OPERATING MANUEL

Model : ELF

ROTARY LEVEL SWITCH

Information in this manual is reviewed and completely reliable. Responsibility is not assumed due to any typing error.
Products in this manual are available only for information purpose and they may be changed without notice.

Models :

ELF 101 , ELF 102 , ELF 103
ELF 103p , ELF 104 , ELF 105
ELF 106 , ELF 106m , ELF 108
ELF 109

CE

Important Notes:

Used Symbols :

: Caution : Note : Disposal

- Please read this manual carefully before installation of the **level switch**. User is responsible for accidents and losses arising from failure to comply with the warnings in this manual.
- In the event that **level switch** is broken, take measures in order to prevent accidents and losses which can occur in its system.
- There is not any fuse and circuit breaker on the instrument; they should have been added to the system by the user.
- This manual should be stored in an easily accessible place for subsequent use.
- The manufacturer's liability cannot exceed the purchase price of the device according to the law.
- Do not make any modification on the instrument and do not try to repair it. Reparation should be made by authorized service staff.
- Do not operate the system before making assembly in compliance with the assembly chart related to the instrument.
- Products which do not contain label and serial number are considered to be excluded from the warranty scope.
- The instrument's useful life, determined and announced by the ministry, is 10 years.

Table of Contents :

1. **General Information** 2
2. **Installation** 4
3. **Failure Detection** 16
4. **Disassembly of Instrument** 16
5. **Service** 16
6. **Recalibration** 16
7. **Repair** 16
8. **Disposal** 16
9. **Terms of Warranty** 16
10. **Terms of Return** 16

1. General Information :

1.1. Material Acceptance

Check that there is no damage on the packages during the transportation immediately after the material acceptance. If packages are damaged, open the packages immediately and check whether products are affected or not, if there is any damage, send your complaint report to the transporter company and its photocopy to the address of our company.

1.2. 1.2. Information about Areas of Use

Level Switch is designed for industrial facilities. It must not be used in mines. If its used in mines, resposibilty of manufacturer will be abolished.

Plastic Industry ; PVC, PVDF, PP granular etc..
Food Industry ; Grain Dust, Ground Corn, Sugar-Granulated,Cacao, Malt-Graoung Dry, Sunflower Corn, Whead, Peanuts-Shelled, Clays- Kaoline, Talcum Powder, Ground-Paprika, Coffee-Roasted vb..
Build Industry ; Rocks-Limestone Crushed, Lime, Cement Powder, Rubber Ground, Lime Hydrate Dust, Calsium Dust, Iron Chips, Silica Sand, Moulding Sand, Styrofaam etc..
Wood Industry ; Wooden Fiberst, Saw Dust etc..
Other Chemistry Industry ; Coal Lump, Ash-Coal Dry etc..

Advantages

* **Fast delivery period**
* **Reverse-rotation safety**
* **Adjustable precision**
* **Perfect mechanical durability**

Ambient Conditions : **Relative Humidity:** 0-95 %RH **Ambient Temperature:** 60C (It is not used under -20 C)

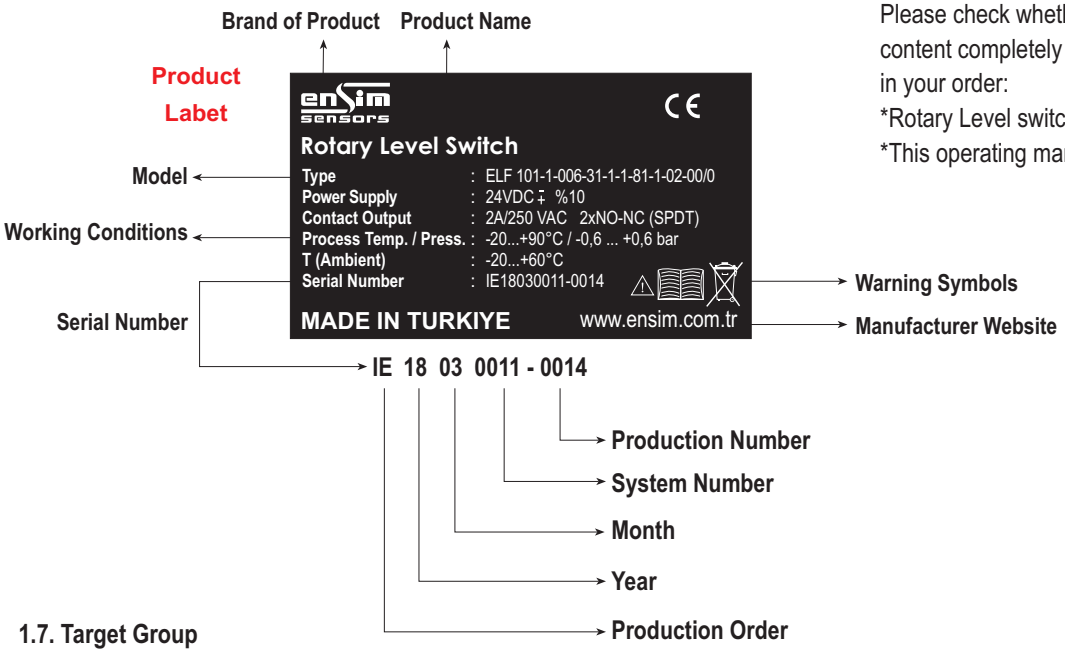
1.3. Working Princible

A palette selected according to the material is installed on the tip of the motorized level switch which can be installed on the tank wall. It revolves idly with the revolution speed of the probe motor. Material to be detected reaches to the level of the palette and covers its circumference and creates a counter-force according to the revolution force. Firstly, level information alarm contact is activated. Then, the other contact is triggered and stops the motor. Adjustment of the spring in four different torque values according to specific weight of the material can be realized by the user. When the material level at the end of the palette is decreased the created force is released and the motor starts to revolve, consequently, changing the alarm position.

1.4. Technical Specifications and Material Information

Working Temperature	(-) 20 .....(+) 90 C Opt. Max.150 °C With High Temperature Type (Plastic Housing) Max.200 °C With High Temperature Type (Aluminium Housing) Max.600 °C Very High Temperature Type
Ambient Humidity	0-98 %Rh (Non Condensate)
Ambient Temperature	(-) 20 ... (+) 60°C
Working Pressure	(-) 0,6 ... (+) 0,6 bar
Material Connection Housing Paddle And Rode Extension Pipe Grounding Apparatus O-Ring for Cover Bearing Dust Protected Felting	Aluminium (Std) Opt. 304 / 316 Stainless Steel, PTFE Antistatic Plastic (Std) Opt. Aluminium Injection - AlSi12Fe (Std) Body : Black (RAL:9005) Cover : Orange (RAL:2004) 304 Stainless Steel (Std) Opt. 316 Stainless Steel 304 Stainless Steel (Std) Opt. 316 Stainless Steel 304 Stainless Steel **Elastomer Thermoplastic 120°C (Std) Ops. FPM (Viton) 150°C** Double ball bearing (With Dust-protected) **(120°C) Ops. 280°C** NBR (Std) Opt. FPM (Viton) 150°C, PTFE 200°C
Connection	1" BSP (Std) , Opt. 1 ¼" BSP , 1 1/2" BSP Male Thread
Power Consumption	Max. 4W
Revolutions Per Minute	5 d/d (Std) (Clockwise - When Looking Paddle Side) Opt. 1,5-1,8 d/d
Power Supply	24 VDC ,+/-10 24/110/220 VAC 50/60 Hz +/- %10
Cable and stopper input	PG13.5 (Std) Opt. M20x1,5
Relay switching capacity	2A/250 VAC 2xNONC (SPDT) 5E4 Opt. 10A/250 VAC - 4A/30VDC
LED	Power LED: Green , Alarm LED: Red
Ventilation Gland	M10x1,5mm (Only For Plastic Housing)
Max. Grain Structure	50mm
Min. Density	0,04 g/cm3 (According to paddle type)
Torque Rating	4 Stages, adjustable
Load on probe	Max. 500 N (Extention Pipe)
Protection Class	IP 66 (EN60529)
Certification	CE declaration, EMC , LVD

1.5. Label Information



1.6. Package and package contents :

Please check whether you have taken delivery of below listed content completely or not and check its conformity with criterions in your order:

*Rotary Level switch

*This operating manual

260 x 160 x 125 mm

Std. Package

1.7. Target Group

This operating manual has been prepared for qualified technical personnel.

1.8. Certifications and Approvals

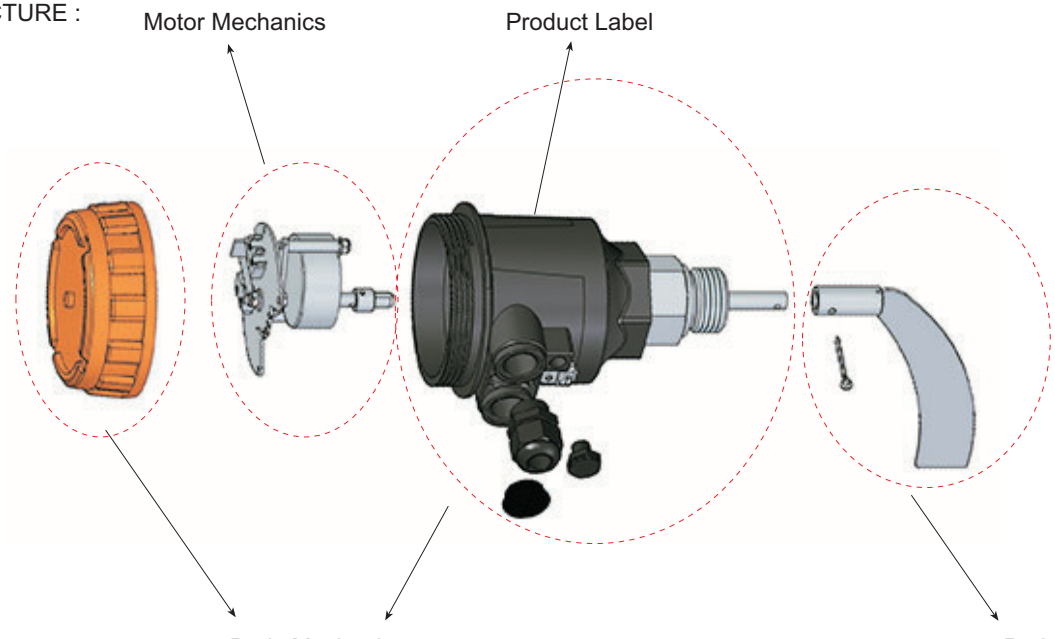
CE	:	It shows that, product meets required conditions of EU with CE stamp and stipulate that product passed quality assessment stages
LVD (2014 / 35 / AB)	:	TS EN 61010 - 1 : 2012 TS 3033 EN 60529 : 1997
EMC (2014 / 108 / AT)	:	TS EN 61326 - 1 : 2013

1.9. Security Notes

Following notes should be taken into consideration in order to avoid dangers which can occur on the operator and around the ambient:

Installation, operation and maintenance of this instrument should be made only by people who have read the operating manual and who are knowledgeable about work safety!
It should be complied with work safety, accident prevention regulations and national installation standards.
Product should be used only within the scope of stated specifications!
You can assemble the instrument only when pressure is not available!

MODULAR STRUCTURE :



2. Installation :

It closes on clockwise turn

2.1. General Notes

Installation of the instrument should be made only by authorized staff.
Do not apply force to the instrument during the installation!
Do not use the level switch with a greater pressure than recommended pressure.
Do not forget that instrument is precise, carry it carefully and prevent to be damaged.
It should be guaranteed that there are not any magnetic particles.

2.2. General Installation Stages

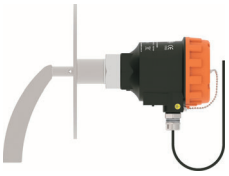
*Remove level switch from the box carefully
*Check whether gasket is appropriate for fluid or not. If is not appropriate, contact with manufacturer.
*Then, apply below mentioned explanations according to structure of the design.

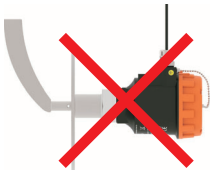
2.3. Special Notes

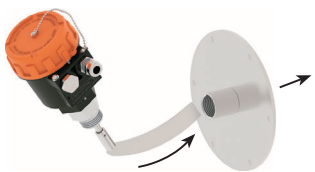
*Please ensure that there is no mechanical stress on the shaft following installation.
Such case will cause slipping in the characteristic curve.
*Level switch should be placed in completely vertical or horizantal position to the tank.
*Allocate valve certainly in the process connection while instrument is used.
*Allocate blowdown valve under bottom flange for blowdown.
*If instrument is mounted outside and if there is any danger of lightning or excessive pressure,please take precawtions to prevent any harm.
*In the operating conditions, level switch may be hot according to situation of fluid, in this case, do not touch the switch, otherwise your skin can be harmed.

2.4. Installation For Mechanical Connections

*Use appropriate O-Ring or gasket for tightness.
*Ensure that its surface is clean and smooth.
*Assemble the instrument manually.
*Connect the contacts as shown in the figure. (Max.20 Nm for G1", Max.30 Nm for G1 1/4" and G1 1/2")



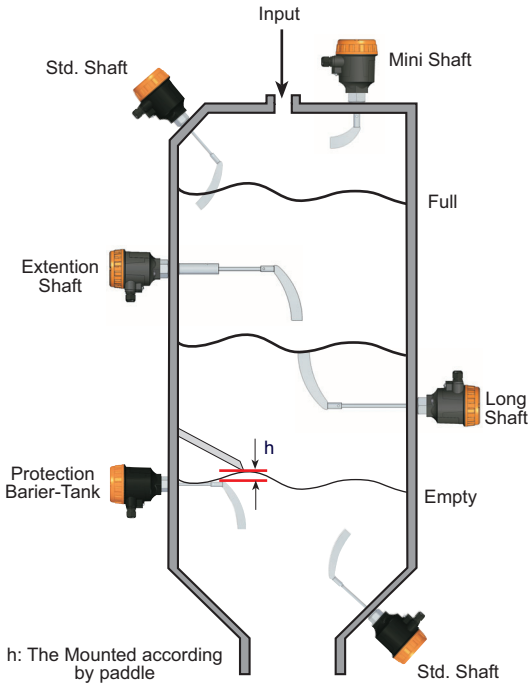


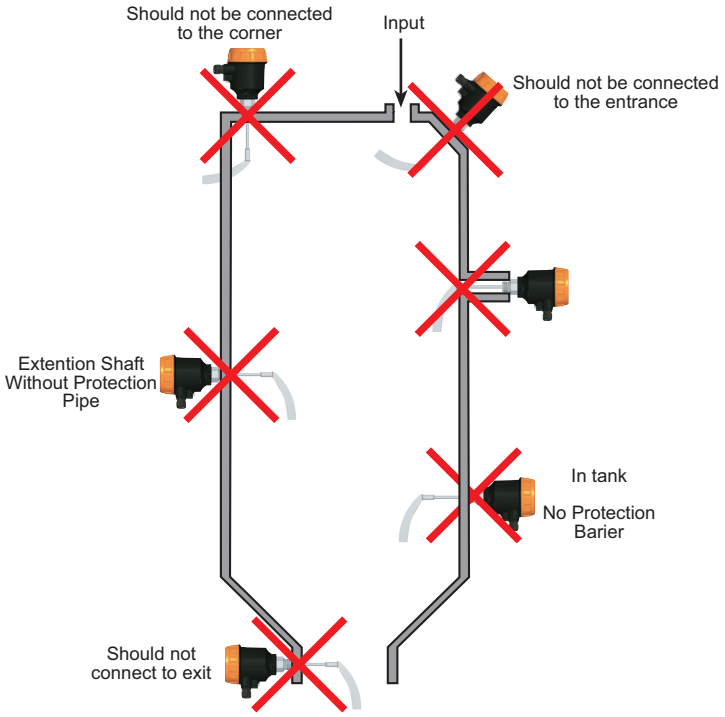


For scimitar paddle mounting

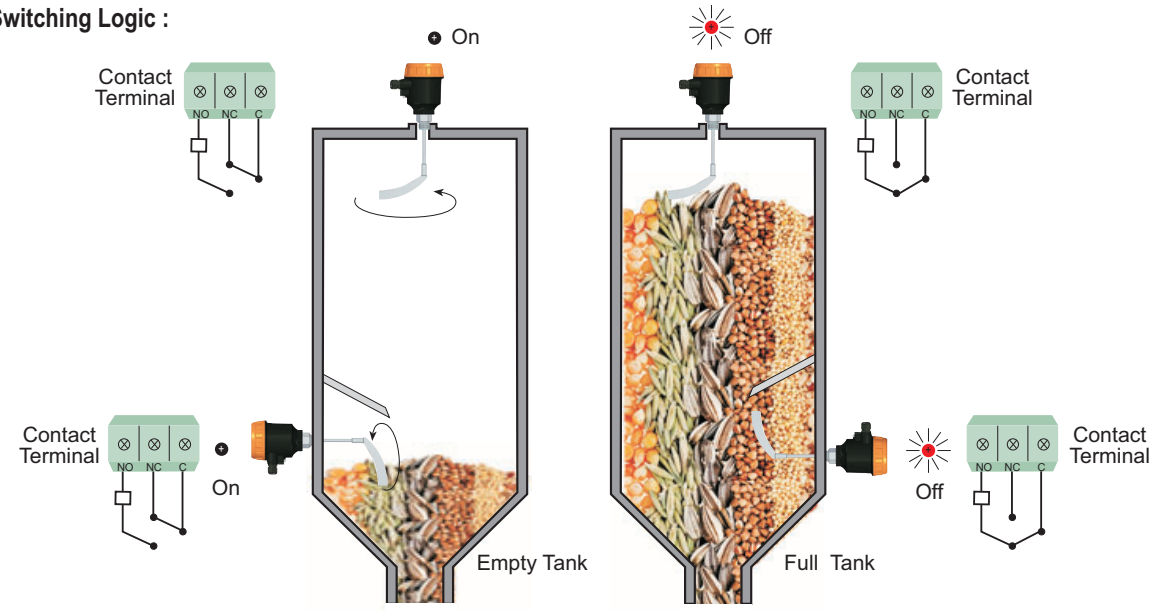
Double-Bladed Collapsible Paddle Mounting

2.5. Example Mounting Types:





2.6. Switching Logic :



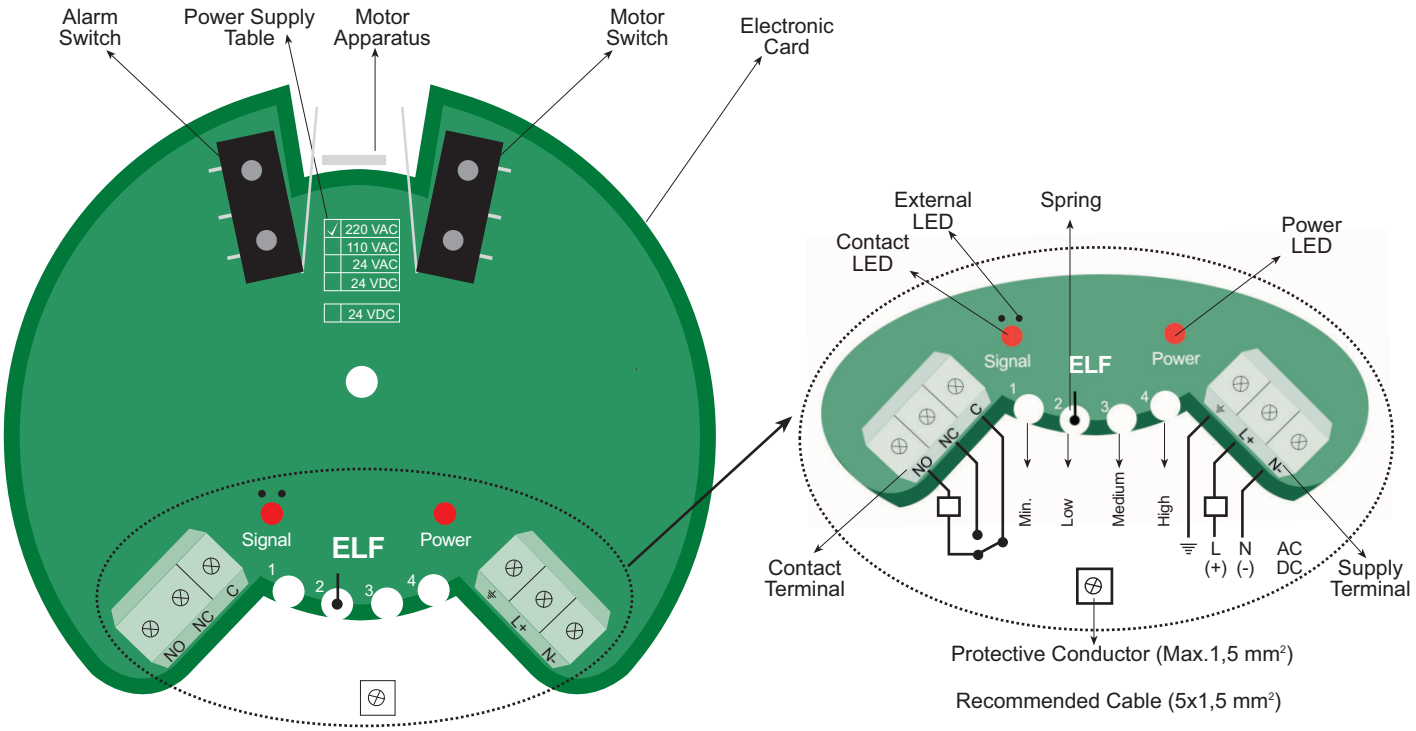
Torque calibration mechanism :

Torque spring should be used for recalibration of shaft's output torque which is set as low and weak in factory settings.
Calibration of torque spring can be adjust to material's weight and density which is specified by customer.
If the density of measured material is high, please set the spring to strong position until to get optimal working conditions.
High torque setting must be choosen in materials that has adhesion tendency and moist properties.
Low torque setting must be choosen for materials that has low density and dry properties.

Working Position	Supply	Motor Position	Output Position	Alarm LED Position
Normaly Working	Yes	Stop	-	On light
	Yes	Stop	Full	On light
During an Alarm	Yes	Stop	Full	On light
	Yes	-	Full	Uninspiring

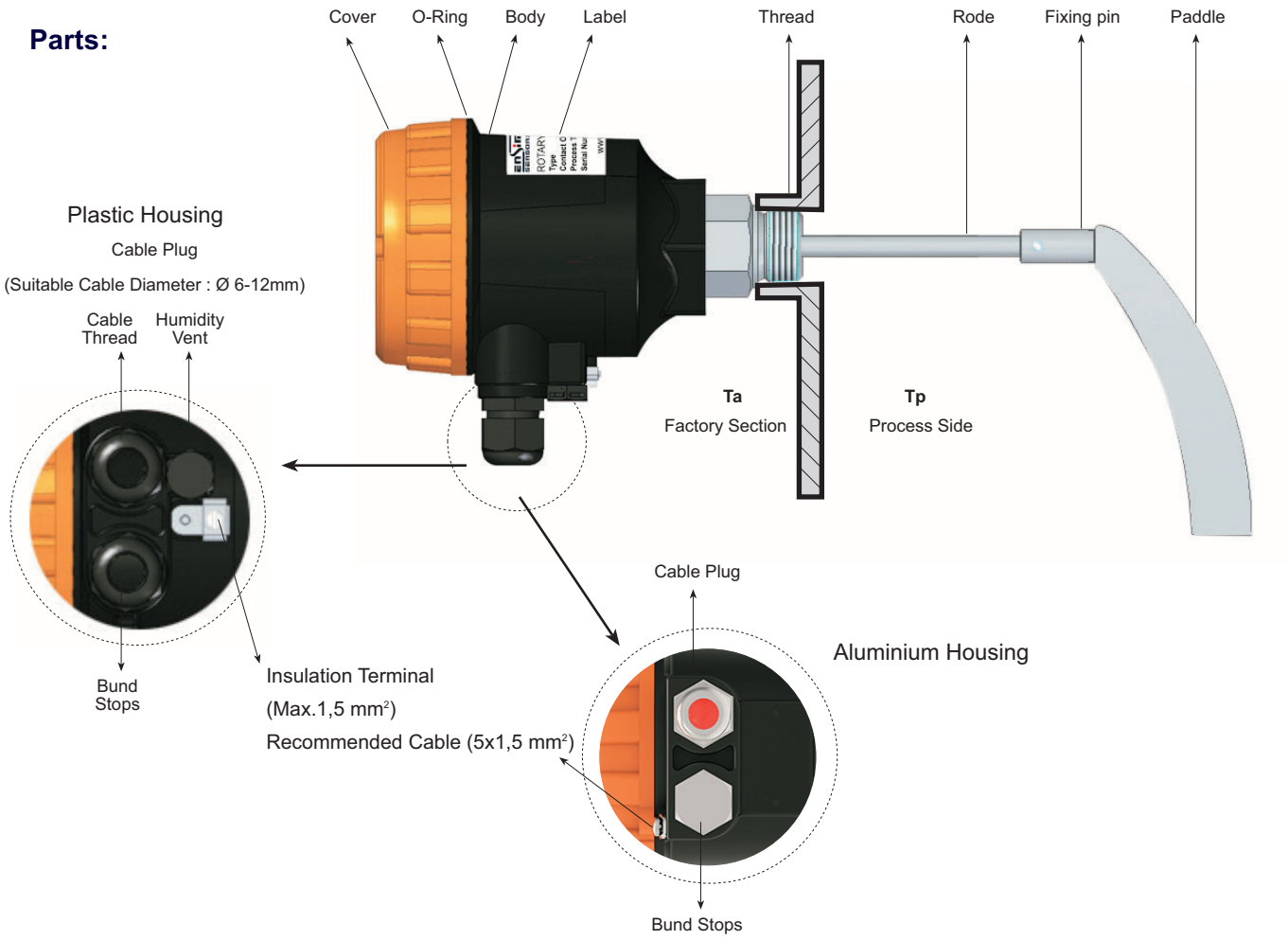
2.7. Electrical Installation

Make the electrical connection of the instrument according to details on its label, table and cable figures in this manual.



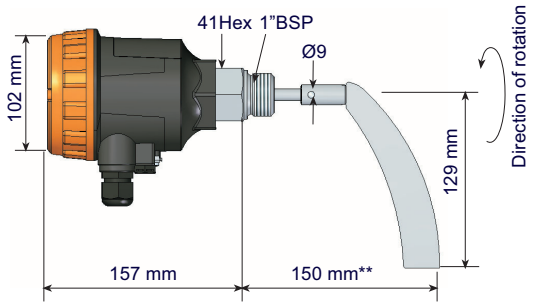
Note : It has been produced according to IPC A 600 class 2 conditions and tested with 100 % E-test. Moreover, HASL (non-lead) surface test has been applied.

2.8. Mecahanical Parts and Connection Apparatus:



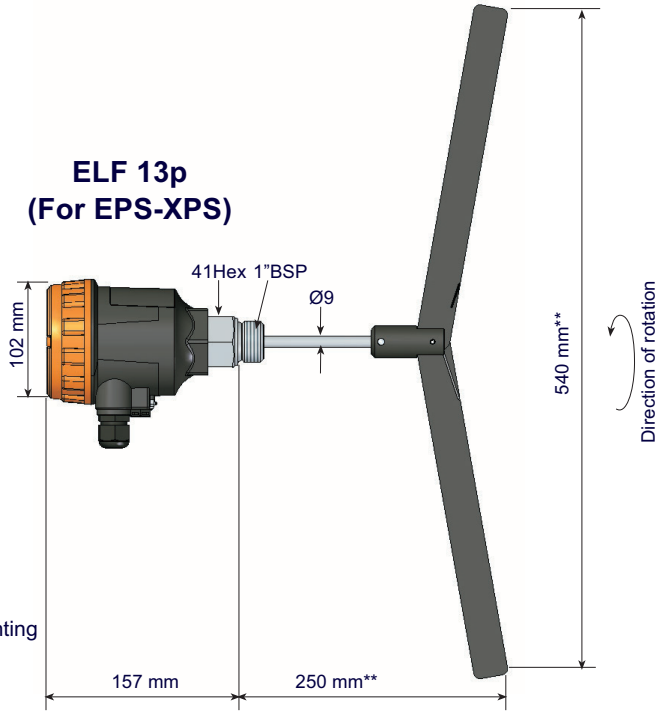
2.10. Sample Models :

ELF 11



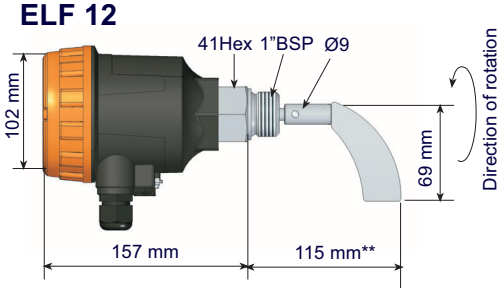
90°C Opt. 150°C
Vertical / Horizontal Mounting
Weight : 1.1 kg

ELF 13p (For EPS-XPS)



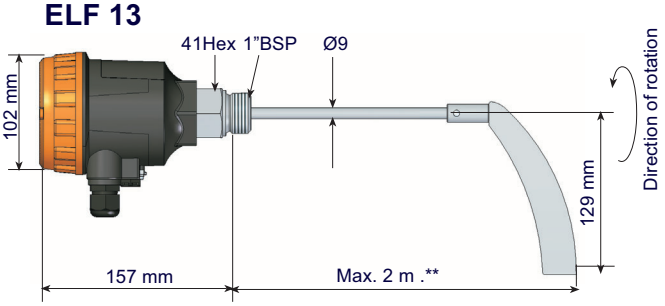
(-20)...+60°C
Vertical / Horizontal Mounting
Weight : 1.1 kg

ELF 12



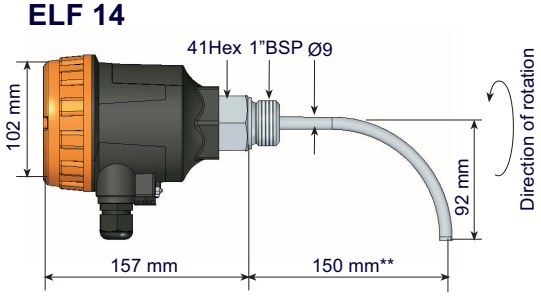
90°C Opt. 150°C
Vertical / Horizontal Mounting
Weight : 1 kg

ELF 13



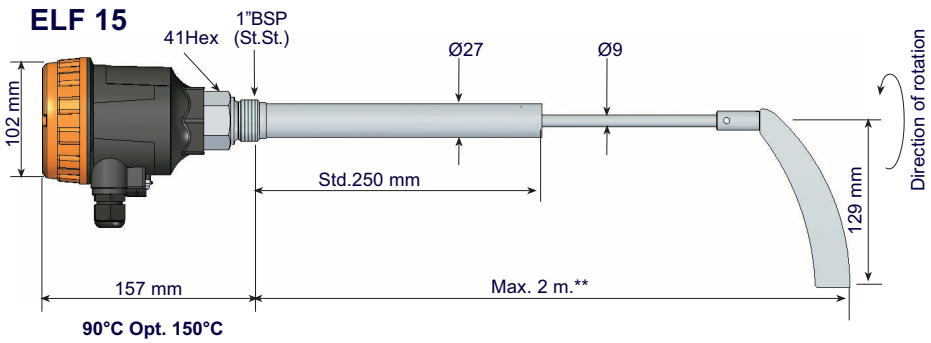
90°C Opt. 150°C
Vertical Mounting
Weight : 1.1 kg

ELF 14



90°C Opt. 150°C
Vertical / Horizontal Mounting
Weight : 1 kg

ELF 15

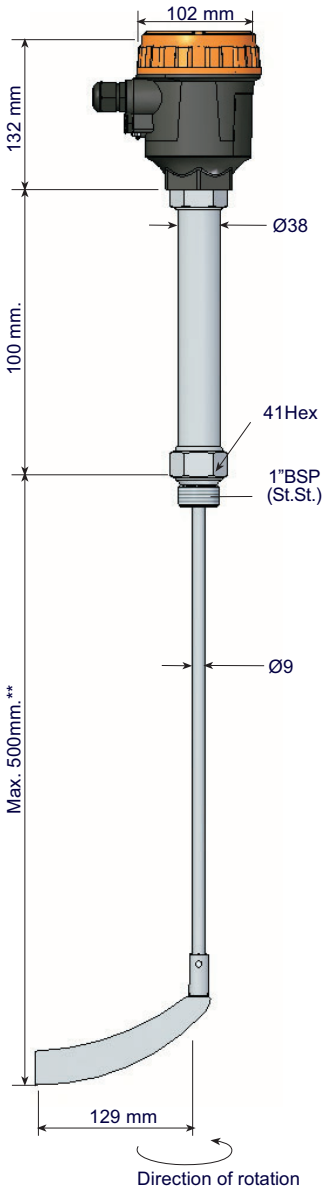


90°C Opt. 150°C
Vertical / Horizontal Mounting
Weight : 1.5 kg

** Tolerance -/+ 5 mm .

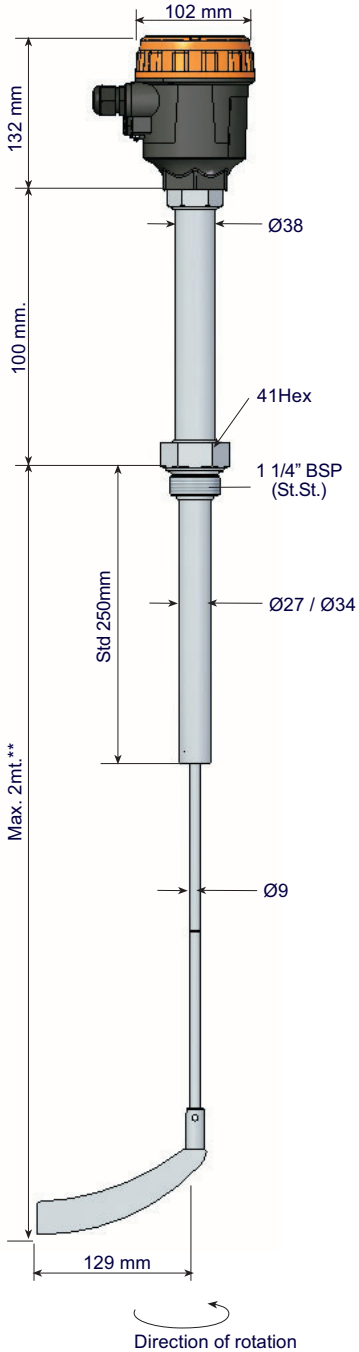
Sample Models :

ELF 106m



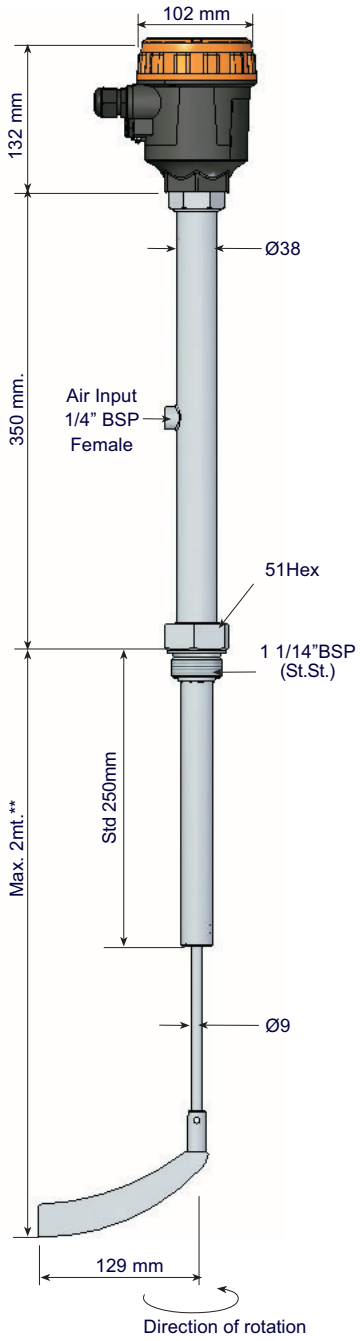
150°C
(Opt. 200°C Connection 1 1/4"BSP)
Vertical / Horizontal Mounting
Weight :1.75 kg

ELF 106



150°C
(Opt. 200°C Connection 1 1/4"BSP)
Vertical / Horizontal Mounting
Weight :2.3 kg

ELF 107

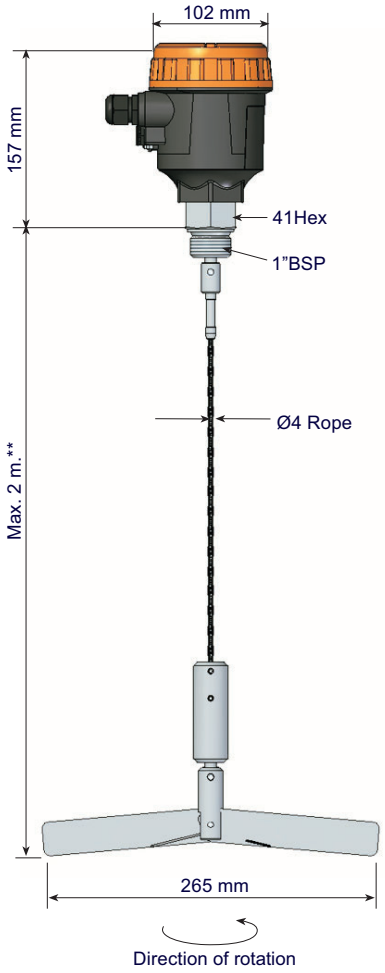


Max. 600°C
Vertical / Horizontal Mounting
Weight : 2.85 Kg
(In the design phase)

** Tolerance -/+ 5 mm .

Sample Models :

ELF 108

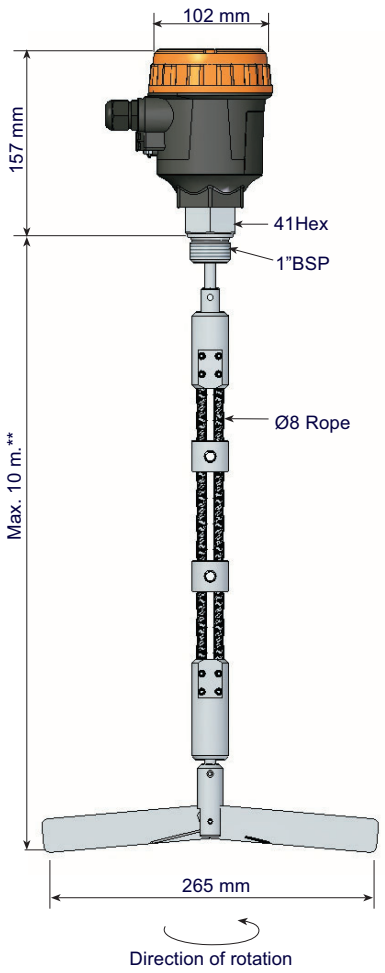


90°C (Opt.150°C)

Vertical Mounting

Weight : 1.65 kg

ELF 19



90°C (Opt.150°C)

Vertical Mounting

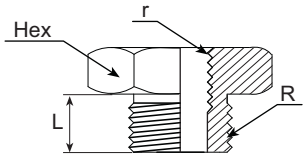
Weight : 2.3 kg

** Tolerance -/+ 5 mm .

2.9. Connection Accessories :

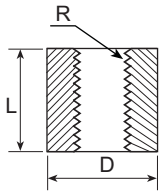
You can consult our company for the Ex-proof models.

Reduction :



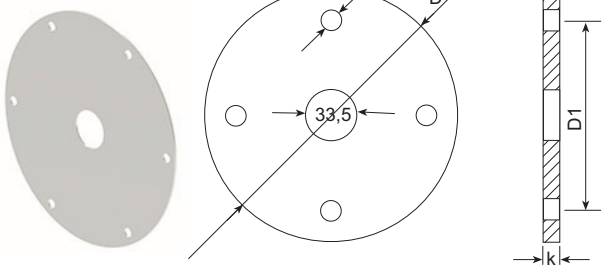
Order Code	R	r	L mm	Hex	Material
/ R1	1"BSP	1 1/4" BSP	21	44	304 St.St.
/ R2	1"BSP	1 1/2" BSP	19	50	304 St.St.
/ R7	1"BSP	2" BSP	25	60	304 St.St.
/ R3	1"BSP	1 1/4" BSP	21	44	316 St.St.
/ R4	1"BSP	1 1/2" BSP	19	50	316 St.St.
/ R5	1"BSP	1 1/4" BSP	22	45	ST 37 Steel
/ R6	1"BSP	1 1/2" BSP	22,5	50	ST 37 Steel

Muff :



Order Code	R	D mm	L mm	Material
/ M1	1"BSP	Ø 37	41	304 St.St.
/ M2	1 1/4"BSP	Ø 47,5	46,5	304 St.St.
/ M3	1 1/2"BSP	Ø 54,4	48,1	304 St.St.
/ M4	1"BSP	Ø 37	41	316 St.St.
/ M5	1 1/4"BSP	Ø 47,5	46,5	316 St.St.
/ M6	2"BSP	Ø 54,4	48,1	316 St.St.
/ M7	1"BSP	Ø 37,6	40,2	ST 37 Steel
/ M8	1 1/4"BSP	Ø 47,8	47	ST 37 Steel
/ M9	1 1/2"BSP	Ø 52,6	46,5	ST 37 Steel

Flange :

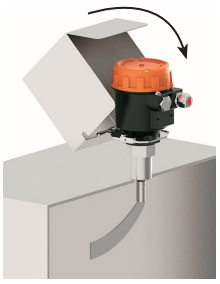


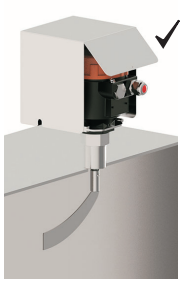
Order Code	D	D1	d	k	Number of Hole	Material
/ F1	110	90	8	2	4	304 St.St.
/ F2	110	90	8	2	4	316 St.St.
/ F3	200	180	8	2	6	304 St.St.
/ F4	200	180	8	2	6	316 St.St.

Note : 1"BSP With 1" Nut-Aluminium

Protection Case:

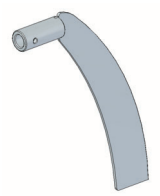
Material : 304 St. St.
Welded Production
Open - Close hinged
For Protection of switch from external conditions





2.12. Paddle Shapes :

Standard Scimitar Paddle (258 mm)



Weigh 105 g.

Paddle 01 (304 St.St.)
Paddle 02 (316 St.St.)

Mini Scimitar Paddle (138 mm)

Weigh 75 g.

Paddle 03 (304 St.St.)
Paddle 04 (316 St.St.)

Double-Baded Collapsible Paddle (265 mm)

Weigh 235 g.

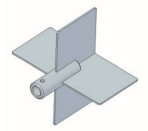
Paddle 05 (304 St.St.)
Paddle 06 (316 St.St.)

Double-Baded Collapsible Paddle (540 mm)

Weigh 120 g.

Paddle 11 (Plexiglass)

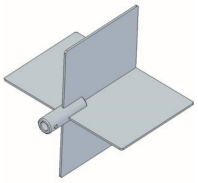
Cross-Wing Paddle (105 x 90 mm)



Weigh185 g.

Paddle 09 (304 St.St.)
Paddle 10 (316 St.St.)

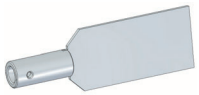
Cross-Wing Paddle (148 x 98 mm)



Weigh 515 g.

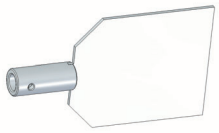
Paddle 07 (304 St.St.)
Paddle 08 (316 St.St.)

Single Wing Paddle (75 x 35 mm)



Paddle 12 (304 St.St.)
Paddle 13 (316 St.St.)

Single Wing Paddle (80 x 65 mm)

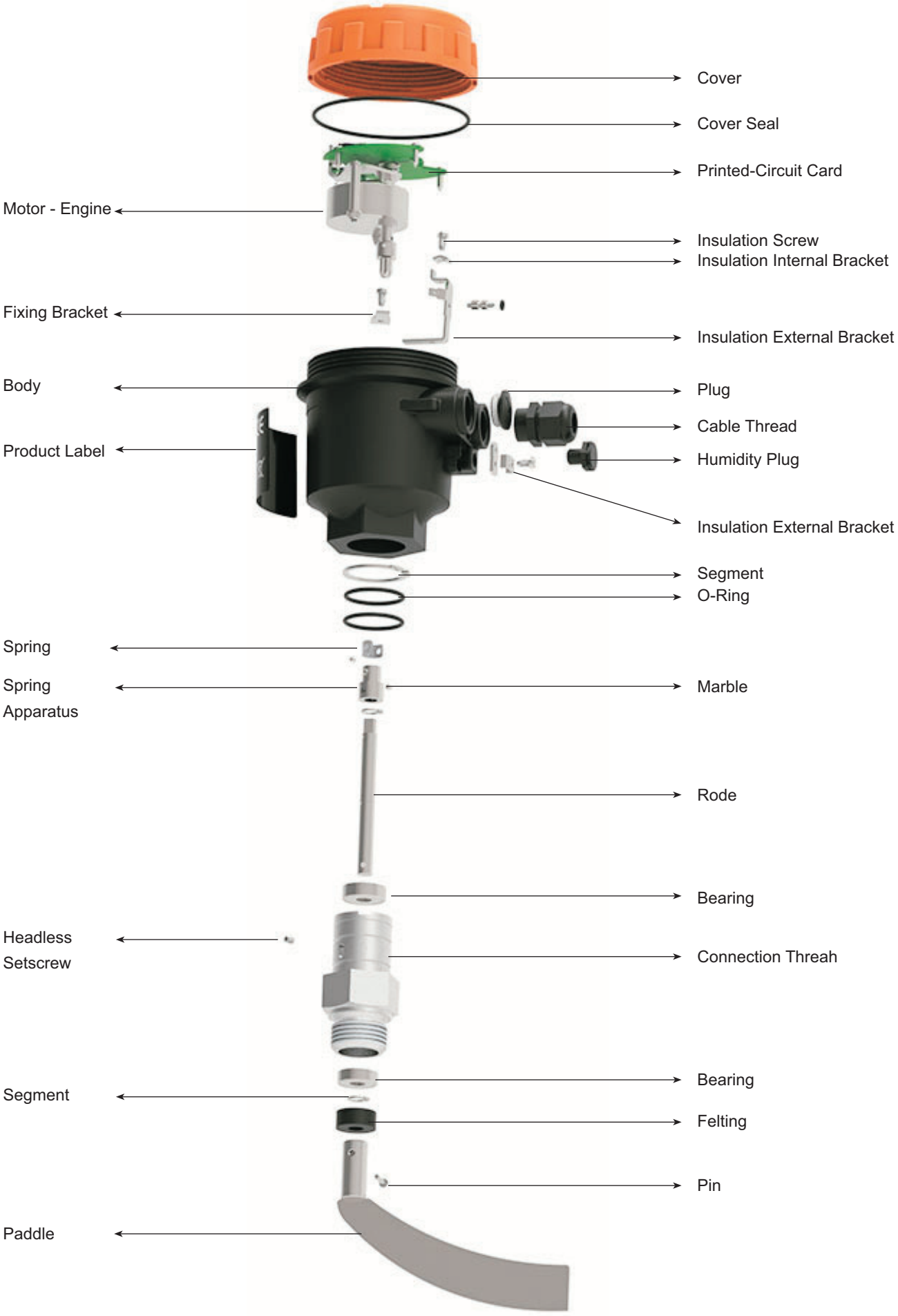


Paddle 14 (304 St.St.)
Paddle 15 (316 St.St.)

2.13.List of Example Materials with Density

Material	Min.Density (Kg/m3)	Material	Min.Density (Kg/m3)
Chopped Corn	550	Metals, Iron Chips	2650
Crushed limestone	1350-1510	Coal Pellet	400-800
Sawdust	50-160	Dry Malt Floor	310
Rubber Floor	400-800	Dry Coarse Coal	560-725
Tea Leaves	195	Grain - Oat	400-560
Shelled Peanut	550-710	Sugary Granule	880
Dusting Powder	730-990	Wheat	400-500
Acrylic Resin	330	Breadstuff	600-800
Wheat flour	480-560	Aquaous Lime Powder	400-500
Cement Dust	1370-1510	Powder PVC	300-600
Silica Sand	1510	Granule PVC	300-600
Lumpy Polypropylene	540-575	Sunflower Marsh	300-500
Roasted Coffee	350-480	Red Pepper	800-1000

2.13. Parts Names :



 Order Form : Please consider sample models when coding

1 MODEL ELF

Standart.....1

2 CERTIFICATE

None.....0

(EN10204-3-1) Material Certification.....1

3 SHAFT TYPE - (STEM LENGHT)

Standart Shaft - L= 150 mm.....1
Mini Shaft - L= 75 mm.....2
Long Shaft - L= 500 mm 3
Standart Shaft - L= 250 mm.....3p
Single Shaft - L= 500 mm 4
Extented Shaft - L= 500 mm.....5

Shaft With Extention Tube - L= 2 m. (For High Temperature).....6
Mini-Shaft With Extention Tube - L= 150 mm Max.500 mm.....6m
Extention High Temperature Shaft- L= 2m. (At the design state).....7
Rope Shaft - L= 2000 mm.....8
Reinforced Rope (28 KN) - L= Max.10 m.....9
Special.....x

4 PADDLE TYPE

Without Paddle (184 mm) 00
Standart Scimater Paddle (258 mm).....304 St. St. 01
Standart Scimater Paddle (258 mm).....316 St. St. 02
Mini Paddle (138 mm).....304 St. St. 03
Mini Paddle (138 mm).....316 St. St. 04
Double-Baded Collapsible Paddle (265 mm).....304 St. St. 05
Double-Baded Collapsible Paddle (265 mm).....316 St. St. 06

Cross-Wing Paddle (148x98 mm).....304 St. St. 07
Cross-Wing Paddle (148x98 mm).....316 St. St. 08
Cross-Wing Paddle (105x90 mm).....304 St. St. 09
Cross-Wing Paddle (105x90 mm).....316 St. St. 10
Double-Baded Collapsible Paddle-Plexiglass (540 mm)....11
Single Wing Paddle (75x35 mm).....304 St. St. 12
Single Wing Paddle (75x35 mm).....316 St. St. 13
Single Wing Paddle (80x65 mm).....304 St. St. 14
Single Wing Paddle (80x65 mm).....316 St. St. 15
Special.....x

5 CONNECTION

* 1" BSP Male Thread (Std).....0006
1 1/4" BSP Male Thread 0008

1 1/2" BSP Male Thread 0010
Special.....x

***Those can be choosen(applicable)only products with 90 Celcius working temperature.**

6 CONNECTION MATERIAL

304 Stainless Steel.....001
316 Stainless Steel.....002
Aluminium (Std).....031

PVC (Max.60 °C).....061
Delrin (Max.60 °C).....063
PTFE (Max.200 °C).....066
Special.....x

7 POWER SUPPLY

24 VDC 50/60 Hz ± %10 1
24 VAC 50/60 Hz ± %10 2
110 VAC 50/60 Hz ± %10.....3

220 VAC 50/60 Hz ± %10.....4
48 VAC 50/60 Hz ± % 10.....5
Special.....x

8 REVOLUTIONS PER MINUTE

5 d/d (Std) 1
1,5 d/d 2
Special.....x

9 MATERIAL OF POWDER FEELTING

PTFE Max. 200 °C.....066
NBR (Std) Max.90 °C.....081
FPM Maxs. 150 °C.....085
Graphite Max. 600 °C (In the design state).....086
Special.....x

10 ROLLER

Metal Ball Bearing (Std) 120 °C.....1
Ceramic Ball Bearing.....2
Metal Ball Bearing 280 °C.....3
Metal Ball Bearing 200 °C.....4
Metal Ball Bearing 300 °C.....5
Special.....x

11 HOUSING MATERIALS

Plastic (PBT) B20p.....5001
Aluminum B20x.....5240
Special.....x

12 ELECTRICAL CONNECTION

With Terminals.....00
Special.....x

13 OPTIONAL

None...../ 0
Reduction 1” BSP - 1 1/4" BSP 304 St.St...../ R1
Reduction 1” BSP - 1 1/2" BSP 304 St.St...../ R2
Reduction 1” BSP - 1 1/4" BSP 316 St.St...../ R3
Reduction 1” BSP - 1 1/2" BSP 316 St.St...../ R4
Reduction 1” BSP - 1 1/4" BSP ST 37 Steel...../ R5
Reduction 1” BSP - 1 1/2" BSP ST 37 Steel...../ R6
Reduction 1” BSP - 2" BSP 304 St.St...../ R7
Flange with muff 110 mm 304 St.St...../ F1
Flange with muff 110 mm 316 St.St...../ F2
Flange with muff 200 mm 304 St.St...../ F3
Flange with muff 200 mm 316 St.St...../ F4
Protection plate 304 St.St...../ K1
Shelter - (For the outside of the tank) 304 St.St. ...../ K2
Muff 1” BSP 304 St.St...../ M1
Muff 1 1/4” BSP 304 St.St...../ M2
Muff 1 1/2” BSP 304 St.St...../ M3
Muff 1” BSP 316 St.St...../ M4
Muff 1 1/4” BSP 316 St.St...../ M5
Muff 1 1/2” BSP 316 St.St...../ M6
Muff 1” St 37 Steel...../ M7
Muff 1 1/4” ST 37 Steel...../ M8
Muff 1 1/2” ST 37 Steel...../ M9
M12 x 5 pin socket (Max. 60 V)...../ S1
External LED socket...../ L1
Change for body - Cover ...../ Z1
Special.....x

Important Note : In hight temprature aplications , felting and protection material must be selected appropriately.

SAMPLE

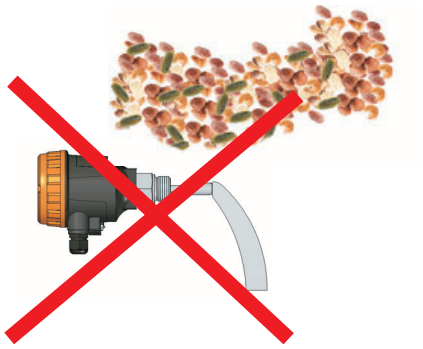
ELF 101 - 01 - 0006 - 031 - 1 - 1 - 081 - 1 - 5001 - 00 / 0

Rotary Level Switch , ELF 101 , Standard Paddle , L=150mm , 1” BSP, 24VDC

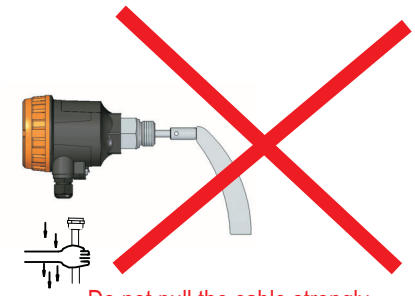
2.15.

WARNINGS !!!

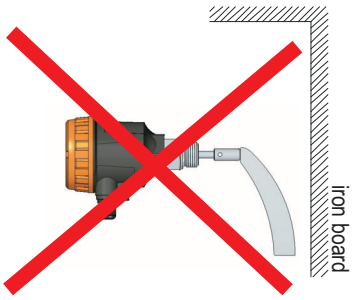
Please pay attention to following matters in order to operate your level switch properly.



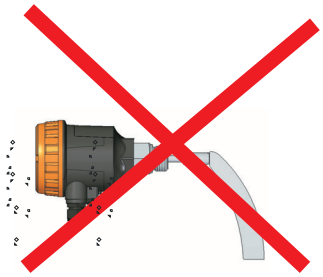
No material shall not drop on the pedal.
Cover the top with guard plate.



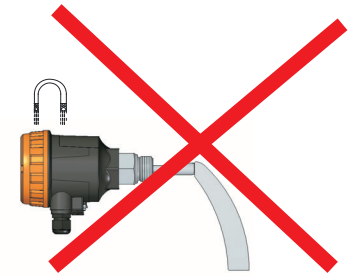
Do not pull the cable strongly, otherwise the characteristics might be changed.



Please keep away from magnetic materials like iron board ; otherwise the characteristics might be affected.

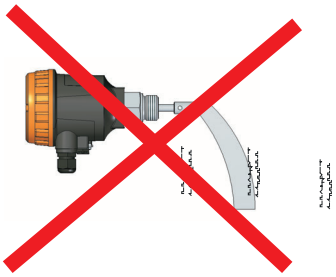


Please do not dip cables potting into liquids,otherwise instulation problem may cause..

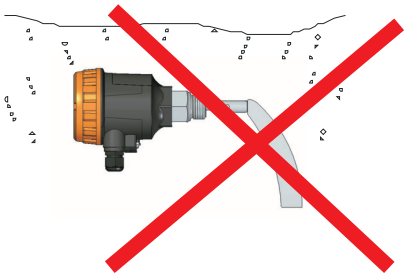


Please keep away from magnetic field ,otherwise it might be mis-operated.

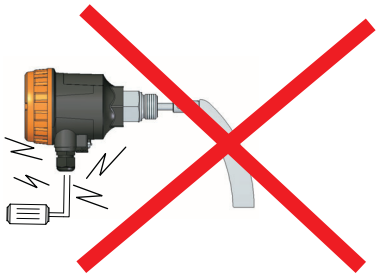
Please do not drop , otherwise the characteristics might be changed..



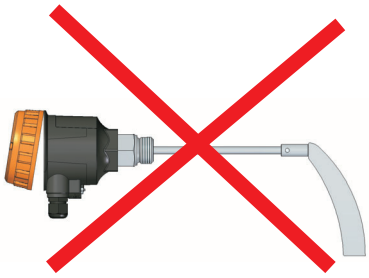
Vibration might be caused instability.



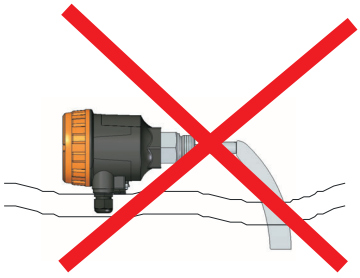
In case vapour splash cable potting points,insulation problem may cause.



Excess current , to be drawn as a result of direct connection to motor, may burn relay of switch



Do not remove the plastic parts of the bottom of the switch body, do not loosen.



Due not use with materials which may damage the material.

Do not connect the switch with inverted polarity.
It characteristics may change.

3. Failure Delection

Failure	Possible cause	Troubleshooting/remedy
Housing is broken	Product fell down or suffered external impact	Notify the authorized service center.
Noises come from the product.	-Bearing may be broken. -Bearing lubrication function may be degraded. -Spring may be broken. -Seal may be broken -Board screws may be loose.	-Notify the authorized service center. -Check and retighten the screws.
Signals no contact or always signals contact	-The contact may be burnt-out. -Installation angle may be wrong. -Socket may be damaged. -Product may be exposed to magnetic field in the environment. -Values higher than operating current and/or voltage are used. -Water has infiltrated in the housing.	-Notify the authorized service center. -Correct the installation angle. -Check the socket connections. -Ensure that the electrical connection points downward. -Check the gaskets.
Unstable operation of the contact	-Product fell down or suffered external impact -Correct spring position is not selected. -Correct palette is not selected.	-Notify the authorized service center. -Contact the manufacturer for palette suitable for the material.
Motor running but no signal is being received.	-The pedal may be dislocated. -The material may not have reached to switch level. -Palette is not selection is not made according to the density of the material.	-Check and reinstall the pedal. -Check if the switch is installed to the right position.

If you find an error, try to eliminate it by using this table or send the instrument to our service address for repair.

The instrument should be repaired only by authorized service! Serial number shall be indicated to the authorized service center.

4. Disassembly of Instrument

Instrument should be disassembled while feeding and pressure is not available!

5. Service

The instrument does not require maintenance. If it is desired, residue accumulated inside should be blown according to kind of fluid and instrument can be cleaned with soft cleaning solutions. Measures should be taken during the disassembly.

6. Re-Calibration

Calibration is not required during long period useful life of a level switch.

7. Repair – Manufacturer Address

If irreparable breakdowns occur, the instrument should be sent to us for repair purpose. Before this, the instrument should be cleaned carefully and packaged so as not to be broken. Furthermore, you should also add a detailed explanation which describes the breakdown while instrument is sent. If your instrument contacts with harmful substances, decontamination report should be also sent additionally. In the event that instrument does not have any decontamination report or our service department has doubts about instrument, repair process will not start until an acceptable report is sent.

If the instrument contacts with hazardous substances, necessary measures should be taken for decontamination!
Service -Manufacturer Company Name and Address:

LONCA MAK. SAN. TİC. A.Ş.Ferhatpaşa Mahallesi Gazipaşa Caddesi No:104 A 34888 Ataşehir / İSTANBUL - TÜRKİYE

Tel:+90 216 505 05 55 Faks:+90 216 515 45 84 E-Mail: **lonca@ensim.com.tr** Web: **www.ensim.com.tr**

8. Disposal

The instrument should be disposed according to 2002/96/EC and 2003/108/EC European Directives (waste electrical and electronic instruments).
Waste electrical and electronic equipment should not be mixed with domestic wastes!

If the instrument has contacted with harmful substances, special attention should be paid for its disposal!

9. Terms of Warranty

The instrument has warranty legally for 24 months after delivery date. Warranty demands are not accepted in case of inappropriate operation, damage on the instrument or any modification on the instrument.

10. Terms of Return

In the return of materials, user should send an open list related to damage or problem, malfunction of the material to be returned or its operation in the different modification, with the instrument. If it is required to return the material, used in the dangerous, corrosive or toxic fluid, in this case, used part should be cleaned very carefully. Security of personnel should be ensured. All products to be returned should be sent to our company address, which we have stated.