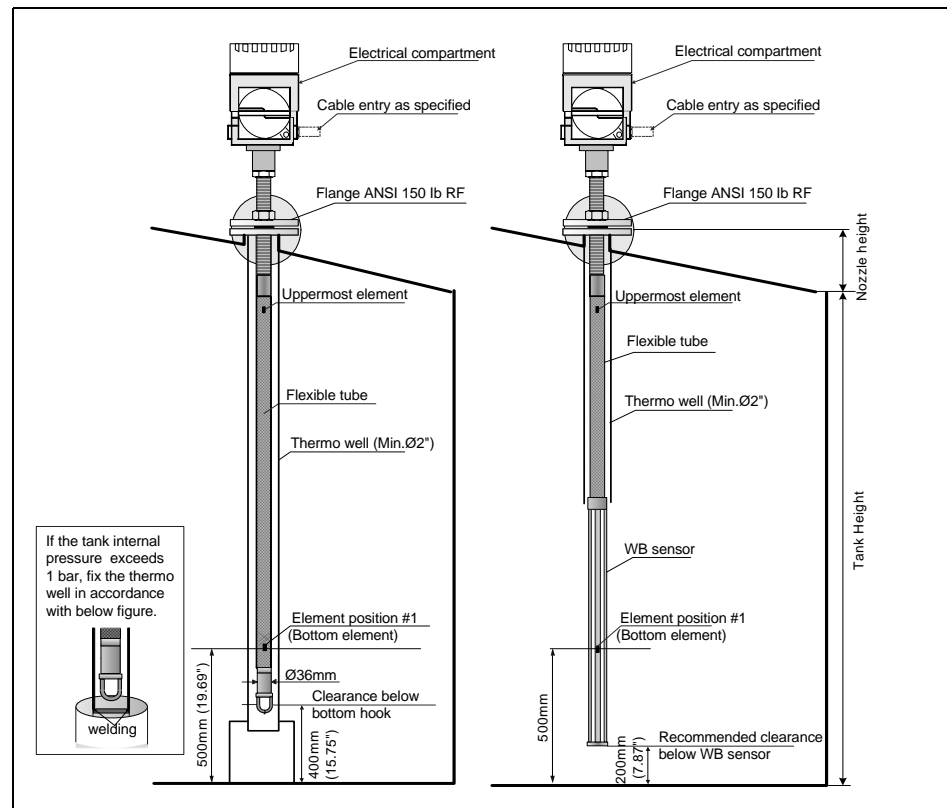


Figure 5-4: Thermo well method installation

The installation procedure requires the following steps:

Caution! Catching or scraping the flexible tube or WB probe against the edge of the nozzle hole could cause damage. Lower the tube carefully without excessive bending, as illustrated in Figure 4-7.

1. Insert a gasket and lower the flexible tube and/or WB sensor probe from the inlet of the thermo well.
2. Rotate the 4539 ATC so that you can set up the cable in the most convenient way.
3. Bolt the mounting flange of the 4539 ATC to the nozzle on the tank top.

5.1.3 Anchor weight method

The flexible tube is stabilized by an anchor weight.

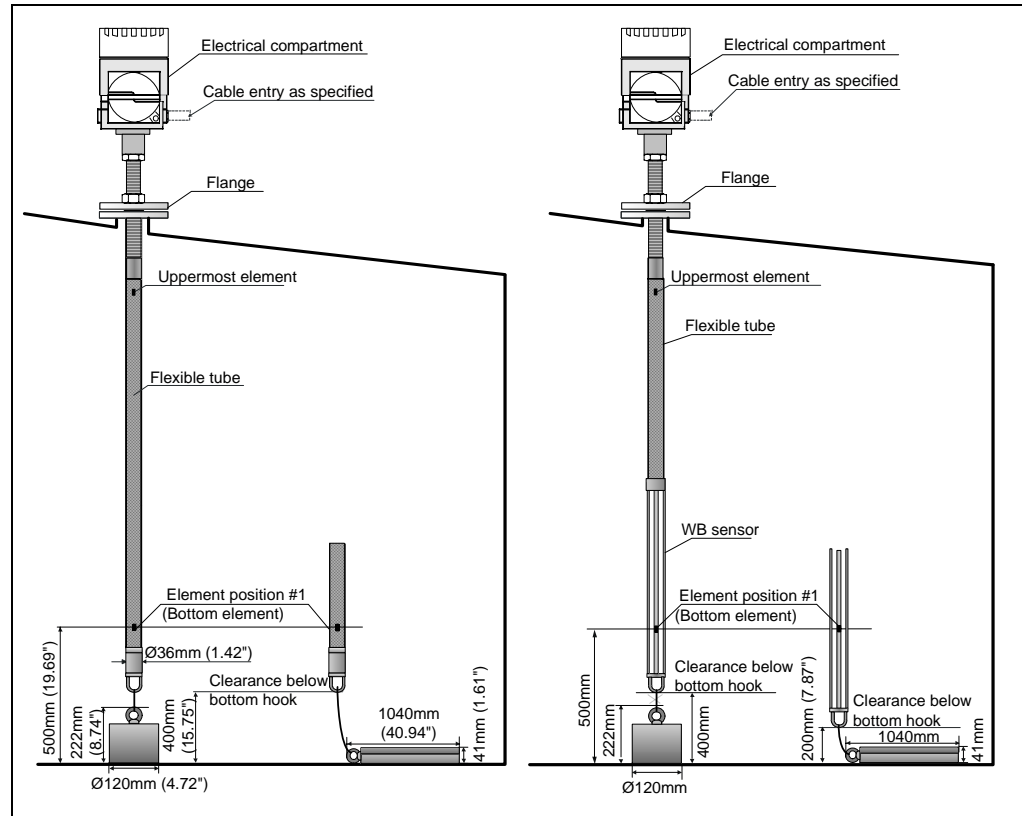


Figure 5-5: Anchor weight method installation

The installation procedure requires the following steps:

Caution! Make sure to put the anchor weight on the tank bottom. When installing with the suspended anchor weight, limit the anchor weight to 16kg. More weight may cause internal damage or breakage in the flexible tube.

Caution! Catching or scraping the flexible tube or WB probe against the edge of the nozzle hole could cause damage. Lower the tube carefully without excessive bending, as illustrated in Figure 4-7.

1. Insert a gasket and lower the flexible tube and/or WB sensor from the nozzle on the tank top.
2. Rotate the 4539 ATC so that you can set up the cabling in the most convenient way.
3. Tighten the tensioning wire between the lower end of the flexible tube and the anchor weight.
4. Wind the tensioning wire twice around the hitches and wrap a wire around it (see Figure 5-6)
5. Bolt the mounting flange of the 4539 ATC to the nozzle on the tank top.

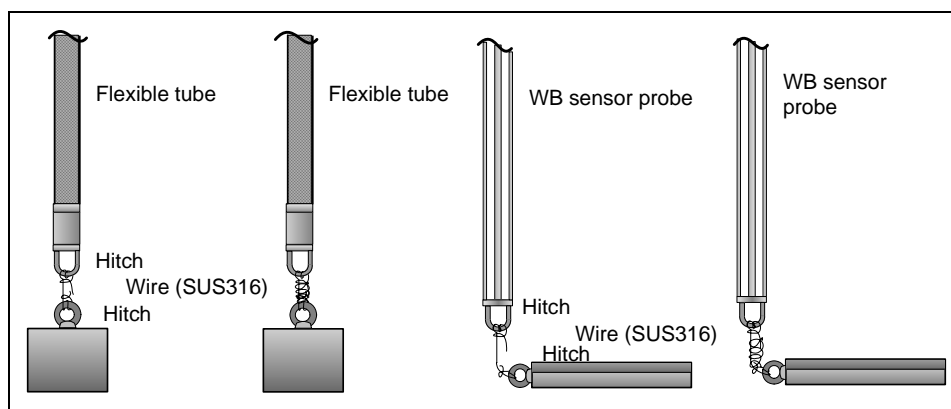


Figure 5-6: Flexible tube / WB sensor probe installation

5.2 Mounting on a floating roof tank

There are three methods of mounting the 4539 ATC on a floating roof tank:

- Top anchor method
- Thermo well method
- Guide wire ring method

Note! If the tank bottom has a heating coil, the clearance from the flexible tube or probe bottom hook to the tank bottom must increase according to the heating coil type.

5.2.1 Top anchor method

The flexible tube or WB sensor is installed in a fixed pipe and stabilized by a top anchor. The 6000 STG and 4539 ATC can be mounted in the same pipe. The installation procedure is the same as for mounting on a fixed roof tank using the top anchor method (See Section 5.1.1).

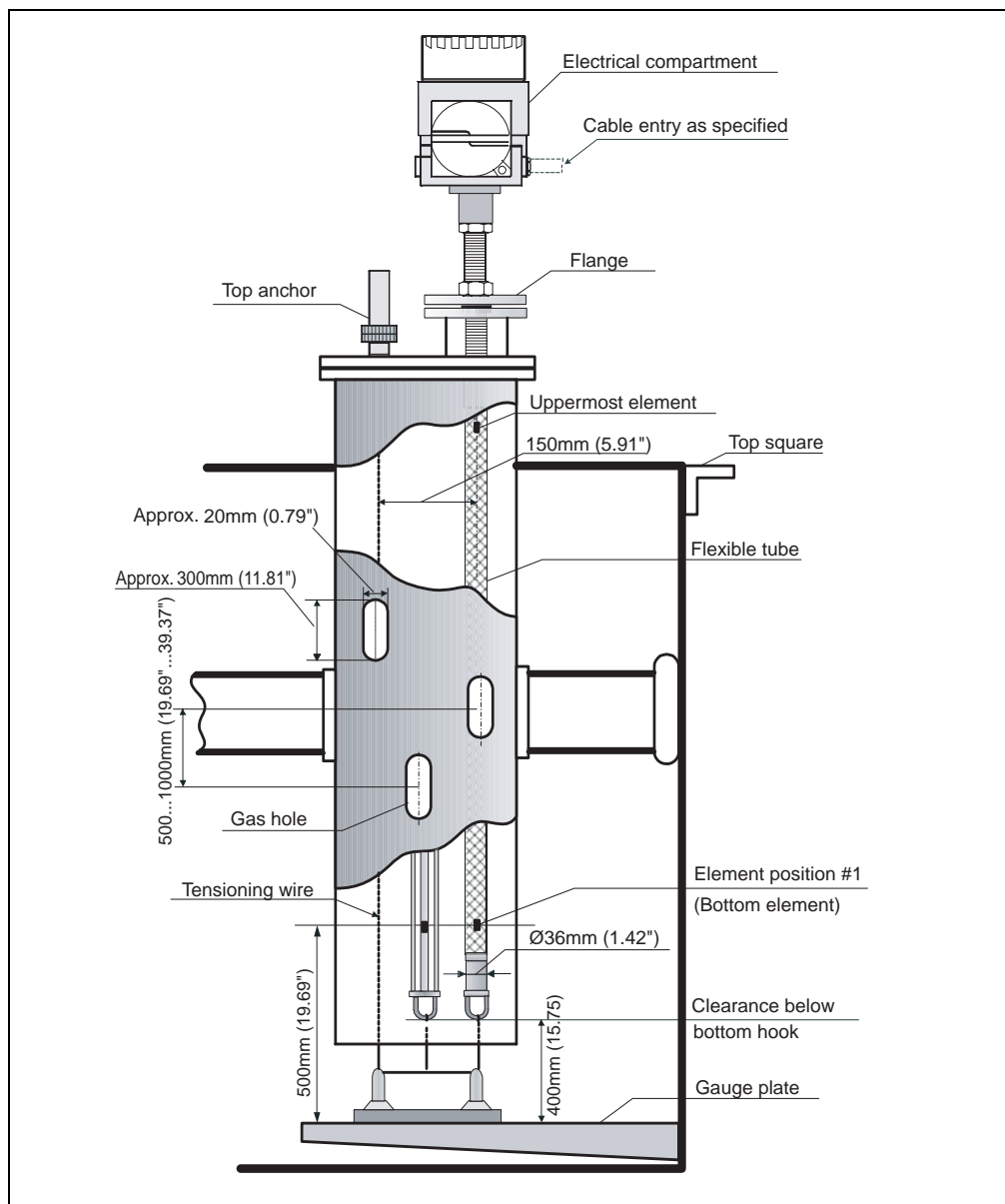


Figure 5-7: Top anchor method installation

5.2.2 Thermo well method

The flexible tube and/or WB sensor probe are inserted into a thermo well in a fixed pipe. The installation procedure is the same as for mounting on a fixed roof tank using the thermo well method. (See Section 5.1.2.)

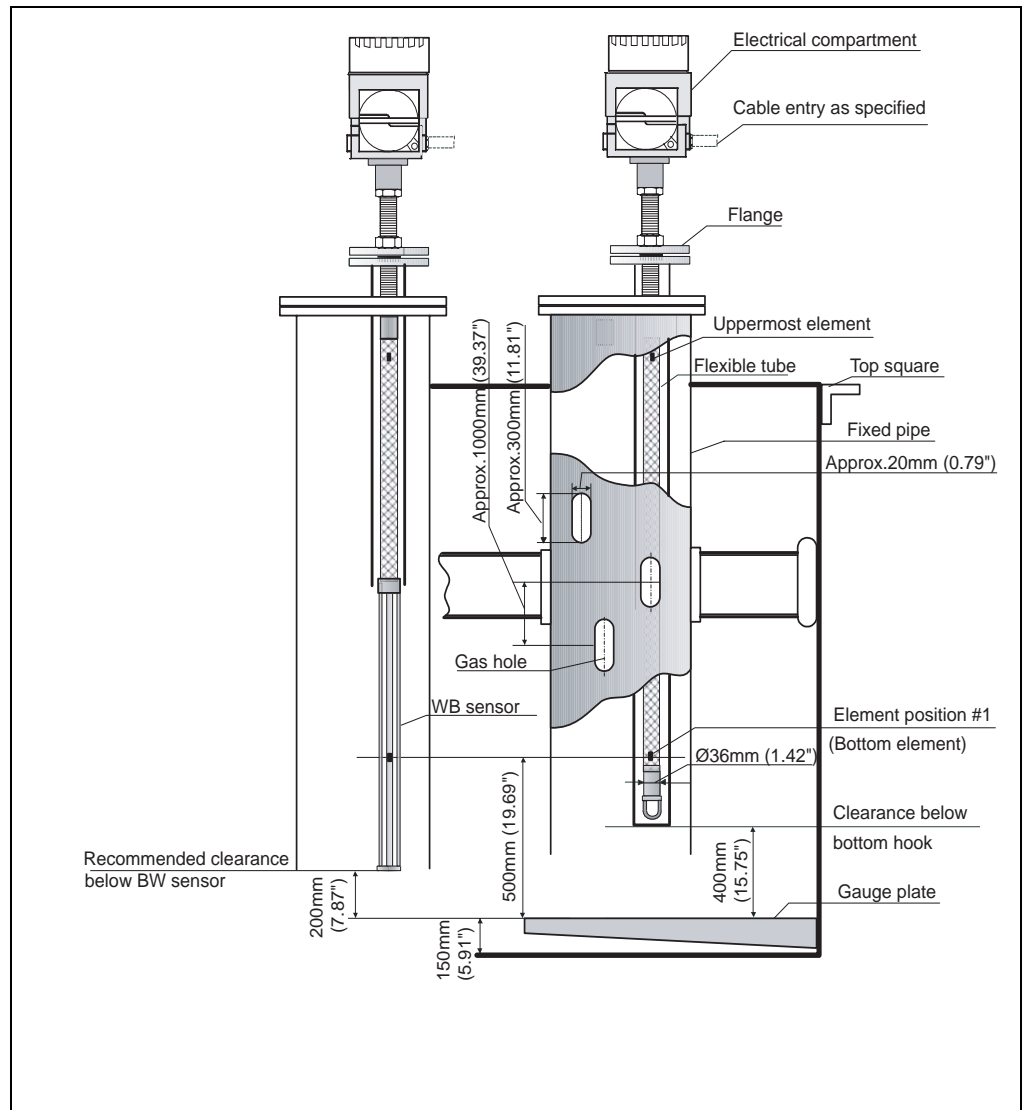


Figure 5-8: Thermo well method installation

5.2.3 Guide wire ring and anchor weight method

The flexible tube and/or WB sensor are stabilized by a guide ring and anchor weight.

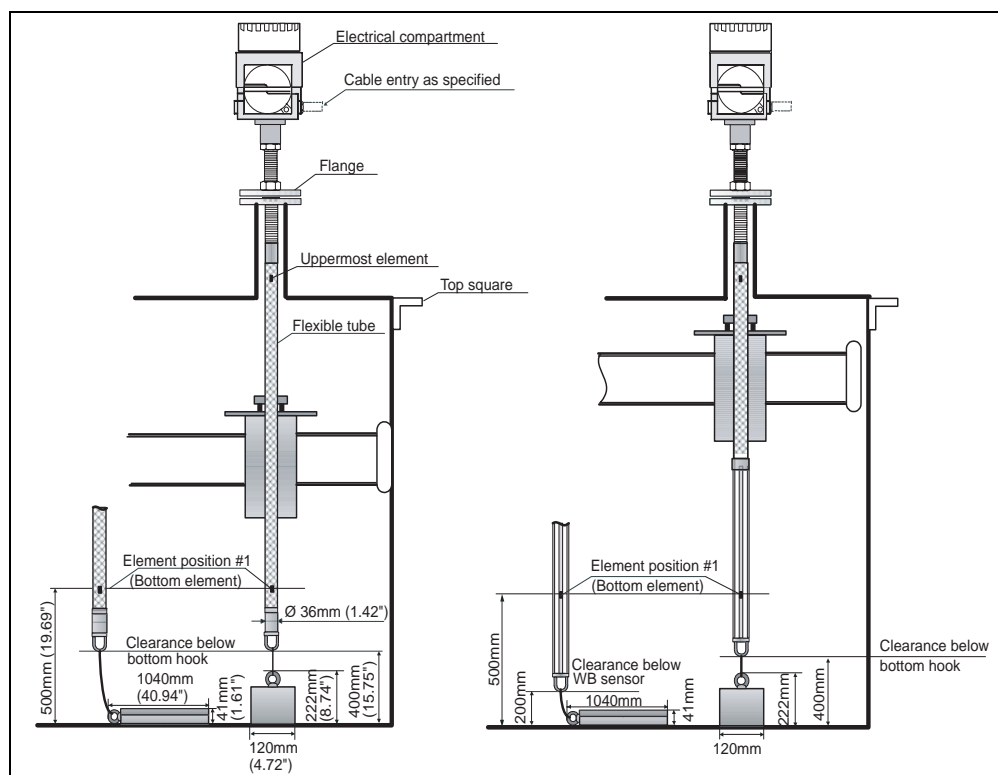


Figure 5-9: Guide wire ring and anchor weight method installation

Caution! Make sure to put the anchor weight on the tank bottom. When installing with the suspended anchor weight, limit the anchor weight to 16kg. More weight may cause internal damage or breakage in the flexible tube.

Caution! Catching or scraping the flexible tube or WB probe against the edge of the nozzle hole could cause damage. Lower the tube carefully without excessive bending, as illustrated in Figure 4-7.

The installation procedure requires the following steps:

1. Set the guide ring to the floating roof.
2. Insert a gasket and lower the flexible tube and/or WB sensor probe through the nozzle on the tank top.
3. Rotate the 4539 ATC so that you can set up the cabling in the most convenient way.
4. Tighten the tensioning wire between the lower end of the flexible tube or WB sensor and the anchor weight. Wind the tensioning wire twice around each of the hitches and wrap a wire around it (See Figures 5-2 and 5-3 on page 16.).
5. Bolt the mounting flange of the 4539 ATC to the nozzle on the tank top.

6 Wiring

6.1 Mechanical connection for converter-only version

Note! Prior to the removal of the existing RTD temperature converter, note the following information. This information is also applicable for new installations.

1. Element type (material and structure)
2. Total element number
3. Presence of bottom and vapour spot elements
4. Lowest element position
5. Element intervals
6. Cable colour for each element

Prior to performing the 4539 ATC installation, temporarily tie up all RTD cables (and coaxial cables if the probe is equipped with a water bottom sensor) with zip ties or short string to avoid damaging cables during mechanical connection.

6.1.1 Preparation of the mechanical connection

Caution! Use caution when installing the new to the existing RTD probe.

Unscrew the lower NPS threaded female connector once and try to fit it on the temperature RTD probe to ensure that each threaded connection can be smoothly attached (see Figure 6-1).

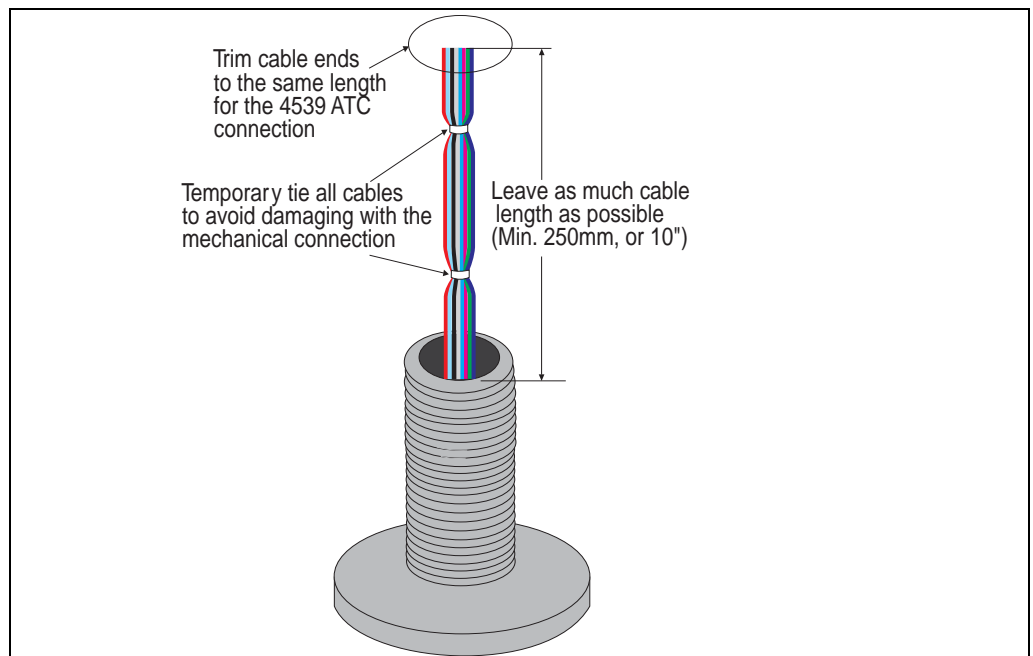


Figure 6-1: Mechanical connection for converter-only version

6.1.2 Threaded type connection

1. Install lower NPS threaded female connector along with free spinning coupling onto the RTD probe threaded connection until it is completely seated.
2. Wrap the RTD probe's threaded connection with seal tape (see Figure 6-2).

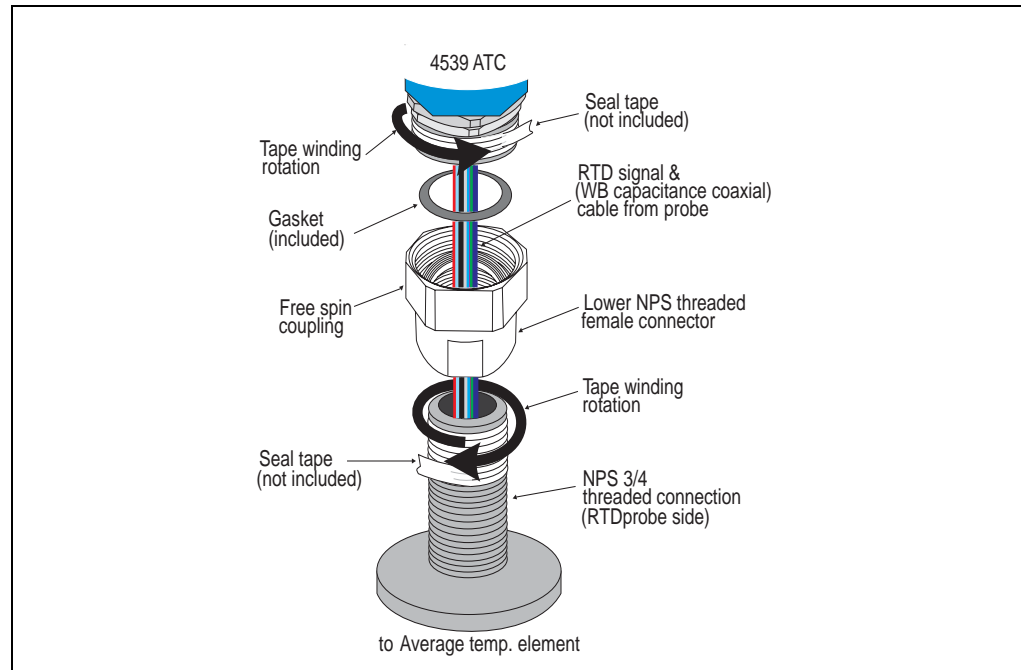


Figure 6-2: Threaded type connection

3. Install 4539 ATC housing with the gasket(included)n-between.
4. Use seal tape and wrap it around the male threaded connector on the 4539 ATC housing side.
5. Hand tighten the free-spinning coupling until it stops.
6. Remove the cap cover and make sure that both sides of the cable have enough length to be connected freely.

Warning! Do not pull either side of the cables or apply over-tension during this procedure. Internally torn cables or loose connections can cause invalid temperature measurement.

7. After performing the cable connection and positioning the face angle of the 4539 ATC, tighten the free-spinning coupling by hand.
8. Use a wrench to turn the coupling approx. 1 / 8th turn more.

6.2 4539 ATC to RTD probe

6.2.1 Temperature signal cable

The RTD cable is directly connected to the 4539 ATC (converter-only version) input cable with simple crimp connectors (included). Strip each end of the cable approximately 10mm (3/8") and slip it into the connector, then pinch with pliers to secure the connection (see Figure 6-3).

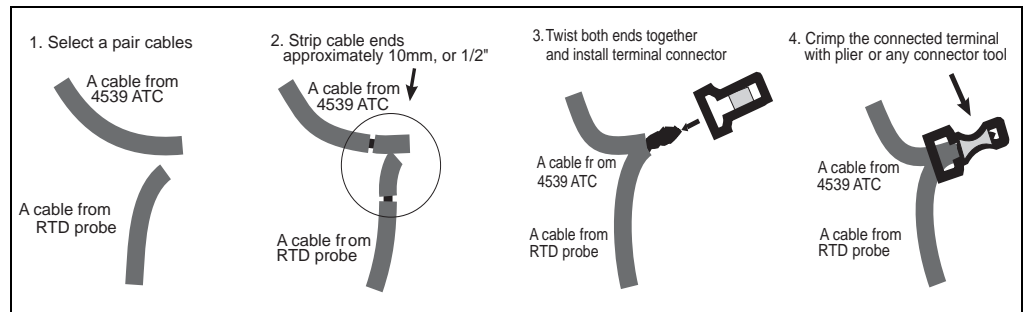


Figure 6-3: RTD cable connection

The cabling color code is listed below.

The 4539 ATC cable color: the principle is based on the A,B,b 3 wire spot RTD cabling method.

A: Signal wires

No. 1:	brown	No. 09:	white
No. 2:	red	No. 10:	black
No. 3:	orange	No. 11:	brown & white
No. 4:	yellow	No. 12:	red & white
No. 5:	green	No. 13:	orange & white
No. 6:	blue	No. 14:	yellow & white
No. 7:	violet	No. 15:	green & white
No. 8:	gray	No. 16:	blue & white

B: Common wire

BO:	violet & white
B:	black & white

6.2.2 Coaxial cable for capacitance signal to auxiliary converter

The 4539 ATC temperature and water bottom version allows accessibility to the coaxial cable (water bottom capacitance signal) from the auxiliary capacitance to HART converter (Drexelbrook and others). The sensor cable from the WB probe and converter cable through the cable outlet can meet within the 4539 ATC terminal housing or the sensor cable can directly exit from the cable outlet. Some WB capacitance sensors might have additional ground wire. Route this wire to the existing CV converter without causing interruption inside the 4539 ATC housing.

6.3 Terminal Connection

6.3.1 4539 ATC terminal

Note! The 4539 ATC allows an intrinsically safe HART connection only. Refer to the i.s. regulation for establishing wiring and field device layout.

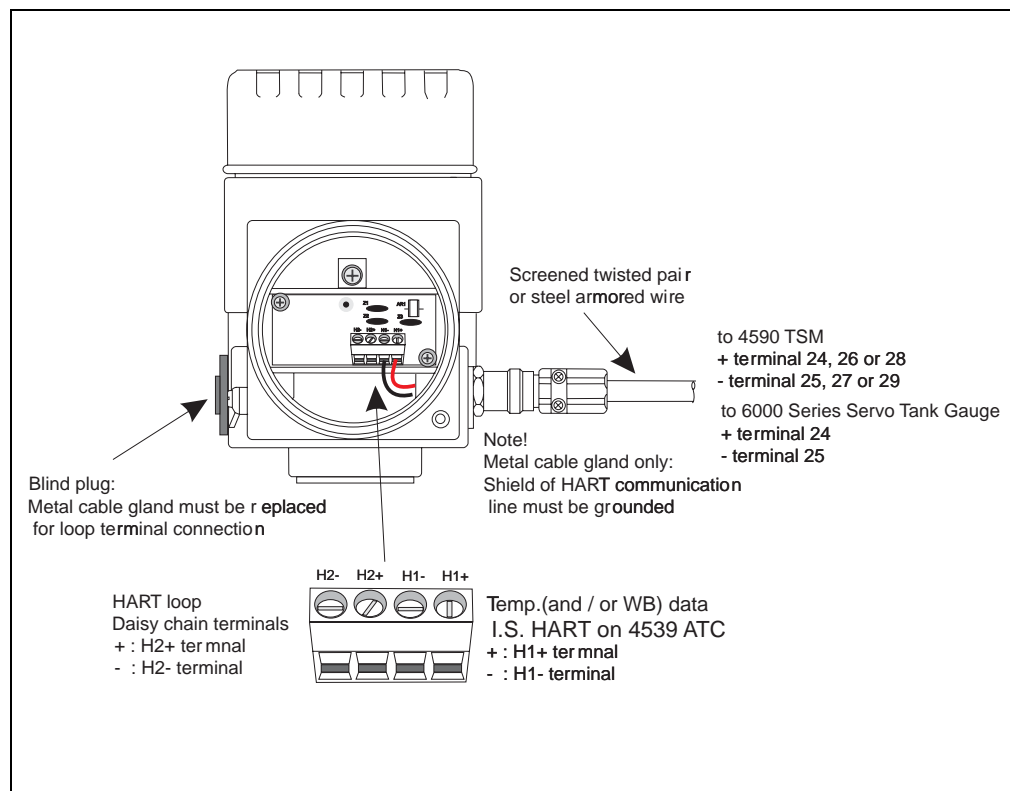


Figure 6-4: 4539 ATC terminal board

The 4539 ATC has convenient DG chain HART loop terminals that enable the 4539 ATC to be a terminal junction for HART multi-drop instruments.

6.3.2 6000 Series Servo Tank Gauge terminal

Since the 4539 ATC is an intrinsically safe instrument, the terminal connection to the Ex i side on HART connection is allowed on the 6000 STG terminal housing.

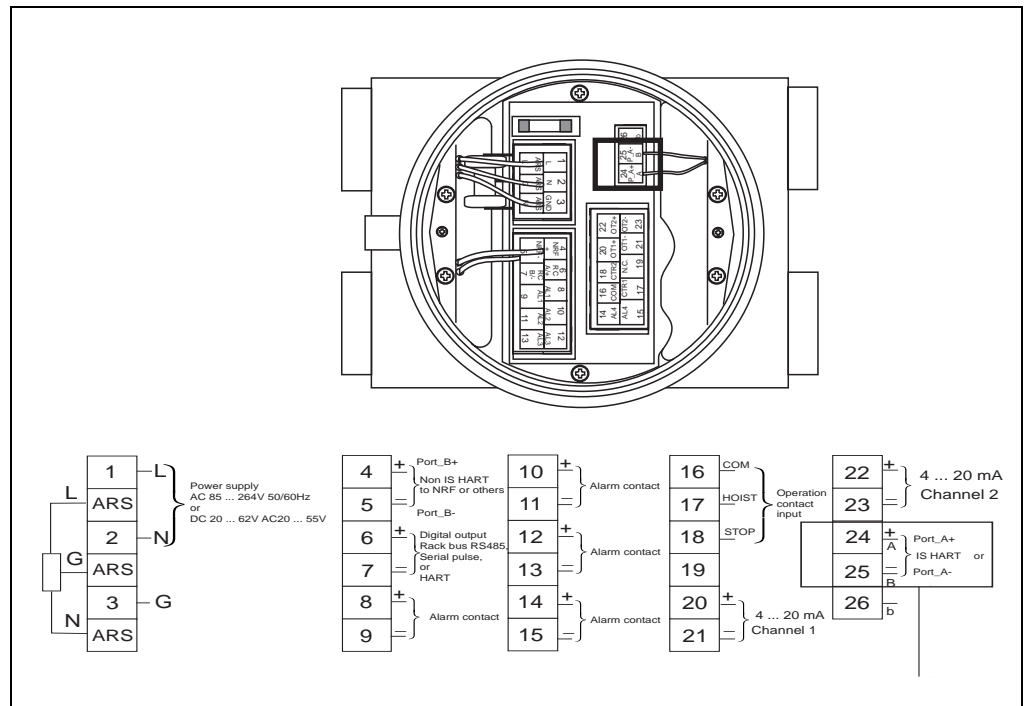


Figure 6-5: Terminal connection on the 6000 STG

Note! Do not connect the 4539 ATC HART communication on terminals 4 and 5 on the 6000 STG. These terminals are designed to connect Ex d HART communication.

6.4 4590 TSM i.s. terminal

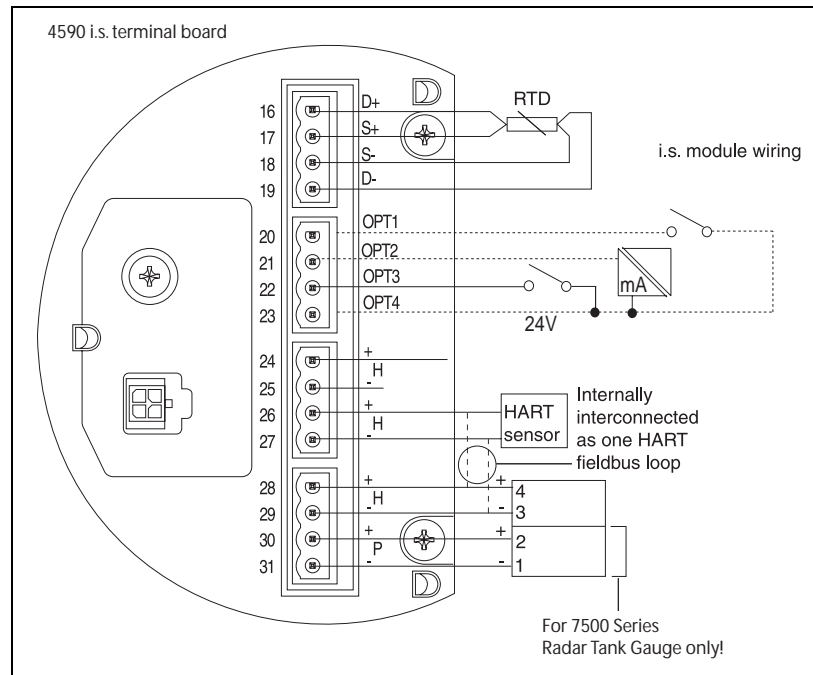


Figure 6-6: Terminal connection on the 4590 TSM

Note! The 4590 TSM has three sets of i.s. HART terminals. These three pairs are looped internally.

Caution! Do not connect signal HART lines from the 4539 ATC to terminals 30 and 31. They are designed to supply drive power for the 7500 Series Radar Tank Gauge only.

7 Certificates and approvals

CE approvals

By attaching the CE mark, Varec confirms that the instruments pass the required tests.

Ex approvals

See order information

W & M approval

To be announced

External standards and guidelines

Based on IEC 61326, Immunity according to table A-1

Immunity to surge on data lines

EN 61000-4-4

Immunity to burst on data lines

EN 61000-4-2

Immunity to electrostatic discharge

EN 61000-4-6

Immunity to electromagnetic field disturbance

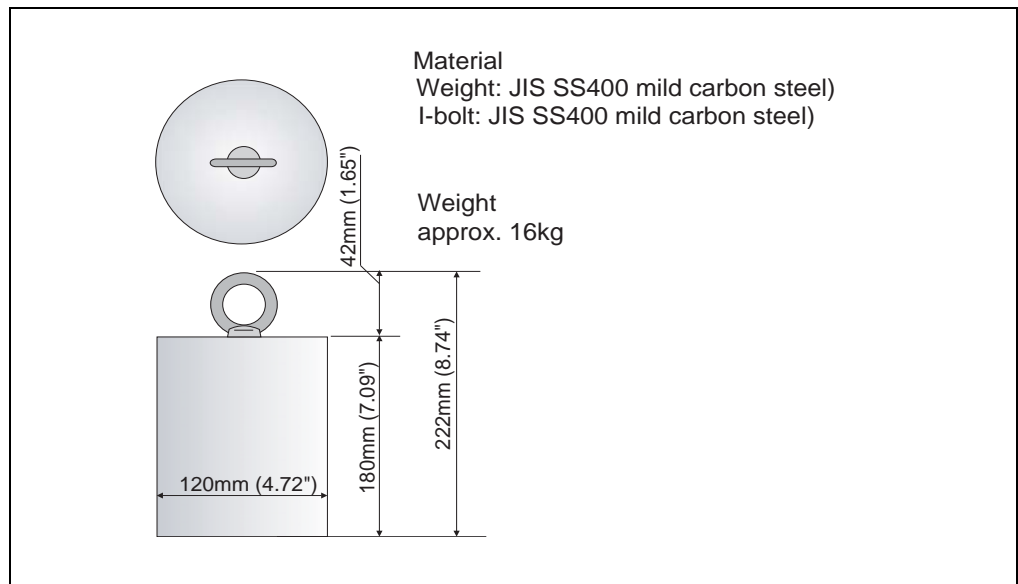
EN 61326/CISPR 16

Electromagnetic emission

8 Accessories

8.1 Anchor weight (tall profile) mounting attachment option: B

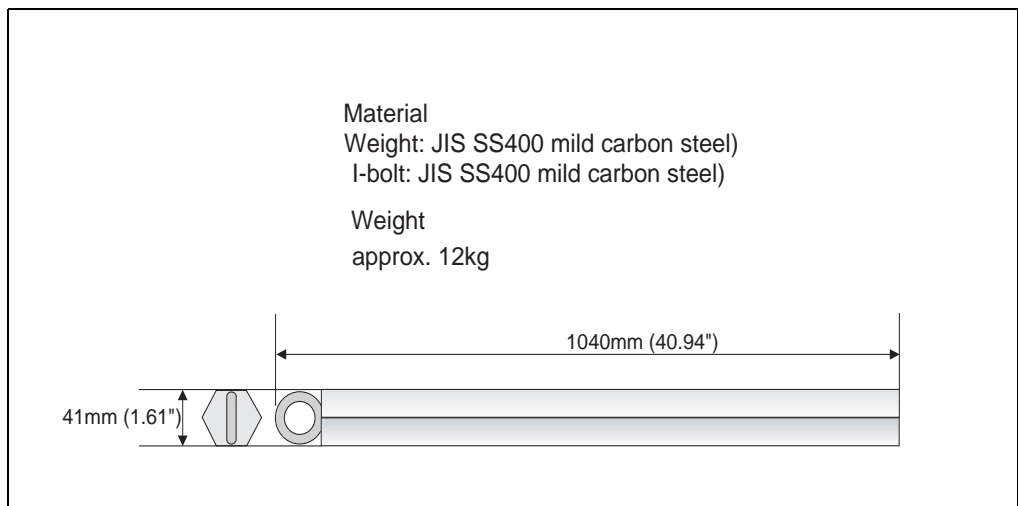
Caution! Installation of the anchor weight will cause the lowest temperature measurement position to be raised approximately 400mm (16") from the tank floor.



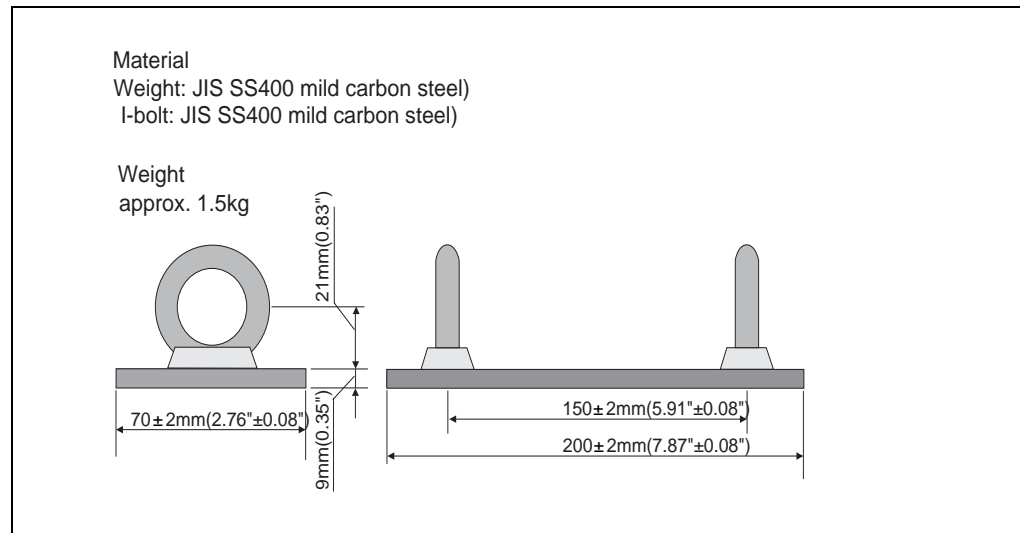
Different dimensions, weight and material for the anchor weight are also available. Consult with your Varec representative for further details.

8.2 Anchor weight (low profile) mounting attachment option: C

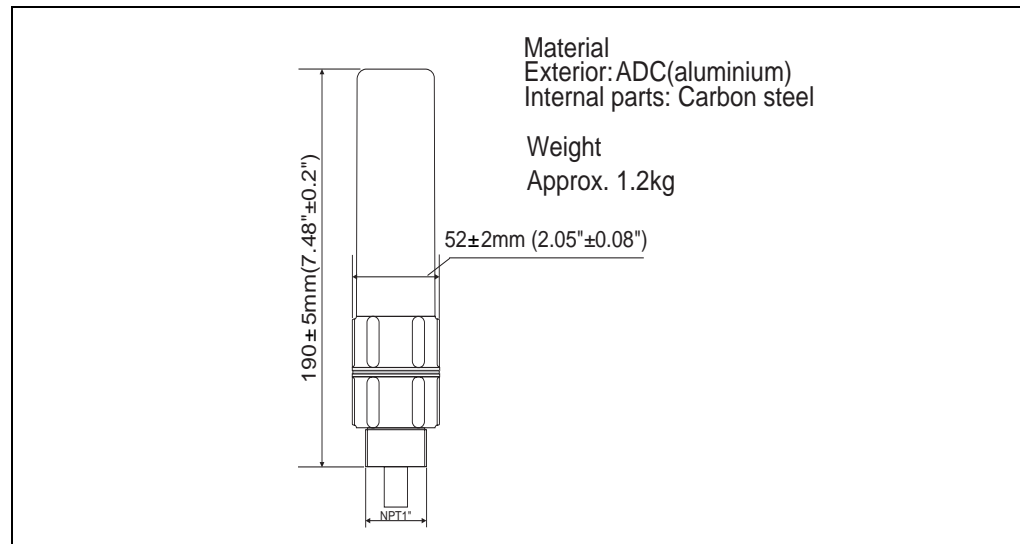
The low profile anchor weight is mainly designed to stabilize the WB sensor, securing it straight up without shortening the WB measuring range. There is also a version for an existing tank installation with a small nozzle opening for converter and temperature version as well.



8.3 Wire hook, Top anchor mounting attachment option: D



Actual tensioning can be completed with SUS316 stranded 3mm diameter tension wire between wire hook to top anchor. Based on the application and installation variables, type of wire and size, material and special coatings are available. Consult with your Varec representative for further details.



Note! The standard process connection of the top anchor is PT1" threaded connection. Different thread size, material and specification are available. The flange type connection is also available.

9 Technical specifications

9.1 General specifications

Manufacturer	Varec
Designation	4539 ATC
Function	RTD average temperature signal to HART conversion
	RTD average temperature measurement + HART converter
	Capacitance water interface measurement + HART converter
	Average temperature and water interface measurement + HART converter
Total accuracy (temperature)	$\pm 0.1^{\circ}\text{C}$ or less (at reference condition)*1
Total accuracy (water bottom)	4mm($\pm 2\text{mm}$) or better (at reference condition)*2

9.2 Power supply

Input	16 30VDC (via HART line from host gauge)
Power consumption	6mA@16VDC (HART converter-only)
	6mA@16VDC (Temp. probe + HART converter)
	12mA@16VDC (WB sensor + HART converter)
	12mA@16VDC (Temp. probe + WB sensor + HART converter)

9.3 Converter specifications

Compatible element type	Pt100, Cu90, Cu100, PtCu100
Housing	Aluminium diecast
Process connection	PF 3/4" (NPS 3/4") universal coupling
	M20 threaded (Varec 1700 connection only)
Cable entry	G (PF) 1/2"
	NPT 1/2"
	PG16
	M20
Ambient temperature	-40 ...+85 °C (-40 ...+185 °F) (converter housing)

9.4 Temperature probe specifications

Temperature element	Class A Pt100, IEC PUB 751 1983 and / or JIS 1604 1989
Installation height adjuster	±360 mm threaded (SUS 316)
Probe material	SUS 316 flexible tube
	SUS 316 flexible tube + SUS316 armored mesh pending
	PTFE or Nylon tube pending
Operation temperature	–200 ...+235 °C (–328 ...+455 °F)
Process connection	JIS 10K 50A RF
	ANSI 150lb 2" RF
	JPI 150lb 50A RF
	DIN DN50 PN 10RF

9.5 Water Bottom (capacitance) sensor specifications

Sensor material	SUS 316 (center rod SUS 304 & PFA protected)
Operation range	1 m (3.3 ft.) and 2m (6.6 ft.)
Operation temperature	–20 ...+100 °C (–4 ...+212 °F)
Sensible RF	to be announced
Data transmission	2.5mm coaxial cable and common ground

9.6 Environment

Weather proof	IP 65
Explosion proof	EEx ia IIB T2 ... T6, ATEX
	IS Class 1, Div. 1, Gp. CD FM

Reference *1

Accuracy of RTD – Temperature conversion. Accuracy measurement shall be conditioned with precisely calibrated dial resistor or IEC class A Pt100 ohm temperature element.

Reference *2

Measurement condition is based on 80% span of 1m probe in water / air interface at 25°C.

10 Troubleshooting

The Varec repair concept assumes that the measuring device has a modular design and that customers are able to undertake repairs themselves. Spare parts are contained in suitable kits. They contain the related replacement instructions. Spare parts that you can order from Varec for the 4539 ATC are shown with their order number in the diagram below. For more information on service and spare parts, contact Varec Customer Service or your local sales representative.

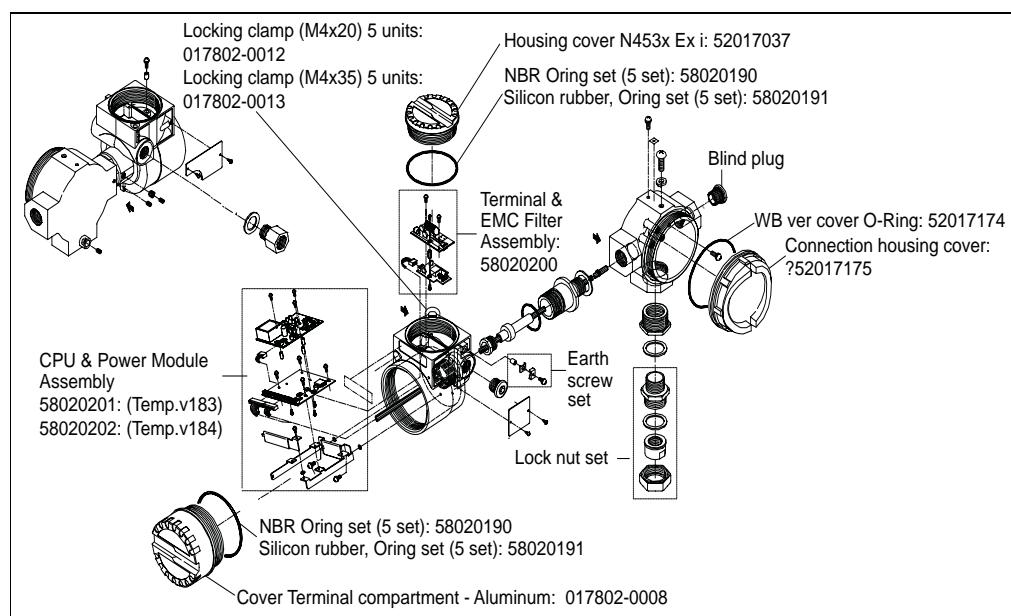


Figure 10-1: Type 1: Converter-only version [Standard PF(NPS3/4") universal coupling connection]

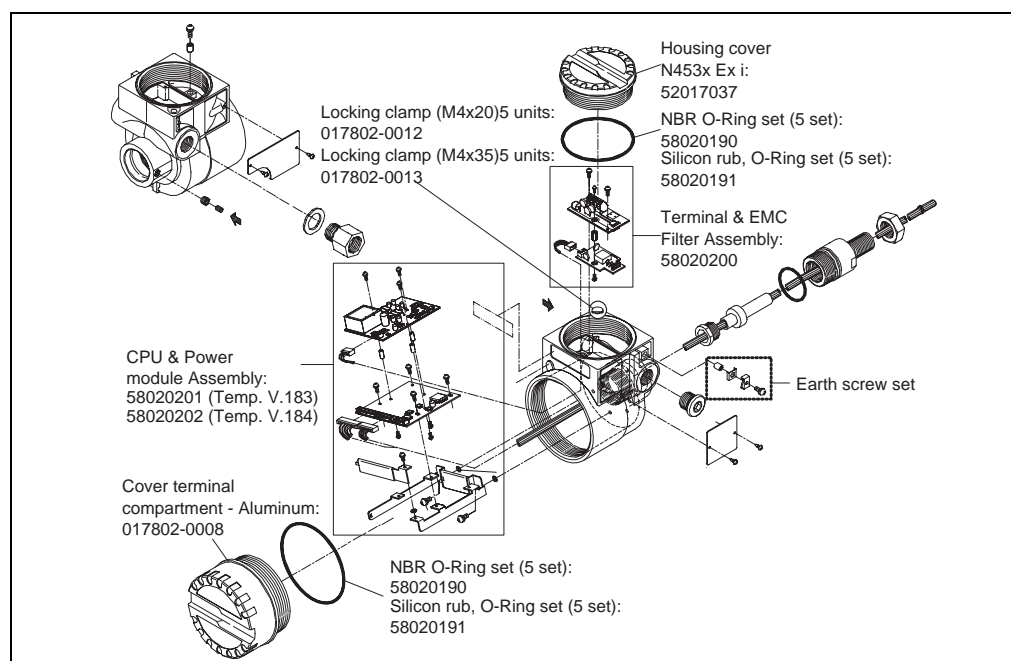


Figure 10-2: Type 2: Converter-only version (for the Varec 1700 win M20 threaded con-

nection)

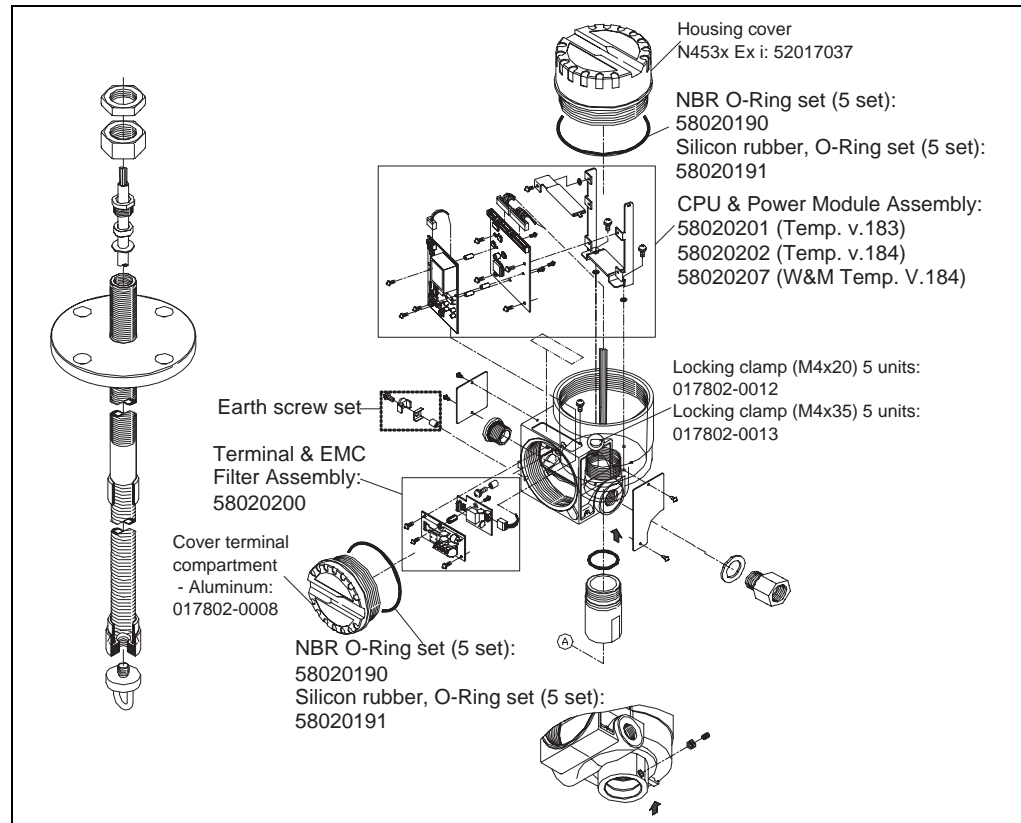


Figure 10-3: Converter + average temperature probe version

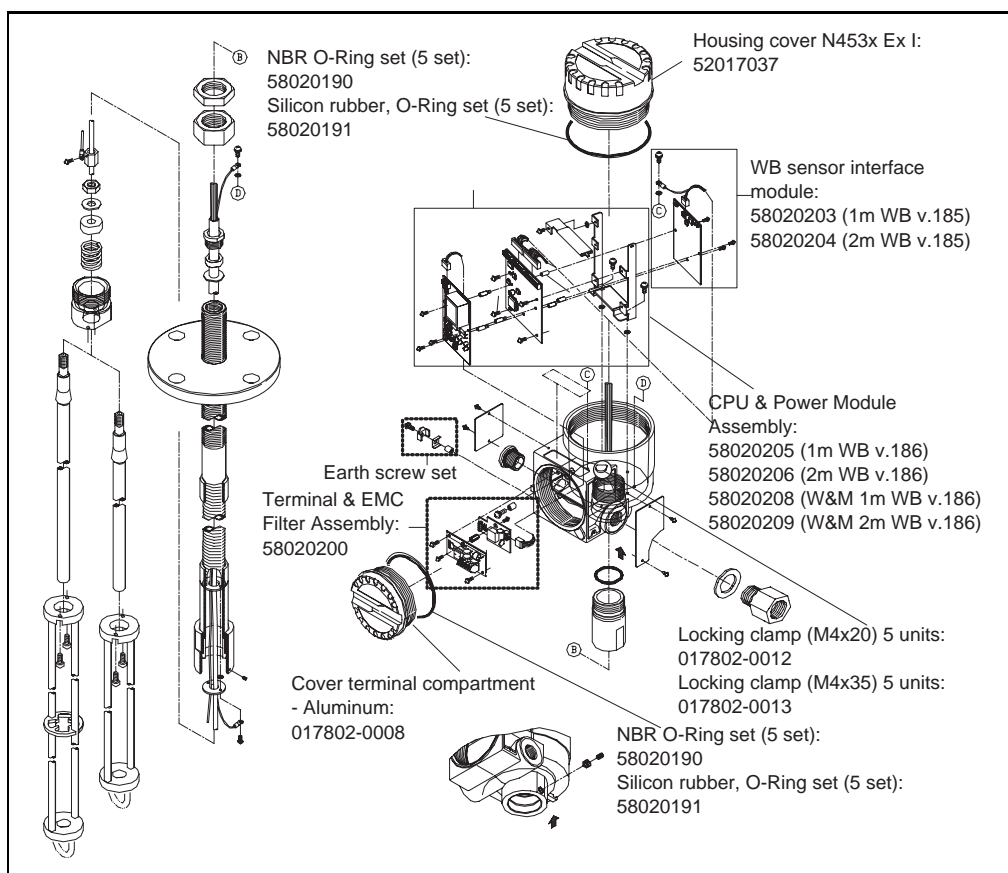


Figure 10-4: Converter + WB probe and Converter and Temp. + WB probe version

11 Order Codes

4539 Average Temperature/Water Bottom Sensor and Convertor

10	Protection class				
	0	Protection: Waterproof IP 65			
	7	IS class 1Div 1 Gp ABCD.,FM			
	B	EEx ia IIC TB-T6, ATEX			
	9	Special version			
20	Measuring function				
	0	Converter-only			
	1	Temperature + Converter			
	2	Water Bottom + Converter			
	3	Temperature + Water Bottom + Converter			
	4	Temperature + Converter (T&W)			
	5	Temperature + Water Bottom + Converter (T&W)			
	9	Special version			
30	Temp.measuring range				
	0	Temp.device not selected			
	1	-40...+100 °C (-40...+212 °F)			
	2	-55...+235 °C (-67...+455 °F)			
	9	Special version			
40	Water Bottom measuring range				
	0	Water Bottom device not selected			
	1	1 m (3.3 ft.)			
	2	2 m (6.6 ft.)			
	9	Special version			
50	Cable entry				
	A	1 x G (PF) ½, thread			
	B	1 x NPT ½ x1, thread			
	C	1 x PG16, thread			
	D	1 x M20, thread			
	Y	Special version			
60	Process connection				
	0	JIS 10K 50A RF, flange			
	1	ANSI 2" 150lb RF, flange			
	2	DIN DN50 PN 10RF, flange			
	3	JPI 50A 150lb RF, flange			
	4	PF ¾" (NPS ¾"), universal coupling...Converter-only Type 1			
	5	M20, thread...Converter-only Type 2			
	9	Special version			
70	Number of elements				
	A	2...Pt100 elements			
	B	3...Pt100 elements			
	C	4...Pt100 elements			
	D	5...Pt100 elements			
	E	6...Pt100 elements			
	F	7...Pt100 elements			
	G	8...Pt100 elements			
	H	9...Pt100 elements			
	J	10...Pt100 elements			
	K	11...Pt100 elements			
	L	12...Pt100 elements			
	M	13...Pt100 elements			
	N	14...Pt100 elements			
	O	15...Pt100 elements			
	P	16...Pt100 elements			
	Q	Element not selected			
	Y	Special Version			

Continued...

Installation and Operations Manual

12 Declaration of Contamination Form

APT071GVAE0307

Declaration of Contamination



For the safety of our employees and operating equipment, we require that you fill out this form and return it to Varec with your signature before we can fulfill your order. Please include the completed form with the device and shipping documents, along with safety sheets and/or specific handling instructions if appropriate.

Type of device/sensor: _____ Serial no.: _____
 Medium/concentration: _____ Temperature: _____ Pressure: _____
 Cleaned with: _____ Conductivity: _____ Viscosity: _____

Warnings for returned device (mark the appropriate symbols)



Reason for return _____

Company data

Company	_____	Contact person	_____
	_____		_____
Address	_____	Department	_____
	_____	Phone	_____
	_____	FAX / e-mail	_____
	_____	Order number	_____

I hereby certify that the returned equipment has been cleaned and decontaminated according to standard industrial practices and is in compliance with all regulations. This equipment poses no health or safety risks due to contamination.

 Place, date

 Company stamp and signature

Varec, Inc., an SAIC Company
 5834 Peachtree Corners East, Norcross (Atlanta), GA 30092 USA
 Tel: +1 (770) 447-9202 Fax: +1 (770) 662-8939

NOTES

Your official representative

Varec[®]



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