FILSA

FDF

Rotary blade level indicator for solids

Operating Instructions

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Talleres Filsa, S.A.U. • E-08100 Mollet del Vallès (Barcelona) • **Tel.** +34 93 570 46 01 • **Fax** +34 93 570 24 71 • filsa@filsa.es • **www.filsa.es**

▶ Read these Safety instructions before using the device for the first time and follow the Operating instructions.

Safety instructions

1. The installation, initial operation and maintenance should only be carried out by a qualified expert with electrical know-how.
2. Comply with the local and statutory rules and/or the VDE0100.
3. Before electrical connection, check the specifications on the data plate and the technical data of this manual.
4. A fuse must be connected in series to the supply voltage, according to the Standard and Normative documents.
5. Protect the signal contacts of the limit switch against voltage peaks when inductive or capacitive loads are connected.
6. Do not remove the Plastic protection inside the housing. It is a protection used to protect the motor-gear from the cables.
7. The device may be put into operation only if the electrical connection is correct. To secure the type of protection, the sealing cap and the gasket must be placed correctly and the screw nut of the cable gland has to be fixed and fastened to the cable entry.
8. The earth connection of the device has to be installed in such a way that mechanical damage will be excluded.
9. Protect the controller from vibration and shakes. The vibration can provoke premature damage to the controller and may become useless.
10. The blade must not be hit by the filling stream. To avoid this, deflect the filling stream or install a deflection screen or a protection roof. It is also recommended to install a protection roof when the controllers are used as empty-indicator or medium-indicator in silos where vaults could be formed or where high loads above it could exist.
11. Avoid the installation of standard devices in ambient with vapour or with several changes of temperature. There are specific models for these applications with different sealings rings and bearings that can extend the lifetime of the device.
12. Ask for rotary levels with the special sealing ring made of Stainless Steel-PTFE-Viton in applicactions with aggressive products or with micronized bulk solids.
13. The connections of the single components as like as blade, shaft, extension, anti-buckling protection, etc. are permissible only with the attached pins.
14. Switch off the power supply, before disconnecting the device.

Operating instructions

1. Specification

1.1 Intended use

The rotary blade level indicator F9 observes the filling level as a limit switch. It can be used as indicator for dusty and powdery, granulated and grainy bulk goods and are appropriated due to the range of models and blades to control the level of bulk solids like dust, flour, grain, sand, plastic, etc. with a bulk density between 0.01 to 2 t/m^3. Although the characteristics of the product, humidity, conductivity, grain size, etc. change, any adjustment is needed

These devices are used to control the level in silos, containers, bunkers and they can be installed horizontally or vertically. For vertical mountings there are rope shafts up to 10 m could be made depending on the product to control.

1.2 Function

The rotating measuring blade, projecting into the silo or container, is driven by a gearmotor. If the bulk material reaches the measuring blade, the rotation will be hindered and it will be stopped. The return torque turns the pivoted motor from its end position and actuates the signal switch. A second switch turns off the motor off.
If the filling level of the bulk material sinks, the blade becomes freely again and a spring will turn the motor back into its original end position. Thereby the motor will be turned on again and the signal switch will be switched back.

1.3 Technical data

Manufacturer	Talleres Filsa, S.A.U.	
Address	Bernat Metge, 33 08100 Mollet del Vallès (Barcelona)	
Name	Rotary blade indicator	
Type	**FDF11**	ref: **FDF11...**
	FDF21	ref: **FDF21...**
	FDF22	ref: **FDF22...**
	FDF23	ref: **FDF23...**
	FDF24	ref: **FDF24...**
	FDF25	ref: **FDF25...**
	FDF26	ref: **FDF26...**
	FDF27	ref: **FDF27...**
	FDF28	ref: **FDF28...**
	FDF30	ref: **FDF30...**
	FDF31	ref: **FDF31...**
	FDF33	ref: **FDF33...**

Measuring blade speed	1 or 5 rpm depending on the model
Switching voltage	Standard 230 V AC (50 ... 60 Hz)
(Under request 115 V AC, 48 V AC, 24 V AC, 24 V DC due to a converter)	
Power consumption	4 VA in AC; 4 W in DC
Density of the product	0.01 t/m^3 ... 2 t/m^3
Self-monitoring	Function or Voltage monitoring, Under request
Maximum pressure	-0.5 bar ... +1 bar
(Under request up to +5 bar with sealing ring of Stainless Steel-PTFE-Viton)	
Cable entry	2 of M20x1.5
Maximum voltage of contact	4 V DC ... 250 V AC
Switching function	1 NO + 1 NC
Capacitity of the contact	1 mA / 4 V DC ... 2 A / 250 V AC (for resistive loads)
For inductive or capacitive loads reduce at 50%	
Bulk goods temperature	-20 °C ... +80 °C (Under request up to +1.000 ºC)
Ambient temperature	-20 °C ... +70 °C
Type of protection	IP66 according DIN EN60529 certification **ATEX** under request
Weight	1.2 kg ... 5 kg depending on the model

To know the specific characteristics of each model, please see "Choice of optins" of each model.

1.4 Materials

Housing	Aluminium, RAL 7001 coated, Stainless Steel, under request
Process connection	G 1 " 1/4, G 1 " G 3/4 " ... G 2 ", M30 o M32, depending of the model. Made of Aluminum or Stainless Steel.
Flange connection	Aluminium, Zincated Steel or S.S. depending on the model
Measuring blade	S.S. 1.4301, shaft 1.4305
(Under request special models of S.S. 1.4401, Plastic or Gummy)	
Sealing ring	NBR
(Under request Stainless Steel-PTFE-Viton, NBR FDA, Graphite)	
Rope shaft	Stainless Steel
Rod shaft	Stainless Steel
Protection tube shaft	Zincated Steel
(Under request Stainless Steel)	

To know the specific characteristics of each model, please see "Choice of optins" of each model.

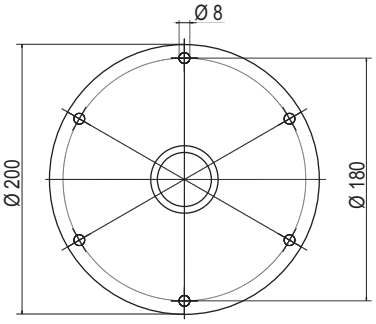
1.5 Dimensiones

Approximate measures are given in mm.

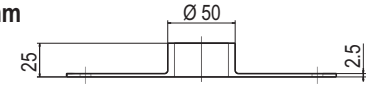
To know the specific characteristics of each model, please see "Choice of optins" of each model.

Flange connection
Threaded flange in all models G 1 " 1/4 female.

"**C**" Flanges in Zincated Steel
"**A**" Flanges in Aluminium
"**E**" Flanges in Stainless Steel

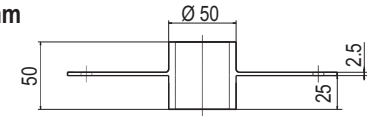


F3C of 25 mm



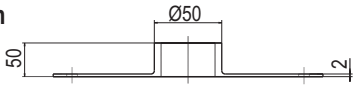
FDF-01

F3C of 50 mm



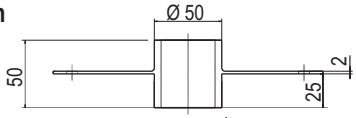
FDF-02

F3E of 25 mm

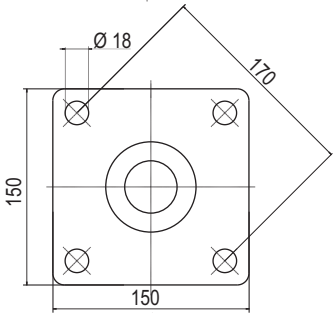


FDF-03

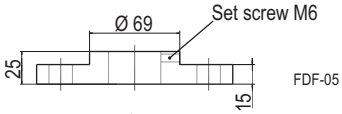
F3E of 50 mm



FDF-04

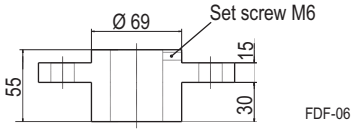


F2A de 25 mm

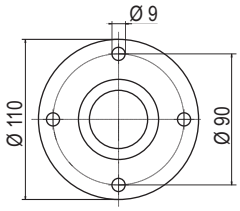


FDF-05

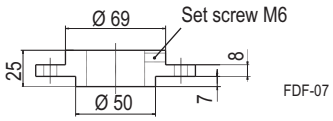
F2A de 50 mm



FDF-06

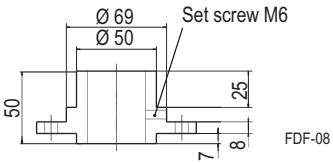


F1A and F1E ATEX of 25 mm



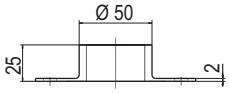
FDF-07

F1A of 50 mm



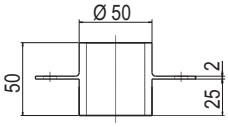
FDF-08

F1E of 25 mm no ATEX



FDF-09

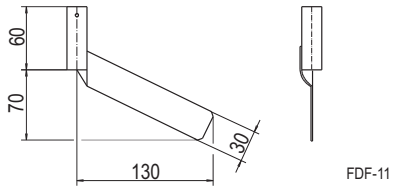
F1E of 50 mm no ATEX



FDF-10

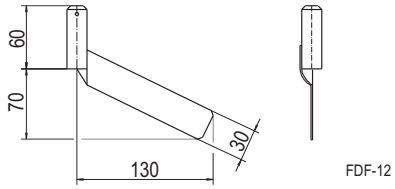
Most used measuring blades

Diagonal S2 for models ATEX, reinforzed and with extensions



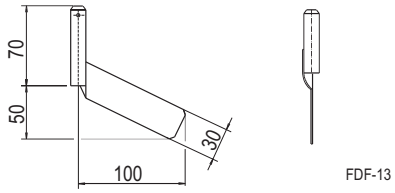
FDF-11

Diagonal S2 models no ATEX



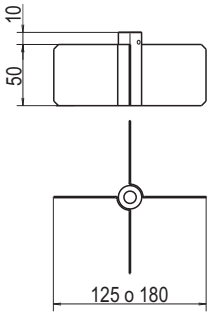
FDF-12

Diagonal S1



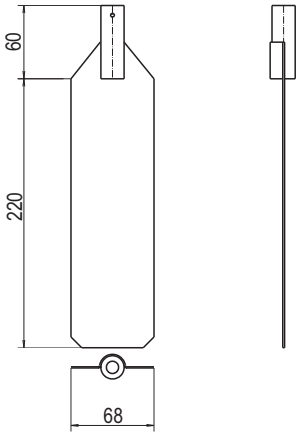
FDF-13

X6 (125 mm) or X7 (180 mm)



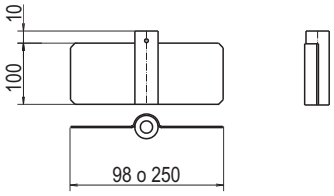
FDF-14

T0



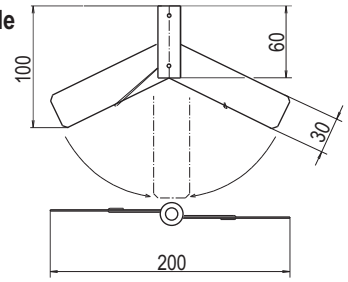
FDF-15

T2 (98 mm) or T5 (250 mm)



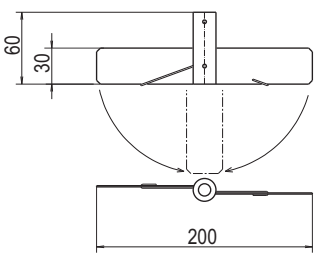
FDF-16

K2 hinged blade



FDF-17

K1hinged blade



FDF-18

2. Installation

2.1 Preparing for use

- Read the Safety instructions and the Operating instructions before using the controller.
- Verify if you got all the parts, the controller, blade with pin and shaft extension if it was requested.

2.2 Mechanical connection

There are models that can be mounted horizontally or vertically into the silo.

To know the specific characteristics of each model, please see

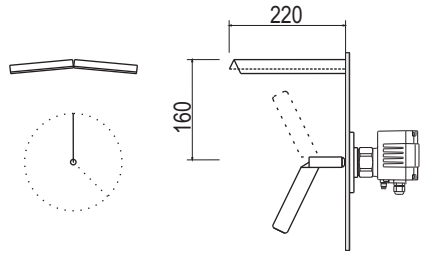
“Choice of optins” of each model.

The standard form is mounting the device with a flange, drilling holes on the silo to allow the mounting of the controller using screws, rods, fasteners or nuts. If the flange was not requested, the thread is 1 " 1/4 or 1 " male, depending on the model and can be fixed using 1 or 2 nuts or introducing it into a threaded socket with a maximum of 25 mm length. If it is larger, the bulk goods have the possibility to deposit in the thread socket. This could provoke that the device becomes useless.

After the mounting is done, the housing could be turned in order to face the cable gland correctly.

TProtection roof

The blade must not be hit by the filling stream. To avoid this, deflect the filling stream or install a deflection screen or a protection roof. It is also recommended to install a protection roof when the controllers are used as empty-indicator or medium-indicator in silos where vaults could be formed or where high loads above it could exist.

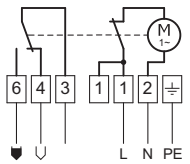


FDF-19

2.3 Electrical connection

Connection diagram AC

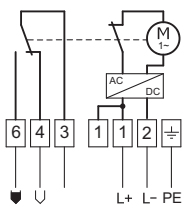
⏚ - Ground
1 - Supply voltage
2 - Supply voltage
4 - Normally closed
6 - Normally open
3 - Common



FDF-20

Connection diagram DC

⏚ - Ground
1 - Positive: 24 V DC
2 - Negative: 0 V DC
4 - Normally closed
6 - Normally open
3 - Common



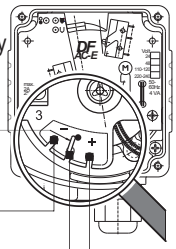
FDF-21

Cable gland

- Fasten the cable gland after making the electrical connection.
- Fix and fasten the screw nut of the cable gland to make sure of the water-tightness.

Sensitivity adjustment

For a right adjustment of the sensitivity modify the position of the spring arm using pinces or a screwdriver carefully.



(–) **Light**: Very light bulk goods.
Low strain to the spring.
(•) **Medium**: Suitable for almost all bulk goods.
Medium strain to the spring.
(+) **Strong**: For sticking bulk goods.
Strong strain to the spring.

FDF-22

3. Use

3.1 Commissioning

- Put the controller into operation only if the installation and the electrical connection have been done correctly.

3.2 Normal operation

- Use the device in its intended application only.
- Comply with the specifications on the data plate and the technical data of this manual.
- If the controller is damaged, disconnect it immediately.
- It is forbidden to make changes to the device. This violates the Normative.

3.3 Inexpert handling

- Ignoring the Safety instructions and the Operating instructions.
- Not intended use.
- Making changes or handling the controller.
- Violation against applicable Law and Standards.
- Using of non original parts.

4. Maintenance, servicing and spare parts

4.1 Maintenance

- If used correctly, no specific maintenance is required.

4.2 Servicing

- Check and review the state of the housing, the blade, shaft extension if it was required and the correct commutation of the electrical contact, as well.

4.3 Spare parts

- Use only original parts.
- The spare parts of the controller can be consulted in the document “R-F9-01”.

5. Storage

- Store the controller in a dry and dust-free environment.
- Dismount the shaft together with the blade. Ensure that the shaft of the level indicator with jib extension will not be buckled or bended.

6. Disposal

- Switch off the power supply, before disconnecting the device.
- The controller can be recycled.
- The disposal applies to the valid environmental Guidelines according to the location of the carrier and the local manufacturing conditions.

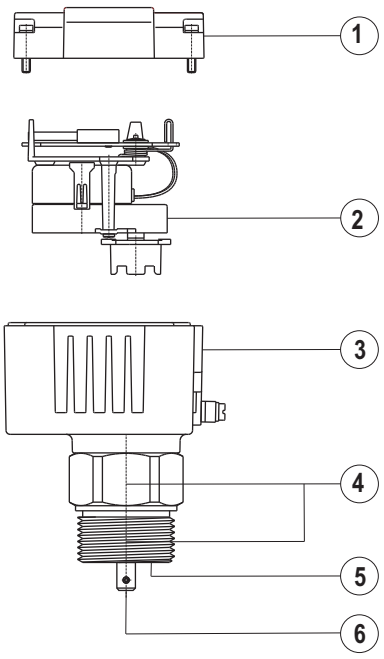
Keep this manual for further questions!

Any manipulation of an ATEX controller, it could supose to fail the certification !

FDF

Rotary blade indicator
for solids

Spare parts



R-F9-001

1. **Cap kit:**
   - 1.1 4 Screws
   - 1.2 Aluminium cap with gasket

2. **Complete gearmotor kit:**
   - 2.1 Complete gearmotor
   - 2.2 Printed circuit board with 2 microswitches
   - 2.3 Clutch connection

3. **Complete housing kit:**
   - 3.1 Aluminium housing
   - 3.2 Racor depending on model
   - 3.3 Shaft with clutch
   - 3.4 2 bearings ZZ 609
   - 3.5 Sealing ring NBR (R0)
     Under request Stainless Steel-PTFE-Viton (R1)

4. **Bearing ZZ 609**

5. **Sealing ring:**
   Standard NBR (R0)
   Under request Stainless Steel-PTFE-Viton (R1)

6. **Shaft with clutch**

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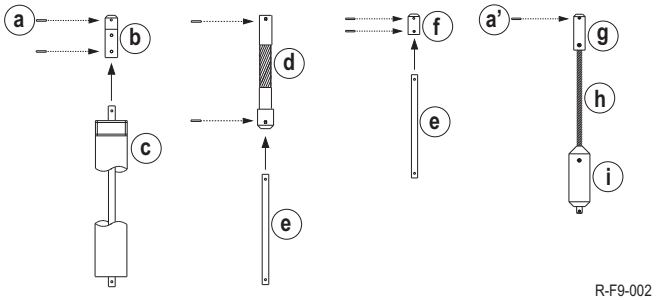
7. **Flanges and measuring blades** depending on the models shown in the Operating instructions “MI-F9”, pages 4 and 5.

8. **Shaft extensions, buckling shafts, connections and pins** (depending on the model):
   - **a** Elastic pin.
   - **a’** Solid pin.
   - **b** Metallic anti-buckling shaft (U.F.M).
   - **c** Shaft with protection.
   - **d** Anti-buckling shaft.
   - **e** Shaft without protection.
   - **f** Shaft without protection connection.
   - **g** F9 rope shaft connection.
   - **h** Rope shaft extension.
   - **i** Stainless Steel counterweight.

Shaft extension with protecting tube | Pendulum shaft extension without protection | Shaft extension without protection | Rope shaft extension



R-F9-002

FILSA constantly strives to improve its products and reserves the right to modify designs, materials and data without prior notice.

Any manipulation of an ATEX controller, it could supose to fail the certification !

Talleres Filsa, S.A.U. • **E-08100 Mollet del Vallès (Barcelona)** • **Tel. +34 93 570 46 01** • **Fax +34 93 570 24 71** • **filsa@filsa.es** • **www.filsa.es**