

USER MANUAL

WLT310 / WLT311



Lapp Automaatio Oy
Martinkyläntie 52
FI-01720 Vantaa
P: +358 (0)20 764 64
F: +358 (0)20 764 6820
Email: info.automaatio@lappgroup.com
www.lappautomaatio.fi

Tavaraosote/Warehouse Address
Varastokatu 10
FI-05800 Hyvinkää
P: +358 (0)20 764 64
F: +358 (0)20 764 8355

Kotipaikka/Domicile
Vantaa
Y-tunnus: 1107293-1
VAT: FI11072931

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1. Warnings



Devices in this manual are not to be used in an Ex-area or environment which requires devices to meet the ATEX directive. If such device is required, please seek contact with our local sales representative.

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.

Note: This product has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this product does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment should be installed and operated with a minimum distance 20cm between the radiator and your body.

Alert:

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC Compliance:

RSS General (English)

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

RSS General (French)

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada.

Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

2. Product types

WLT 310/311 B (Battery operated)

WLT 310/311 E (External power supply)

Type	Supply voltage		Housing material		Inlet threads
WLT 310 868 MHz WLT 311 915 MHz	B	Battery operated	DAN/W/H	Aluminum	1x M20x1,5 right side 1x M20x1,5 down side
	B	Battery operated	DANDW	Aluminum	2x M20x1,5 right side 1x M20x1,5 down side
	E	Supply 12 or 24 V DC	DAND	Aluminum	2x M20x1,5 right side 1x M20x1,5 down side

3. Technical details

3.1 General

Weight	1,6 kg
Height	According to customer application
Wide	According to customer application
Depth	According to customer application
Housing materials	Aluminium, AISI 316
Ingress protection rating	IP65...IP68 depending on inlet sealings
Wire Size Maximum	1C 1.0 mm ² , AWG18, stranded wire
Operating temperature range with battery**)	-25...+60 °C
Operating temperature range with external power supply	-40...+80 °C
Conformity standards	
EMC	EN 61326-1:2013 ja EN 301489
RF	EN 300 220-1 v2.4.1
Vibration	EN 60068-2-6
LoRaWAN certified product	

**) Note: can vary on battery manufacturer's technical specification

3.2 Temperature sensor inputs

Pt100/Pt1000 input, RTD (S1/S2)	
One or two of the inputs can be set to Pt100/Pt1000 sensors with 2-, 3- or 4-wire connection. Inputs are short circuit protected and broken wire monitored.	
Temperature measurement range**)	-200...+800 °C
Measurement accuracy	$\leq \pm 0,3$ °C
Temperature coefficient	$\leq \pm 0,01$ °C / °C

**) Note: varies with thermocouple type installed

Thermocouple input, TC (S1/S2)	
One or two of the inputs can be set to thermocouple sensor inputs. TC-input is broken wire monitored.	
Thermocouple types	E, J, K, N, R, S, T, B, L and U supported types
Measurement range**)	-200 to +1820 °C
Measurement accuracy for types E, J, K, N, T, U and L	$\leq \pm 1$ °C
Measurement accuracy for types B, R and S	$\leq \pm 2$ °C
Cold junction compensation (CJC)	- 40...+80 °C, accuracy $\leq \pm 1$ °C
Linear resistance input, Lin. R (S1/S2)	
Resistance measurement range	0-3757 Ω
Measurement accuracy	$\leq \pm 0,1$ % of span
Temperature coefficient	$\leq \pm 0,01$ % of span / °C

3.3 Analog input

Current/voltage input (AUX)	
Analog input can be configured as current or voltage input	
Current measurement range	0...20 mA (0 – 23 mA)
Measurement accuracy	$\leq \pm 0,5 \%$ of span
Temperature coefficient	$\leq \pm 0,01 \%$ of span /°C
Voltage measurement range	0...10 V (0 - 11 V)
Measurement accuracy	$\leq \pm 0,5 \%$ of span
Temperature coefficient	$\leq \pm 0,01 \%$ of span /°C

3.4 Power supply

Battery	• Lithium battery, 3.6 V, C size, 8.5 Ah • Battery connection is polarity protected • The battery lifetime depends on transmitter settings. (typical battery life is 1-2 years from installation) • Current consumption < 100mA *)
External supply voltage	• Transmitter can be powered from external 12 or 24 V DC supply • Supply voltage range 9 . . . 40 V • External power supply is galvanically isolated from inputs. Isolation voltage between supply/inputs is 1500 Vrms • Inputs are not isolated among each other! • Current consumption < 70mA *)

*) Current consumption is affected by the transmission interval, connected sensors and the quality of the radio connection between the transmitter and the gateway. Typical current consumption is 0,5...50 mA.

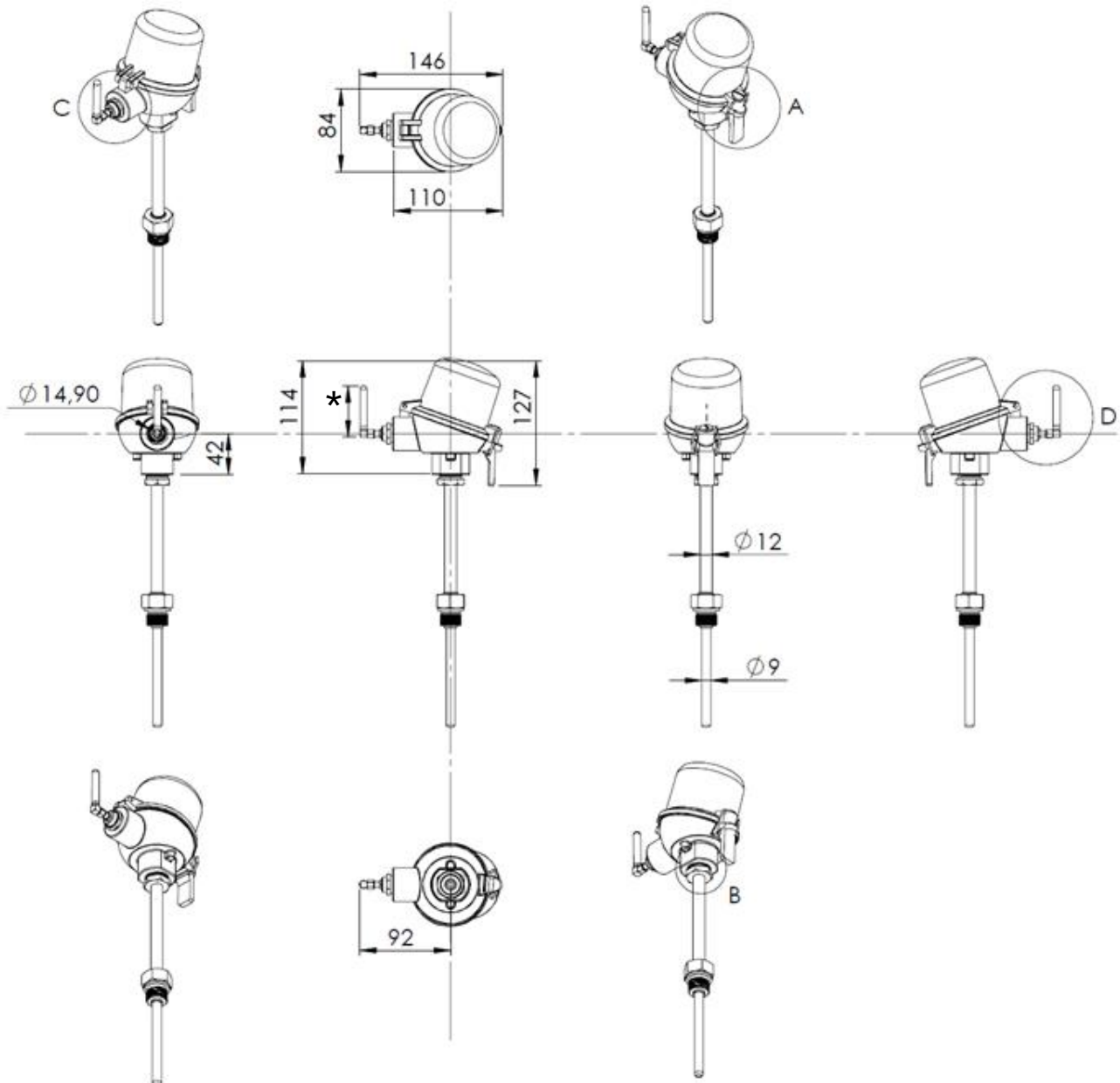
3.5 Environmental conditions

Operating temperature with battery**)	-25...+60 °C
Operating temperature with external supply	-40...+80 °C
Ingress protection rating	IP54 / IP66 / IP66 depending on inlets
Vibration resistance	DNV Standard (Certification No 2.4 class B).
Relative humidity	
RH for transmitter	90 %, non-condensing
RH WSB-sensor	90 %, non-condensing
Storage	90 %, non-condensing
Transportation	90 %, non-condensing
The expected lifetime of the transmitter is over 10 years in ambient temperature range of -40...+80 °C.	

***) Note: can vary on battery manufacturer's technical specification

4. Mechanical details

4.1 Battery operated version

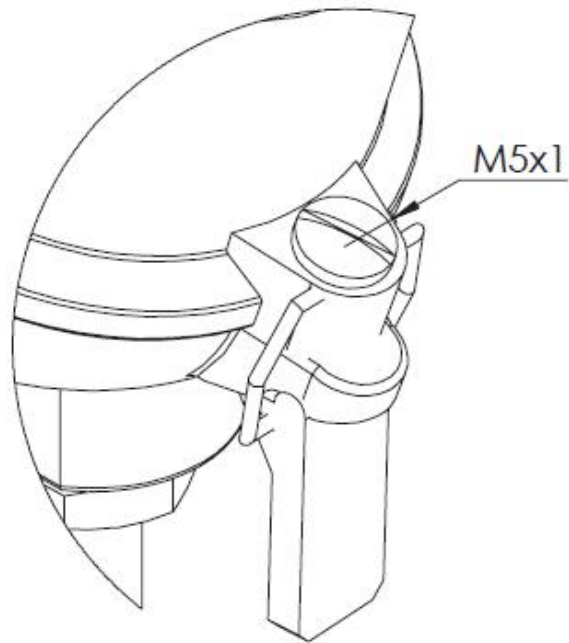


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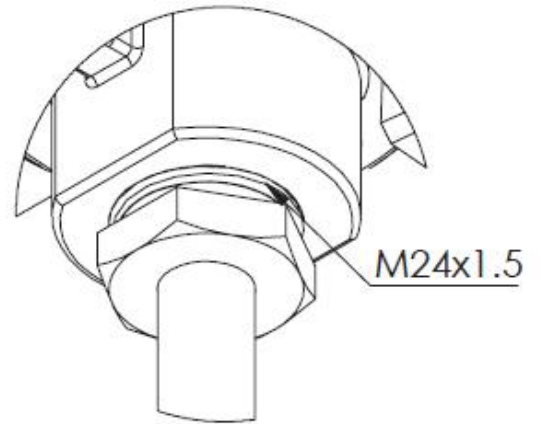
Dimensions in metric [mm]

*Note: WLT310 is supplied with Taoglas antenna, type: TI.08.C.0112, length 53 mm

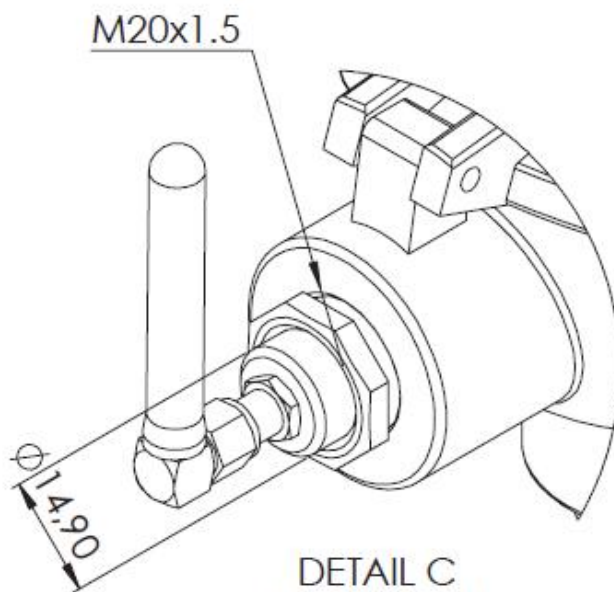
*Note: WLT311 is supplied with Linx Technologies antenna, type: ANT-916-CW-RAH, length 47 mm



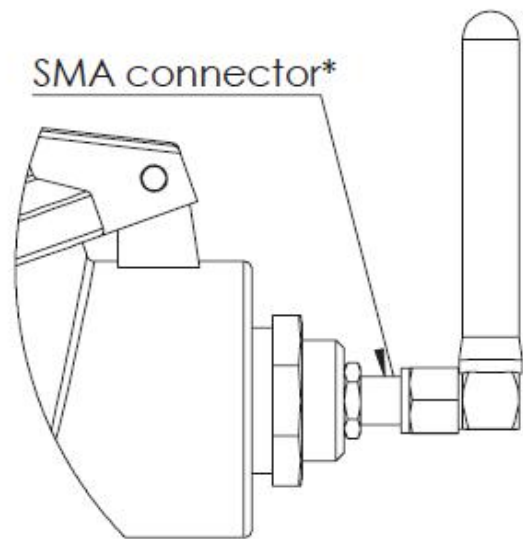
DETAIL A
SCALE 1 : 1



DETAIL B
SCALE 1 : 1



DETAIL C
SCALE 1 : 1



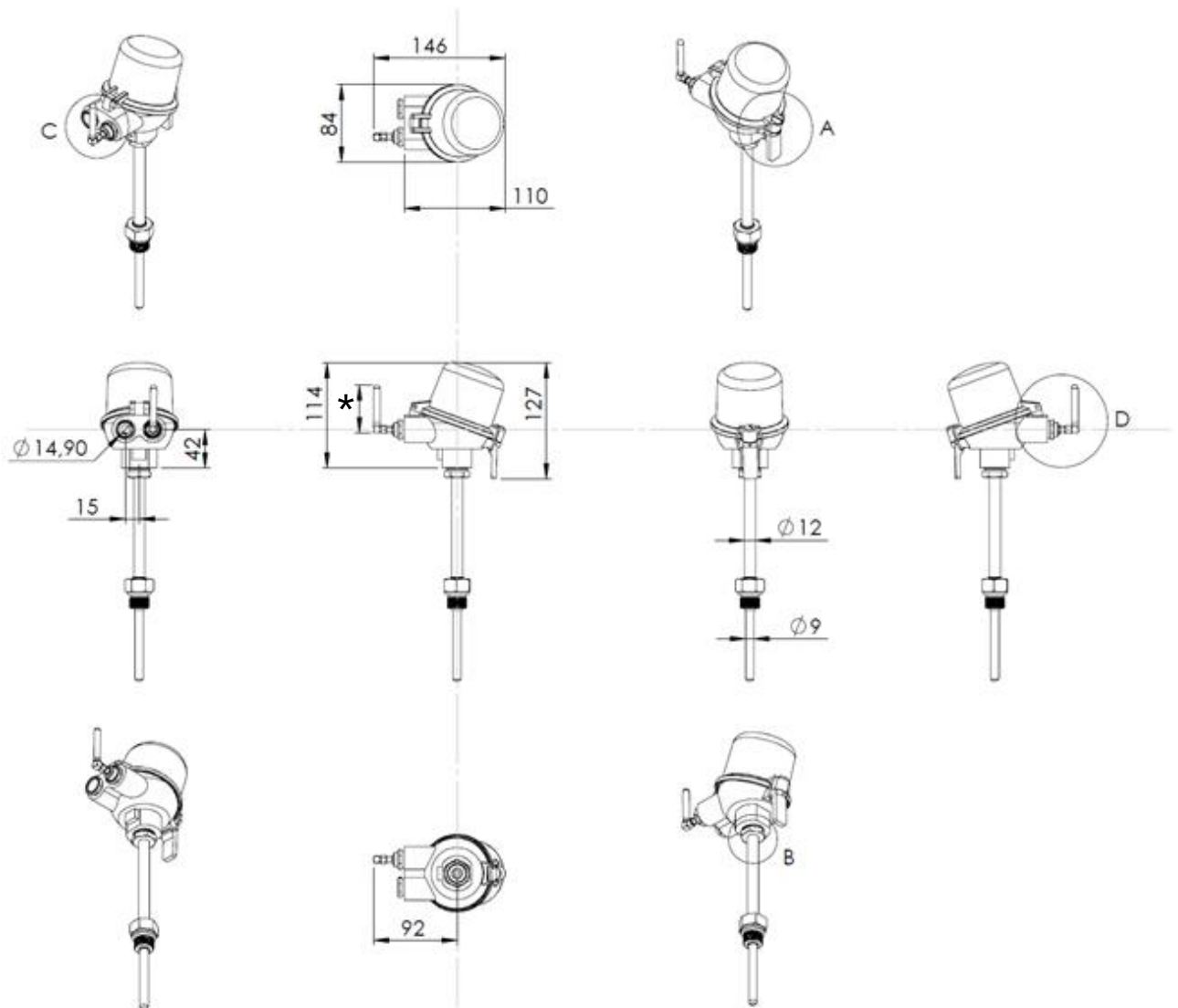
DETAIL D
SCALE 1 : 1

Dimensions in metric [mm]

*Note: WLT310 is supplied with SMA connectors

*Note: WLT311 is supplied with RP-SMA connectors

4.2 Battery operated version with external sensor support

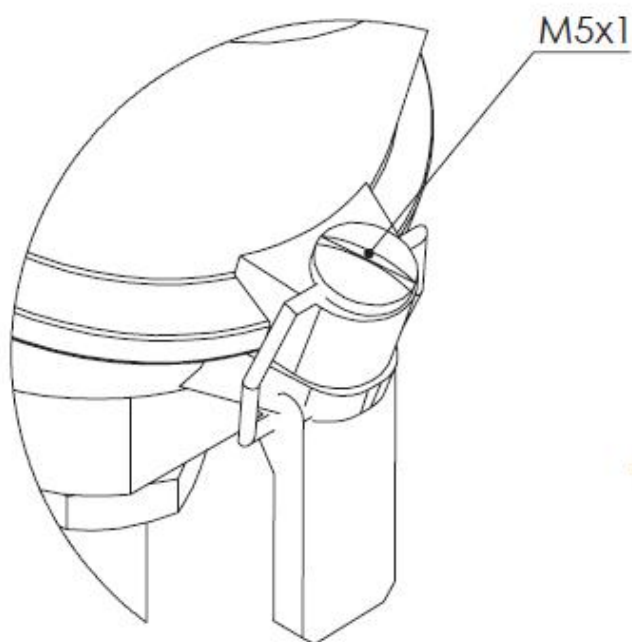


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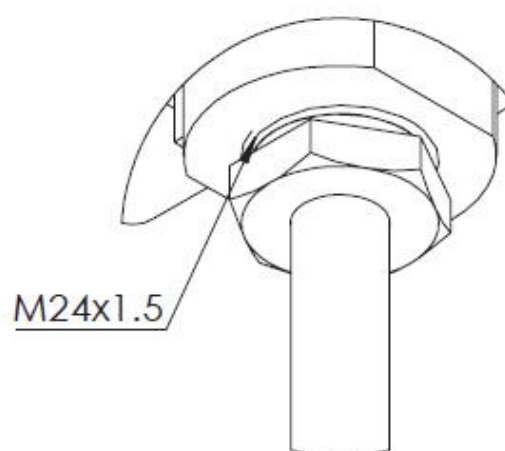
Dimensions in metric [mm]

*Note: WLT310 is supplied with Taoglas antenna, type: TI.08.C.0112, length 53 mm

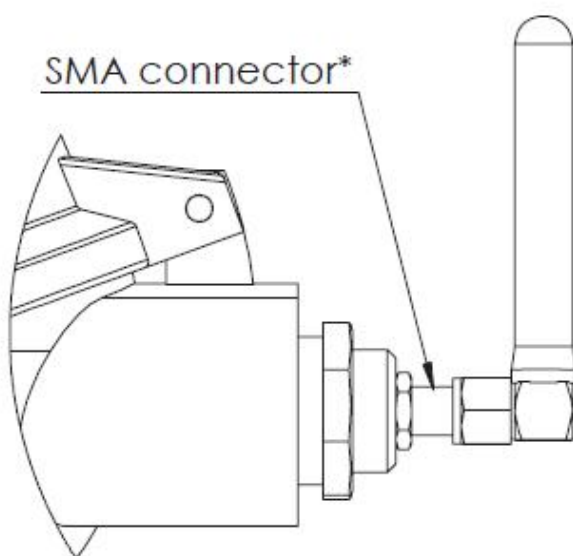
*Note: WLT311 is supplied with Linx Technologies antenna, type: ANT-916-CW-RAH, length 47 mm



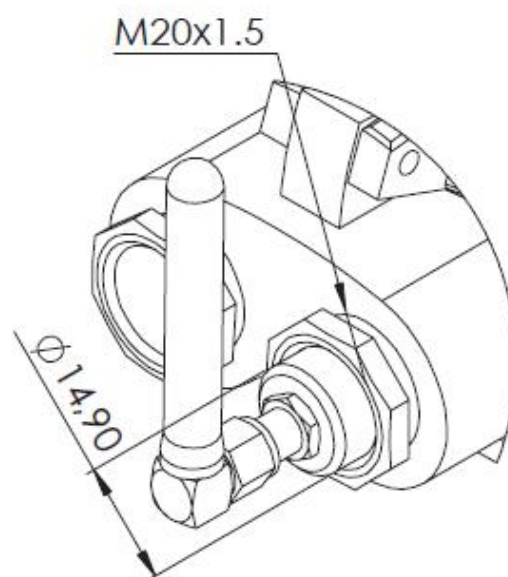
DETAIL A
SCALE 1 : 1



DETAIL B
SCALE 1 : 1



DETAIL D
SCALE 1 : 1



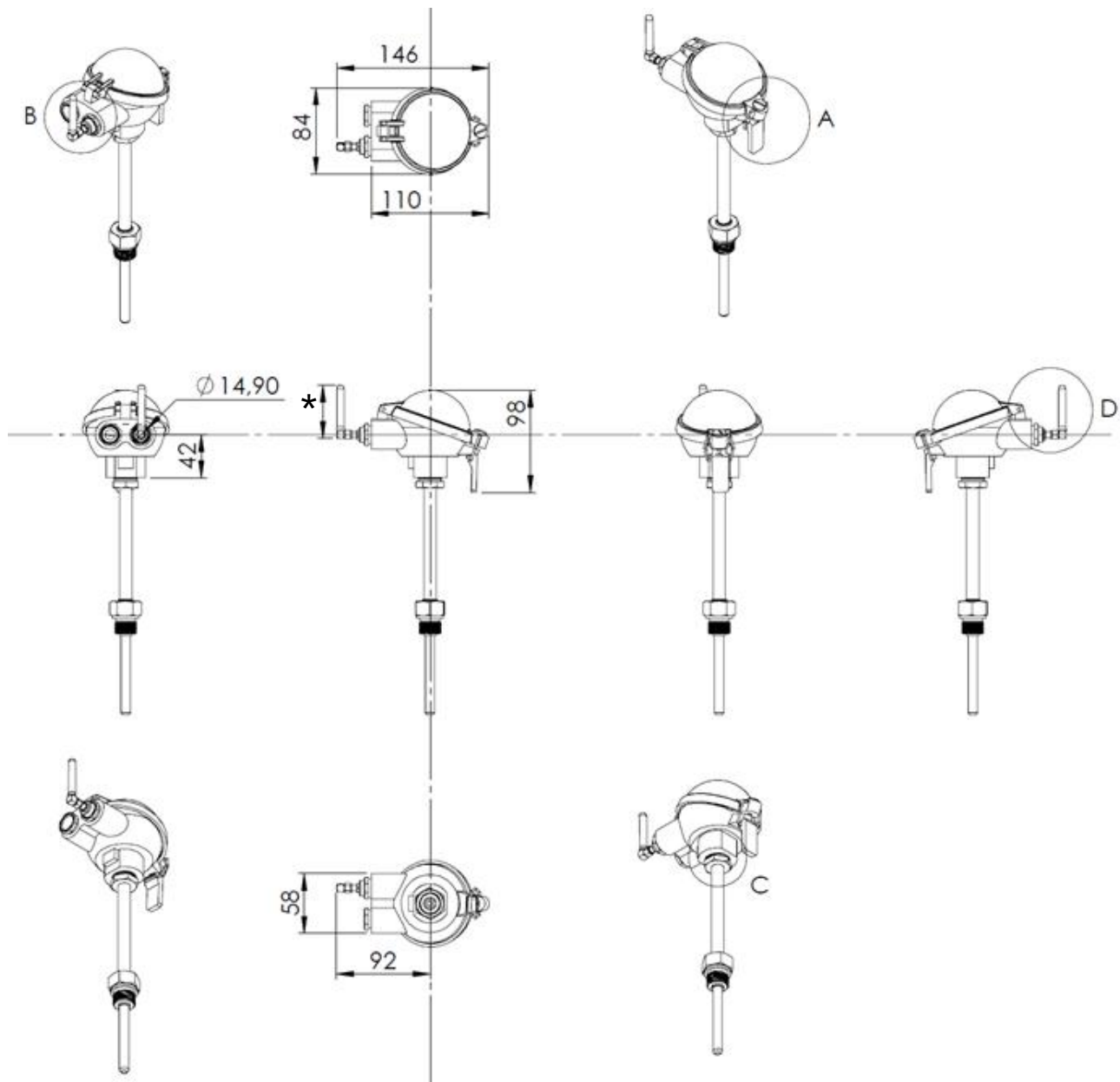
DETAIL C
SCALE 1 : 1

Dimensions in metric [mm]

*Note: WLT310 is supplied with SMA connectors

*Note: WLT311 is supplied with RP-SMA connectors

4.3 Cable powered version

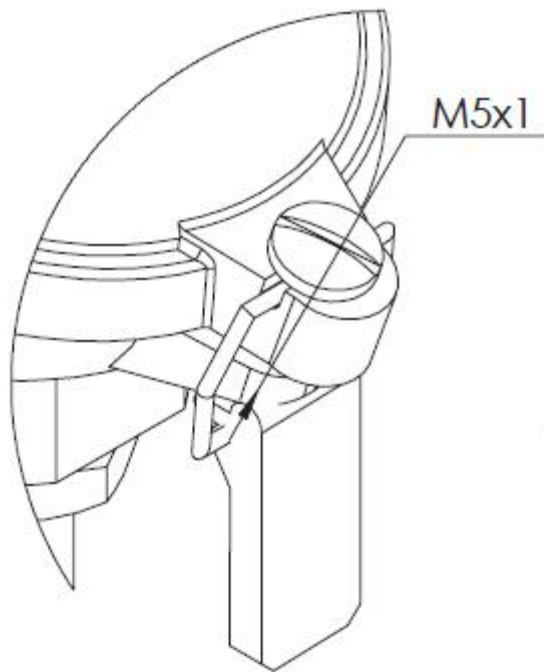


Scale 1:5

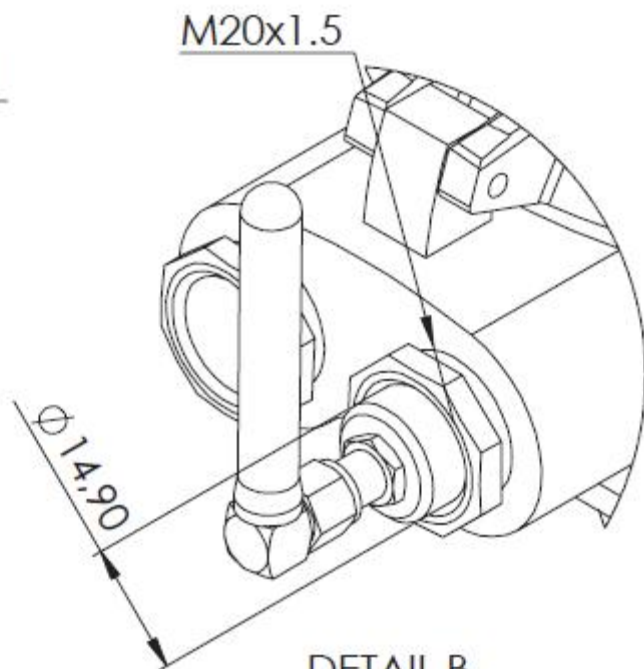
Dimensions in metric [mm]

*Note: WLT310 is supplied with Taoglas antenna, type: TI.08.C.0112, length 53 mm

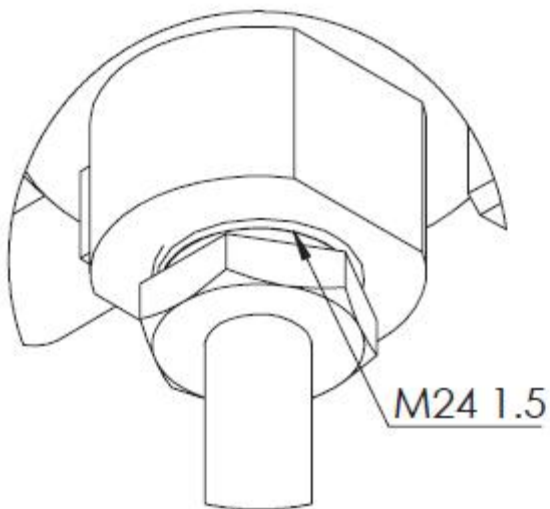
*Note: WLT311 is supplied with Linx Technologies antenna, type: ANT-916-CW-RAH, length 47 mm



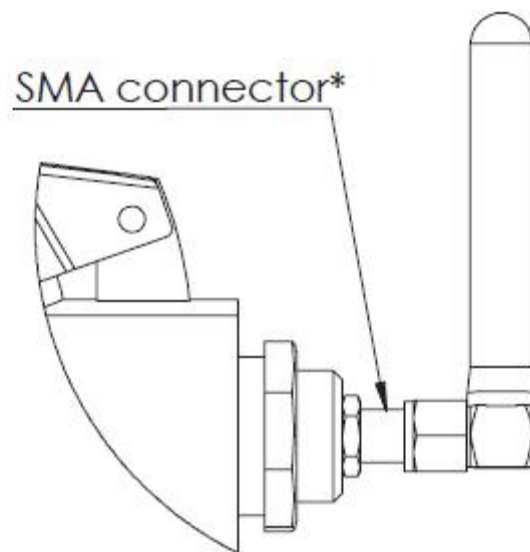
DETAIL A
SCALE 1 : 1



DETAIL B
SCALE 1 : 1



DETAIL C
SCALE 1 : 1



DETAIL D
SCALE 1 : 1

Dimensions in metric [mm]

*Note: WLT310 is supplied with SMA connectors

*Note: WLT311 is supplied with RP-SMA connectors

5 Disassembly and assembly instructions

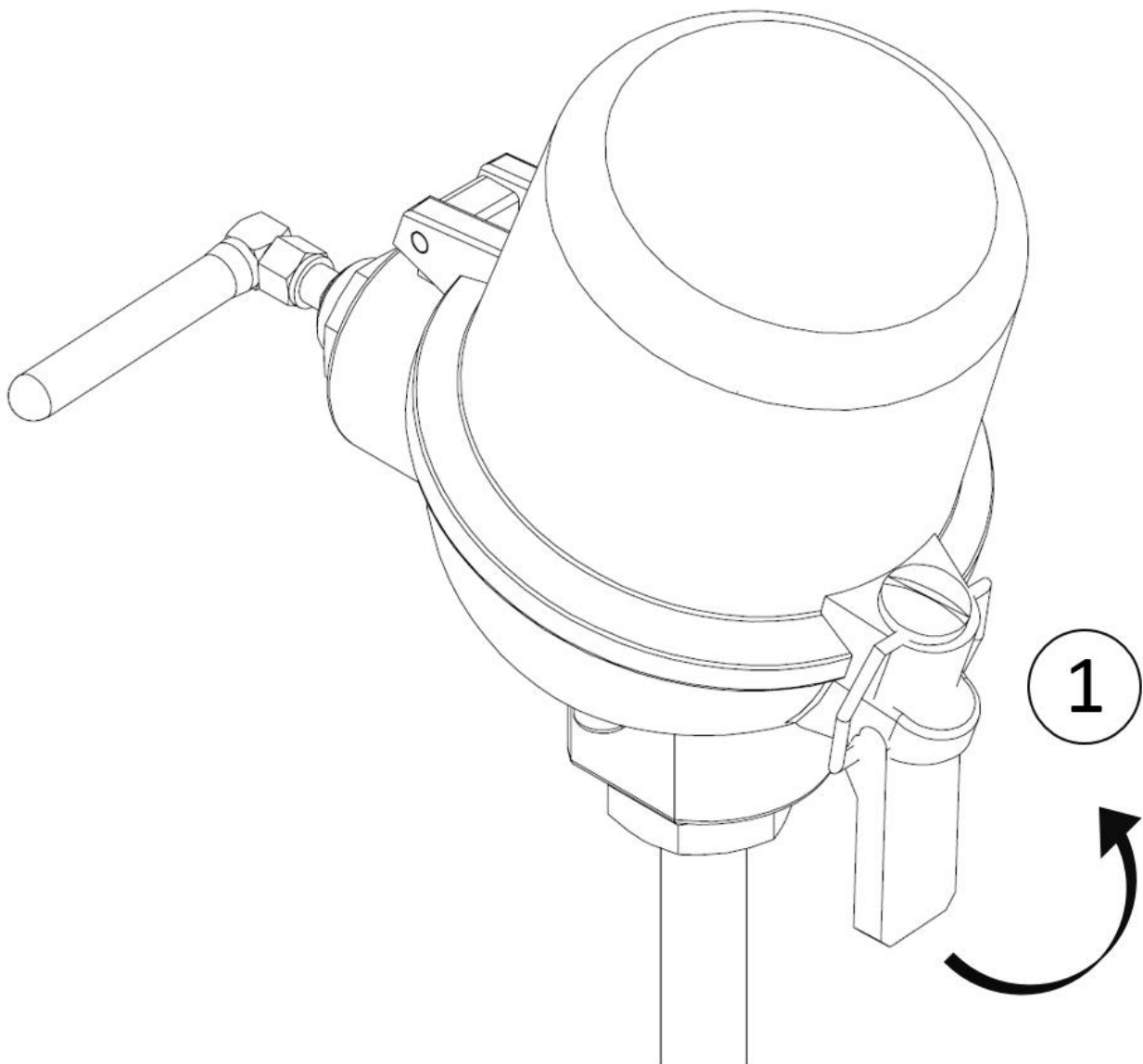
It is recommended to loosen and tilt the antenna to horizontal position before opening the top cover.

When assembling it is recommended to use SMA torque wrench to avoid damage from over tightening the antenna connector.

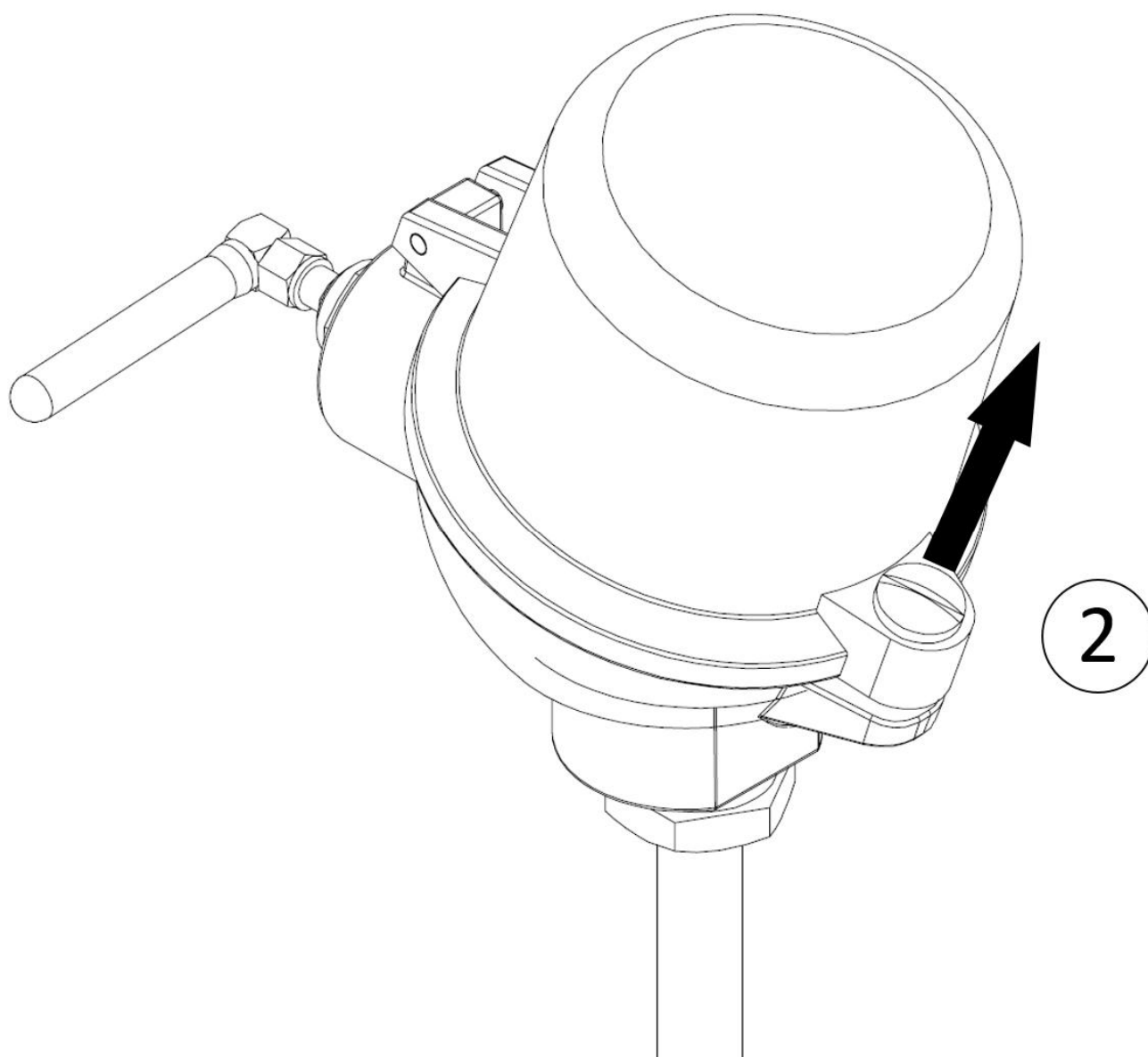
Before opening the top cover be aware that the top cover holds O-ring sealant, which could drop off when performing the opening procedure.

To open the top cover:

1. Tilt the lever outwards to snap the locking pin loose.

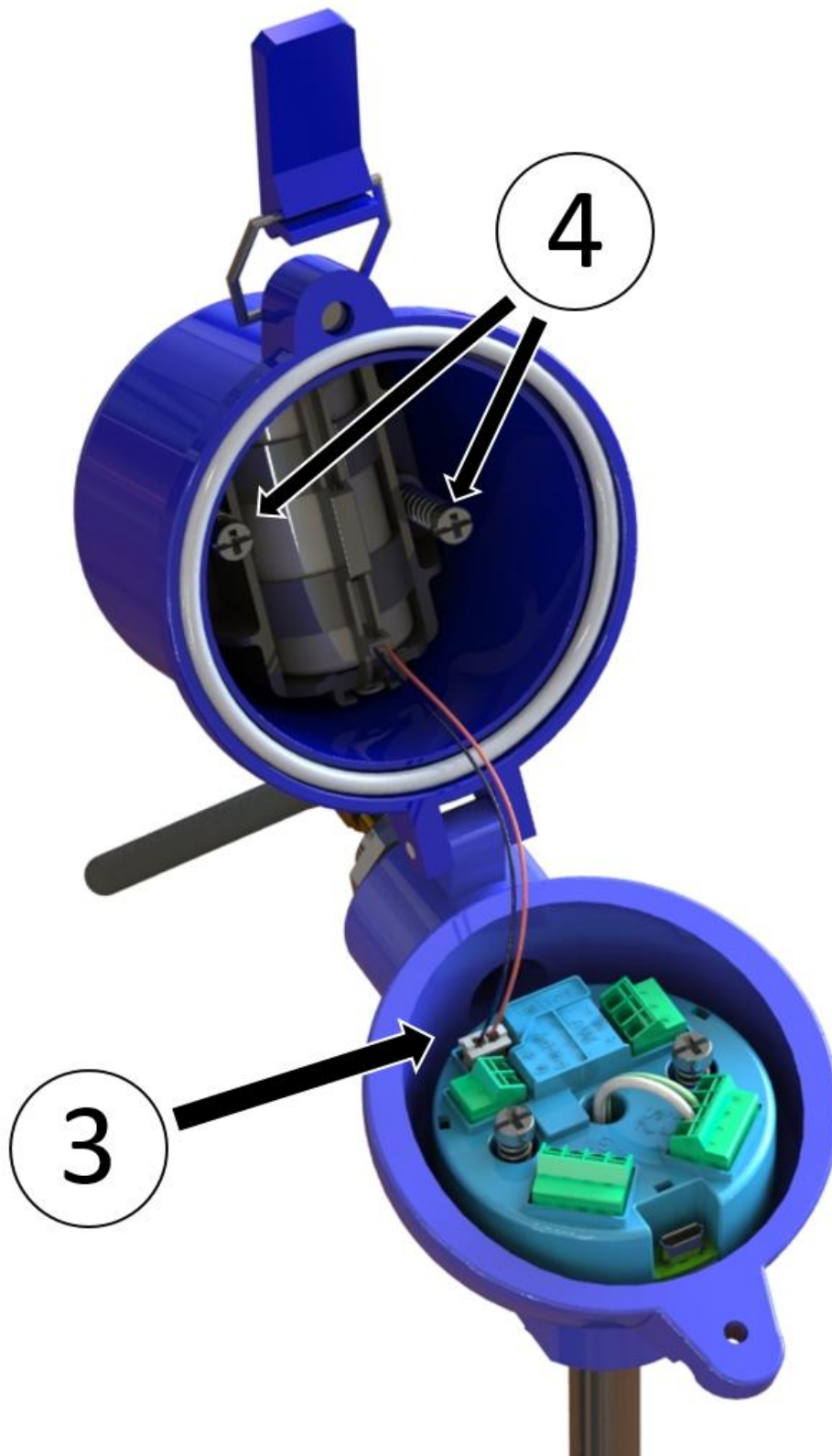


2. or unscrew the locking screw, if lever is not used for locking.

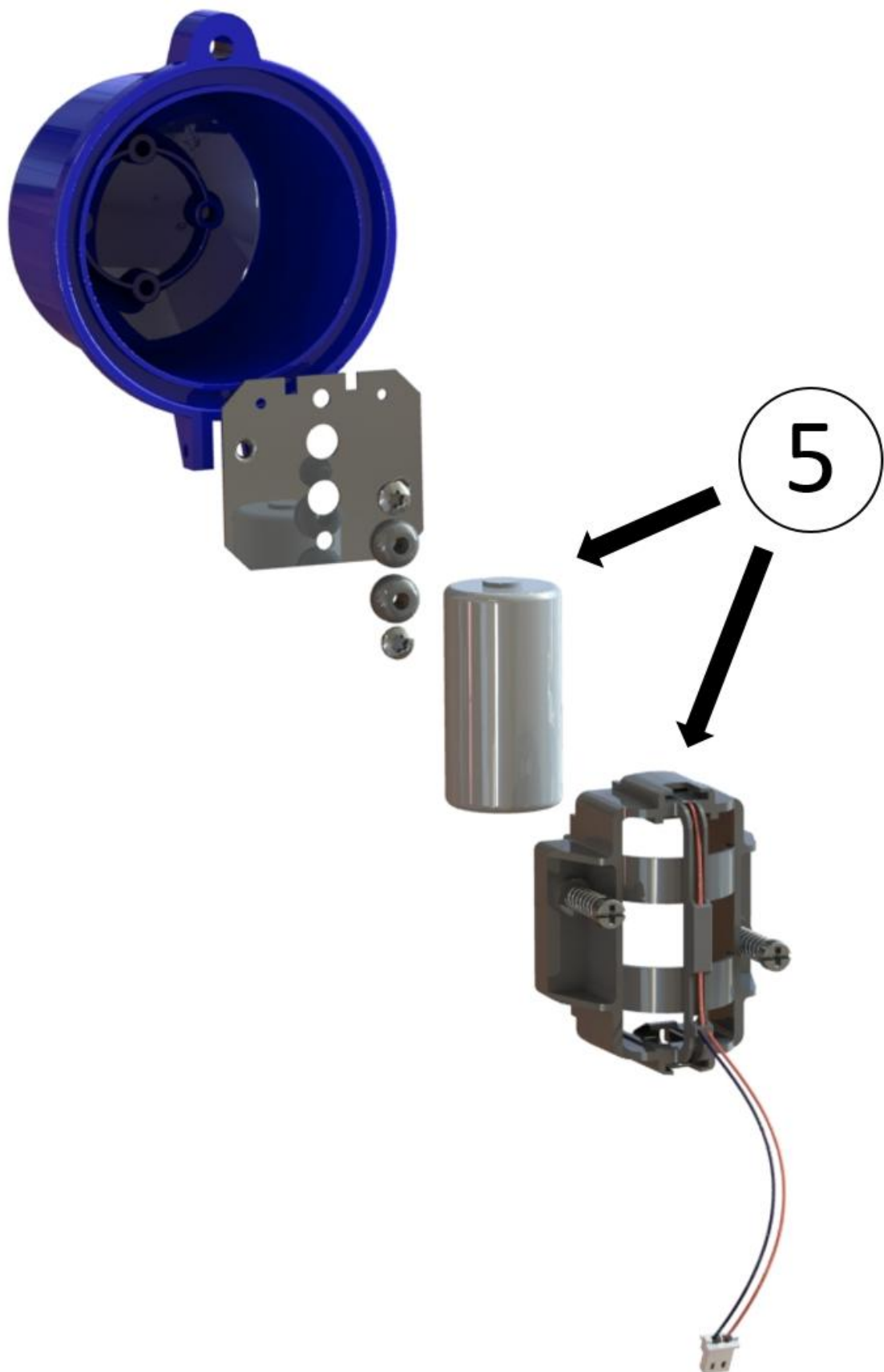


6 Replacing Battery

3. Detach the wire of the battery holder kit from the transmitter.
4. Loosen 2 pcs of screws used to fasten battery holder kit to battery holder plate.

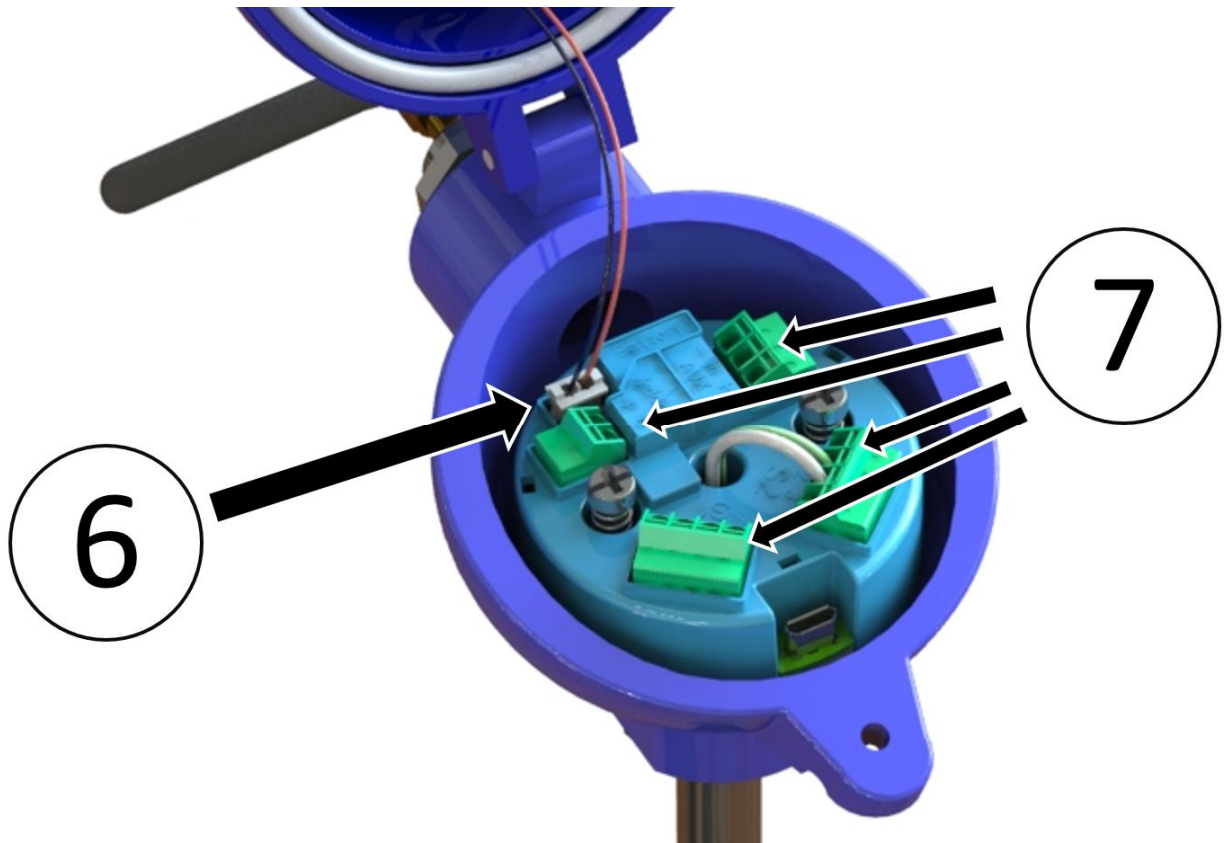


5. Replace the battery. (Note: positive pole of the battery is at the end of red wire.)

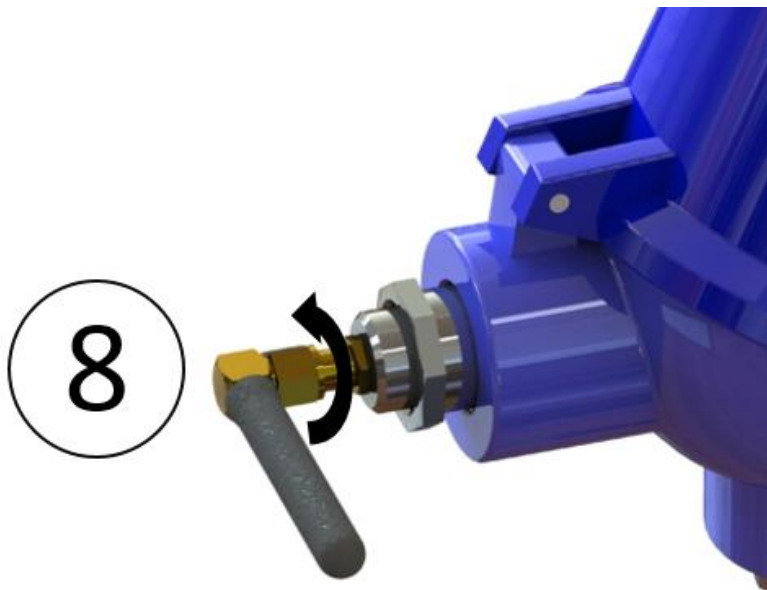


7 Detaching Transmitter

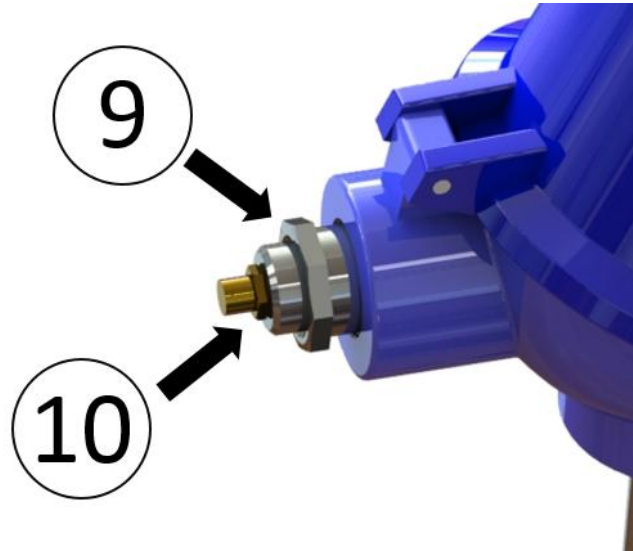
6. Disconnect battery cable if not disconnected.
7. Disconnect all wires from transmitter.



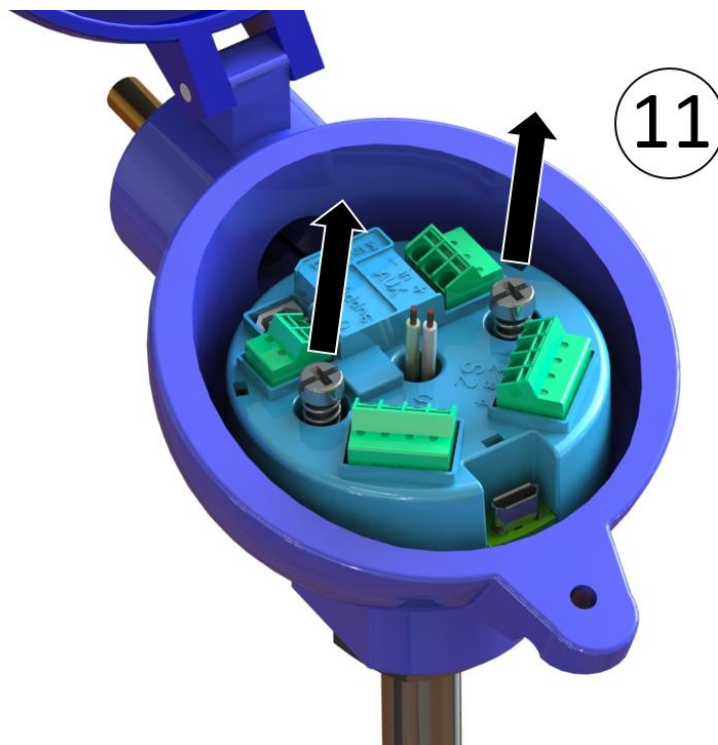
8. Remove the antenna.



9. Loosen and remove hexagonal cable adapter.
10. Loosen and remove the hex nut from SMA connector. The washers, antenna adapter and bushing rubber behind it will become loose, remove these parts.

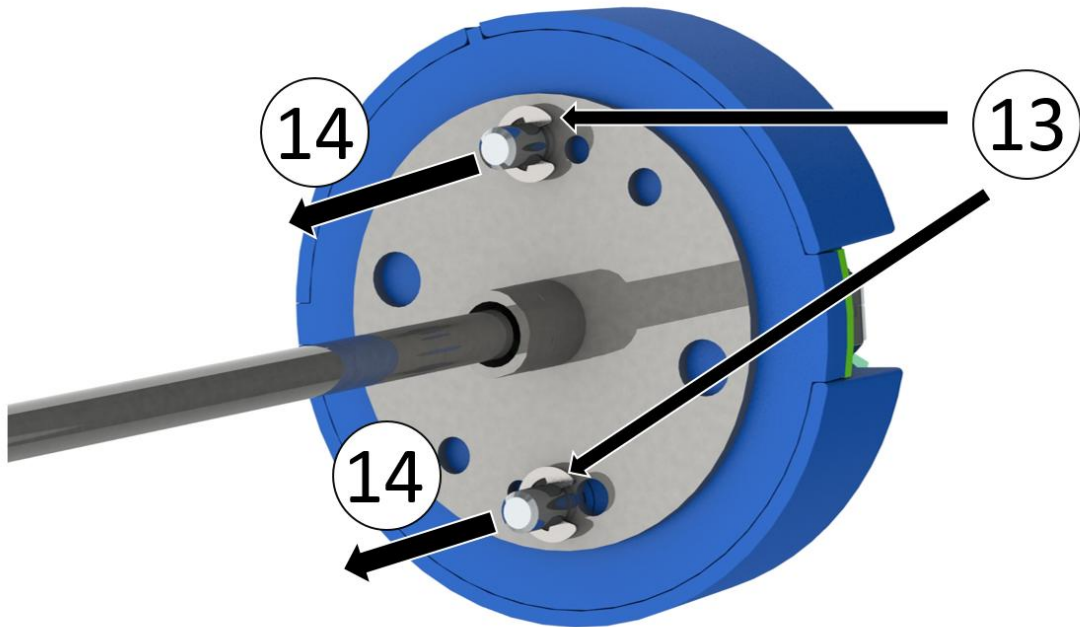


11. Loosen 2 pcs of screws which are used to fasten the transmitter plate to frame.



12. Remove the transmitter and the sensor flange by lifting from the transmitter.

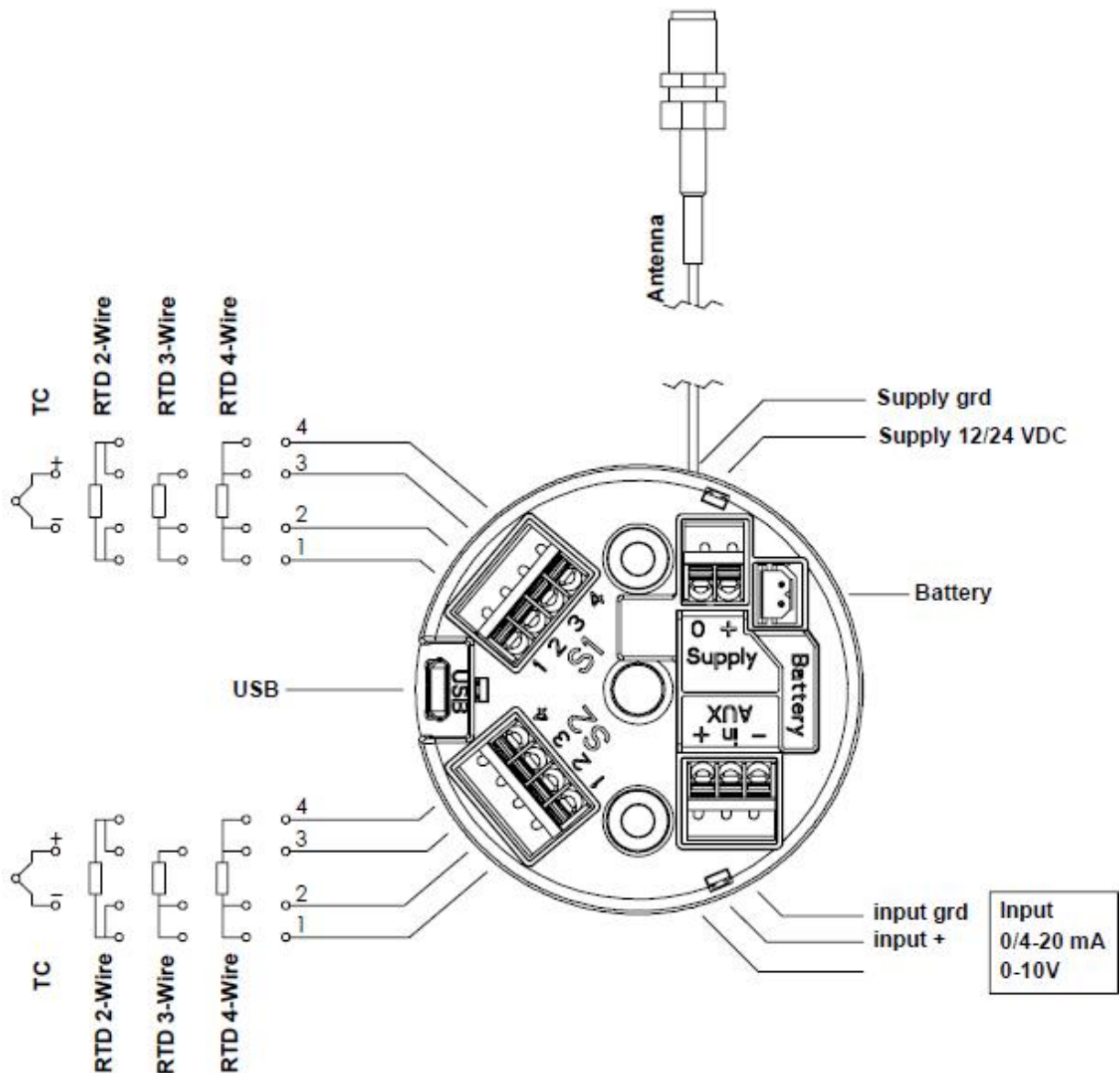
13. Note that there are 2 pcs of locking washers under the transmitter. They are used to lock the sensor flange to transmitter.
14. Remove the locking washers to remove the sensor flange from transmitter. Replace the transmitter.



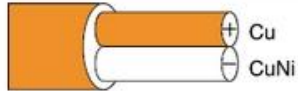
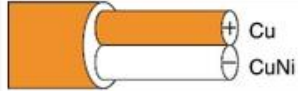
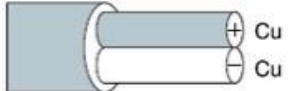
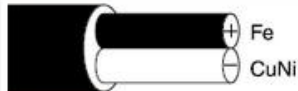
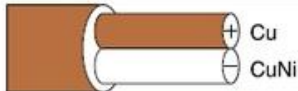
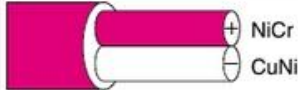
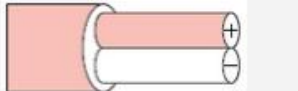
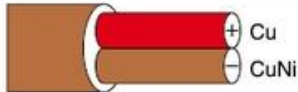
15. Assemble by steps 6-14 in reversed order

8 Sensor connections

Transmitter has two inputs S1 and S2 in which temperature sensors or linear resistors can be connected. Transmitter has one AUX-input in which analog signal can be connected. Temperature sensors can be either Pt100, Pt1000 with 2-, 3- or 4-wire connection or thermocouple type E, J, K, N, R, S, T, B, L or U. Analog signal can be within current range 0...20 mA (0...23 mA) or voltage 0...10 V (0 - 11 V).

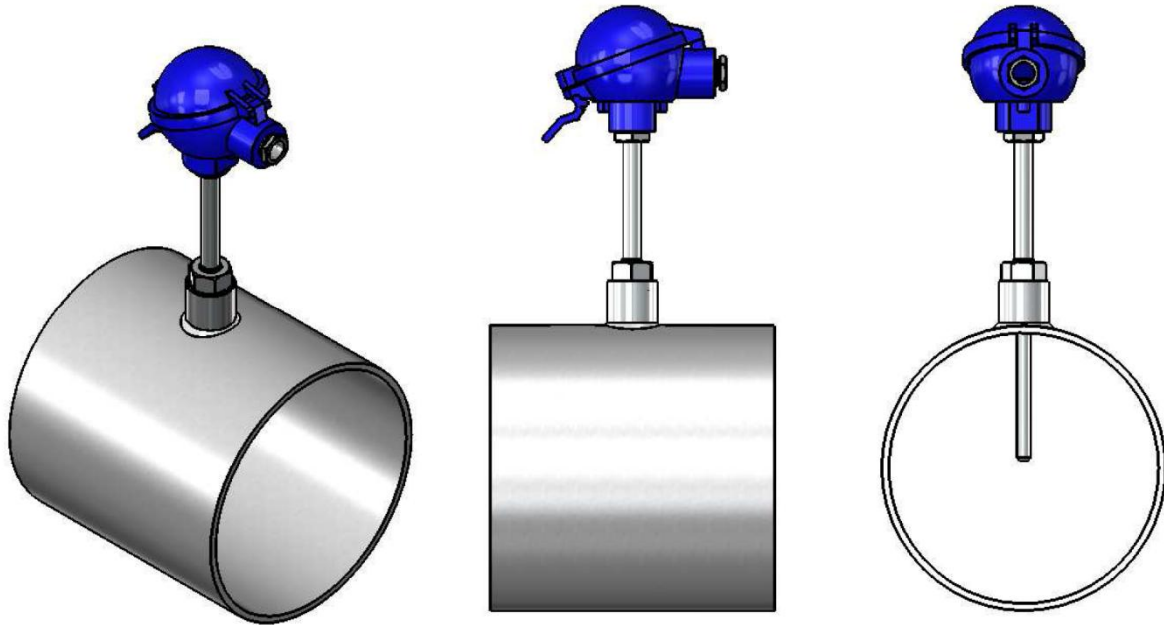


Cable colors according to IEC 584, except U- ja L-types according to DIN 43710.

Type	Thermo materials	Cable materials*	Cable colors**
R	(+) Platinum - 13% Rhodium (-) Platinum	(+) Cu (-) CuNi	
S	(+) Platinum - 10 % Rhodium (-) Platinum	(+) Cu (-) CuNi	
B	(+) Platinum - 30 % Rhodium (-) Platinum - 6 % Rhodium	(+) Cu (-) Cu	
J	(+) Steel (-) Copper - Nickel	(+) Fe (-) CuNi	
T	(+) Copper (-) Copper - Nickel	(+) Cu (-) CuNi	
E	(+) Nickel - Chrome (-) Copper - Nickel	(+) NiCr (-) CuNi	
K	(+) Nickel - Chrome (-) Nickel	(+) NiCr (KX), Cu (KCB), Fe (KCA) (-) Ni (KX), CuNi (KCB), CuNi (KCA)	
N	(+) Nickel - Chrome - Silicon (-) Nickel - Silicon	(+) NiCrSi (NX), Cu (NC) (-) NiSi (NX), CuNi (NC)	
U	(+) Copper (-) Copper - Nickel	(+) Cu (UX, DIN 43710) (-) CuNi (UX, DIN 43710)	
L	(+) Steel (-) Copper - Nickel	(+) Fe (LX, DIN 43710) (-) CuNi (LX, DIN 43710)	

9 Installation

Installation configuration is application specific, in example the depth of the pipe measured, sensor type, and other mechanical parts in the assembly will define the final installation dimensions. Simplified installation example is illustrated in the picture below:



10 Spare parts

Product code	Name
5078683	Antenna 90 degree angle 868MHz
5103996	Antenna straight 868MHz
5108800	Antenna 90 degree angle 915MHz
5078690	Battery 3.6V Lithium R14-C
5084342	Battery holder kit for IoTKey
5083211	WLT 310 Transmitter
5103294	WLT 311 Transmitter