



Instruction Manual

Conductivity Transmitter (TE67K)



TE91K024-EN3

ESE02887EN

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1. EC Declaration of Conformity

The designated company

Alfa Laval Kolding A/S

Company name

Albuen 31, 6000 Kolding, Denmark

Address

+45 79 32 22 00

Phone no.

hereby declare that

Alfa Laval Conductivity Transmitter

Denomination

TE67Kxxxxxxxxx

Type

valid for serial numbers from 2019-00001 and subsequent serial numbers.

is in conformity with

- FDA: PEEK: 21CFR177.2415

And the following EU directives:

- EN10/2011, 1935/2004, 2023/2006

The person authorised to compile the technical file is the signer of this document.

Global Product Quality Manager
Pumps, Valves, Fittings and
Tank Equipment

Title

Lars Kruse Andersen

Name



Signature

April 1, 2019

Date

Kolding

Place

This Declaration of Conformity replaces Declaration of Conformity dated 2019-02-01



2. Safety

Unsafe practices and other important information are emphasized in this manual.

Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.

Pay special attention to the instructions below so that severe personal injury or damage to the transmitter are avoided.

2.1 Important information

Always read the manual before using the conductivity transmitter.

WARNING

Indicates that special procedures must be followed to avoid severe personal injury.

CAUTION

Indicates that special procedures must be followed to avoid damage to the conductivity transmitter.

NOTE

Indicates important information to simplify or clarify procedures.

2.2 Warning signs

General warning:



Dangerous electrical voltage:



Caustic agents:



Unsafe practices and other important information are emphasized in this manual.

Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.

Pay special attention to the instructions below so that severe personal injury or damage to the transmitter are avoided.

2.3 Safety instructions

This instrument is built and tested according to the current EU-directives and packed in technically safe condition. In order to maintain this condition and to ensure safe operation, the user must follow the hints and warnings given in this instruction.

During the installation the valid national rules have to be observed. Ignoring the warnings may lead to severe personal injury or substantial damage to property.

The product must be operated by trained staff. Correct and safe operation of this equipment is dependent on proper transport, storage, installation and operation.

All electrical wiring must conform to local standards. In order to prevent stray electrical radiation, we recommend twisted and shielded input cables, as also to keep power supply cables separated from the input cables. The connection must be made according to the connecting diagrams.

Before switching off the supply voltage check the possible effects on other equipment and the processing system. Ensure that the supply voltage and the conditions in the environment comply with the specification of the device.

This instruction manual is part of the device, must be kept nearest its location, always accessible to all employees. This instruction manual is copyrighted. The contents of this instruction manual reflect the version available at the time of printing. It has been issued to our best knowledge. However, errors may have occurred. Alfa Laval Kolding A/S is not liable for any incorrect statements and their effects.

– Technical modifications reserved – Limitation of liability

By non-observance of the instruction manual, inappropriate use, modification or damage, no liability is assumed and warranty claims will be excluded.



The device is not approved for electrical installations in explosion proof areas.

After mounting of the device - do check that the housing has a ground potential.

3. General description

3.1 Working principle of the conductivity transmitter

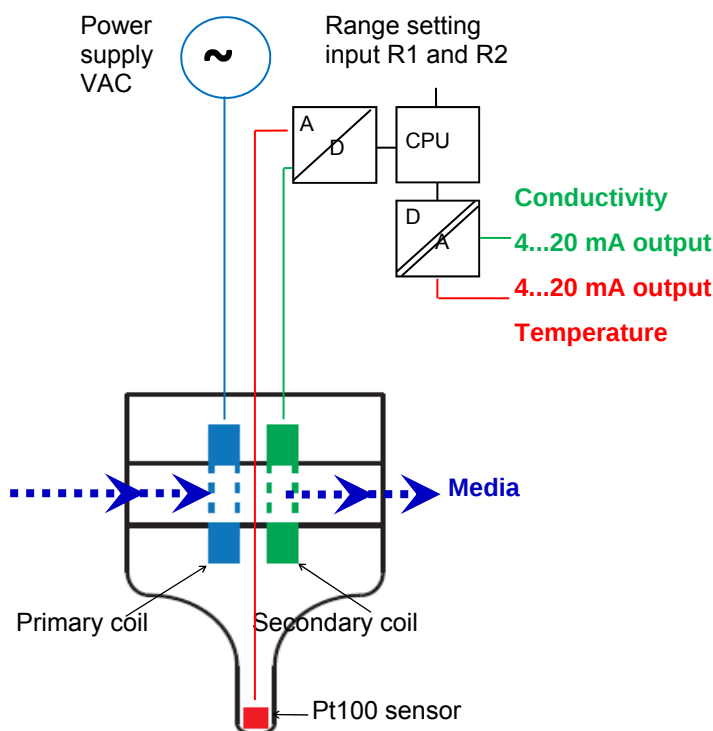
The measuring cell is a homogeneous sealed body all in PEEK.

Through the body is a hole, through which the media is flowing. Built-in around the hole are two coils; a primary coil supplied with an AC voltage and a secondary coil, which picks up a small signal through the media induced voltage.

The size of this voltage is dependent on the conductivity of the media. This signal is handled and amplified in the electronics to a linear analogue 4...20 mA output signal. Also built into the body is a Pt100 sensor placed in the tip of the sensor. This is measuring the media temperature to enable temperature compensation of the conductivity signal, which is very temperature dependent.

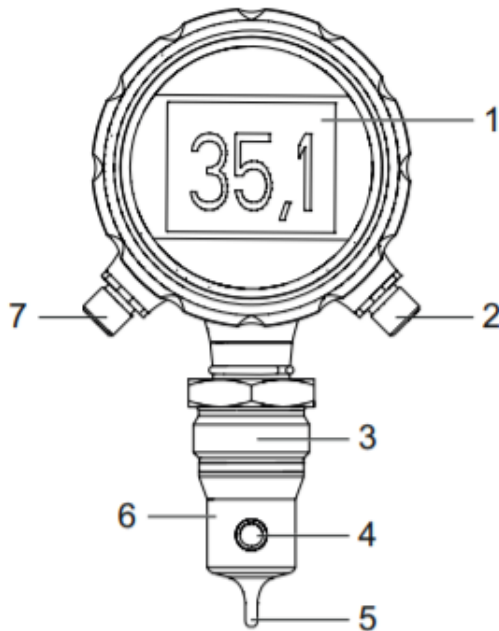
The Pt100 sensor signal also features as a separate analogue 4...20 mA output signal.

The coils and sensor are encapsulated in the PEEK sensor body, which have a surface with surface roughness $Ra < 0,8 \mu m$. It is therefore well suited for use in hygienic processes or directly in concentrated acids or alkalis.



3. General description

3.2 Construction and function



1. Display
2. Connection for temperature and relay signal
3. Thread for mounting the AFIX
4. Hole for medium (conductivity measuring)
5. Tip with temperature sensor
6. Measuring cell
7. Connection for conductivity and concentration signal

The conductivity transmitter consists of a conductivity sensor, temperature sensor and a transmitter.

The device measures conductivity/concentration and temperature of liquid media.

Programming can be done via the touch screen display or via the Instrument Programmer. During operation, the display shows information regarding measured values, alarms and other data as specified during setup.

The 2 connectors are used to transfer sensor data, alarms, control signals and programming data.

3. General description

3.3 Temperature compensation of the conductivity measurement

Conductivity measurement is very temperature dependent.
The factory compensation set-up is 2,0%/°K.

This means that the TE67K will automatically compensate with this factor.
If the temperature dependence is known for the media this factor must be set.

However if the factor is unknown, it is recommended to use an average from the table at the right.

It is possible to adjust the temperature compensation factor from 0,0 ... 5,0 %/°C.

Typical temperature dependence	
Media	% change per °C
Acids	1,0 ... 1,6
Bases	1,8 ... 2,2
Salts	2,2 ... 3,0
Neutral water	2,0

3.4 Recycling information:

- **Unpacking**
 - Packing material consist of plastic and cardboard boxes.
 - Cardboard boxes can be reused, recycled or used for energy recovery.
 - Plastics should be recycled or burnt at a licensed waste incineration plant.
- **Maintenance**
 - During maintenance seals and O-ring should be replaced (only on clamp connections).
 - All metal parts should be sent for material recycling.
 - Worn out or defective electronic parts should be sent to a licensed hanger for material recycling.
 - Oil and all non metal wear parts must be taken care of in agreement with local regulations.
- **Scrapping**
 - At end of use, the equipment shall be recycled according to relevant, local regulations. Beside the equipment itself, any hazardous residues from the process liquid must be considered and dealt with in a proper manner. When in doubt, or in the absence of local regulations, please contact the local Alfa Laval sales company.

3. General description

3.5 Conductivity table

In the following table, a list of the most common medias and their typical conductivity is shown

Fruit compound, vegetables and fruit juices:

Media	Temperature	Conductivity	Measurable by TE67K
Apricot mix 60%	22.0 °C (71.6 °F)	613 µS/cm.	Yes
Apple/kiwi fruit 60%	22.0 °C (71.6 °F)	254 µS/cm.	Yes
Strawberry mix 60%	23.0 °C (73.4 °F)	260 µS/cm.	Yes
Grapefruit	23.0 °C (73.4 °F)	3396 µS/cm.	Yes
Raspberry mix 60%	22.0 °C (71.6 °F)	240 µS/cm.	Yes
Coconut mix / sorbet 62%	21.5 °C (70.7 °F)	311 µS/cm.	Yes
Muesli 60%	22.0 °C (71.6 °F)	314 µS/cm.	Yes
Mandarin mix	22.0 °C (71.6 °F)	156 µS/cm.	Yes
Orange Jelly 70%	21.0 °C (69.8 °F)	78 µS/cm.	Yes
Orange Concentrate	20.0 °C (68.0 °F)	500 µS/cm.	Yes
Dark cherry 60%	22.0 °C (71.6 °F)	190 µS/cm.	Yes
Liquid Jam without fruit	29.0 °C (84.2 °F)	304 µS/cm.	Yes
	17.0 °C (62.6 °F)	112 µS/cm.	Yes
Thick jam with fruit	27.5 °C (81.5 °F)	1470 µS/cm.	Yes
	17.5 °C (63.5 °F)	1010 µS/cm.	Yes
Raspberry/Blackberry 35 brix	21.0 °C (69.8 °F)	2742 µS/cm.	Yes
Kiwi/Gooseberry 35 brix	21.0 °C (69.8 °F)	3138 µS/cm.	Yes
Peach/maracuja	20.0 °C (68.0 °F)	2530 µS/cm.	Yes
Raspberries 55 brix	19.0 °C (66.2 °F)	273 µS/cm.	Yes
Mandarin 55 brix	18.5 °C (65.3 °F)	2134 µS/cm.	Yes
Cherries 55 brix	18.0 °C (64.4 °F)	232 µS/cm.	Yes
Strawberries 55 brix	18.0 °C (64.4 °F)	251 µS/cm.	Yes
Strawberries 35 brix	16.0 °C (60.8 °F)	3674 µS/cm.	Yes
Blueberries 55 brix	19.0 °C (66.2 °F)	224 µS/cm.	Yes
Blueberries 35 brix	15.5 °C (59.9 °F)	2410 µS/cm.	Yes

3. General description

Others:

Media	Temperature	Conductivity	Measurable by TE67K
Sodium caseinate	20.0 °C (68.0 °F)	7380 µS/cm.	Yes
Coffee extract no.1	20.0 °C (68.0 °F)	10160 µS/cm.	Yes
Coffee extract no.2	20.0 °C (68.0 °F)	11510 µS/cm.	Yes
Diatomite	22.0 °C (71.6 °F)	444 µS/cm.	Yes
NeoCryl A-83 35%	20.0 °C (68.0 °F)	2530 µS/cm.	Yes
NeoCryl AWR-37-B	20.0 °C (68.0 °F)	9830 µS/cm.	Yes
Paraffin	84.0 °C (183.2 °F)	0,5 µS/cm.	No
Rundvet	76.0 °C (168.8 °F)	<1,0 µS/cm.	No
Reuzel	72.0 °C (161.6 °F)	193 µS/cm.	Yes
Shampoo – Basic material	22.0 °C (71.6 °F)	15620 µS/cm.	Yes
Latex (hardener)	22.0 °C (71.6 °F)	7880 µS/cm.	Yes
Latex (hardener)	23.0 °C (73.4 °F)	6800 µS/cm.	Yes

Soft Drinks:

Media	Temperature	Conductivity	Measurable by TE67K
Afri-cola	22.0 °C (71.6 °F)	557,5 µS/cm.	Yes
Bluna	22.0 °C (71.6 °F)	345 µS/cm.	Yes
Citro	22.0 °C (71.6 °F)	357 µS/cm.	Yes
Sportler mix	22.0 °C (71.6 °F)	375,5 µS/cm.	Yes

Raw Material For Candy:

Media	Temperature	Conductivity	Measurable by TE67K
Hazelnut cream	22.0 °C (71.6 °F)	3	No
Lecithin	29.0 °C (84.2 °F)	5	No
Mixed nuts 60%	22.0 °C (71.6 °F)	202	Yes
Chopped nuts	21.0 °C (69.8 °F)	186	Yes
Marzipan	22.0 °C (71.6 °F)	112	Yes
Chocolate	30.0 °C (86 °F)	4	No
Milk Chocolate	Conductivity is not measurable.		No

3. General description

Water Types:

Media	Temperature	Conductivity	Measurable by TE67K
City water	14.5 °C (58.1 °F)	138 µS/cm.	Yes
	20.0 °C (68.0 °F)	154 µS/cm.	Yes
City water	18.5 °C (65.3 °F)	205 µS/cm.	Yes
Rinse water before production	23.0 °C (73.4 °F)	695 µS/cm.	Yes
Water	13.0 °C (55.4 °F)	600 µS/cm.	Yes
	31.0 °C (87.8 °F)	870 µS/cm.	Yes
Water	20.0 °C (68.0 °F)	141 µS/cm.	Yes
Water	17.0 °C (62.6 °F)	281 µS/cm.	Yes
Water	6.0 °C (42.8 °F)	303 µS/cm.	Yes
	16.0 °C (60.8 °F)	407 µS/cm.	Yes
Water from Silkeborg	20.0 °C (68.0 °F)	271 µS/cm.	Yes

Egg (With Additives):

Media	Temperature	Conductivity	Measurable by TE67K
Egg with sugar and additives	17.0 °C (62.6 °F)	415 µS/cm.	Yes
Yolk	20.0 °C (68.0 °F)	2707 µS/cm.	Yes
Egg white	20.0 °C (68.0 °F)	7407 µS/cm.	Yes
Egg white solution	11.0 °C (51.8 °F)	3240 µS/cm.	Yes

3. General description

Vegetable Oil / Spice Mixture:

Media	Temperature	Conductivity	Measurable by TE67K
Mayonnaise	20.0 °C (68.0 °F)	386 µS/cm.	Yes
Spicy Mix	25.0 °C (77.0 °F)	32 µS/cm.	No
Oiled mixed spices f. cheese prod.	20.0 °C (68.0 °F)	27,4 µS/cm.	No
Oil with additives	20.0 °C (68.0 °F)	5 µS/cm.	No
Dijon mustard	21.0 °C (69.8 °F)	34160 µS/cm.	Yes
Soya oil with additive	25.0 °C (77.0 °F)	12 µS/cm.	No
Starch (water, oil, mustard, eggs)	25.0 °C (77.0 °F)	14 µS/cm.	No
Vegetable oil for margarine prod.	50.0 °C (122.0 °F)	8 µS/cm.	No
Pepper sauce	23.0 °C (73.4 °F)	12100 µS/cm.	Yes
Tartar sauce	23.0 °C (73.4 °F)	13620 µS/cm.	Yes
Barbecue sauce	23.0 °C (73.4 °F)	22400 µS/cm.	Yes
Cocktail sauce	23.0 °C (73.4 °F)	6070 µS/cm.	Yes
Curry sauce	23.0 °C (73.4 °F)	7750 µS/cm.	Yes
Mustard sauce	23.0 °C (73.4 °F)	8250 µS/cm.	Yes
Herb sauce	23.0 °C (73.4 °F)	9030 µS/cm.	Yes
Horse-reddish sauce	23.0 °C (73.4 °F)	7160 µS/cm.	Yes
Garlic sauce	23.0 °C (73.4 °F)	16630 µS/cm.	Yes
Cafe de Paris sauce	23.0 °C (73.4 °F)	22350 µS/cm.	Yes
Coconut oil		22000 µS/cm.	Yes
Water with 16% vegetable oil	20.0 °C (68.0 °F)	2300 µS/cm.	Yes
Water with 20% vegetable oil	20.0 °C (68.0 °F)	500 µS/cm.	Yes
Water with 60% vegetable oil	20.0 °C (68.0 °F)	100 µS/cm.	Yes

3. General description

Sugar Solutions:

Media	Temperature	Conductivity	Measurable by TE67K
Liquid sugar	21.0 °C (69.8 °F)	8 µS/cm.	No
Liquid sugar	18.0 °C (64.4 °F)	15 µS/cm.	No
	25.0 °C (77.0 °F)	23 µS/cm.	No
Liquid sugar	22.9 °C (73.2 °F)	16 µS/cm.	No
Liquid sugar	21.0 °C (69.8 °F)	3,5 µS/cm.	No
Liquid sugar	22.5 °C (72.5 °F)	3640 µS/cm.	Yes
Sugar solution/Brewing sugar	20.0 °C (68.0 °F)	56 µS/cm.	Yes
	40.0 °C (104.0 °F)	100 µS/cm.	Yes
Sugar syrup	22.0 °C (71.6 °F)	6 µS/cm.	No
Sugar syrup	22.0 °C (71.6 °F)	5,5 µS/cm.	No
	45.0 °C (113.0 °F)	7 µS/cm.	No
Sugar syrup	22.0 °C (71.6 °F)	35 µS/cm.	No
Water with 63.8% sugar	21.0 °C (69.8 °F)	10,5 µS/cm.	No
Glucose syrup	92.0 °C (197.6 °F)	6 µS/cm.	No
Glucose syrup	65.0 °C (149.0 °F)	5 µS/cm.	No
Glucose syrup	53.0 °C (127.4 °F)	45 µS/cm.	No
Sugar glucose 67 brix	22.0 °C (71.6 °F)	2 µS/cm.	No
	8.0 °C (46.4 °F)	1 µS/cm.	No
Fruit glucose 70 brix	22.0 °C (71.6 °F)	1 µS/cm.	No
	8.0 °C (46.4 °F)	0,5 µS/cm.	No
Sugar solution 62 brix	22.0 °C (71.6 °F)	4,2 µS/cm.	No
	50.0 °C (122.0 °F)	20 µS/cm.	No
Sorbitol	22.0 °C (71.6 °F)	0,16 µS/cm.	No
Propylene glycol	22.0 °C (71.6 °F)	0,13 µS/cm.	No
Glycerin	22.0 °C (71.6 °F)	0,000 µS/cm.	No

3. General description

Beer (and raw materials for beer):

Media	Temperature	Conductivity	Measurable by TE67K
Alt-bier (Special beer)	23.0 °C (73.4 °F)	1150 µS/cm.	Yes
Beer	6.0 °C (42.8 °F)	1300 µS/cm.	Yes
	17.0 °C (62.6 °F)	1840 µS/cm.	Yes
New beer	10.0 °C (50.0 °F)	1030 µS/cm.	Yes
	15.0 °C (59.0 °F)	1030 µS/cm.	Yes
Malt mash	23.0 °C (73.4 °F)	1520 µS/cm.	Yes
Malt mash (fresh)	13.0 °C (55.4 °F)	1208 µS/cm.	Yes
Malt mash (3 days old)	23.0 °C (73.4 °F)	1960 µS/cm.	Yes

Dairy Products:

Media	Temperature	Conductivity	Measurable by TE67K
Vanilla Zofru 60%	21.0 °C (69.8 °F)	140 µS/cm.	Yes
Butter oil	70.0 °C (158.0 °F)	< 2 µS/cm.	No
Fresh milk	14.0 °C (57.2 °F)	3500 µS/cm.	Yes
	33.0 °C (91.4 °F)	5400 µS/cm.	Yes
Cream cheese (Mon-chou)	21.0 °C (69.8 °F)	34160 µS/cm.	Yes
Concentrated fermented milk serum for butter production	23.0 °C (73.4 °F)	28300 µS/cm.	Yes
Cheery crud 35%	22.0 °C (71.6 °F)	1445 µS/cm.	Yes
Whole milk 3,5% fat	14.0 °C (57.2 °F)	3900 µS/cm.	Yes
	20.0 °C (68.0 °F)	3970 µS/cm.	Yes
Cocktail sauce	25.0 °C (77.0 °F)	550 µS/cm.	Yes
Cocktail sauce	25.0 °C (77.0 °F)	360 µS/cm.	Yes
Butter 40-50% fat	25.0 °C (77.0 °F)	45 µS/cm.	No
Whipping cream 38%		1470 µS/cm.	Yes
Salted butter		0,016 µS/cm.	No

4. Technical specifications

4.1 Conductivity Transmitter

Technical specifications		
Accuracy:		(Sensor incl. Transmitter)
Conductivity		0..500 µS/cm ≤ 1,5 %
		0..1 / 0..500 mS/cm ≤ 1,0 %
		0..1 S/cm. ≤ 1,5 %
Temperature		-30.. 150 °C. ≤ 0,4 °C
Measurement Range:		
Conductivity		0..500 µS/cm..0..1 S/cm 14 selectable ranges
Minimum conductivity measurable		50 µS/cm
Temperature:		-30..150 °C.
		Free programmable range
Temperature compensation		0,0..5,0 %/°C, free adjustable
Compensation range		-20..150 °C.
Reference temperature		25 °C (adjustable)
Start-up time		≤ 15 seconds
Response time:		
Conductivity		< 2,0 seconds
Temperature, t ₉₀		< 15 seconds
Electrical specifications		
Power supply		15..35 VDC
Output		
Conductivity		4..20 mA
Temperature		4..20 mA
Relay		2 galvanic insulated relays included in the display
Temperature drift		≤ 0,1% / °C
Electrical connection		
Electrical connection	Left side	M12, 5 pin
		M16 or M20 cable gland
	Right side	M12, 5 pin (4..20 mA output only)
		M12, 8 pin (4..20 mA + relay output)
		M16 or M20 cable gland

4. Technical specifications

Materials	
Wetted parts:	
37 mm. Version	PEEK natura
83 mm. Version	PEEK natura
Non wetted parts:	
Housing	Stainless steel, AISI 304
Electrical connections:	
Cable Gland	Polycarbonate or Stainless steel, AISI 304
M12 connector	Polycarbonate or Stainless steel, AISI 304
Display:	
Housing	Polycarbonate plastic
Micro enviroment demand specifications	
Temperature:	
Media temperature	-20..140 °C 150 °C up to 1 hour
Ambient temperature	-40..85 °C
Vibrations:	
IEC 60068.2.6 - test Fc	1,0 mm (2-13,2 Hz) 0,7g (13,2-100 Hz)
Humidity:	
IEC 68.2.38	98% condensing
Protection Class	
IEC 529	IP67 with cable gland IP69K with M12 connector and IP69K approved cable and correct torque
Isolation voltage	500 VAC
Compliance and approvals	
Apply to	
EU directives	10/2011, 1935/2004, 2023/2006
FDA	PEEK: 21CFR177.2415
Approvals	
Hygienic	3-A standard 74-07 on some models, see Chapter 9

5.1 Mechanical Installation

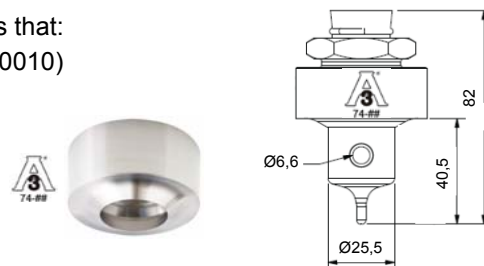
The TE67K has several possibilities for mechanical mounting into the process.

Mounting with 3-A approved welding adaptor:

For the TE67K15x1111xx and TE67K16xxxxxxx to be compliant to 3-A it must be installed in the welding adaptor TE67N000000010. The TE67N000000010 welding adaptor can be fitted on tanks and on pipes.

It is important that the installation comply to 3-A regulations which means that:

1. Only a 3-A approved welding adaptor is to be used (TE67N000000010)
2. The inspection hole should be visible and drained
3. Mount the adapter in a self drained position/angle
4. The 3-A mark or the arrow shall be placed upwards
5. Welding should be grinded to Ra= 0.8
6. Welding according to appropriate 3-A standard



TE67N000000010 is also available with (these are not included in the 3-A authorization):

Electropolished: TE67N000000017

3.1 certificate: TE67N000000028

Electropolished + 3.1 certificate: TE67N000000035

To ensure a safe connection without leaks it is important that the swirling nipple is tighten to 20-25 Nm



CAUTION

If the swirling nipple is tightened with more than the recommendation above, the PEEK top could be damaged.

Mounting with Clamp DN38/DN51 (ISO2852):

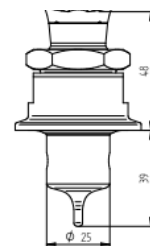
The TE67K is possible with either a DN38 or a DN51 Clamp connection.

To ensure a correct measurement it is important to follow the guidelines of the installation.

It is important, when using a ISO2852 ferrule, that the sensor must be fully emersed in the media.

Be aware that the TE67K with short neck has a very short mounting depth and the hole in the sensor might be partly covered by the ferrule which will cause the transmitter to malfunction.

The flow of the media must be able to pass through the holes in the sensor tip, which means that the sensor tip has to be placed directly in the flow.



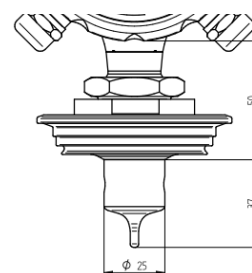
NOTE:

It is recommended to use the versions with long neck TE67K13xxxxxxx or the TE67K18xxxxxxx when it is installed in a clamp ferrule.

Mounting with Unique Flexbody, TE67K1Nxxxxxxx :

The TE67K is available with Unique Flexbody, type N which offer a 100% flush connection.

Unique Flexbody, type N is always delivered with a 37 mm sensor length.

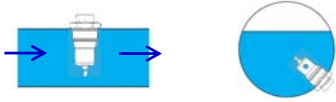


5. Installation

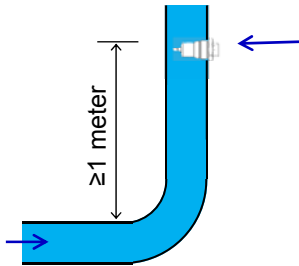
5.2 General Installation Guidelines

How to ensure a correct measurement

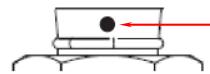
The sensor must be fully emersed in the media.



It is recommended to mount the sensor in a distance of >1 meter from a bend to avoid turbulence problems.



The hole through the sensor must be in the flow direction



The marks on the connection must point in flow direction

There must be some bi-directional flow through the hole to ensure a homogeneous media - i.e. correct measurement. There must be no air-bubbles in the hole.

The housing can be turned 90 degrees by loosening the two hex screws behind the display and turning the house.

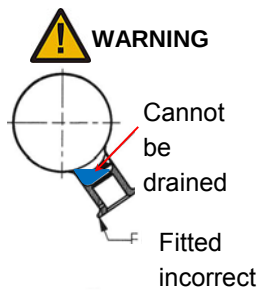
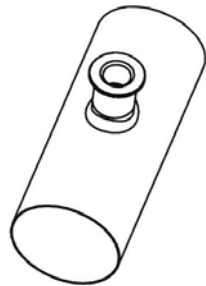


WARNING

Turning the housing more than 90 degrees could damage the electrical connection to the sensor

Avoid deadlegs:

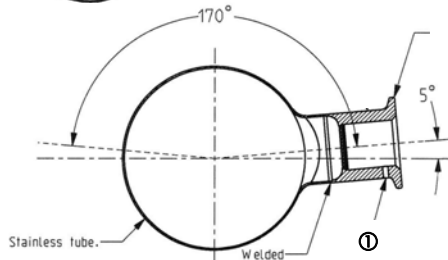
Deadlegs are areas around process connections which, because of misplacement of the connection, is very hard to clean. Welding adaptors must always be placed in a way which makes them self drained and easy to clean. This is done by keeping an angle of at least 5 degrees



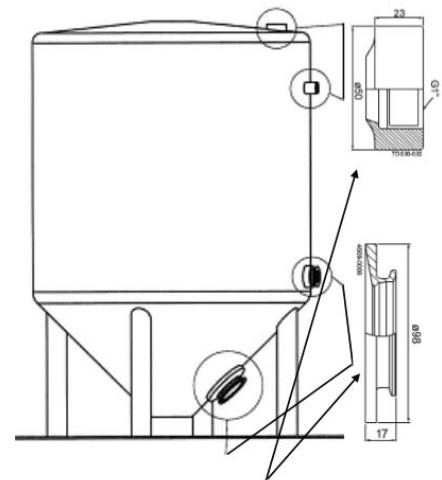
WARNING

Cannot be drained

Fitted incorrect



① Leakage indication hole must be placed downwards



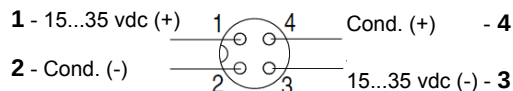
Example with
TE67N000000010
And Unique Flexbody,
type N connection

After installation

- Check the leak tightness of the sleeve/ferrule.
- Check the tightness of glands or M12 plugs.
- Check the tightness of the cover

5.3 Electrical installation with M12 connectors

Left side electrical connection (Front view)



Left side M12, 5-pin connector

1: Brown	Supply (+)	(15...35 vdc)
2: White	Cond. (-)	(4...20 mA)
3: Blue	Supply (-)	(15...35 vdc)
4: Black	Cond. (+)	(4...20 mA)

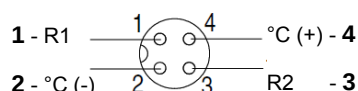
Note:

If a M12 4-pin connector for left and right side is selected the AFI4 is direct compatible with the old Alfa Laval conductivity transmitter.

To set the external input for range selection

Range	R1	R2	Range	R1	R2
1	N.C.	N.C.	3	N.C.	24 VDC
2	24 VDC	N.C.	4	24 VDC	24 VDC

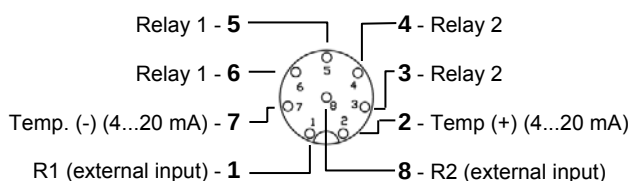
Right side electrical connection (Front view)



Right side M12, 5-pin connector

1: Brown	R1	(external input)
2: White	Temp. (-)	(4...20 mA)
3: Blue	R2	(external input)
4: Black	Temp. (+)	(4...20 mA)

Right side electrical connection with relay output



Right side M12, 8-pin connector

1: White	R1	(external input)
2: Brown	Temp. (+)	(4...20 mA)
3: Green	Relay 2	
4: Yellow	Relay 2	
5: Grey	Relay 1	
6: Light red	Relay 1	
7: Blue	Temp.(-)	(4...20 mA)

Note:

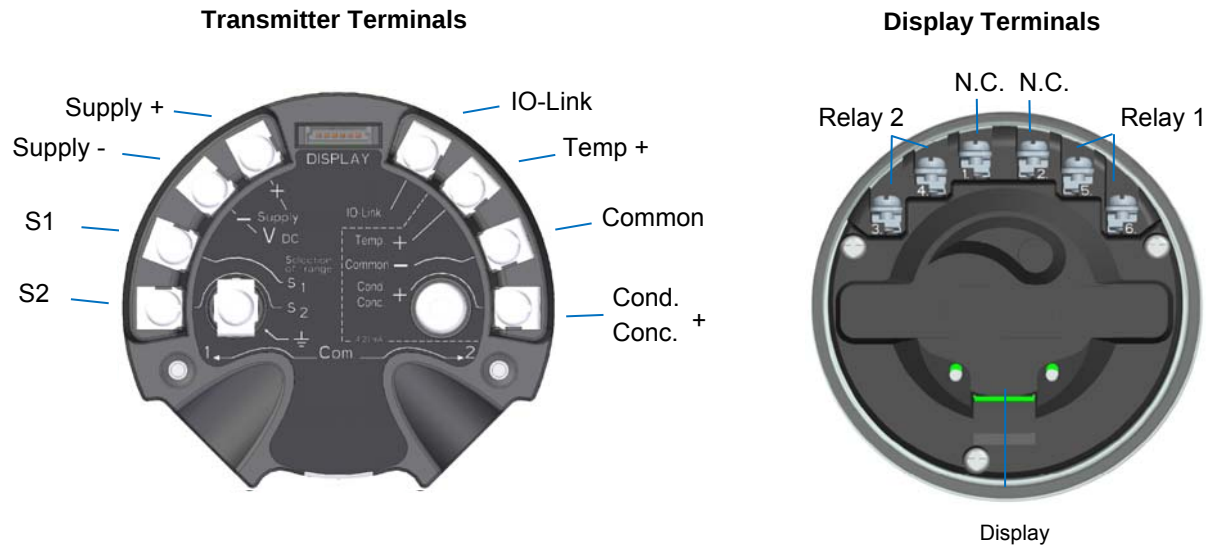
For ranges below 10 mS/cm a shielded cable must be used.

Relays (on display):

Contacts:	2 x Solid state relays
Voltage:	< 60 V
Load Current:	75 mA.
Max On resistance:	10 Ohm

5. Installation

5.4 Electrical installation with M16 or M20 cable gland



To set the external input for range selection

Range	S1	S2	Range	S1	S2
1	N.C.	N.C.	3	N.C.	24 VDC
2	24 VDC	N.C.	4	24 VDC	24 VDC

Relays (on display):

Contacts: 2 x Solid state relays
Voltage: < 60 V
Load Current: 75 mA.
Max On resistance: 10 Ohm

6.1 Programming the transmitter

General

The TE67K is programmed through the touch display on the front.

To access the programming mode, gently touch in the bottom part of the illuminated display area.

A menu button will show in the bottom middle of the display which will give access to the programming mode.

The programming menu has multiple levels and can be navigated through the up and down arrow on each side.

To access a menu point, use the up and down arrow and press select to go the submenu.

To go a level back, go to the top, where there always will be a "↩ Back" menu point and press select or press and hold the up arrow for 3 seconds for moving a level backwards in a menu point.

The display also has a timeout function which make it exit programming mode after 120 seconds. This value can be set individually

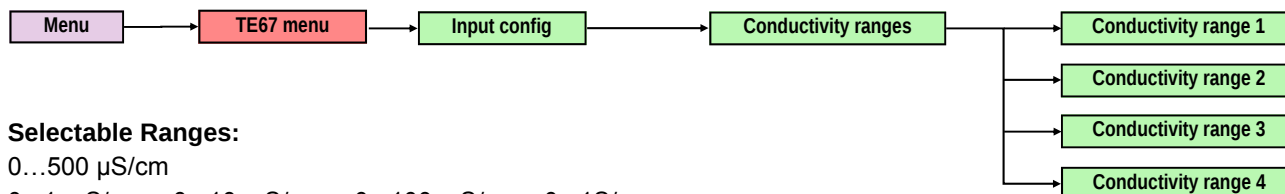
NOTE:

Access can be restricted using a password (see page 25)

Programming the measuring range

Access the programming menu, select the TE67 menu → Input config → Conductivity ranges.

It is possible to select between 4 pre programmed ranges which can be switched between by the digital inputs R1+R2. Every programmed range can be set between 14 different ranged as shown below.



Selectable Ranges:

0...500 µS/cm

0...1 mS/cm 0...10 mS/cm 0...100 mS/cm 0...1S/cm

0...2 mS/cm 0...20 mS/cm 0...200 mS/cm

0...3 mS/cm 0...30 mS/cm 0...300 mS/cm

0...5 mS/cm 0...50 mS/cm 0...500 mS/cm

Definition: 1.000 µS/cm = 1.0 mS/cm

1.000 mS/cm = 1.0 S/cm

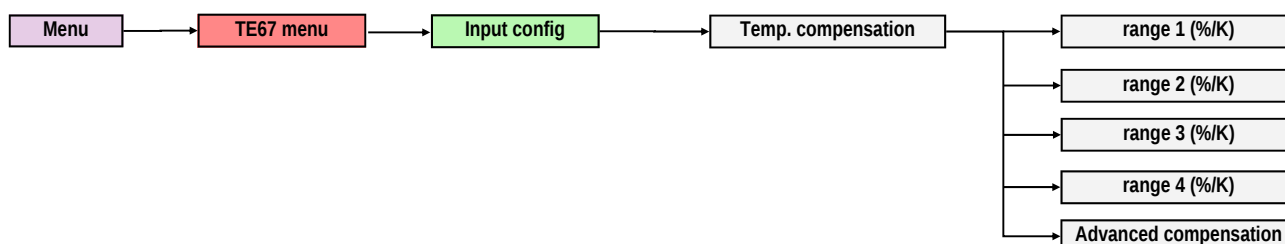
Programming the temperature compensation

As previous mentioned, the conductivity measurement is very temperature dependent (see page 7 for more info).

You can adjust the temperature compensation in the same way as the conductivity range and it will switch between the 4 different ranges through the digital inputs R1+R2

Access the programming menu, select the TE67 menu → Input config → Temp. compensation

Select which of the 4 ranges you wish to adjust and set a value between 0,0 and 5,0 %/°C.



6. Setup

Programming the conductivity output (optional)

If nothing is changed, the transmitter will scale the 4..20 mA output to the complete measuring range.

The transmitter offers the possibility to change this output if only a part of the measuring range is used.

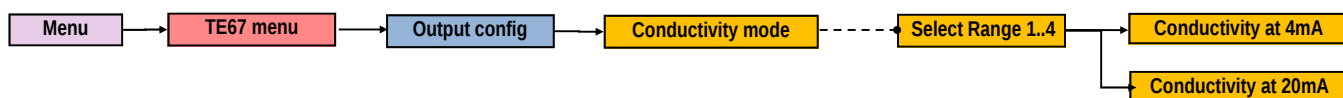
Access the programming menu, select the TE67 menu → Output config → Conductivity mode.

It is then possible to change either of the 4 ranges by changing the 4 mA. Setpoint and 20 mA. Setpoint.

By pressing the change button the display will show the change menu for the selected point. You can step sideways through the digits with the arrows and change the value on each individual digit.

NOTE:

Remember to step all the way to the right to the “✓” symbol to save the changes.



Programming the temperature output

The TE67K has a fully programmable temperature transmitter build in to the sensor tip.

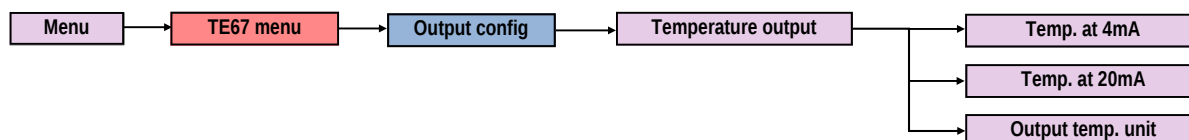
Factory setting is –20..150 °C. but in the 4..20 mA output can be configured individually.

Access the programming menu, select the TE67 menu → Output config → Temperature output.

Select either the “Temp. at 4mA” or “Temp. at 20mA”) and change the value in the same way as programming the conductivity output. It is also possible to change between Celsius and Fahrenheit as the desired output unit.

NOTE:

Remember to step all the way to the right to the “✓” symbol to save the changes.



Output current limits (advanced configuration)

It is possible to change the limits of the 4..20 mA output. When the transmitter is below the programmed range the transmitter will default continue down to 3,7 mA. And up to 21 mA above the upper range. These limits can be changed both on the conductivity and the temperature output.

Error output (advanced configuration)

It is also possible to change the output of the transmitter if it detects an error with either the conductivity sensor or the temperature sensor. The sensor will default change the output to 3,5 mA if it detects an error.

Input damping (advanced configuration)

The transmitter is default set to the fastest possible measurement, but it is possible to set a damping of the input if the transmitter has an unstable measurement.

6.2 Programming the display

General

When attached to the TE67K the Alfa Laval display function as the programming interface as described on the previous pages. There is a number of features which has to be programmed through the display configuration. It involves the screen layout, the color change feature and the setup of the 2 individual relay output. It is also possible to lock the display with a built in password (see page 25).

Screen layout

From the factory at, the display is programmed to show the measured conductivity with all details possible in the display. But it is possible to select between 9 different standard views and 6 TE67K specific screen especially designed for conductivity measurement.

Standard views

The 9 standard views which show the measured value in different ways and both range and units can be configured.



Value (large)



Value (details)



Bar (horizontal)



Bar (vertical)



Analog



Analog + Bar



Value +
analog bar



Tank illustration



Bottle illustration

NOTE:

These 9 views is not designed particular for the TE67K and have to be configured individually (page 24)

TE67K specific views

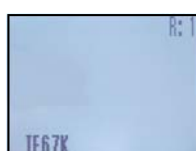
The 6 specific views especially for conductivity measurement refer to the values directly from the transmitter and require no programming



Large view



Large view with
all details (Default)



Media Screen
(no use)



Media Screen
with details
(no use)



Bargraph with
details



Double bargraph
Conductivity / Temp.

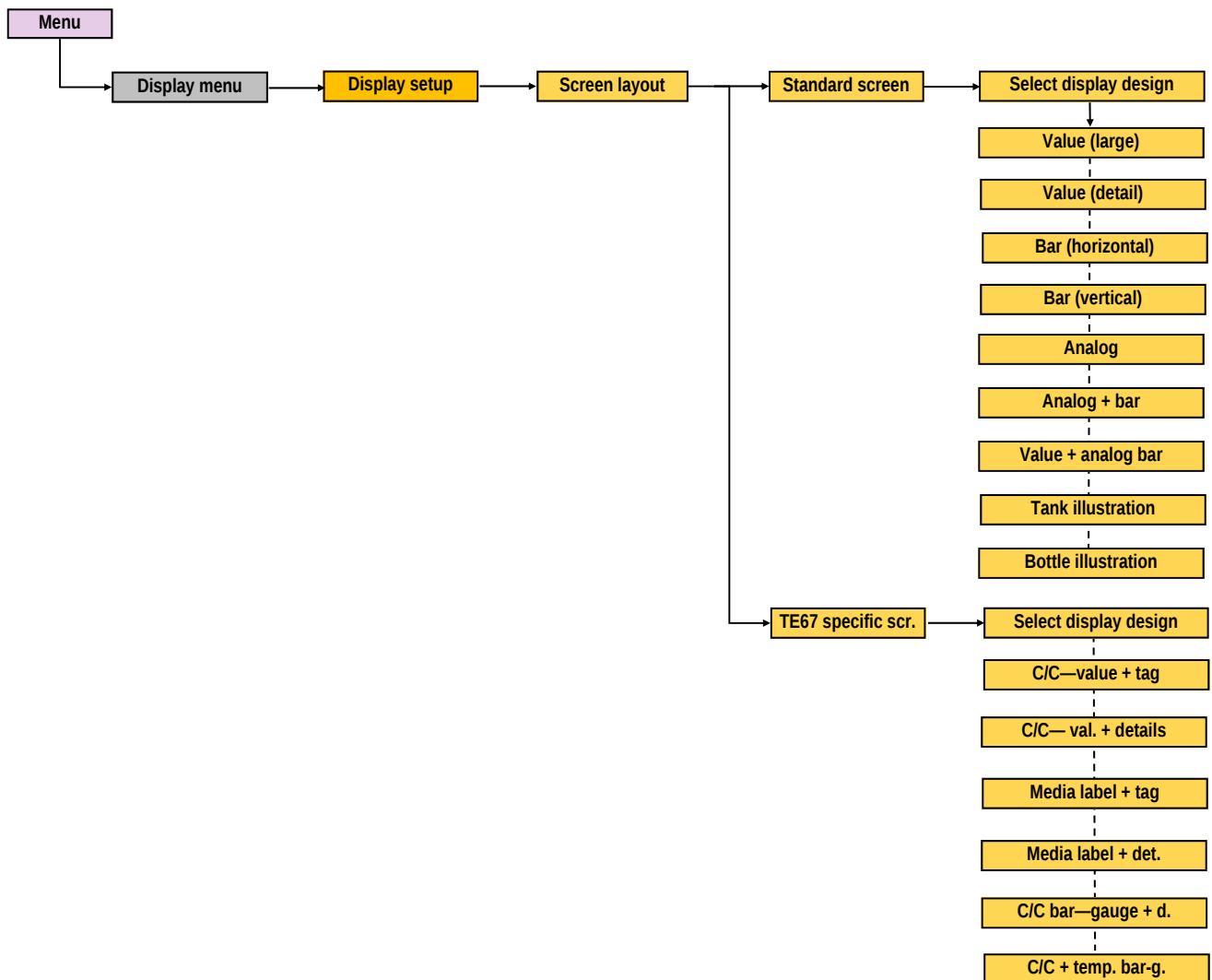
6. Setup

Selecting display view

Configuration of the screen layout is selected through the menus of the touch display on the TE67K.

Touch the bottom center of the screen to activate the menu button.

Press the menu and follow the menu structure as shown below.

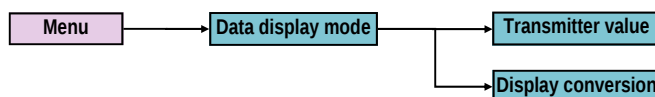


Data display mode

Default the display is connected as a slave to the transmitter which means that all information regarding the display is transmitted from the transmitter to the display. This mean that all display functions from the display is disabled which include range configuration, display units (mS, V, mA, Bar etc.), relays and the error/warning setup.

To access these options, the display has to change settings from "Transmitter value" to "Display Conversion".

Access the programming menu, go to "Data display mode" and select the "Display conversion" mode.



6. Setup

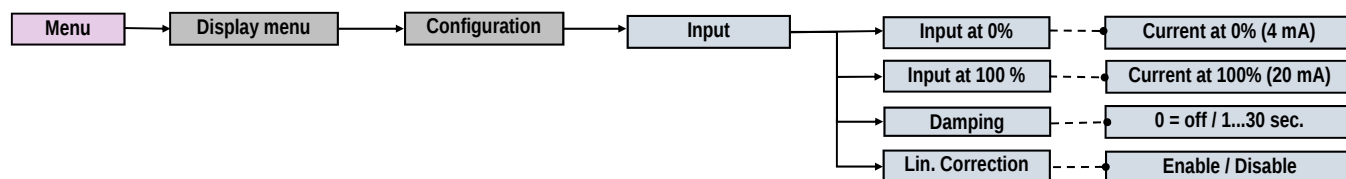
Display input (advanced)

The display input is default configured with 0% at 4 mA. And 100% at 20 mA.

It is possible to change this configuration, but it is not recommended for the TE67K.

Setting up the input configuration

To change the input configuration of the display, access the Menu → Display menu → Configuration → Input



Display output

When the display is set to display conversion, the output is fully programmable in every possible range.

The display convert the 4..20 mA. Signal to a linear curve and displays it in the unit and scale configured in the setup. The number of decimals can be between 0 and 3 decimals or automatic (floating).

The display offers the following units:

Electric:

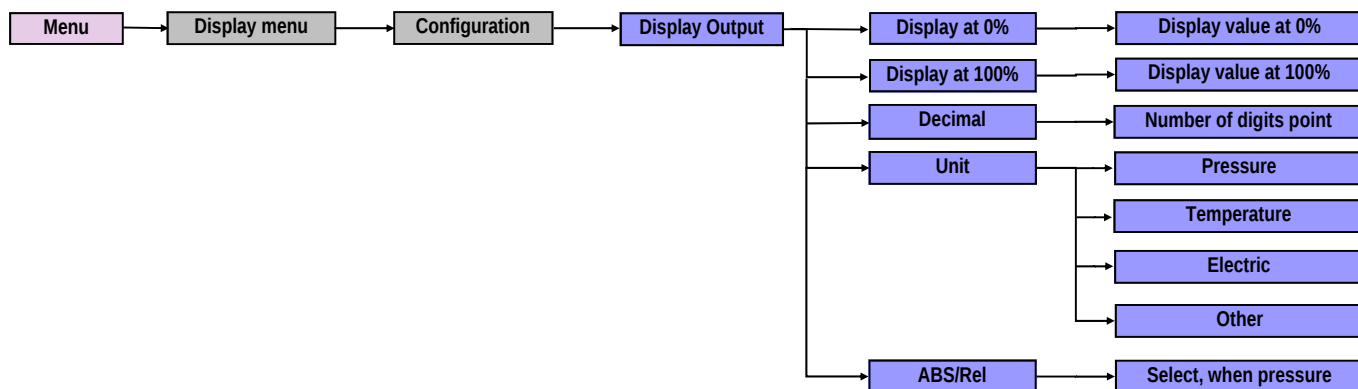
Milli siemens, Micro siemens, mA, mV, V or Ohm

Other:

m3/h, l/h, Hz, l, meter, m3, ton, sec or %

Setting up the configuration

To change the output configuration of the display, access the Menu → Display menu → Configuration → Display Output and begin by scaling the display value at 0% and 100%. Select the number of decimals and finally select the preferred display unit.



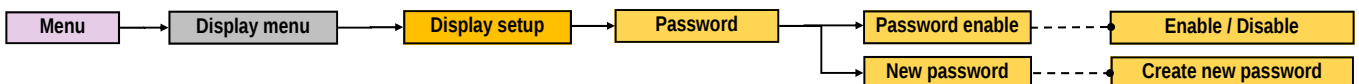
6. Setup

Password protection

The display can be locked with a 4 digit password which must be entered to get access to the programming menu.

Setting up the password configuration

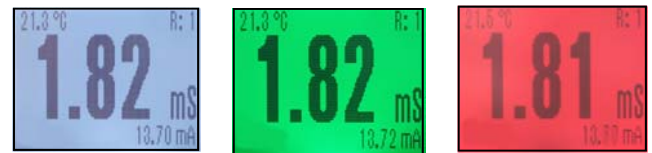
To enabling and configure the password, access the Menu → Display menu → Display setup → Password and begin by enabling the password and then enter the 4 digit code for unlocking the display



Background color and intensity:

The display on the TE67K has 3 different backlight colors.
Factory default is the white color.

The backlight intensity can also be changed anywhere
between 10% and up to 140%.



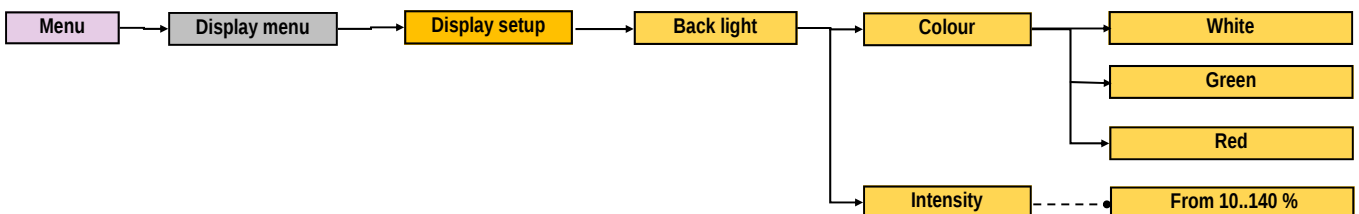
White background Green background Red background

NOTE:

120 and 140% backlight intensity requires a minimum of 5-6 mA.

Setting up backlight color and intensity

To change the backlight color and intensity access the Menu → Display menu → Display setup → Back light

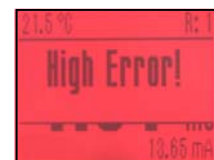


Alarm / warning indication

The display include an error/warning function which can make the display change backlight color or show an error message in the display at certain limit. The function is based on the 4..20 mA loop and the setpoint will stay the same even though the conductivity range is changed.

The display has 4 different settings:

- High Error
- High Warning
- Low Warning
- Low Error



Error message

The high errors and high warning is activated if the value is above the programmed setpoint and the low warning and the low error is activated if the value drops below the programmed setpoint.

Each error and warning limit offers a possibility to change backlight color or set the color to flash. This mean that if the standard backlight color is white and the high error is set to red, the color will change if the limit is reached. It is also possible to se an error message in the display which will be shown as the picture below.

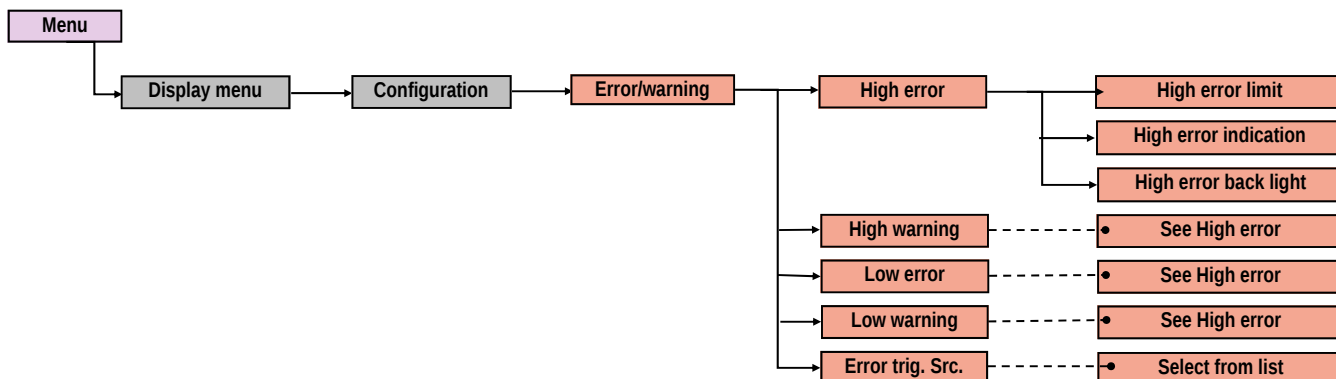
6. Setup

Setting up error/warning indication

To setup the error/warning indication access the Menu → Display menu → Configuration → Error/warning and select the limit that you wish to configure.

NOTE:

The display has to run in "display conversion mode" in order to work (see page 23)



Built-in Solid state relays

The display on the TE67K has 2 built-in solid state relays which can be configured individually.

Both relays can be set as a

Normally Open (NO), Normally Closed (NC), Always Open (AO) or Always Closed (AC) function.

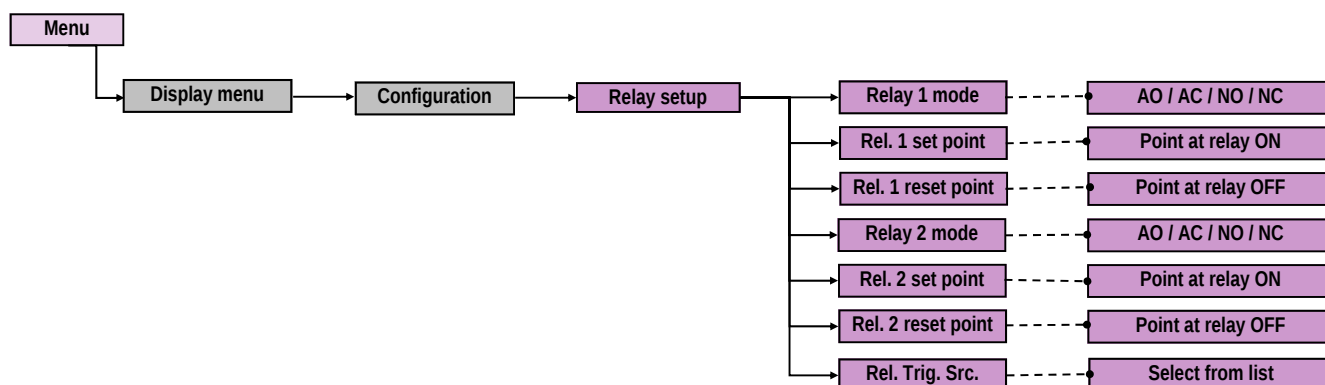
Electrical connection of the relays can be seen on page 18-19 of this manual.

Setting up the relays:

To setup the error/warning indication access the Menu → Display menu → Configuration → Relay setup and chose the relay that you wish to configure.

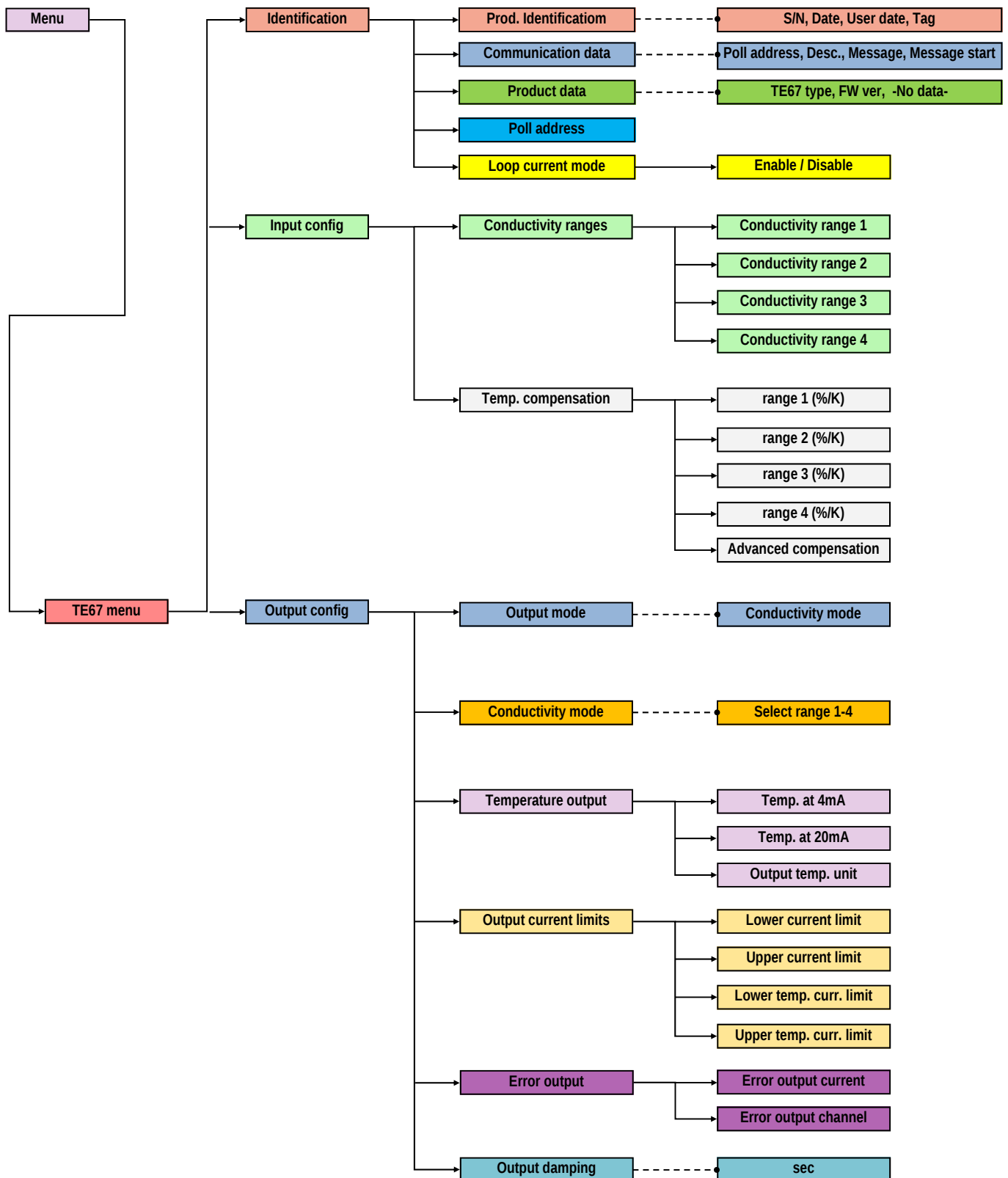
NOTE:

The display has to run in "display conversion mode" in order to work (see page 23)

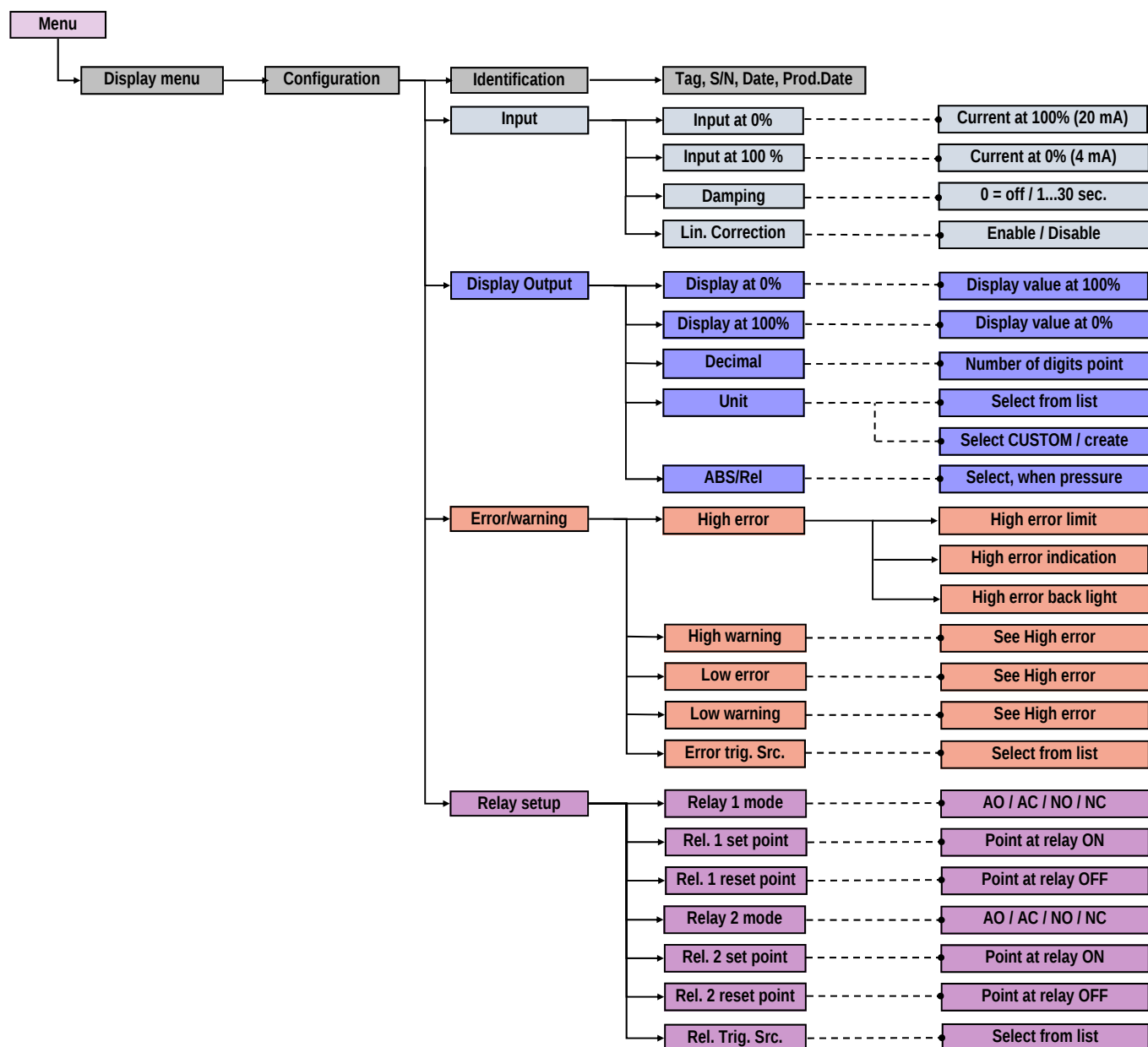


6. Setup

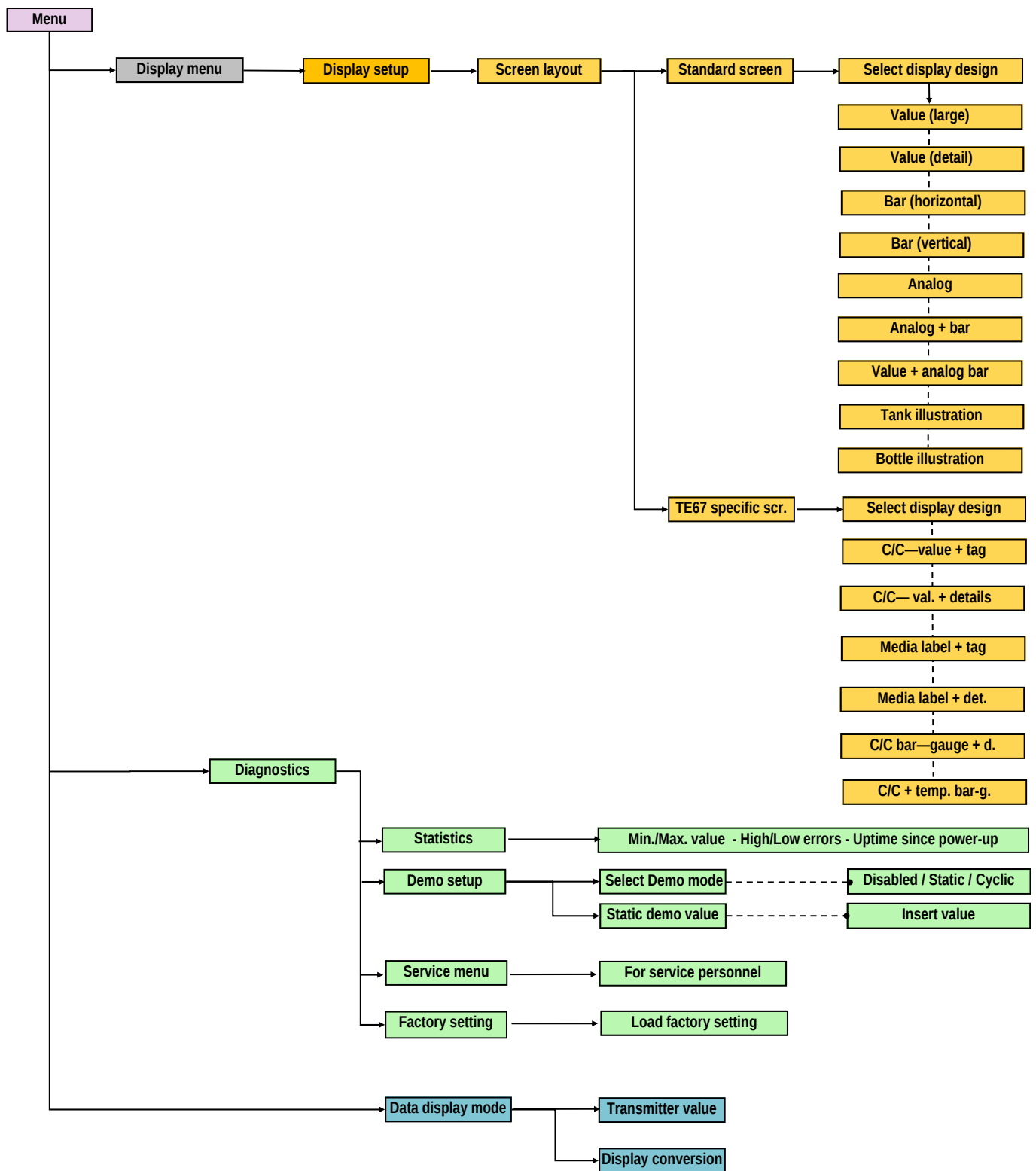
6.3 Complete menu structure of the transmitter and display



6. Setup

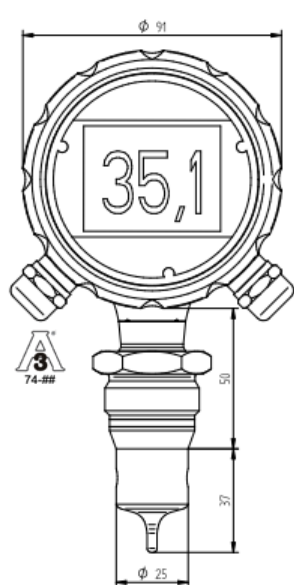


6. Setup

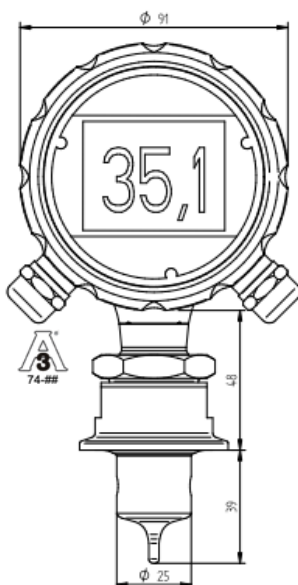


7. Dimensional drawings

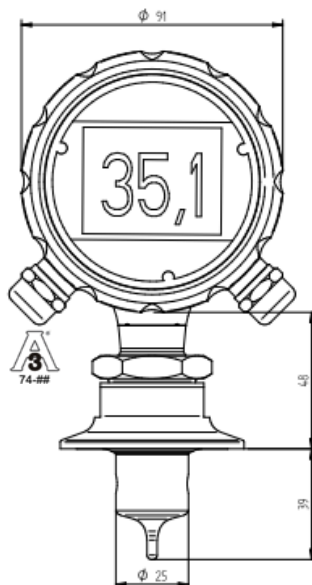
7.1 Dimensional Drawings



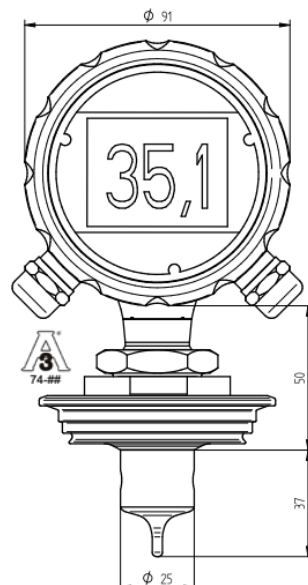
G1" Short neck
TE67K16x111170



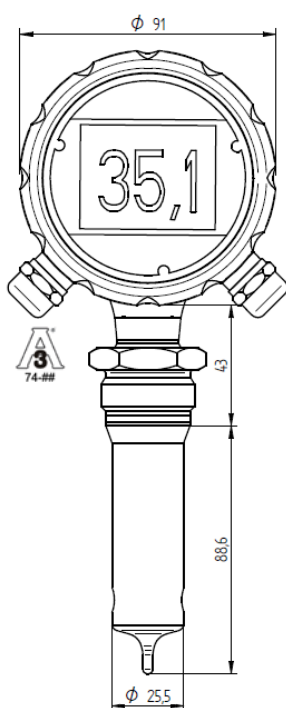
Clamp DN38
TE67K12x111170



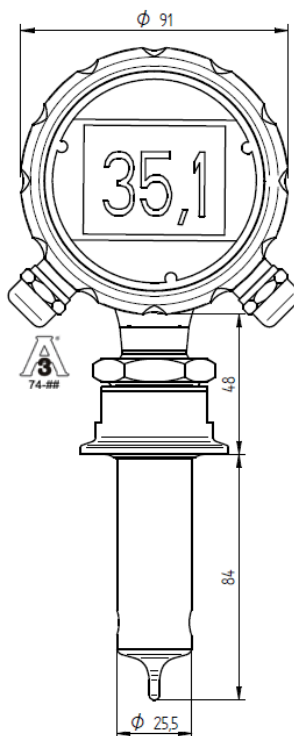
Clamp DN51
TE67K17x111170



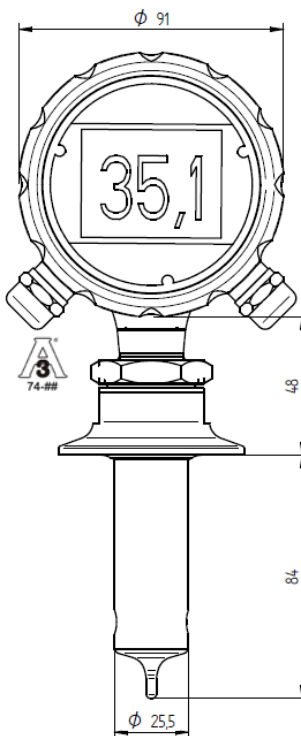
Unique Flexbody, type N
TE67K1Nx111170



G1" Long neck
TE67K15x111170

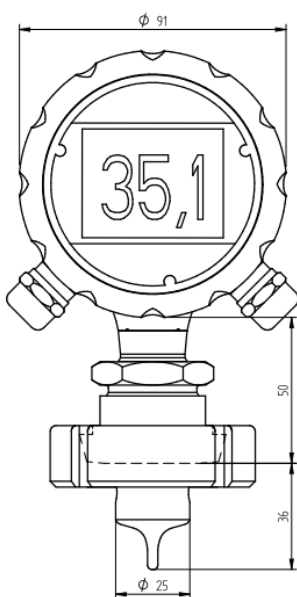


Clamp DN38
TE67K13x111170

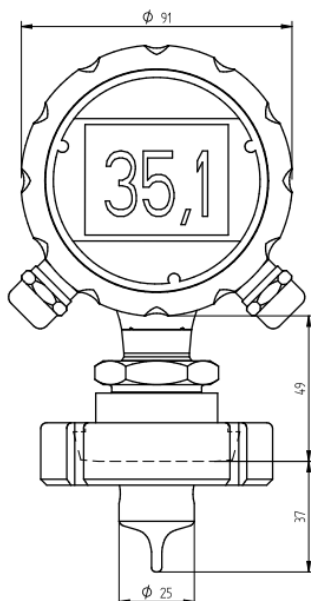


Clamp DN51
TE67K18x111170

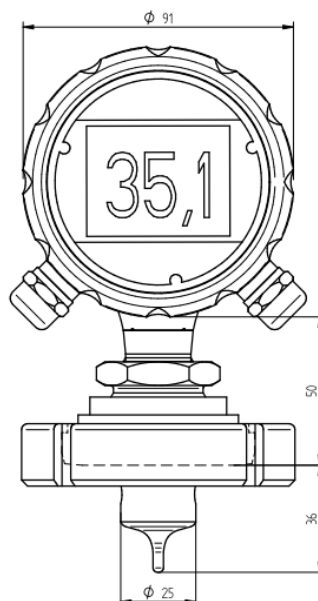
7. Dimensional drawings



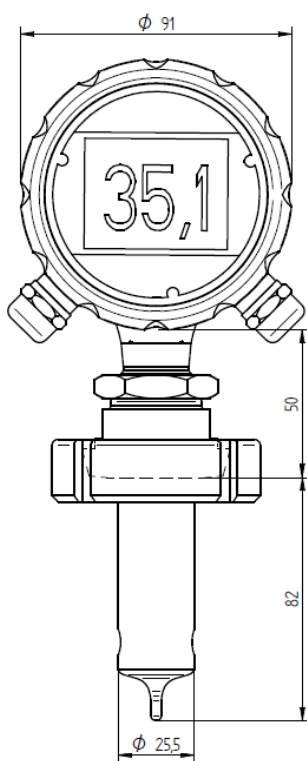
DN 32 (DIN11851)
TE67K1A1x11170



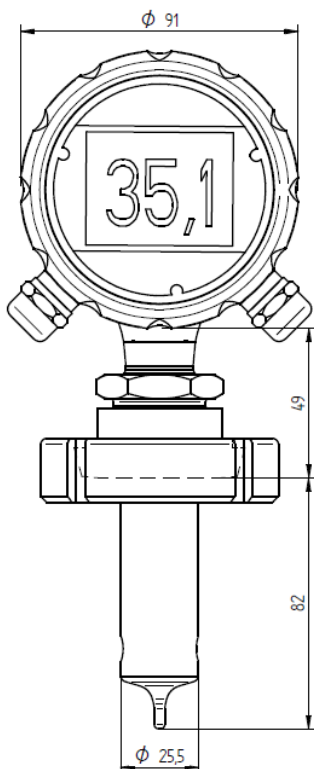
DN 40 (DIN11851)
TE67K1B1x11170



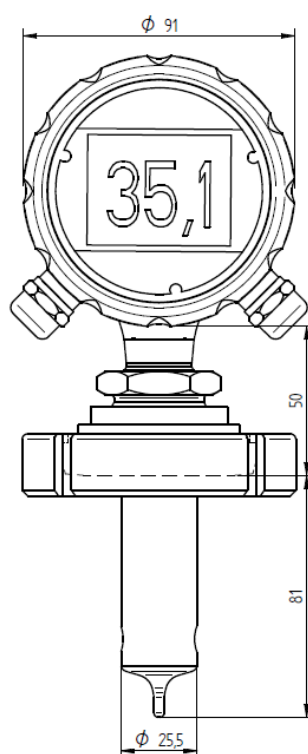
DN 50 (DIN11851)
TE67K1C1x11170



DN 32 (DIN11851)
TE67K1D1x11170



DN 40 (DIN11851)
TE67K1E1x11170



DN 50 (DIN11851)
TE67K1F1x11170

8.1 Troubleshooting

No electrical output from the sensor

In case of no electrical signal from the sensor please follow this checklist for identifying the problem.

- Loosen and remove the frontring and gently loosen the display from the frontring.
- Measure if there is 15-35 VDC on the two supply terminals to make sure that there is power to the sensor.
- Measure if there is 24 VDC on the 4..20 Cond terminals to make sure that the loop is connected.
- Make sure that the ribbon cable between the transmitter and the display is connected.

If all of these points is checked, then the sensor may have an error and need to be returned to Alfa Laval for repair.

No light or numbers in the display

The display is loop powered by the transmitter and supplied through the ribbon cable from the transmitter. If there is no light or numbers in the display, it could be one of the following reasons.

- Ribbon cable is not connected properly, disconnect the sensor and check the connections.
- The sensor has been connected to the powersupply without the display, disconnect the sensor, connect the display with the ribbon cable and connect the sensor to the powersupply again.

It is possible to order the display as a spare part if any damage should happen to it. Ordering key is. TE67I000000000.

No measurement from the sensor

If the sensor fail to measure the media there can be several reasons for that.

- Conductivity in the media is too low. TE67K need at least 50 $\mu\text{S}/\text{cm}$ of conductivity.
- Sensorhead is not fully emersed into the media.
- Lumpy media has blocked the hole in the sensor.
- There is an air bobble in the hole of the sensor.
- The hole of the sensor is not placed in the flow direction.

If none of the above reasons is present then the sensor may have an error and need to be returned to Alfa Laval for repair.

9. Ordering

9.1 Ordering Key Table

Ordering key table		
Description	Option	Item nr. code
Variant	Basic instrument	TE67Kxxxxxxxxx
Programmed Range	50 µS/cm...1 S/cm.	TE67K1xxxxxxxxx
Process connection	G1 (ISO228) L:37 mm	TE67Kx6xxxxxxxxx
	G1 (ISO228) L:83 mm	TE67Kx5xxxxxxxxx
	Clamp DN 38 (ISO2852) L:37 mm	TE67Kx2xxxxxxxxx
	Clamp DN 38 (ISO2852) L:83 mm	TE67Kx3xxxxxxxxx
	Clamp DN 51 (ISO2852) L:37 mm	TE67Kx7xxxxxxxxx
	Clamp DN 51 (ISO2852) L:83 mm	TE67Kx8xxxxxxxxx
	DN 32 (DIN 11851) L:37 mm	TE67KxAxxxxxxxxx
	DN 40 (DIN 11851) L:37 mm	TE67KxBxxxxxxxxx
	DN 50 (DIN 11851) L:37 mm	TE67KxCxxxxxxxxx
	DN 32 (DIN 11851) L:83 mm	TE67KxDxxxxxxxxx
	DN 40 (DIN 11851) L:83 mm	TE67KxExxxxxxxxx
	DN 50 (DIN 11851) L:83 mm	TE67KxFxxxxxxxxx
	Unique Flexbody, type N, L:37 mm	TE67KxNxxxxxxxxx
Surface finish wetted parts	Ra < 0,8µ	TE67Kxx1xxxxxxxxx
Wetted part material	PEEK	TE67Kxxx1xxxxxx
Electrical output	2 x 4..20mA output (conductivity & temperature)	TE67Kxxxx1xxxxx
Housing	ø80 mm Housing with Display	TE67Kxxxxx1xxx
Accuracy	< 1,5% FS	TE67Kxxxxxx1xx
Electrical connection	1 x M12 Connector 4 wire + 1 x M12 Connector 8 wire, Stainless Steel with relay	TE67Kxxxxxxxx2x
	2 x M12 Connector 4 wire, Stainless Steel w.o. relay	TE67Kxxxxxxxx3x
	2 x M16 Cable gland, Plastic	TE67Kxxxxxxxx4x
	2 x M16 Cable gland, Stainless Steel	TE67Kxxxxxxxx5x
	1 x M16 + 1 x M20 Cable Gland, Stainless Steel	TE67Kxxxxxxxx6x
	2 x M20 Cable gland, Stainless Steel	TE67Kxxxxxxxx7x
Certificates	None	TE67Kxxxxxxxx0
	Calibration Certificate	TE67Kxxxxxxxx1
	3.1 Certificate	TE67Kxxxxxxxx2
	Calibration Certificate + 3.1. Certificate	TE67Kxxxxxxxx6

9.2 Certificates Table

Available certificates				
Item code	Process Connection	3-A	Calibration	3.1
TE67K16x1111xx	G1 (ISO228) L:37 mm	X	X	X
TE67K15x1111xx	G1 (ISO228) L:83 mm	X	X	X
TE67K12x1111xx	Clamp DN 38 (ISO2852) L:37 mm	X	X	X
TE67K13x1111xx	Clamp DN 38 (ISO2852) L:83 mm	X	X	X
TE67K17x1111xx	Clamp DN 51 (ISO2852) L:37 mm	X	X	X
TE67K18x1111xx	Clamp DN 51 (ISO2852) L:83 mm	X	X	X
TE67KxAxxxxxx	DN 32 (DIN 11851) L:37 mm		X	X
TE67KxBxxxxxx	DN 40 (DIN 11851) L:37 mm		X	X
TE67KxCxxxxxx	DN 50 (DIN 11851) L:37 mm		X	X
TE67KxDxxxxxx	DN 32 (DIN 11851) L:83 mm		X	X
TE67KxExxxxxx	DN 40 (DIN 11851) L:83 mm		X	X
TE67KxFxxxxxx	DN 50 (DIN 11851) L:83 mm		X	X
TE67K1Nx1111xx	Unique Flexbody, type N, L:37 mm		X	X

3-A Approval is only valid with a 3-A approved welding part

3-A Certificate Authorization number: 1536

A copy of the certificate can be downloaded from [3-A Sanitary Standards, Incorporated](#)

10. General information

10.1 Service / Repair

Upon every return of product, no matter if for modifications or repair, it is necessary to contact your local Alfa Laval office to guarantee a quick execution of your request.

You will receive instructions regarding the return procedure from your local Alfa Laval office.
Be sure to follow the instructions closely.

10.2 Warranty

The warranty conditions are subject to the legal warranty period of 12 months from the date of delivery. In case of improper use, modifications of or damages to the device, we do not accept warranty claims. Damaged devices will also not be accepted. Furthermore, defects due to normal wear are not subject to warranty services.

10.3 How to contact Alfa Laval Kolding A/S

For further information please feel free to contact:

Alfa Laval Kolding A/S

31, Albuen - DK 6000 Kolding - Denmark

Registration number: 30938011

Tel switchboard: +45 79 32 22 00 - Fax switchboard: +45 79 32 25 80

www.toftejorg.com , www.alfalaval.dk - info.dk@alfalaval.com

Contact details for all countries are continually updated on our websites.

How to contact Alfa Laval

Contact details for all countries are continually updated on our website.

Please visit www.alfalaval.com to access the information direct.

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