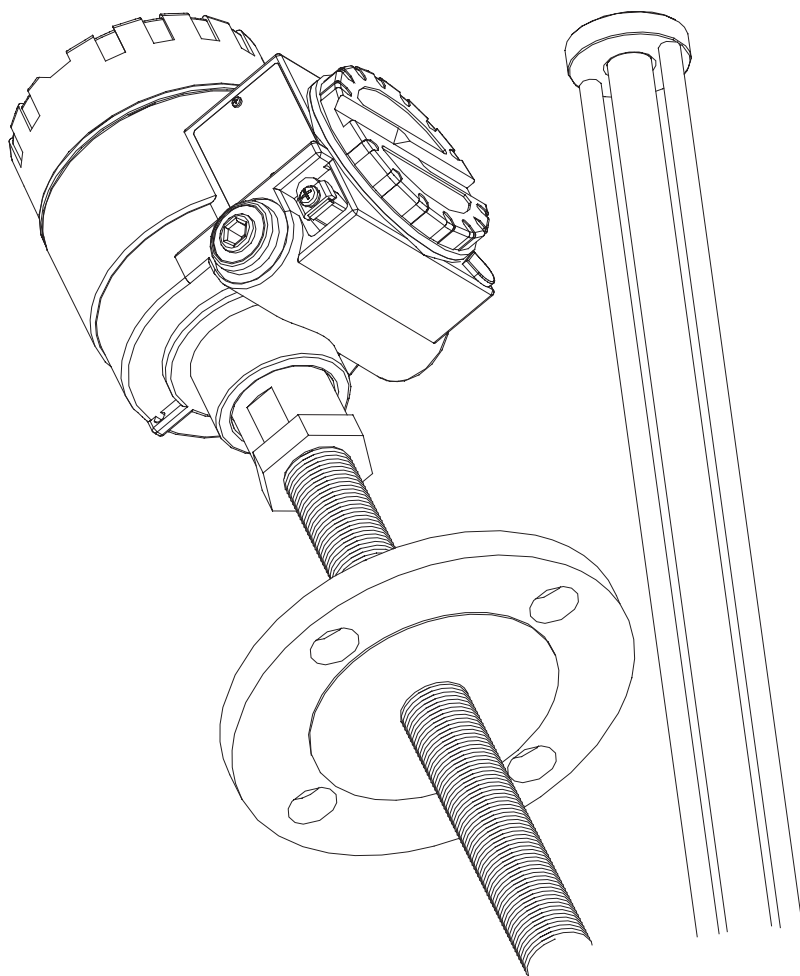


# Temperature *Prothermo NMT 539*

## Installation Instructions



# Endress + Hauser

The Power of Know How



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# 1 Safety instructions

## 1.1 Designated use

The Prothermo NMT 539 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 Endress+Hauser Micropilot S-series radars and the Tank Side Monitor NRF 590. Mounted on the tank top, the NMT 539 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 Endress+Hauser Tank Side Monitor NRF 590 or Proservo NMS 53x.

## 1.2 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.
- Please observe all provisions valid for your country and pertaining to the opening and repairing of electrical devices.

## 1.3 Operational safety

### Hazardous areas

Measuring systems for use in hazardous environments are accompanied by separate "Ex documentation", which is an *integral part* of this Operating Manual. 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.

### 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.

## 1.4 Return

The following procedures must be carried out before the NMT 539 is sent to Endress+Hauser for repair:

- Always enclose a duly completed "Declaration of Contamination" form. Only then can Endress +Hauser 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.



### Note!

A copy of the "Declaration of Contamination" is included at the end of these installation instructions.



### 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.

## 1.5 Disposal

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




## 1.6 Contact addresses of Endress+Hauser

The addresses of Endress+Hauser are given on the back cover of this Installation Instructions. If you have any questions, please do not hesitate to contact your E+H representative.

## 1.7 Notes on safety conventions and symbols

In order 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.






### Safety conventions

Symbol	Meaning
	<b>Warning!</b> A warning highlights actions or procedures which, if not performed correctly, will lead to personal injury, a safety hazard or destruction of the instrument.
	<b>Caution!</b> Caution highlights actions or procedures which, if not performed correctly, may lead to personal injury or incorrect functioning of the instruments.
	<b>Note!</b> 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.

### Explosion protection

	<b>Device certified for use in explosion hazardous area</b> If the device has this symbol embossed on its name plate it can be installed in an explosion hazardous area.
	<b>Explosion hazardous area</b> Symbol used in drawings to indicate explosion hazardous area. - Devices located in and wiring entering areas with the designation "explosion hazardous areas" must conform with the stated type of protection.
	<b>Safe area (non-explosion hazardous area)</b> 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.

### Electrical Symbols

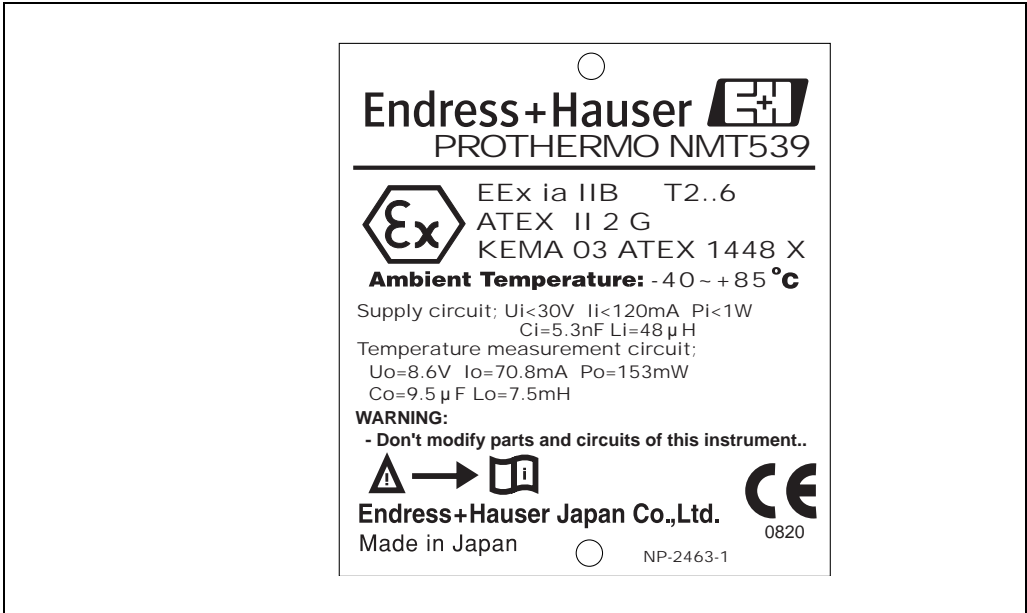
	<b>Direct voltage</b> A terminal to which or from which a direct current or voltage may be applied or supplied
	<b>Alternating voltage</b> A terminal to which or from which an alternating (sine-wave) current or voltage may be applied or supplied
	<b>Grounded terminal</b> A grounded terminal, which as far as the operator is concerned, is already grounded by means of an earth grounding system.
	<b>Protective grounded (earth) terminal</b> A terminal which must be connected to earth ground prior to making any other connection to the equipment.
	<b>Equipotential connection (earth bonding)</b> 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

2 Identification

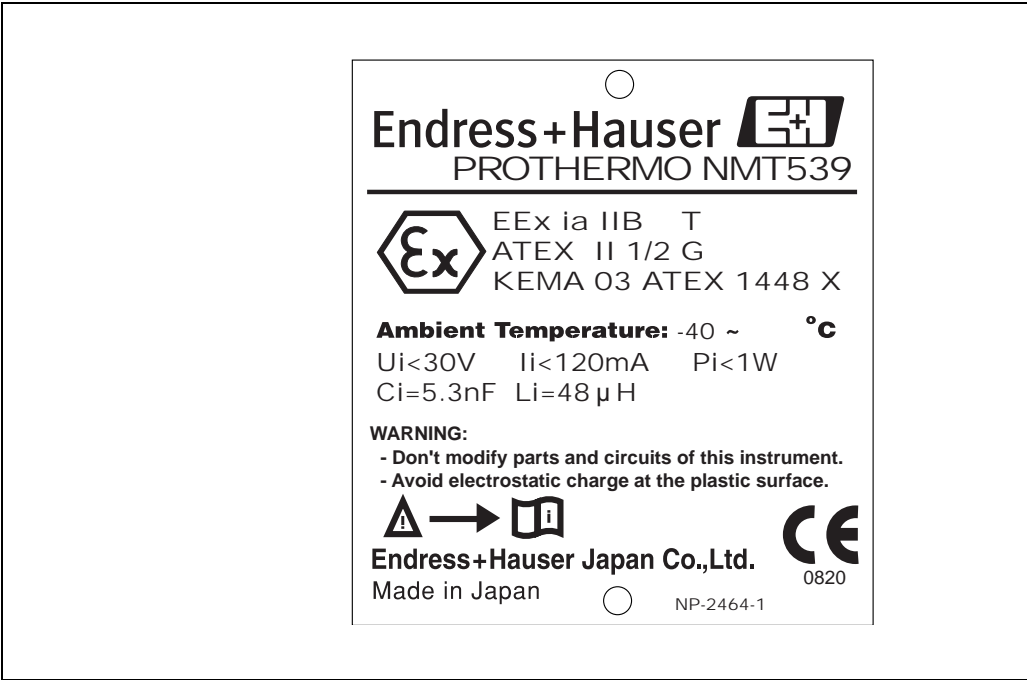
2.1 Device designation

2.1.1 Nameplate

The follow technical data are given on the instrument nameplate:



Converter only version



Converter + average temperature probe version  
Converter + WB probe version  
Converter + Temp. + WB probe version

## 2.1.2 Ordering structure

10	Protection class				
	0	IP 65			
	7	IS class 1 Div 1 Gp.FM...pending			
	8	Class 1 Div 1 Gp.CD (Ex i), CSA			
	A	Ex ia IIB T4, TIIS...pending			
	B	EEx ia IIC T2 - 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 (PTB, NMI T&W)...pending			
	5	Temperature + Water Bottom + Converter (PTB, NMI T&W)...pending			
	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)			
	3	-200...+71 °C (-328...+160 °F)...pending			
	4	-18...+80 °C (-0.4...+176 °F)(W&M only)...pending			
	9	Special version			
40	WB Measuring range				
	0	WB device not selected			
	1	1m(3.3 ft.)			
	2	2m(6.6 ft.)			
	9	Special version			
50	Cable entry				
	A	G(PF)½ x1, thread			
	B	NPT ½ x1, thread			
	C	PG 16 x1, thread			
	D	M20 x1, thread			
	9	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 Type 1			
	5	M20, thread...Converter only Type 2			
	9	Special version			
70	Number of temp. element				
	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			
NMT539-					Complete product designation

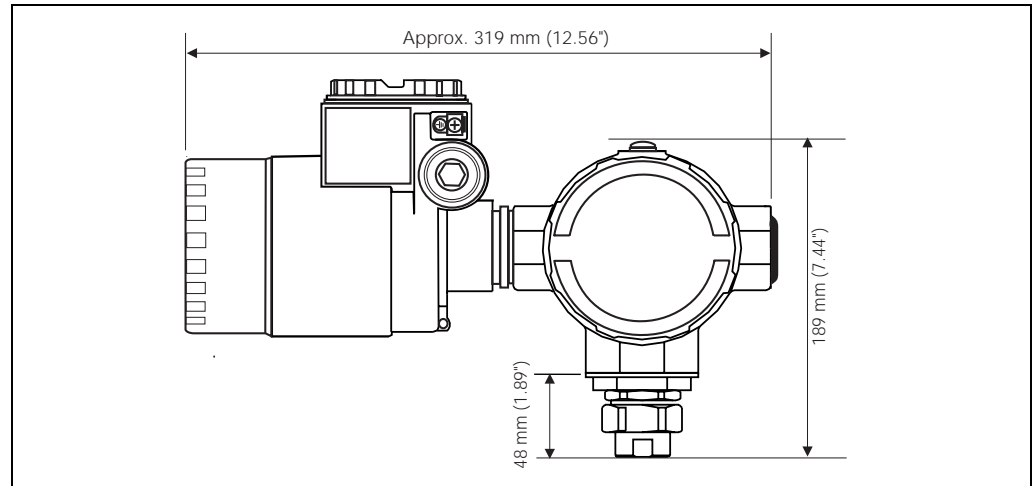




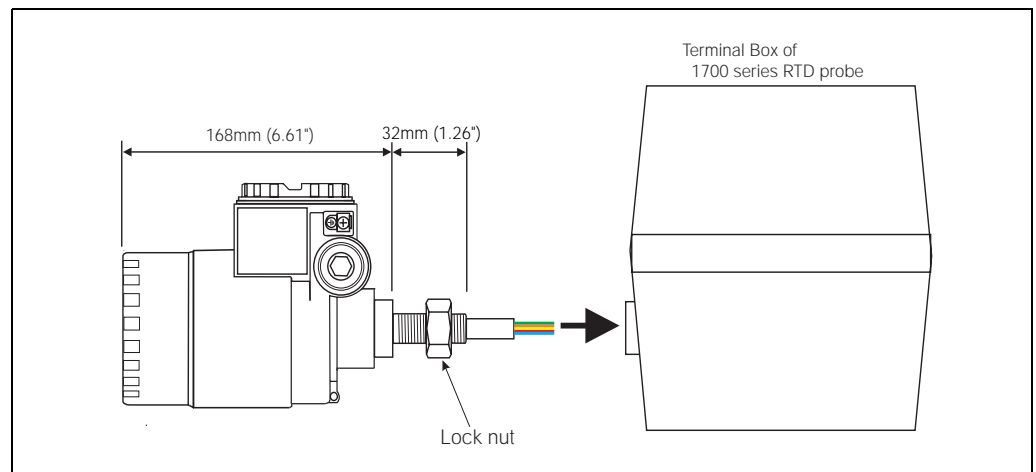
## 3.2 Installation conditions

### 3.2.1 Dimensions

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



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



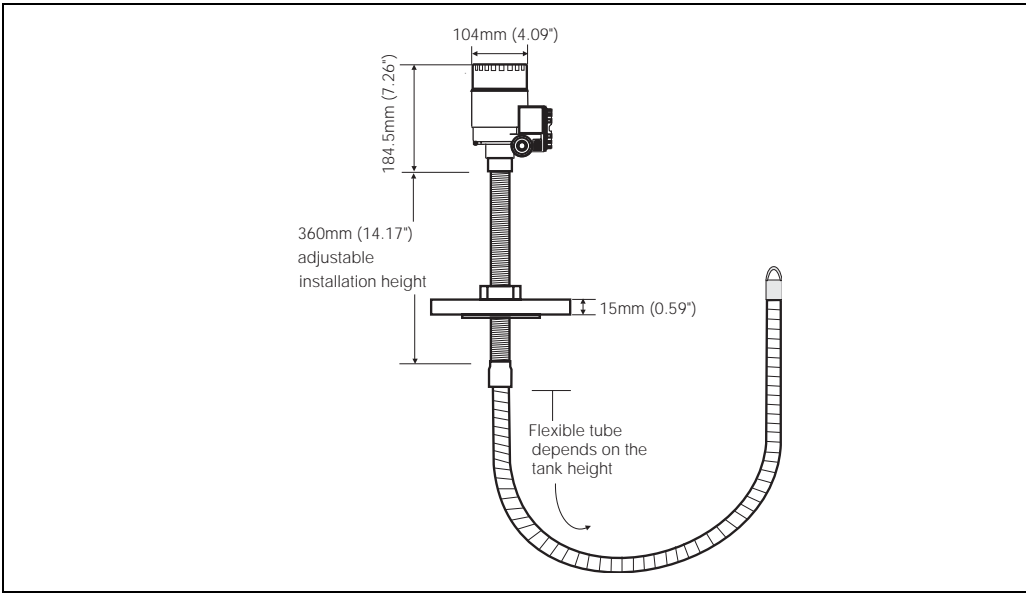
#### Note!

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 Prothermo NMT 539.

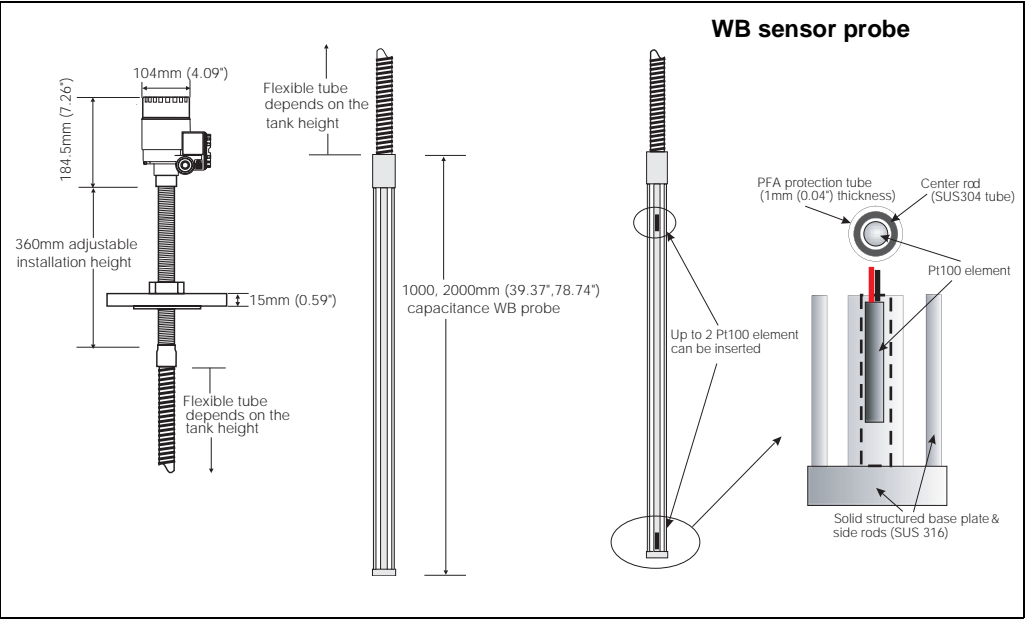
#### Mounting of UK Special version M20 connection to Varec 1700 terminal box

Use seal tape on the threaded gauge to terminal box connection. Slip in a bunch of cable (RTD signal inlet cable) into the terminal box female thread connection. Turn the entire NMT 539 gauge head clockwise and screw in the connection at least 10 complete turns, then secure with lock nut against terminal box.

Converter + average temperature probe version



Converter + WB probe version and Converter + Temp. + WB probe version



### 3.3 Procedure

#### 3.3.1 Unpacking procedure


**Note!**

When unpacking, be careful not to allow the flexible tube to bend and twist. Please refer to the recommended procedure below.

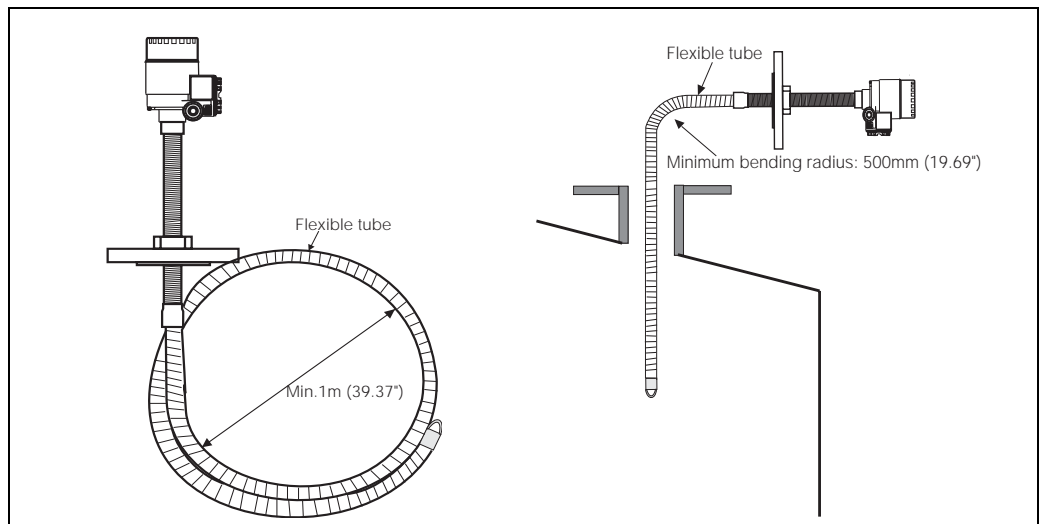


#### 3.3.2 Flexible tube procedure


**Note!**

When taking out and winding the flexible tube, please 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.


**Note!**

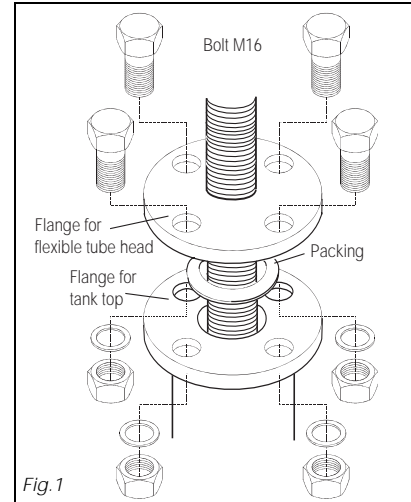
If a flexible tube is bent with a radius of curvature of 500mm (19.69") or less, the flexible tube or the measuring element may be seriously damaged or broken.

### 3.3.3 Mounting procedure



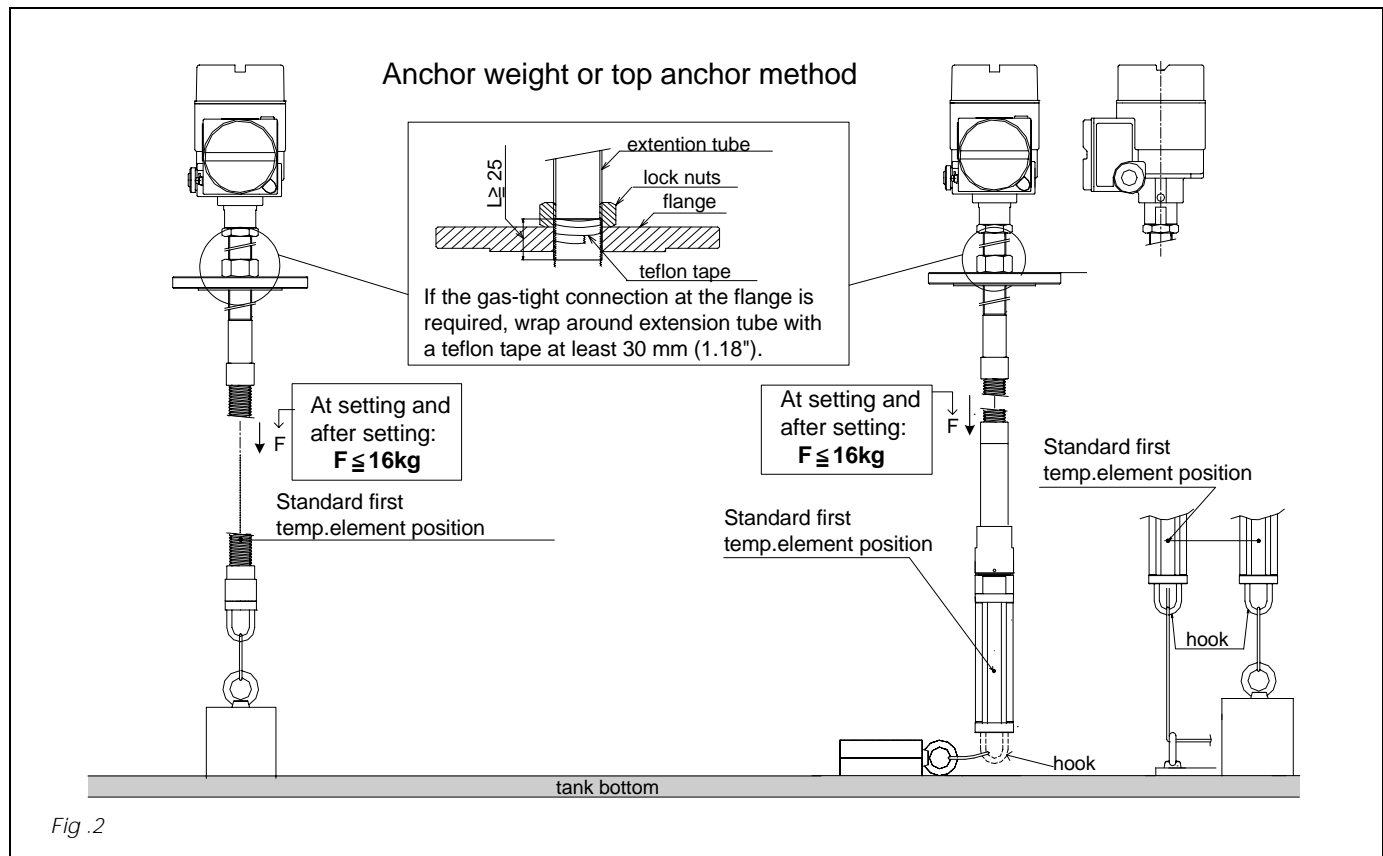
#### Note!

1. The flexible tube length of the Prothermo NMT 539 is defined for the customer's specifications. Before mounting, please check as follows:
  - The tag number (if available) on the body of the Prothermo NMT539
  - The length of the flexible tube
  - The number of measuring points
  - The intervals between measuring points
2. Mount the Prothermo NMT539 at a minimum of 500mm (19.67") away from the tank shell. This will ensure that the measurement is not influenced by changes in ambient temperature.
3. The procedure for mounting the Prothermo NMT539 on a tank depends on the type of tank. Here we shall explain the procedures for a fixed roof tank and for a floating roof tank. In any case, the flexible tube head is mounted on the tank top as show in figure 1.  
The mounting nozzle should have a diameter of 50mm (2") on standard.



#### Caution!

If a gas-tight connection at the flange is required, wrap some Teflon tape around the threaded side for at least 30mm (1.18"). Make sure to keep the tension at a maximum of 16kg both when setting and after setting, because it may cause internal breaking in the flexible tube caused by too much tension. (see fig.2)



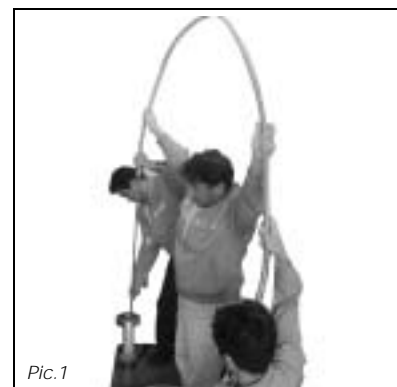
### 3.3.4 Installation for flexible tube and/or WB probe



#### Caution!

The flexible tube and/or WB probe must be lowered carefully without bending it too much and scratching at the inner edge of the nozzle hole.

Please refer to recommended mounting (see pic.1).



Pic.1

## 4 Mounting

### 4.1 Mounting on a fixed roof tank

There are three methods for mounting the Prothermo NMT539 on a fixed roof tank:

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

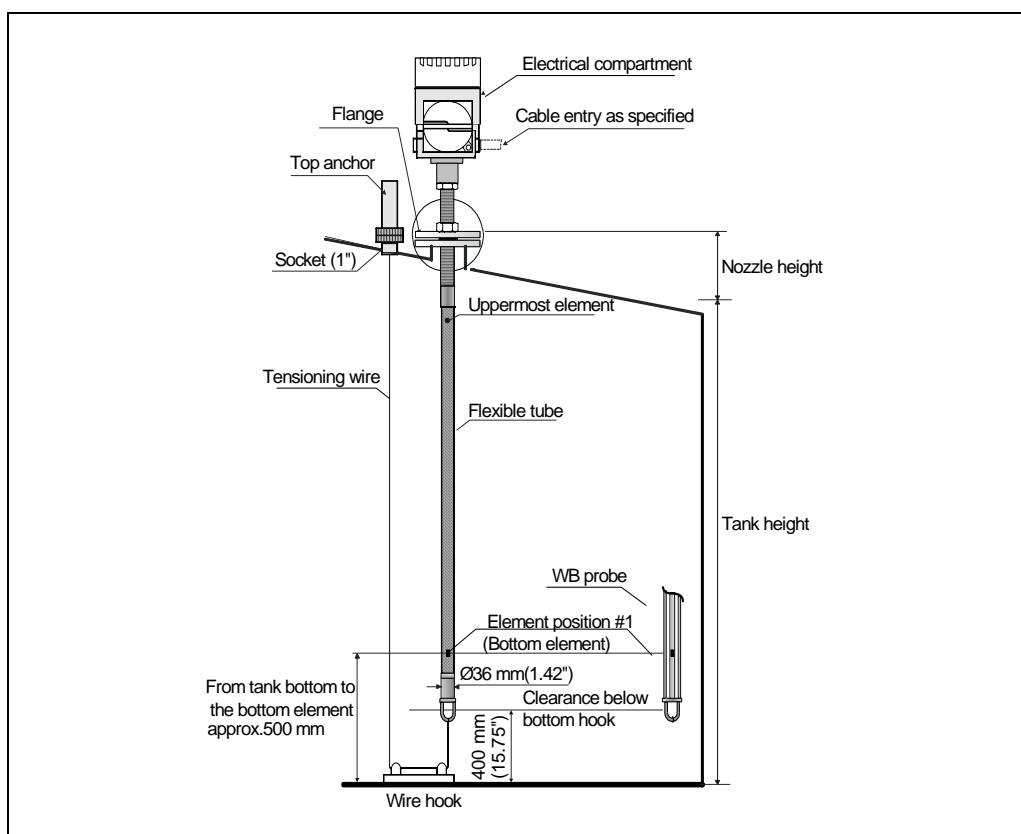


#### Note!

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.

#### 4.1.1 Top anchor method

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

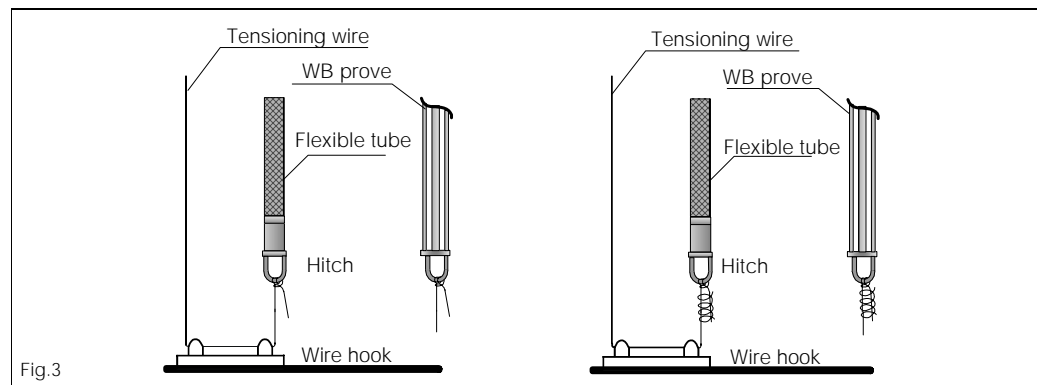


1. Insert a gasket and lower the flexible tube and/or WB probe from the nozzle on the tank top.


**Caution!**

The flexible tube and/or WB probe must be lowered carefully without bending too much and scratching at the inner edge of the nozzle hole. Please refer to the recommended mounting (see pic. 1).

2. Rotate the Prothermo NMT 539 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 fig.3).



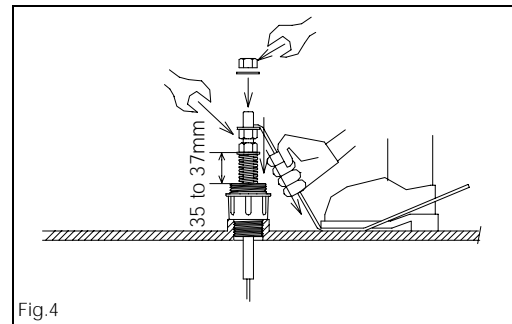
6. Fix the mounting flange of the Prothermo to the nozzle on the tank top using bolts.


**Note!**

Please keep the compression of the spring at 35 to 37mm (1.38" to 1.47").

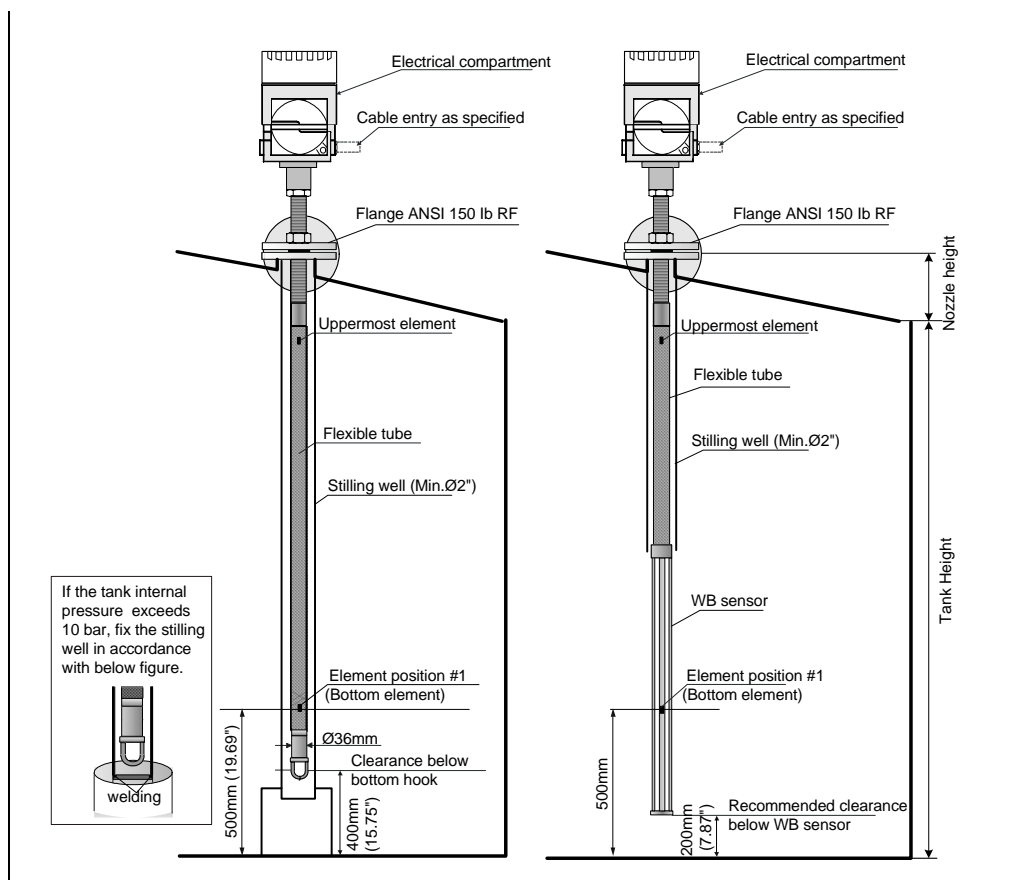
If you compress the spring over 35 to 37mm, it may cause an internal breaking in the flexible tube.

7. Draw the end of the tensioning wire as much as possible by hand and foot (see fig.4).
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.



### 4.1.2 Stilling well method

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



The installation procedure requires the following steps:



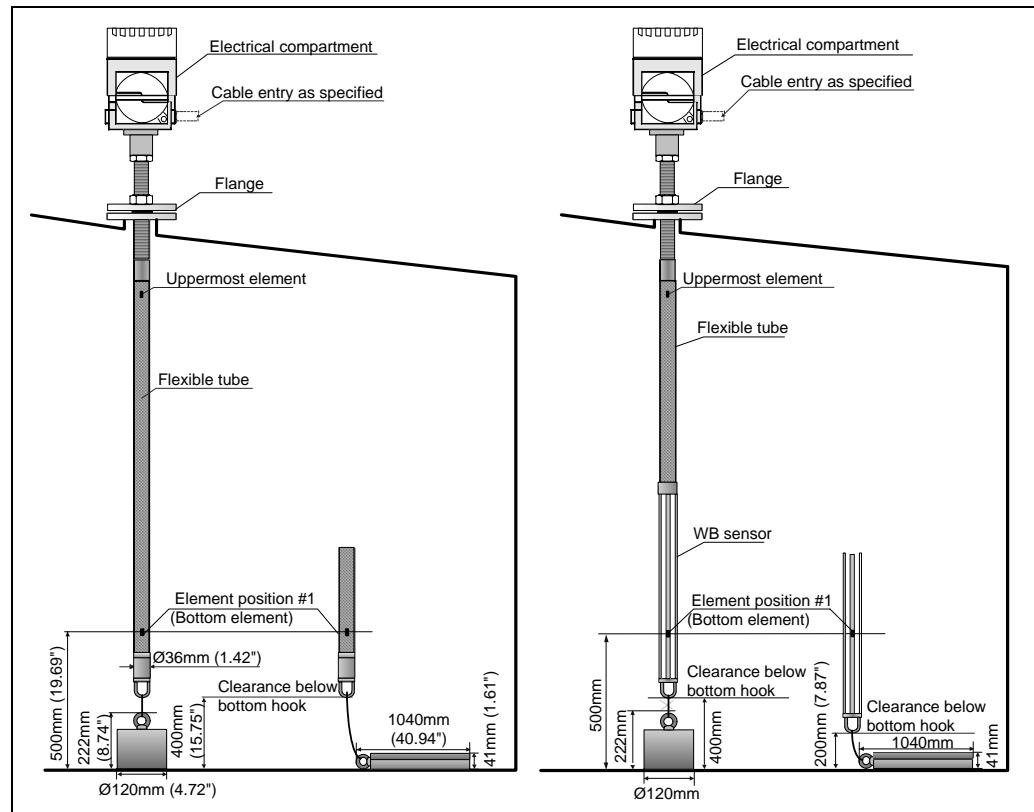
#### Caution!

The flexible tube and/or WB probe must be lowered carefully without bending too much and scratching at the inner edge of the nozzle hole. Please refer to the recommended mounting (see. pic.1).

1. Insert a gasket and lower the flexible tube and/or WB sensor probe from the inlet of the stilling well.
2. Rotate the Prothermo NMT 539 so that you can set up the cable in the most convenient way.
3. Fix the mounting flange of the Prothermo NMT 539 to the nozzle on the tank top using bolts.

### 4.1.3 Anchor weight method

The flexible tube is stabilized by an anchor weight.



The installation procedure requires the following steps:



#### Note!

Make sure to put the anchor weight on the tank bottom. When installing with the suspended anchor weight, please use the anchor weight at a maximum of 16kg. More weight may cause internal breaking in the flexible tube.



#### Caution!

The flexible tube and/or WB probe must be lowered carefully without bending too much and scratching at the inner edge of the nozzle hole.

1. Insert a gasket and lower the flexible tube and/or WB sensor from the nozzle on the tank top.
2. Rotate the Prothermo NMT 539 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 Fig.5)
5. Fix the mounting flange of the Prothermo NMT 539 to the nozzle on the tank top using bolts.

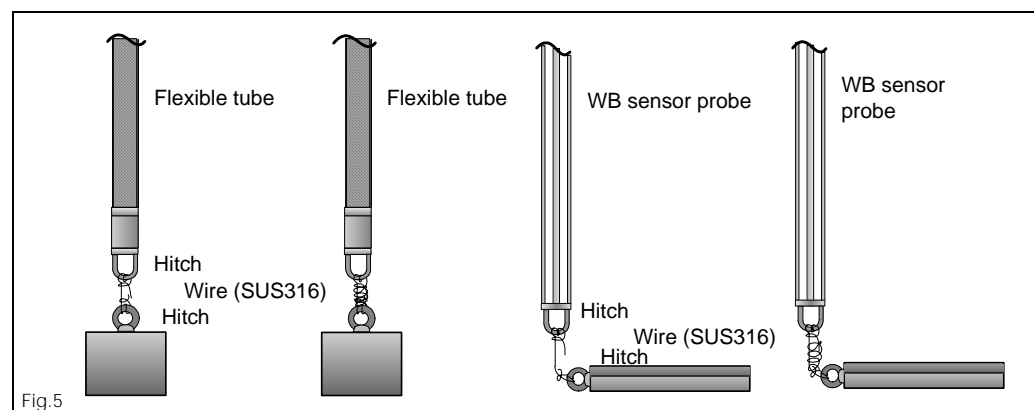


Fig.5



## 4.2 Mounting on a floating roof tank

There are three methods of mounting the Prothermo NMT539 on a floating roof tank:

- 1) Top anchor method
- 2) Stilling well method
- 3) Guide wire ring method

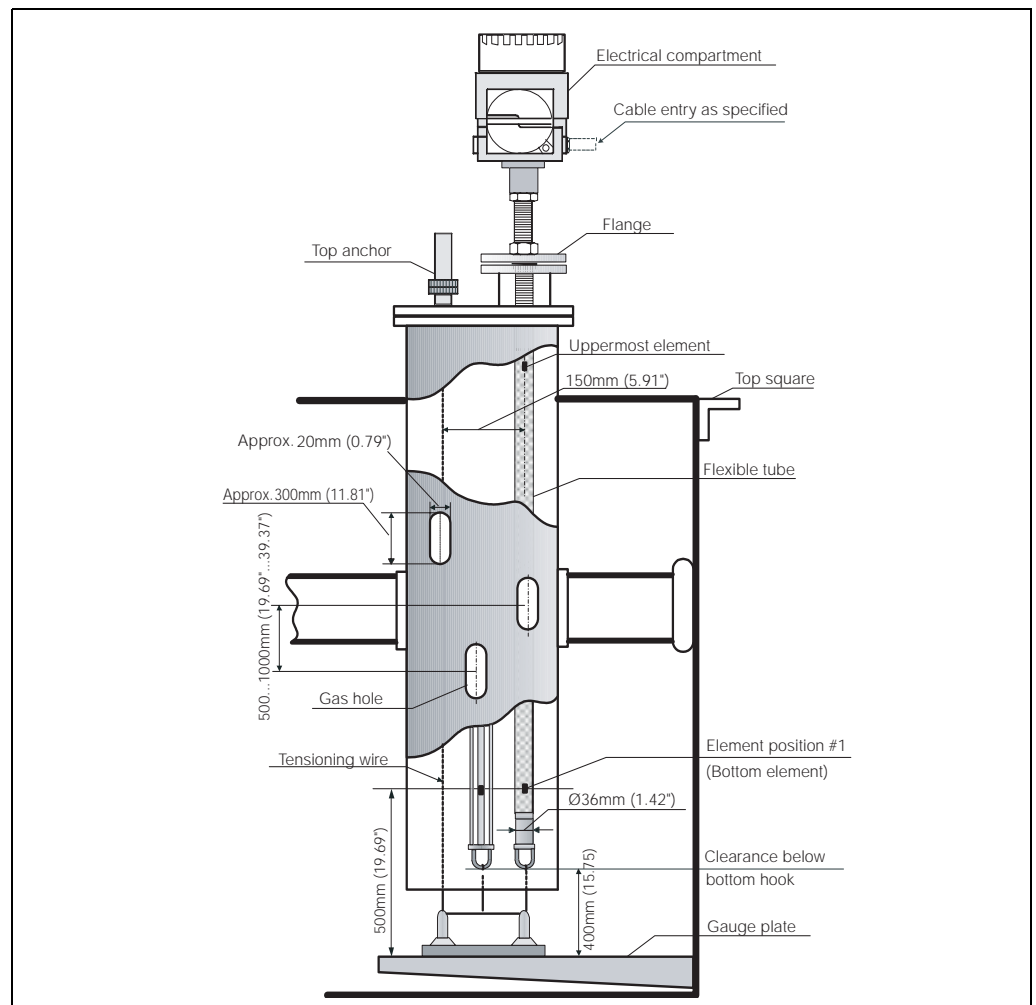


### Note!

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.

### 4.2.1 Top anchor method

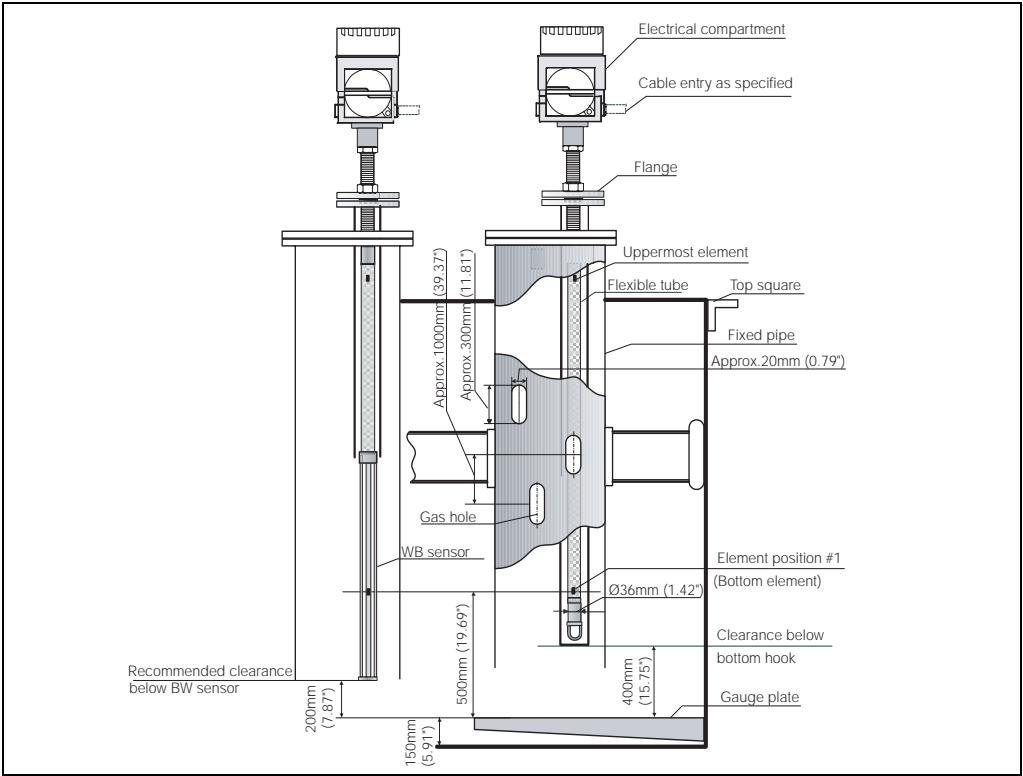
The flexible tube or WB sensor is installed in a fixed pipe and stabilized by a tip anchor. The Proservo NMS53x and Prothermo NMT 539 can be mounted in the same fixed pipe.



The installation procedure is the same as for mounting on a fixed roof tank using the top anchor method.

4.2.2     **Stilling well method**

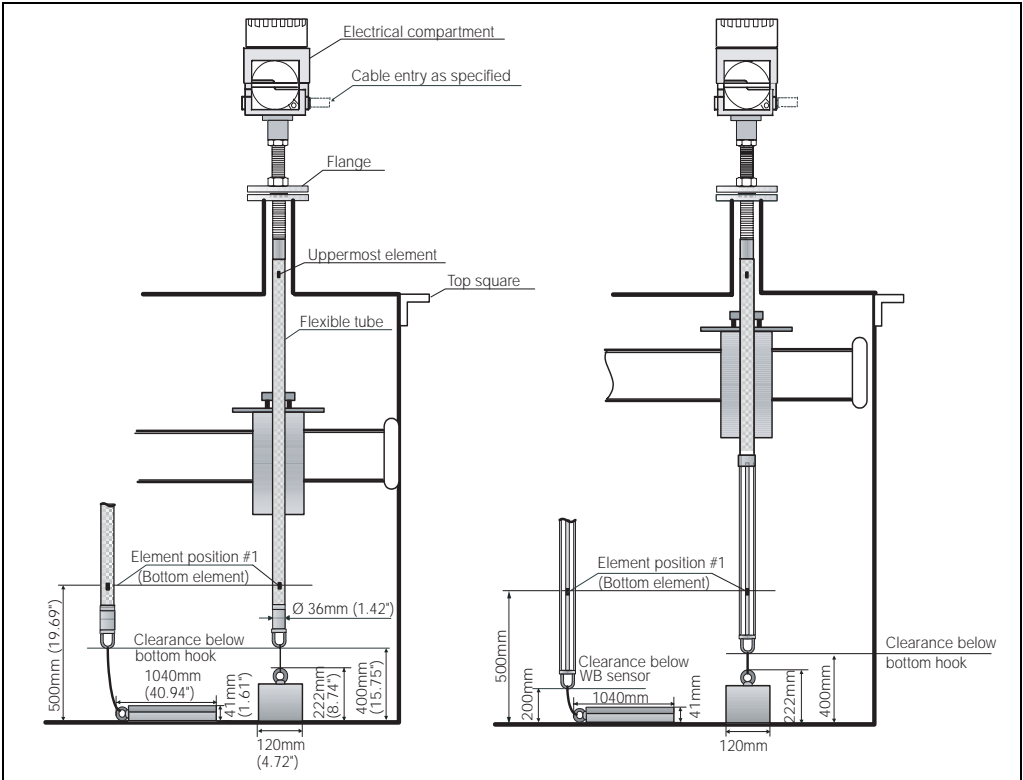
The flexible tube and/or WB sensor probe are inserted into a stilling well in the fixed pipe.



The installation procedure is the same as for mounting on a fixed roof tank using the stilling well method.

4.2.3     **Guide wire ring and anchor weight method**

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



**Note!**

Make sure to put the anchor weight on the tank bottom. When installing with the suspended anchor weight, please use the anchor weight at a maximum of 16kg. More weight may cause internal breaking in the flexible tube.

**Caution!**

The flexible tube and/or WB probe must be lowered carefully without bending too much and scratching at the inner edge of the nozzle hole.

The installation procedure required 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 from the nozzle on the tank top.
3. Rotate the Prothermo NMT 539 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 fig.5 ).
5. Fix the mounting flange of the Prothermo NMT 539 to the nozzle on the tank top using bolts.

## 5. Wiring

### 5.1 Mechanical connection for converter only version

**Note!**

Prior to the removal of the existing RTD temp. 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 NMT539 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.

#### Preparation of the mechanical connection

**Caution!**

Take precaution before performing the NMT mechanical installation 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 fig.6).

#### 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. Use seal tape and rap it around the RTD probe's threaded connection (see fig.7).

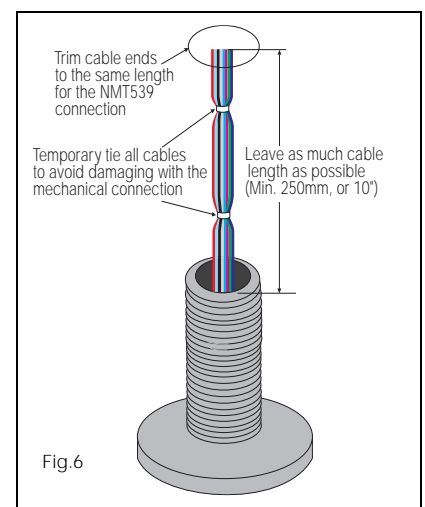


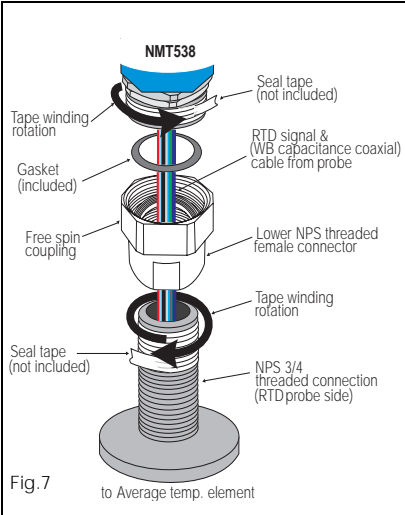
Fig.6

- 2. Install NMT539 housing along with the included gas-ket in-between. Use seal tape and wrap it around the male threaded connector on the NMT 539 housing side, then hand tighten the free spinning coupling until it stops.
- 3. 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.

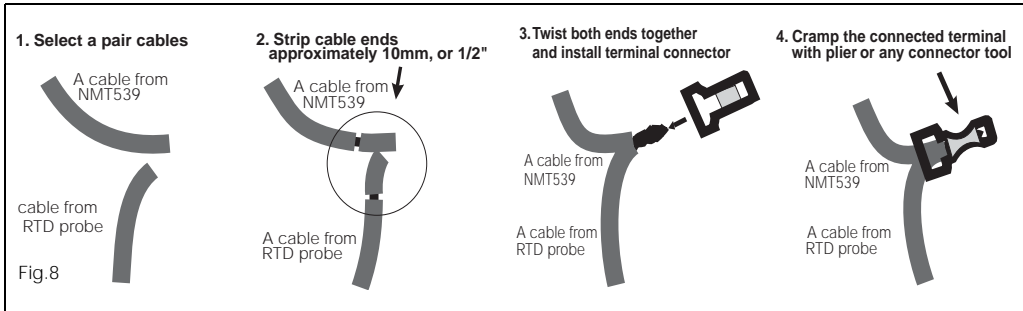
- 4. After performing the cable connection and positioning the face angle of the NMT539, tighten the free spinning coupling approx. 1/8th turn with a wrench from where it was hand tightened



5.2 NMT 539 to RTD probe

Temperature signal cable

The RTD cable is directly connected to the NMT539 (converter only version) input cable with simple cramp 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 fig.8).



The cabling colour code is listed below.  
The NMT 539 cable colour: the principle is based on the A,B,b 3 wire spot RTD cabling method.

A: Signal wires

No. 1 : brown	No. 9 : 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

B0 : violet & white
B : black & white

Coaxial cable for capacitance signal to auxiliary converter

The NMT 539 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 NMT539 terminal housing or the sensor cable can directly exit from the cable outlet. Some WB capacitance sensors might have additional ground wire. Please route this wire to the existing CV converter without causing interruption inside the NMT539 housing.

### 5.3 Terminal Connection

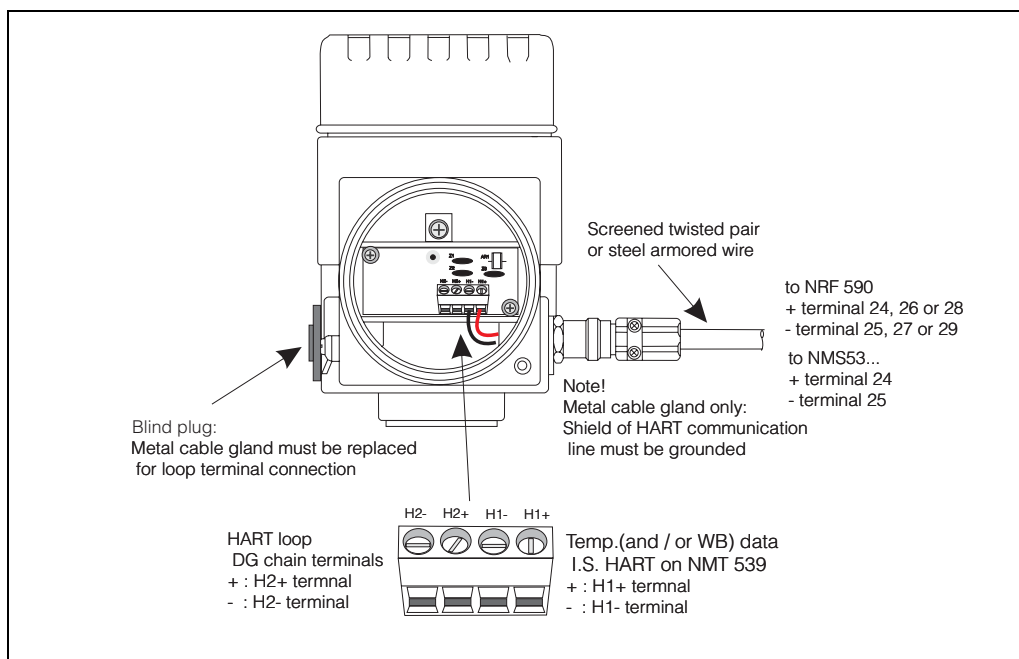
#### 5.3.1 NMT 539 terminal



**Note!**

The NMT 539 allows an intrinsically safe HART connection only. Please refer to the i.s. regulation for establishing wiring and field device layout.

#### NMT 539 terminal board

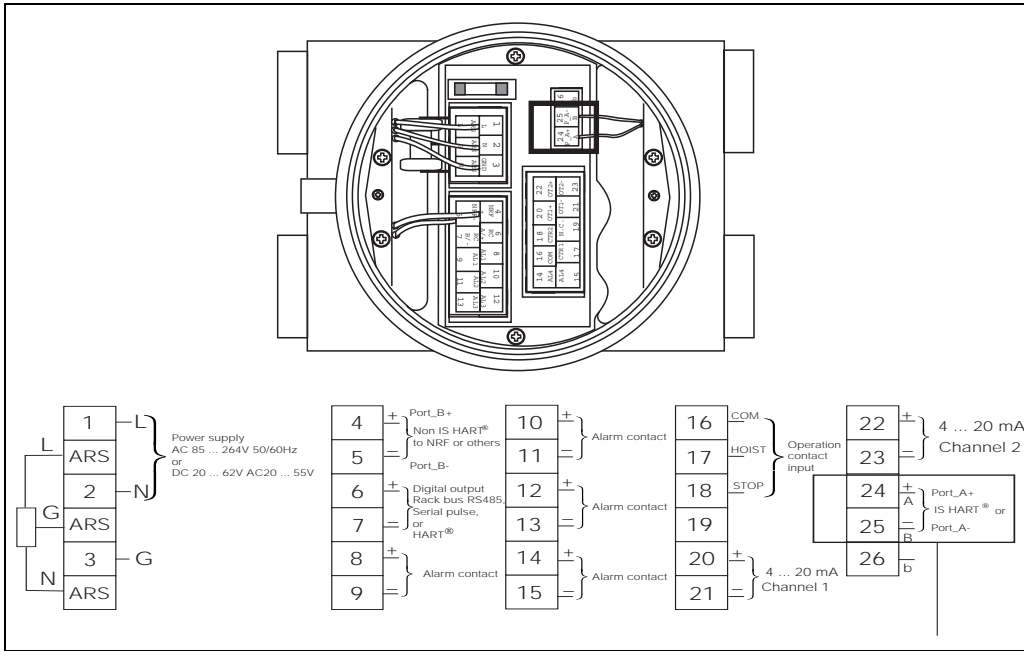


The NMT 539 has convenient DG chain HART loop terminals that enable the NMT 539 to be a terminal junction for HART multi-drop instruments.

#### 5.3.2 Proservo NMS 53x terminal

Since the Prothermo NMT 539 is an intrinsically safe instrument, the terminal connection to the Ex i side on HART connection is allowed on the NMS 53x terminal housing.

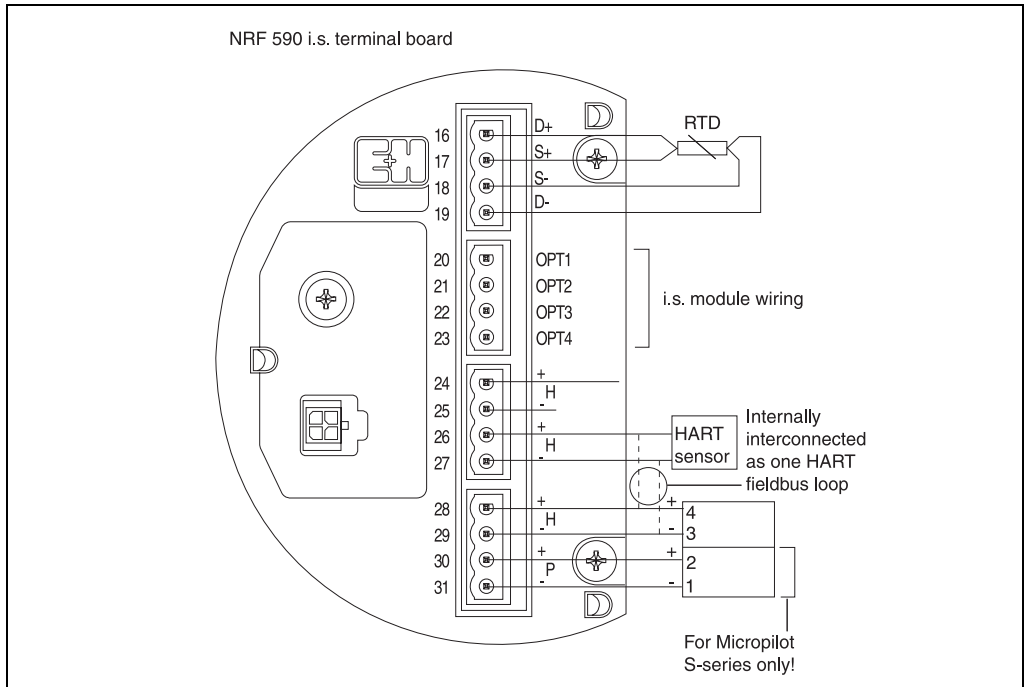
Terminal connection on the Proservo NMS 53x



**Note!** Do not connect the NMT 539 HART communication on terminals 4 and 5 on the Proservo NMS 53x. These terminals are designed to connect Ex d HART communication.

5.3.3 Tank Side Monitor NRF 590 i.s. terminal

Terminal connection on the Tank Side Monitor NRF 590



**Note!** The Tank Side Monitor NRF 590 has three sets of i.s. HART terminals. These three pairs are looped internally.



**Caution!** Do not connect signal HART lines from the NMT 539 to terminals 30 and 31. They are designed to supply drive power for the FMR 53x series only.

## 6 Certificates and approvals

### **CE approvals**

By attaching the CE mark, Endress+Hauser Japan 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

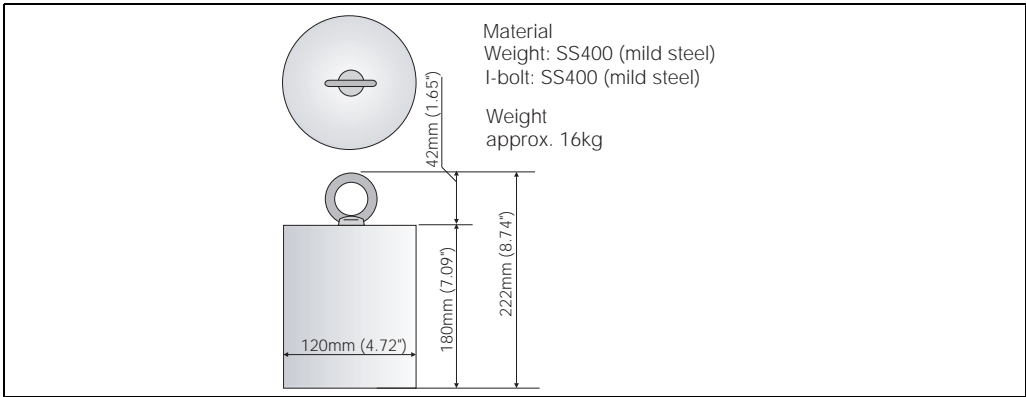
# 7 Accessories

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



### Caution!

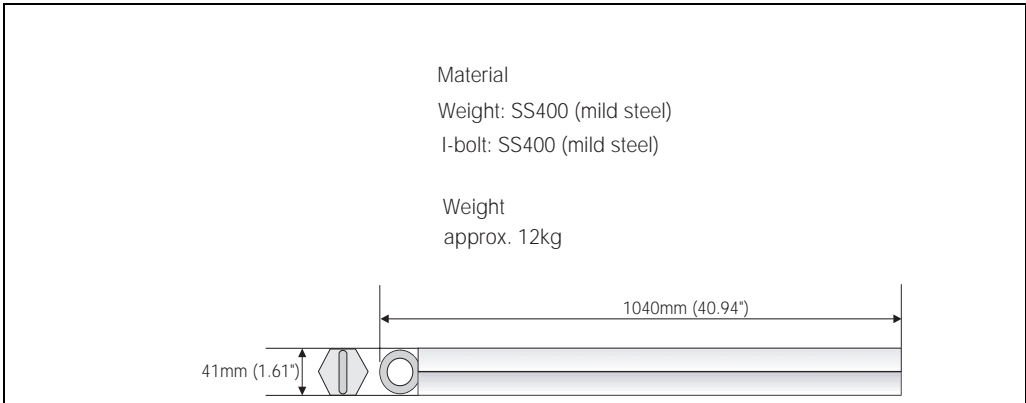
Installation of the anchor weight will cause the lowest temperature measurement position to be raised approximately 400mm (16") from the tank floor.



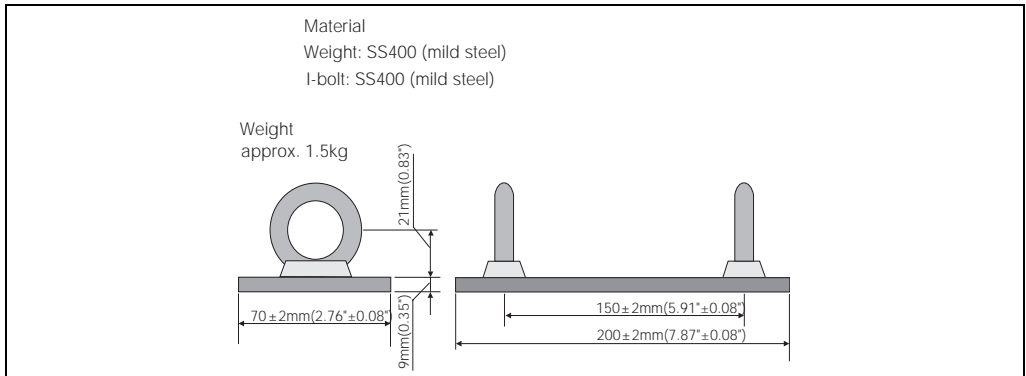
Different dimensions, weight and material for the anchor weight are also available. Consult with your Endress+Hauser representative for further details.

## 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.

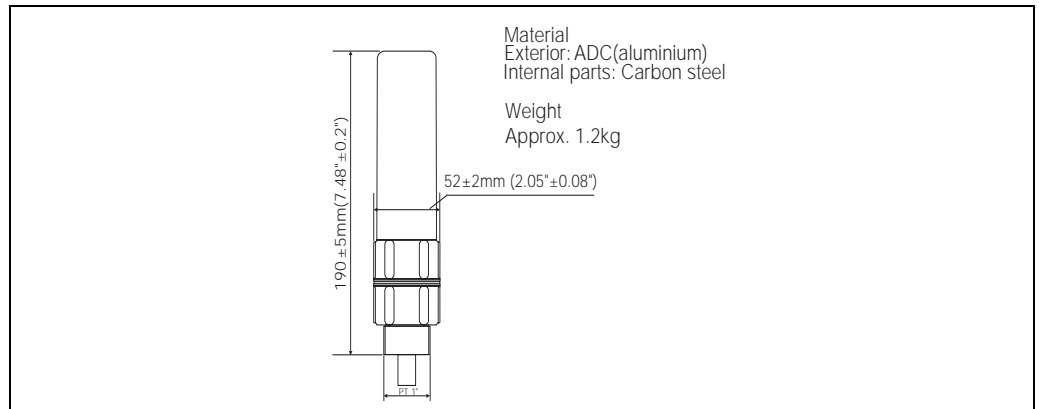


## Wire hook, Top anchor mounting attachment option: D





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. Please consult with your Endress + Hauser 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.

## 8 Technical specifications

### General specifications

<b>Manufacturer</b>	Endress+Hauser Japan
<b>Designation</b>	Prothermo NMT 539
<b>Function</b>	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
<b>Total accuracy (temperature)</b>	±0.1°C or less (at reference condition)*1
<b>Total accuracy (water bottom)</b>	4mm(±2mm) or better (at reference condition)*2

### Power supply

<b>Input</b>	16 .... 30VDC (via HART line from host gauge)
<b>Power consumption</b>	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)

### Converter specifications

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

### Temperature probe specifications

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

**Water Bottom (capacitance) sensor specifications**

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

**Environment**

<b>Weather proof</b>	IP 65
<b>Explosion proof</b>	EEx ia IIC T2 ... T4, ATEX
	IS Class 1, Div. 1, Gp. CD .... FM...pending
	Class 1, Div. 1, Gp. CD .... CSA
	Ex ia IIB T4, TIIS...pending

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

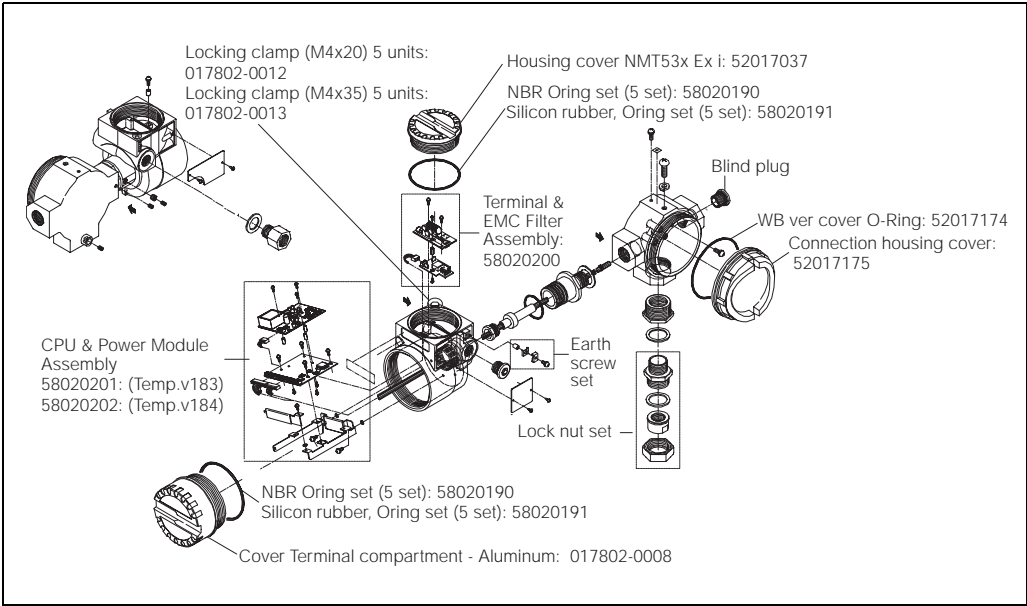
Measurement condition is based on 80% span of 1m probe in water / air interface at 25°C.

# 9 Trouble shooting

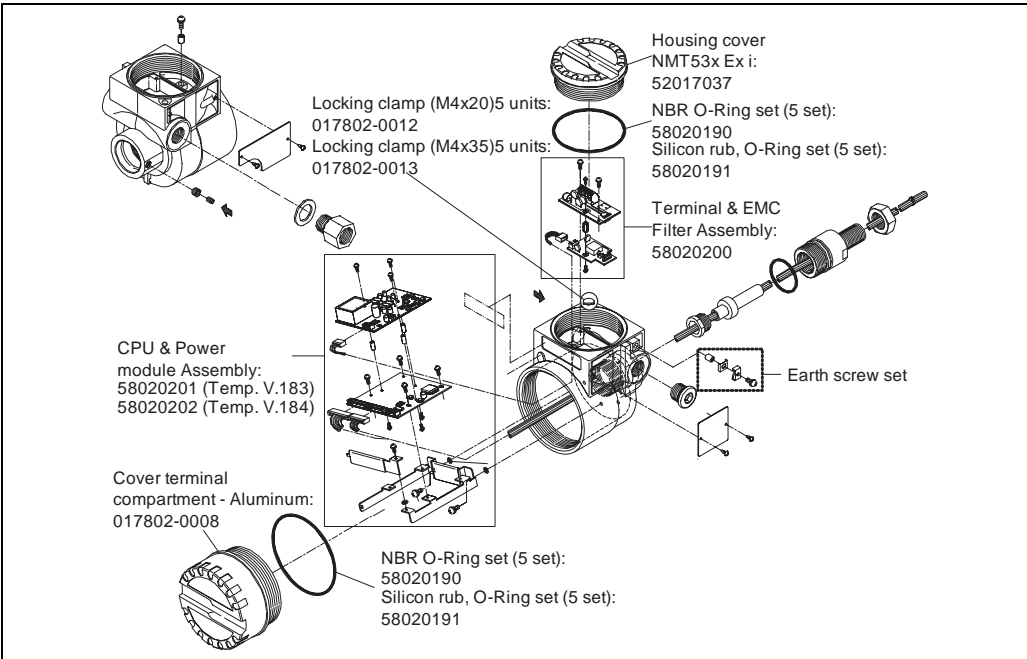
## 9.1 Spare parts

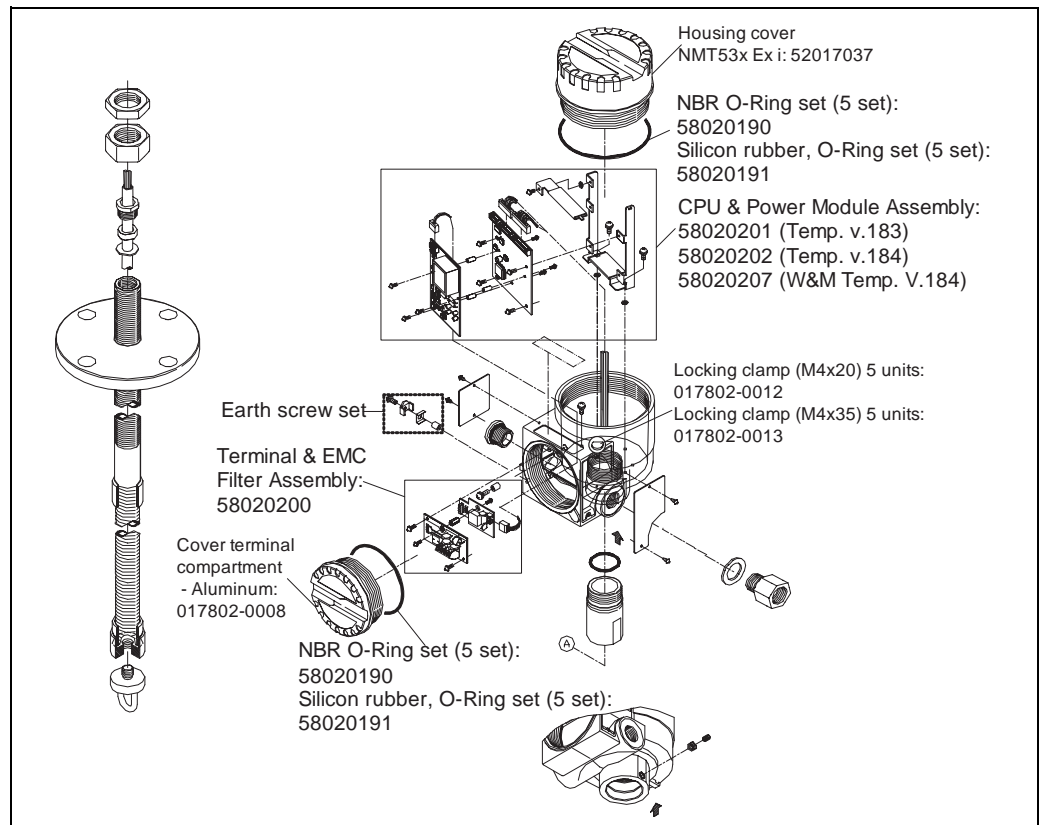
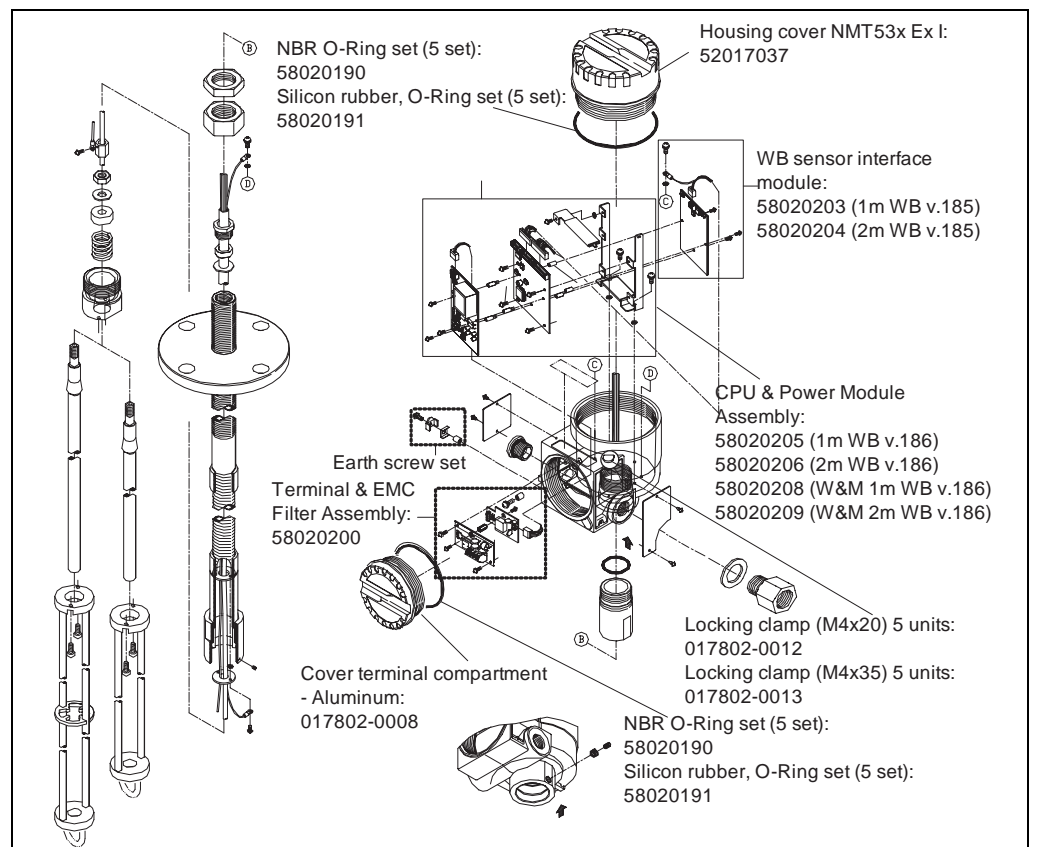
The Endress + hauser repair concept assumes that the measuring device has a modular design and that customers are able to undertake repairs themselves. Spare parts are contained in suitable kits. They contain the related replacement instructions. Spare parts that you can order from Endress+Hauser Japan for the Prothermo NMT 539 are shown with their order number in the diagram below. For more information on service and spare parts, contact the Service Department at Endress+Hauser Japan.

### Type1:Converter only version [Standard PF(NPS3/4") universal coupling connection]



### ype2:Converter only version (for the Varec 1700 win M20 threaded connection)



**Converter + average temperature probe version****Converter + WB probe and Converter and Temp. + WB probe version**

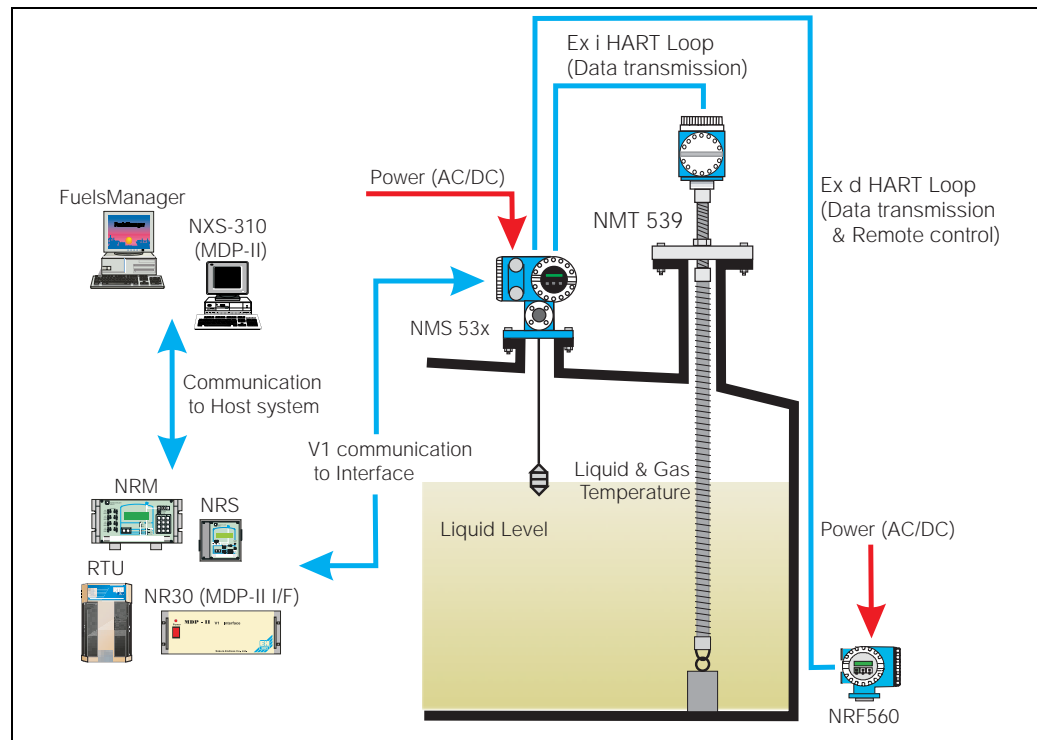
## 10 Appendix

### 10.1 Description of functions

A detailed description of the function groups, functions and parameter is given in the documentation "Operating manual and Description of Instrument Functions" for the Prothermo NMT 539.

### 10.2 Function and system design

#### Connection with Proservo NMS 53x



#### NMT 539 converter + temp. version typical installation diagram

The Prothermo NMT 539 is the successor of the former NMT 535 Ex i version. For proper migration, the NMT 539 has inherited all the functionality and specifications of the NMT535, including process connections, cable entries and wiring method.

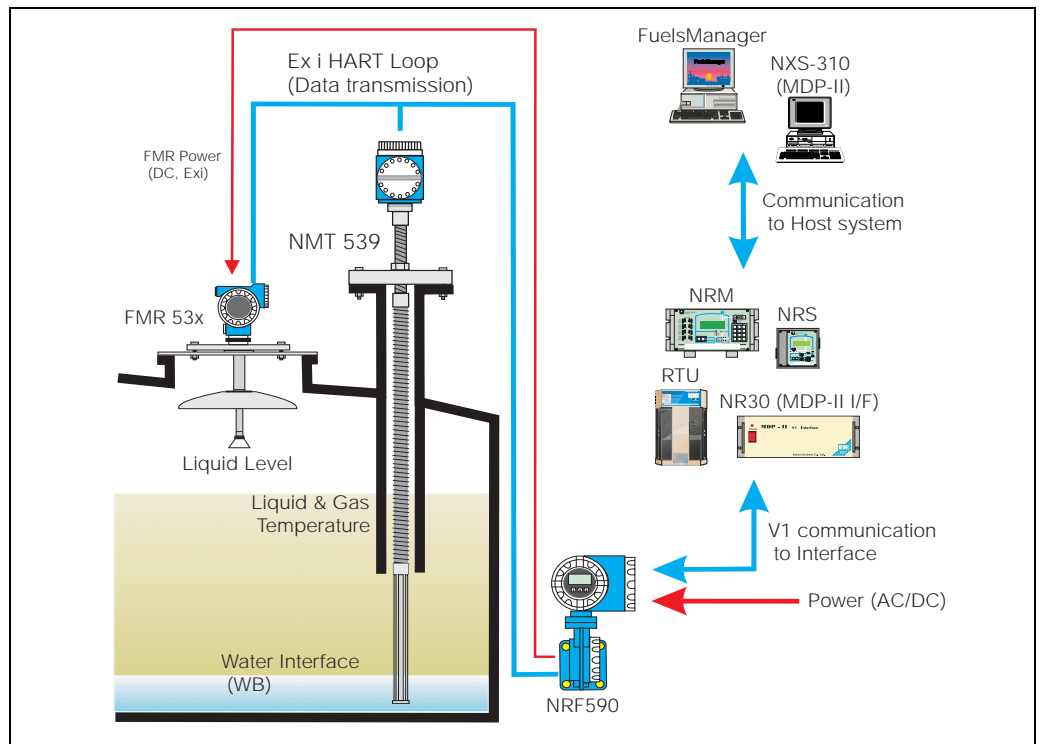
Since the Proservo NMS 53x already provides water interface measurement, the NMT 539 Converter + average temperature may be the best version when used in combination with the Proservo. However if the converter + WB + average temperature version is used in combination with the Proservo, the product in the tank will be thoroughly managed with level, continuous average temperature and water interface measurement.

All the necessary configuration and parameter settings for the NMT 539 are performed on both the Proservo NMS 53x and ToF Tool.

The NMT 539 receives liquid level data from the Proservo, 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 Proservo.

From the Proservo NMS 53x or Tank Side Monitor NRF 590, all sensor data are sent to the interface unit via V1 communication protocol.

### Connection with the Tank Side Monitor NRF 590



#### NMT 539 converter + temp. + WB version typical installation diagram

The NMT 539 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 NRF 590, allows for optimal inventory control. Basic functionality and data access can be performed by the ToF Tool.

The NMT 539 receives radar level data from the NRF 590 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 NRF 590.

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 (please see the NRF 590 technical information).

All gathered data in the interface unit is sent to inventory management software, such as Endress + Hauser's Inventory Management software or NXS-310(MDP-II program), or directly sent to the customer's specific DCS or PLC.

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