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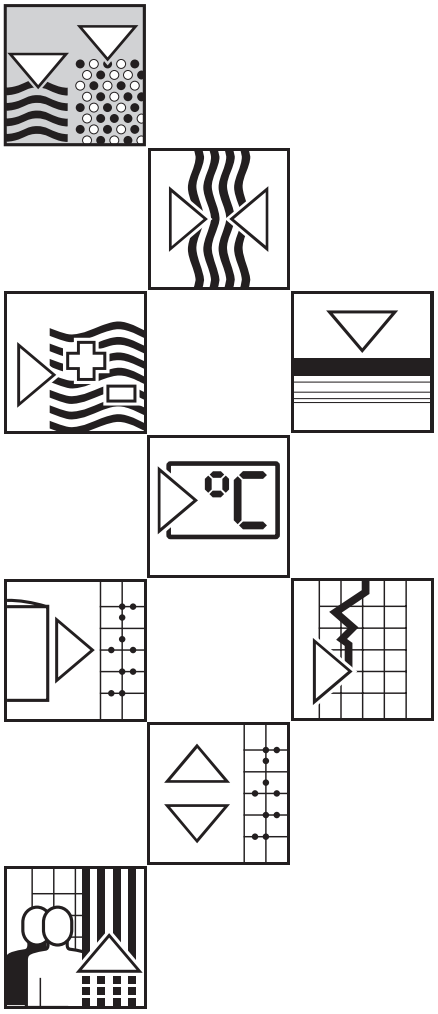
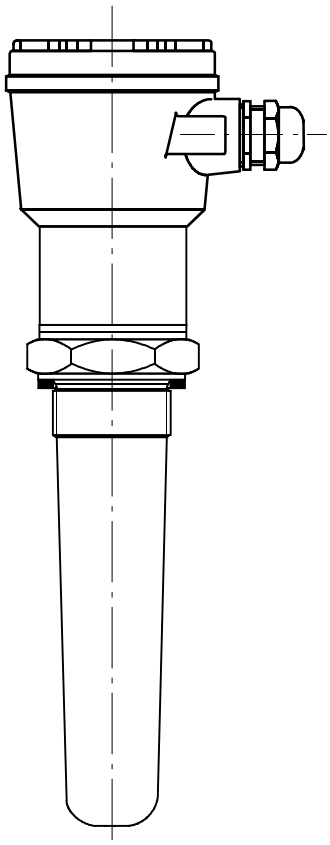
nivocompact
FTC 731
Level Limit Switch

Installation and Operating Manual





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The Power of Know How

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Contents

Application

The Nivocompact FTC 731 is used for limit detection in silos containing bulk solids (for minimum or maximum indication).
It is also for use in the food processing industry.
It can be mounted in the silo from any direction.

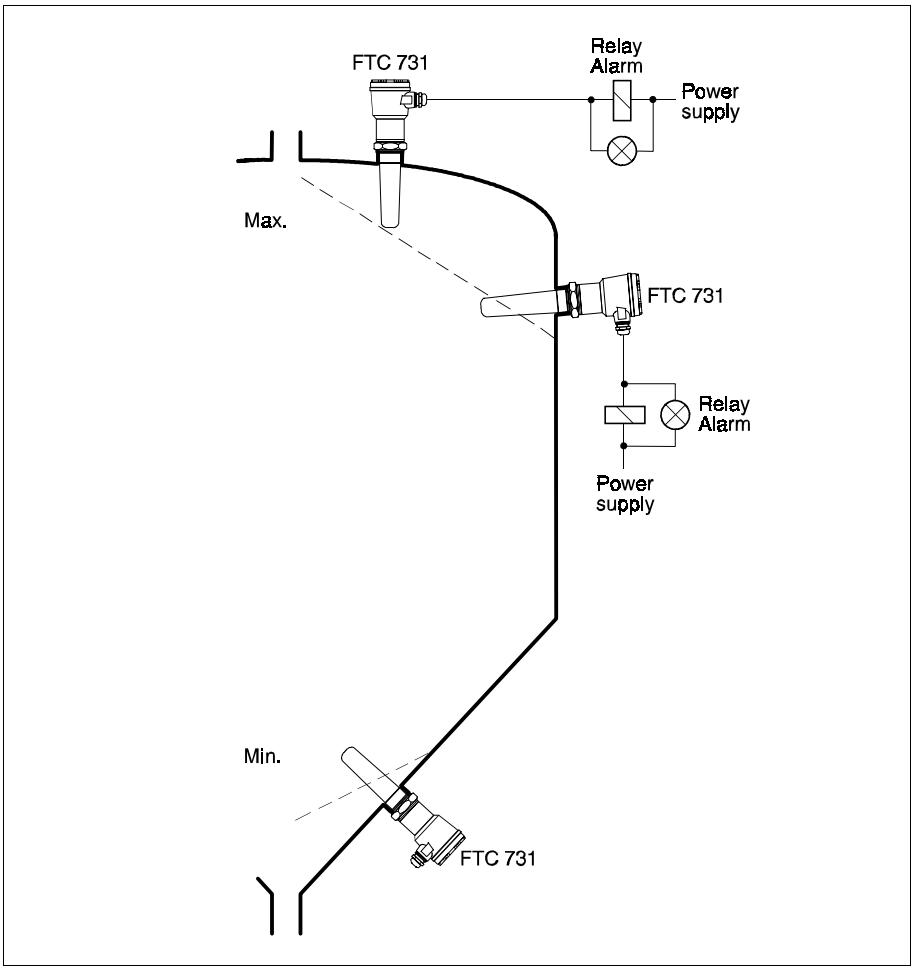


Fig. 1
Limit detection in bulk solid silos with the capacitive level limit switch Nivocompact FTC 731.

Application Examples

Plastic granulates	Grain	Spices
Lime Kaolin	Flour	Semolina
Plaster		Fodder
Cement		
and similar bulk solids		

Note:
Fine grained bulk solids should have dielectric constants $\varepsilon_r \geq 1{,}6$

Please contact us for advice if the dielectric constant of the bulk solid is not known.

Technical Data

Operating Data

- Operating temperature in silo: –20 °C…+100 °C with dry bulk solids; up to +60 °C with moist bulk solids
- Operating pressure p_e in silo: up to 6 bar
- Max. permissible load on probe: 4000 N lateral
- Grain size of material: up to approx. 10 mm
- Minimum relative dielectric constant ε_r of material: 2.0 (Factory-set, without calibration)
- Minimum adjustable dielectric constant ε_r of material: 1.6
- Ambient temperature for housing: –20 °C…+60 °C
- Storage temperature: –40 °C…+85 °C

Probe

- Process connection: parallel thread G $1^1/_2$ A acc. to DIN ISO 228/I
- Material of process connection: fibre-glass reinforced polyester (PBTP)
- Material of probe: fibre-glass reinforced polyester (PBTP)
- Insulation from material: fully insulated

Housing Versions

- Aluminium housing, IP 55
- Aluminium housing, IP 66
- Aluminium housing with synthetic coating, IP 66
- Synthetic housing in PBTP, IP 66 (Protection IP… acc. to DIN 40050)

Cable Gland

- Housing IP 55: standard PG in nickel-plated brass with NBR gasket for cable diameter 7…10 mm.
- Housing IP 66: water-tight PG in polyamide with Neoprene-CR gasket for cable diameter 5…12 mm.

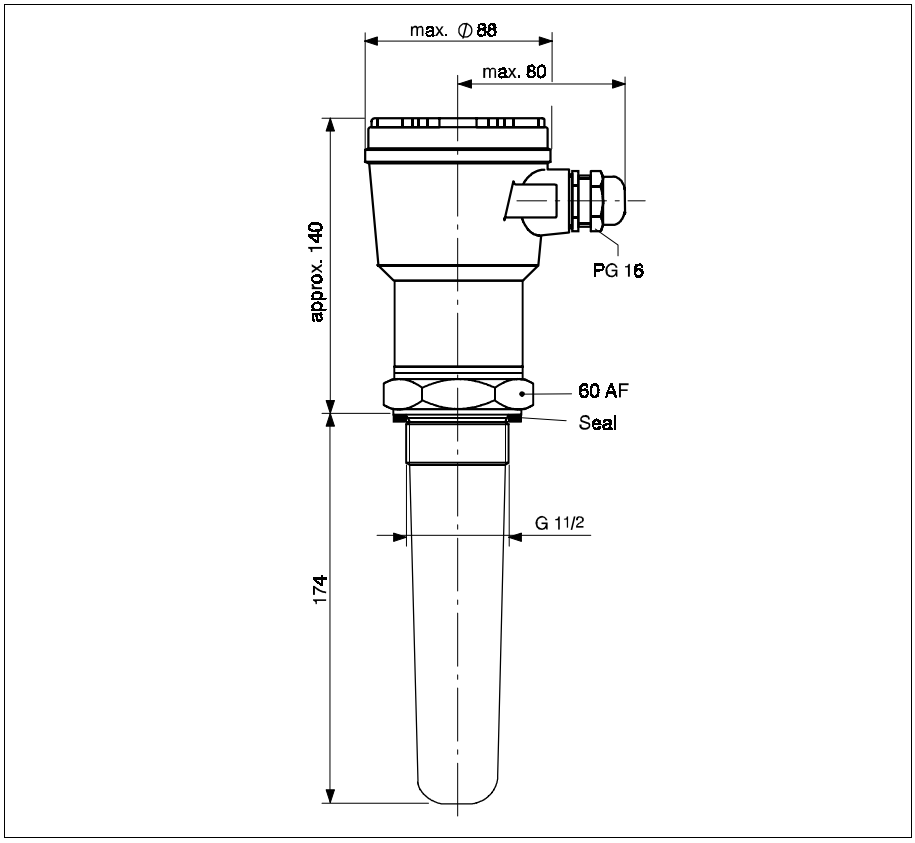


Fig. 2
Dimensions Nivocompact FTC 731.

Electronic Inserts

- Terminal connections: for max. 2.5 mm^2
- Measuring frequency: approx. 1.6 MHz
- Switching delay: approx. 0.5 s…approx. 20 s, selectable
- Minimum/maximum fail-safe switching: selectable with rotary switch
- Switching indication: red LED

Electronic Insert EC 30 for AC (Two-wire Connection)

- Power supply U~: 21 V…250 V, 50/60 Hz
- Connected loads, short-term (max. 40 ms): max. 1.5 A;
  max. 375 VA at 250 V;
  max. 36 VA at 24 V
- Maximum voltage drop: 11 V
- Connected loads, continuous: max. 350 mA;
  max. 87 VA at 250 V;
  max. 8.4 VA at 24 V
- Minimum load current at 250 V: 10 mA (2.5 VA)
- Minimum load current at 24 V: 20 mA (0.5 VA)
- No-load current (eff.): < 5 mA

Electronic Inserts EC 32, EC 33 for DC (Three-wire Connection)

- Power supply U =: 10 V…55 V
- Superimposed AC voltage U_{pp}: max. 5 V
- Current consumption: max. 15 mA
- Load connection: Open Collector; PNP (EC 32) or NPN (EC 33)
- Switching voltage: max. 55 V
- Connected load, short-term (max. 1 s): max. 1 A
- Connected load, continuous: max. 350 mA
- Residual current with transistor blocked: < 100 µA
- Protected against reverse polarity

Electronic Insert EC 34 for DC and AC (Relay Output)

- Power supply U =: 20 V…200 V
  or
  Power supply U~: 21 V…250 V, 50/60 Hz
- Current consumption (eff.): max. 5 mA
- Peak inrush current: max. 200 mA, max. 5 ms
- Pulse current: max. 50 mA, max. 5 ms
- Pulse frequency: approx. 1.5 s
- Output: potential-free change-over contact
- Contact load capacity:
  U~ max. 250 V, I~ max. 6 A,
  P~ max. 1500 VA ($\cos \varphi = 1$) or P~ max. 750 VA ($\cos \varphi \geq 0.7$)
  U = max. 250 V, I = max. 6 A, P = max. 180 W
- Operating life: min. 10^5 switchings at max. contact load
- Additional switching delay: max. 1.5 s

Type Key

See Page 10 for order specification key and order code.

Subject to modification

Accessories

- Gasket for thread G $1^1/_2$ A;
  in elastomer/fibre (asbestos-free) supplied.

- Protective sun cover for aluminium housing
  Material: polyamide

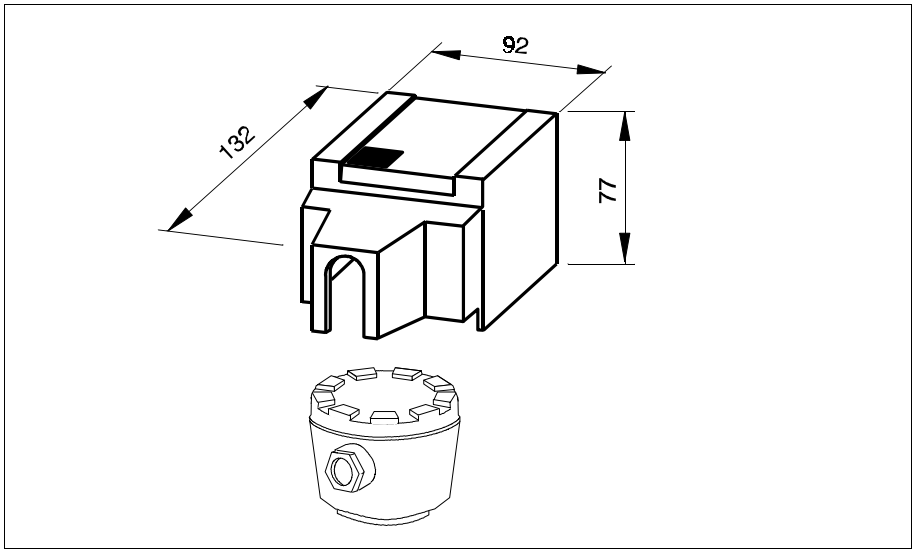


Fig. 3
Dimensions of protective sun cover (accessory).
This cover prevents condensation in the housing.

The Measuring System

The Nivocompact is an electronic switch.
The entire measuring system consists of:
- Nivocompact FTC 731
- power supply and
- connected control systems, switches, signal transmitters (e.g. process control systems, PLC, relays, microcontactors, lamps, sirens etc.).

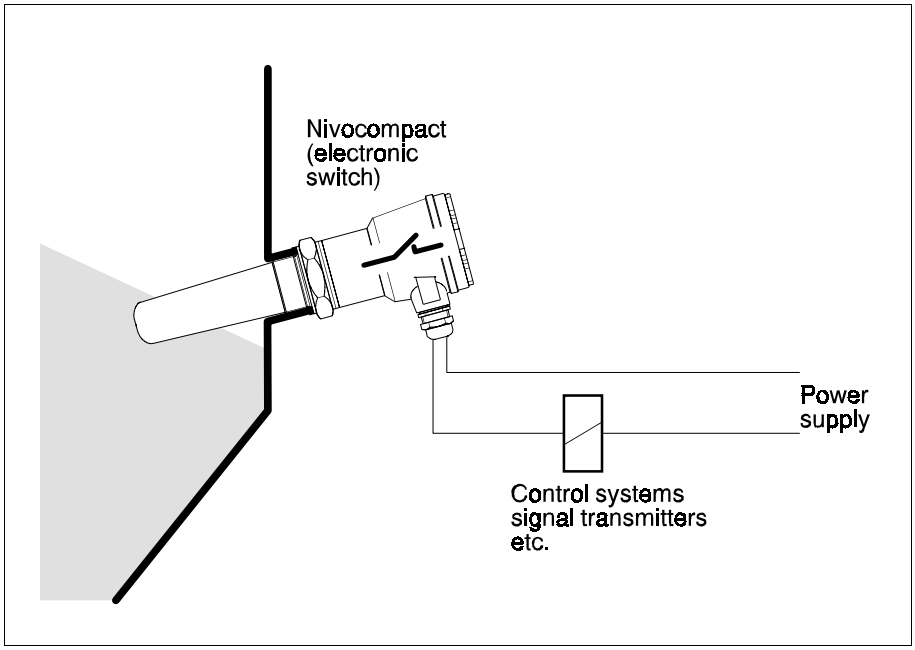


Fig. 4
The measuring system.

Function

A metal sheet at the tip of the probe, within the insulation, and the surroundings (e.g. silo walls) form the two electrodes of a capacitor, with a high frequency voltage between them.
The limit value is based on the principle of a discharge circuit:
As long as the probe tip is in air with a dielectric constant of $\varepsilon_r = 1$, then the discharge time constant is $\tau = R \times C_A$ where R is the resistance of the circuit and C_A the capacitance of the capacitor formed by the probe tip and its surroundings.
If bulk material with a dielectric constant $\varepsilon_r \geq 2.0$ moves into the electrical high frequency field at the probe tip, then the capacitance C_A increases and with it the time constant τ.
This change in the time constant is evaluated and causes the Nivocompact FTC 731 to switch.

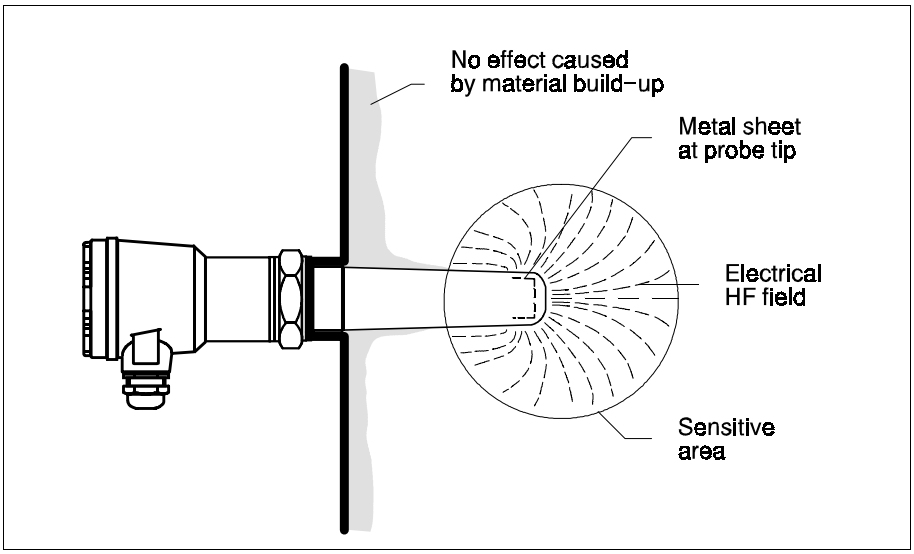


Fig. 5
Operation of the Nivocompact FTC 731 with rod probe is not affected by material build-up, even when several centimetres thick, at the silo wall.

Fail-Safe Switching

The built-in feature for minimum/maximum fail-safe switching allows the Nivocompact to be used in all applications requiring high operational safety:

Maximum Fail-Safe:
The current circuit is blocked if the probe is covered or the power supply fails.

Minimum Fail-Safe:
The current circuit is blocked if the probe is uncovered or the power supply fails.

A red LED on the electronic insert indicates switching status.

See also in Section »Safety Switching«, Page19

Installation

Project Planning

Silo Material

The Nivocompact FTC 731 can be installed in silos made of various materials (e.g. metal, plastic, concrete).

Installation Point

Note the angle of material flow or the outlet funnel when determining the measuring point.

The Nivocompact switches (also with bulk solids with very small dielectric constants) when the probe end is covered by a few centimetres of material or when the material descends a few centimetres below the probe end.

The filling stream should not be directed onto the probe.

Installation in the Open

When installing in the open, the protective sun cover as an accessory protects the Nivocompact with the aluminium housing from excessive temperatures and from condensation which may form in the housing due to large temperature variations.

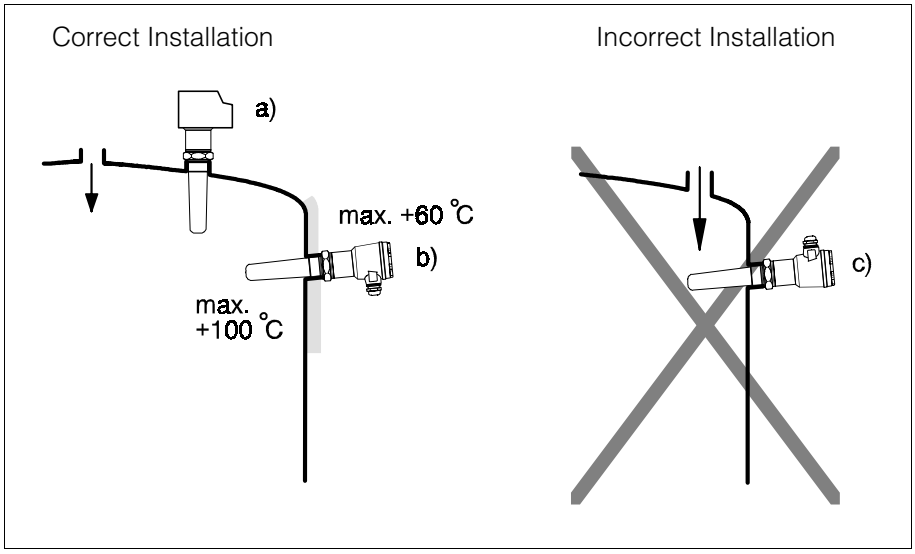


Fig. 6
General information for installing the capacitive level limit switch Nivocompact FTC 731.

Correct Installation

a) Protective sun cover for mounting in the open.
b) Heat insulation on the silo wall with high temperatures in the silo.

Incorrect Installation

c) Incoming material can damage the probe.
The filling curtain can cause error switching.
Cable gland pointed upwards can allow moisture to enter.

Minimum Distances

A minimum distance of 200 mm between the probe ends of two Nivocompact FTC 731 instruments must be maintained to ensure that there is no mutual interference.
The distance between the probe end of a Nivocompact FTC 731 and the probe end a Nivocompact FTC 831 must be at least 500 mm.
To ensure that this distance is maintained when the rope probe of the FTC 831 is swinging, a greater distance than this is recommended especially with pneumatic systems.
The distance between the probe end of a Nivocompact FTC 731 and a metal wall must be at least 120 mm.

Resistance to Load

Note the maximum lateral load of the probe rod when using it for minimum detection.

Start-Up without Calibration

Start-up without calibration is possible if the requirements for installation are met as shown in Fig. 7b). The material of the silo wall is not important.

Examples for Mounting

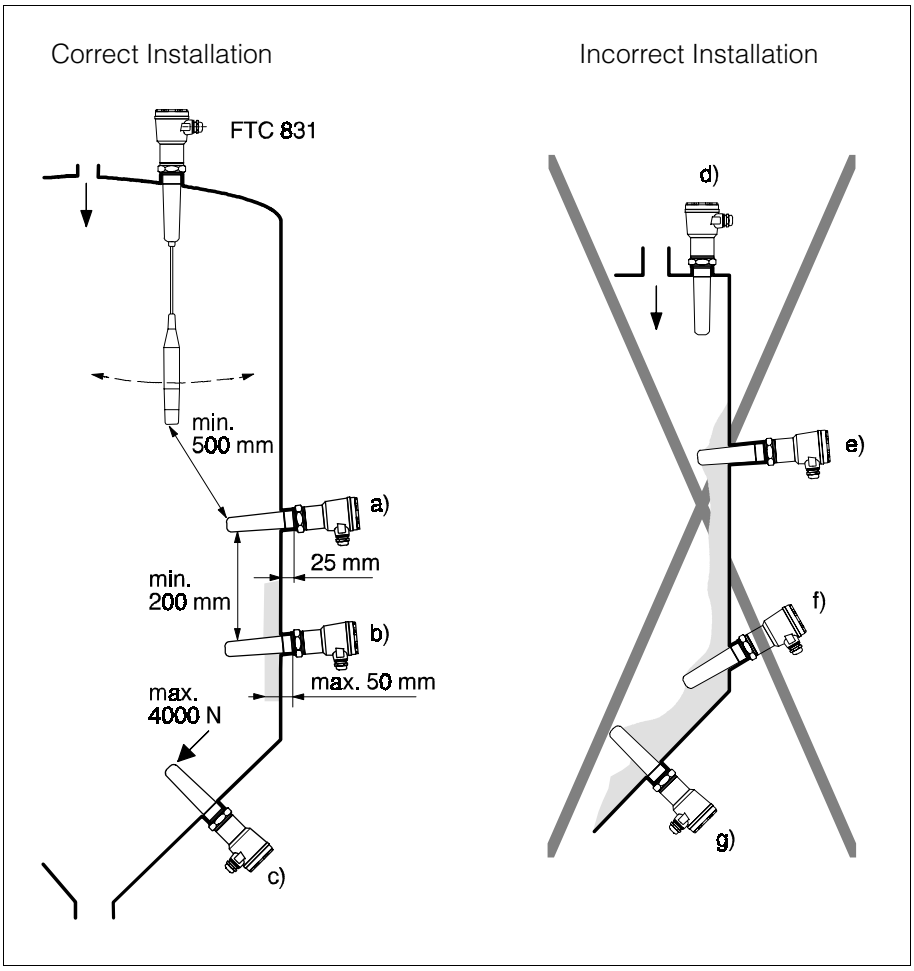


Fig. 7
Noting the information given for installation will prevent errors occurring.

Correct Installation

a) The probe tip points slightly downwards so that material can slide off more easily;
with short threaded socket (half socket length = 25 mm);
with minimum distance of 200 mm to the next Nivocompact FTC 731;
with minimum distance > 500 mm to a Nivocompact FTC 831.
b) Threaded socket + silo wall + material build-up is a maximum 50 mm thick so that no calibration is required before start-up.
c) Minimum detection in the outlet cone is only possible with easy gliding, free-flowing bulk materials.

Incorrect Installation

d) Probe end too near a wall (under the 120 mm distance)
e) Threaded socket too long with material build-up on the silo wall. *
f) In area where material is deposited in silo. *
g) Poor gliding characteristics of material causes material bridges. *

* In these cases it would be better to use a Nivocompact FTC 831 with rope probe, installed from above.

Mounting

Tools Required for Installation

- Open-end spanner 60 AF
- Screwdriver, blade width 5…6 mm or Phillips screwdriver PZD 2

Preparation

Compare the order code on the nameplate of your instrument with the order specification key to ensure that the correct instrument is being installed. The probe rod must not be shortened.

Screwing In

FTC 731 capacitive level limit switch with rod probe

Threaded boss with rod probe

Housing
A Aluminium housing, IP 55
B Aluminium housing, IP 66
R Aluminium housing, coated, IP 66
K PBTP synthetic housing, IP 66
Y Check special version

Electronic Insert (mounted in housing)
1 21 V…250 V, 50/60 Hz (EC 30)
Two-wire AC connection
2 PNP 10 V…55 V= (EC 32)
Three-wire DC connection
3 NPN 10 V…55 V= (EC 33)
Three-wire DC connection
4 Relay, 21…250 V AC/200 V= (EC 34)
AC or DC connection
with relay output (change-over contact)
9 Check special version

FTC 731 | | | **Order code on nameplate**

- Place the elastomer/fibre gasket supplied against the sealing surface of the Nivocompact (Do not wind sealing material around the thread!).
- When screwing the Nivocompact into the threaded socket, turn the instrument by the 60 AF hex nut only!
- If the instrument does not screw in easily, then only cut into the thread of the threaded socket with care.
- A torque of 80 to 100 Nm is sufficient for a reliable seal up to 6 bar; see Fig. 8.
  A torque greater than 120 Nm destroys the plastic thread.

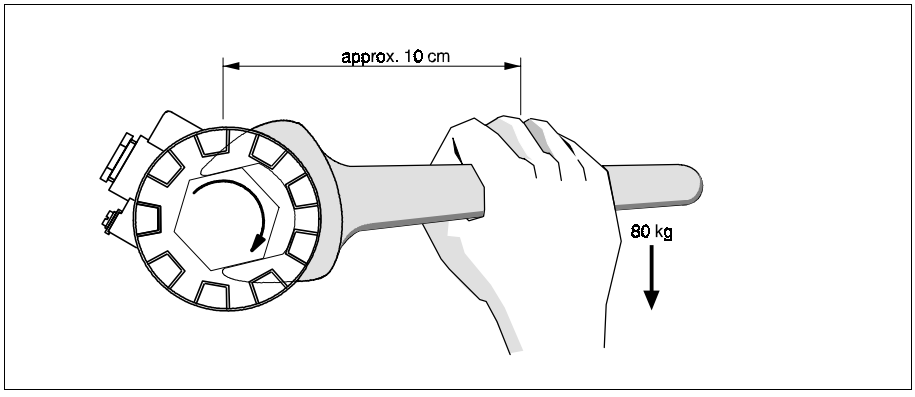


Fig. 8
A torque of approx. 80 Nm when screwing in means that:
If you weigh approx. 80 kg, you can support your total body weight holding the spanner (60 AF) approx. 10 cm from the centre of rotation.

Rotating the Housing

The housing can be rotated if the cable gland is facing in the wrong direction after the Nivocompact has been securely screwed in:

Loosening
- Unscrew and remove the housing cover
- Loosen the central screw in the electronic insert
- Remove the plug-in electronic insert from the housing using the handle
- Slightly loosen the 3 screws in the housing, see Fig. 9.

Rotating
- The housing can now be rotated through 360°.
  When mounting an FTC 731 laterally, the cable gland should point downwards so that no moisture can enter

Tightening
- Tighten up the 3 screws in the housing so that the housing is well sealed at the hex nut
- Insert the electronic insert in the plug
- Securely tighten the central mounting screw
  while making sure that the cable gland remains free

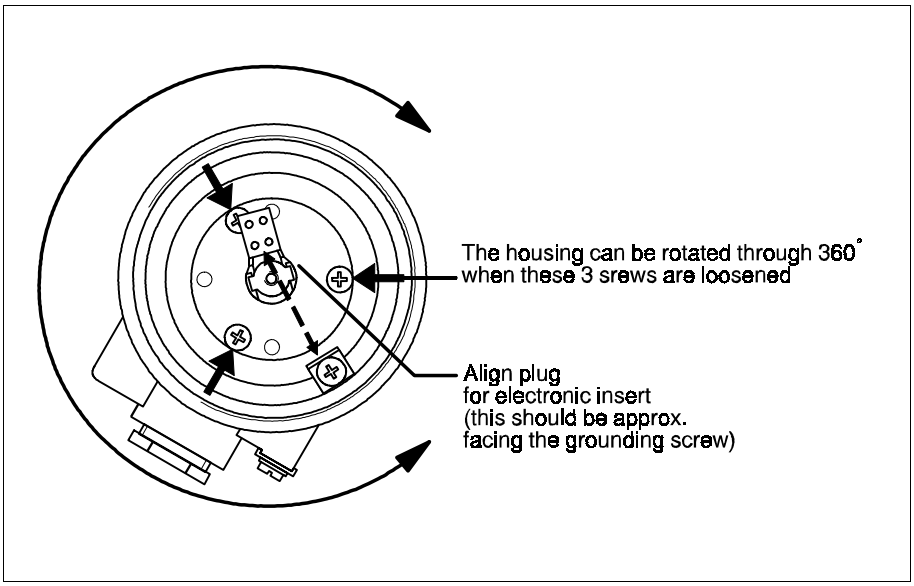


Fig. 9
Loosening and rotating the housing.

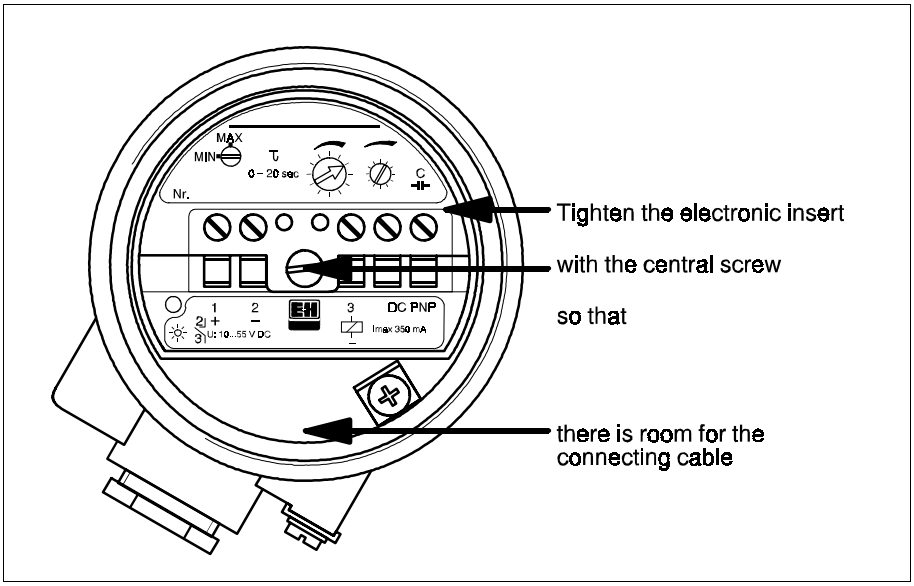


Fig. 10
Tightening the electronic insert.

Connection

Wiring Connection

Main Features of the Different Electronic Inserts

The last number of the order code on the nameplate identifies which type of electronic insert is mounted in the Nivocompact FTC 731:

1=Electronic insert EC 30
Two-wire AC: 21 V…250 V
Electronic switch, max. 350 mA

2=Electronic insert EC 32
Three-wire DC: 10 V…55 V
Transistor circuit, load connection PNP, max. 350 mA

3=Electronic insert EC 33
Three-wire DC: 10 V…55 V 10 V…55 V
Transistor circuit, load connection NPN, max. 350 mA

4=Electronic insert EC 34
with potential-free relay output
AC power supply 21 V…250 V or
DC power supply 20 V…200 V

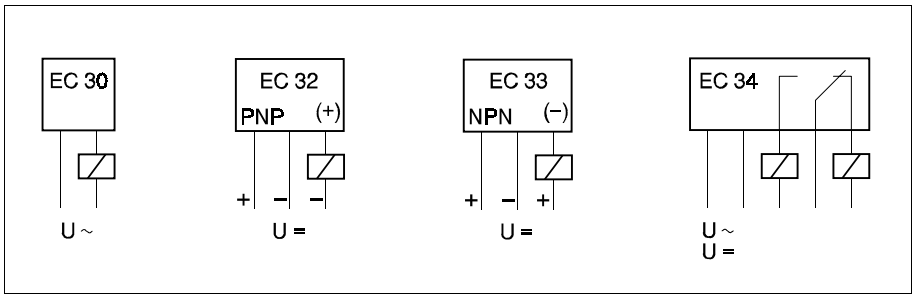


Fig. 11
Electrical connections available with the different electronic inserts.

Load Limit Values

Note the limit values of the loads to which you want to connect the Nivocompact. Exceeding the load can destroy the electronic insert (or the relay contact in the EC 34)

Fuse

Ensure that the rating of the fine-wire fuse corresponds to the maximum load to be connected.
The fine-wire fuse does not protect the electronic insert of the Nivocompact FTC 731.

Diameter of Wiring

Because of the small current used, only small diameter cabling is required. Low-cost cabling with diameter of 0.5 mm^2 to max. 1.5 mm^2 is recommended.

Earth Connection, Grounding

The Nivocompact must be grounded to give reliable operation free from interference. This is done by either connecting it to a grounded silo with metal or reinforced concrete walls or else to the earth conductor PE.
The probe requires a good counter potential. This is done by connecting the ground connection on the outside of the housing to an electrically conductive part of the silo. If the silo is made of a non-conductive material, then connect to the ground connection conductive and grounded parts near to the silo. The connecting cable must be as short as possible.

Connecting the Nivocompact with Electronic Insert EC 30 for AC (Two-Wire Connection)

Connecting in Series to a Load

The level limit switch Nivocompact with electronic insert EC 30 must - like all switches - be connected in series with the load (e.g. relays, microcontactors, lamps) to the power supply.

Direct connection to the power supply without any intermediate load connected (short-circuit!) will result in immediate and permanent damage to the electronic insert.

The load can be connected to Terminal 1 or 2 of the electronic insert.
It is unimportant whether L1 is connected to Terminal 1 or 2.

Power Voltage

The voltage across Terminal 1 and 2 of the electronic insert must be at least 21 V.
The power voltage must be correspondingly higher to compensate for the voltage drop across the connected load.

Load Cutoff

Note that loads connected in series are not completely disconnected from the power supply if the electronic switch in the electronic insert of the Nivocompact »disconnects« (blocks) with level alarm.
Because of the current requirements of the electronics, a small »no-load« current still flows through the connected load.
When the load is a relay with a very small retaining current, then the relay may not de-energise. In this case connect an additional load in parallel to the relay, e.g. a resistor or signal lamp.

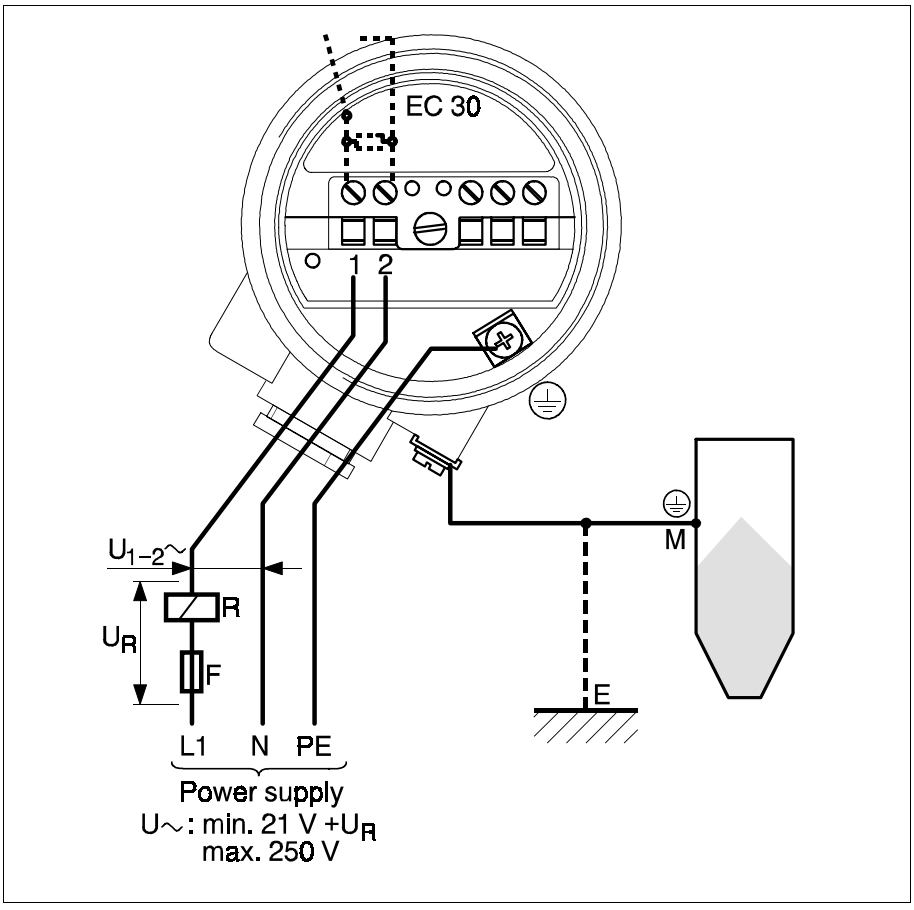


Fig. 12
Connecting the Nivocompact FTC 731 with electronic insert EC 30

U_{1-2}~:21 V...250 V across Terminals 1 and 2 of the EC 30
R: Connected (external) load, e.g. relay
F: Fine-wire fuse, load-dependent
U_R: Voltage drop across the load and the fine-wire fuse
M: Ground connection to silo or to metal parts near to the silo
E: Grounding

Connecting the Nivocompact with Electronic Insert EC 32 (Three-Wire PNP) for DC

Transistor Circuit for Load

The load connected to Terminal 3 is switched by a transistor, contactless and therefore without bouncing.

Terminal 3 has a **positive** signal in normal switching mode.

The transistor is blocked on level alarm or with a power failure.

Protection Against Voltage Peaks

Connecting to an instrument with a high inductance:
a voltage limiter should be connected.

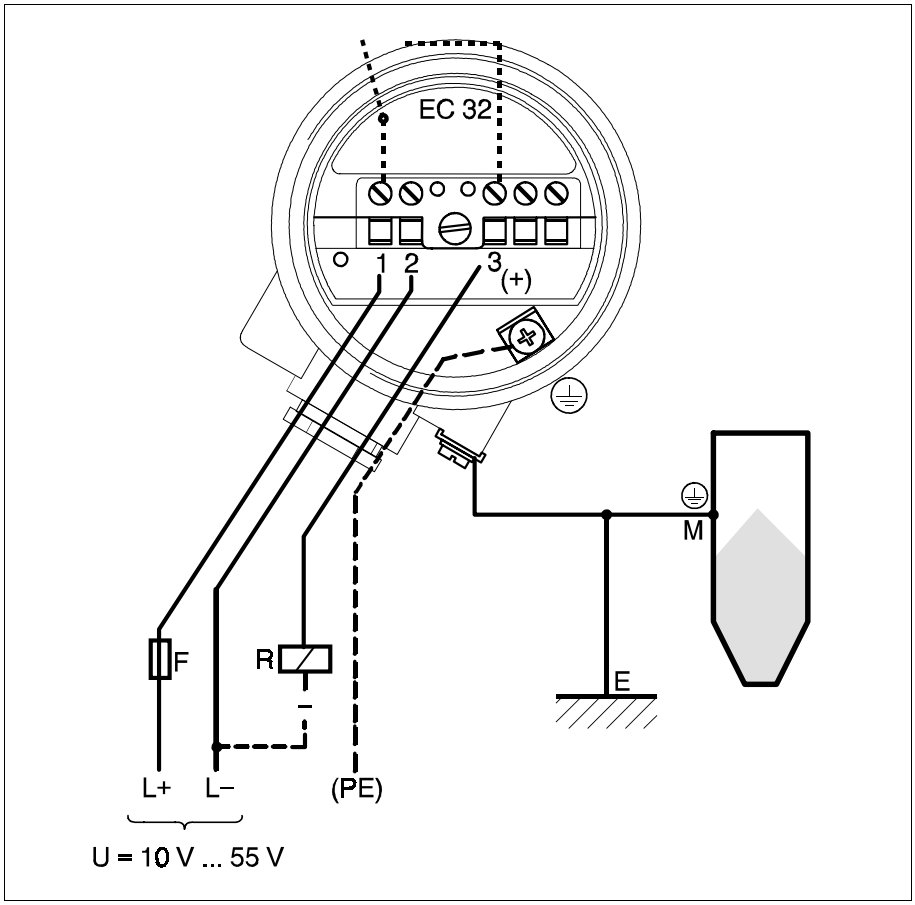


Fig. 13
Connecting the Nivocompact with electronic insert EC 32 (PNP)

F: Fine-wire fuse, load-dependent
R: Connected load, e.g. PLC, PCS, relay
M: Ground connection to silo or metal parts near to the silo
E: Grounding

Connecting the Nivocompact with Electronic Insert EC 33 (Three-Wire NPN) for DC

Transistor Circuit for Load

The load connected to Terminal 3 is switched by a transistor, contactless and therefore without bouncing.

Terminal 3 has a **negative** signal in normal switching mode.

The transistor is blocked on level alarm or with a power failure.

Protection Against Voltage Peaks

Connecting to an instrument with a high inductance:
a voltage limiter should be connected.

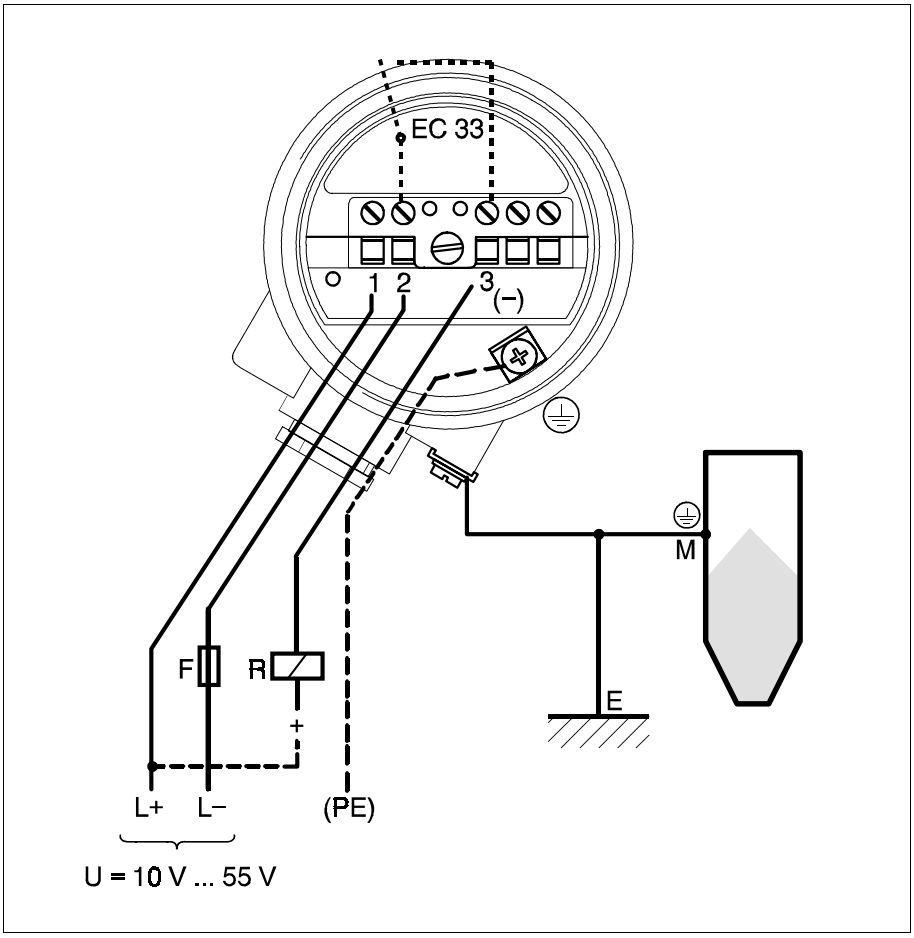


Fig. 14
Connecting the Nivocompact with electronic insert EC 33 (NPN)

F: Fine-wire fuse, load-dependent
R: Connected load, e.g. PLC, PCS, relay
M: Ground connection to silo or metal parts near to the silo
E: Grounding

Connecting the Nivocompact with Electronic Insert EC 34 (Relay Output) for DC and AC

Power Supply

With AC, it is unimportant whether L1 or N is connected to Terminal 1.
With DC, it is unimportant whether L+ or L– is connected to Terminal 1.

Relay Contact for Load

The load is connected over a potential-free relay contact (change-over contact).
The relay contact breaks the connection between Terminal 3 and Terminal 4 on level alarm or with a power failure.

Protection Against Voltage Peaks and Short-Circuiting

Protect the relay contact by connecting a spark barrier to instruments with high inductance.
A fine-wire fuse (load-dependent) can protect the relay contact if a short-circuit occurs.

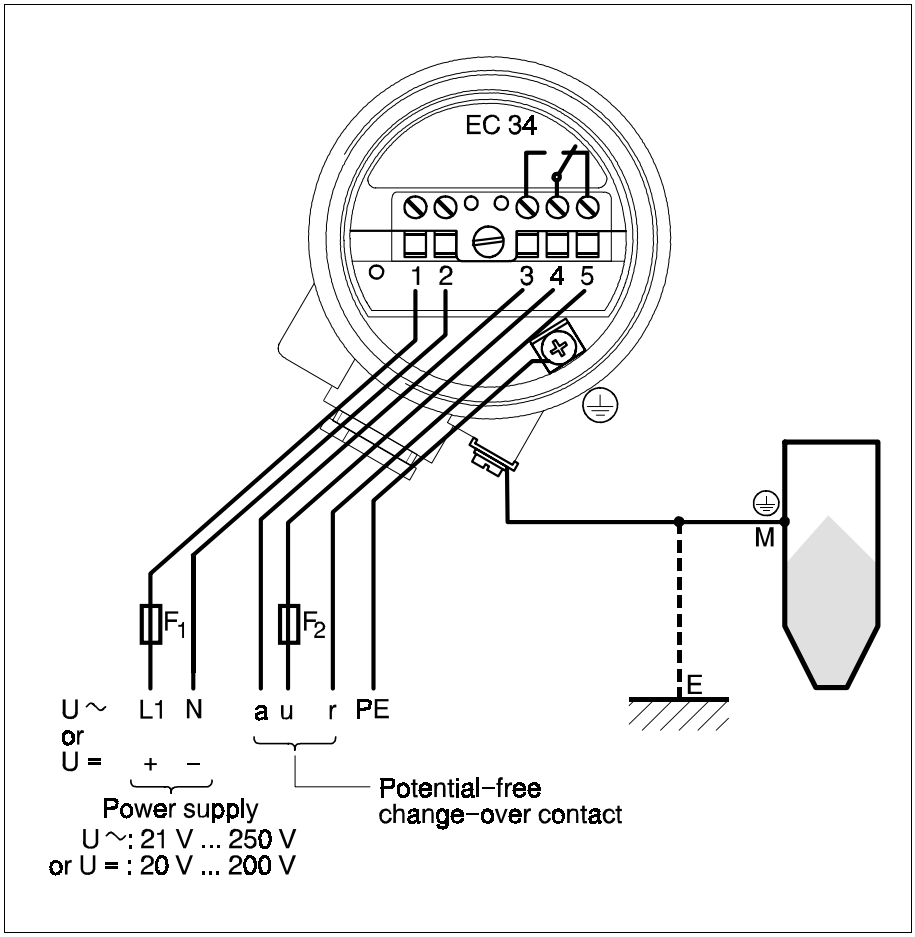


Fig. 15
Connecting the Nivocompact with electronic insert EC 34 (relay output)

F_1: Fine-wire fuse 200 mA, semi-time lag recommended
F_2: Fine-wire fuse to protect the relay contact, load-dependent
M: Ground connection to silo or to metal parts near to the silo
E: Grounding

Wiring On-Site

Tools Required for Installation

- Open-end spanner 22 AF
- Screwdrivers, blade width approx. 4 mm and 7 mm or Phillips screwdrivers PZD 1 and PZD 2
- Usual electrical tools

Before connecting, make sure that the power supply used is the same as that stated on the nameplate of the electronic insert.

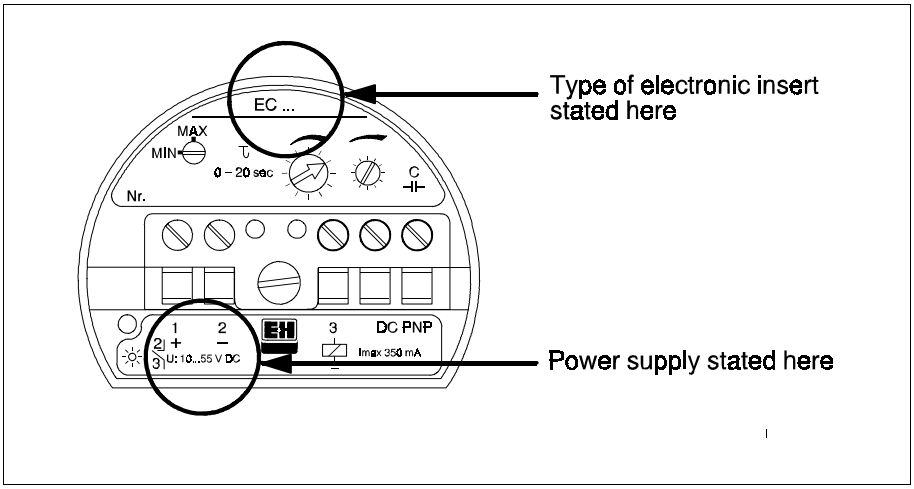


Fig. 16
Note the power voltage stated on the nameplate!

Electrical Connection

Connect the Nivocompact according to the appropriate diagram Fig. 12 to Fig. 15.

Ensure that no water gets into the housing while connecting up.

The gasket in the standard cable gland is designed for cable diameters from 7 mm to 10 mm.
A suitable gasket must also be used for other cable diameters.

You can seal with the »water-tight« cable gland with cables having diameters from 5 mm to 12 mm.

Ensure that there is a good, **short ground connection** from the housing of the Nivocompact to the silo or to grounded metal parts near to the silo.

After Connecting

Screw the thread of the cable gland securely to comply with the standards of Protection IP 55 or IP 66.

For applications in the open or in moist surroundings, sealing the standard cable gland with sealing compound is also recommended.
(This is not required with the »water-tight« cable gland).

Calibration

Tools Required for Calibration

- Screwdriver with blade width approx. 3 mm
- Screwdriver with blade width approx. 4 mm

The rotary switches and adjusting elements for calibration are on the electronic insert in the housing.
Directly beside these calibration elements are the power connections with voltages up to 250 V.
Only use a screwdriver which has insulation as far as the blade or else tape over the terminals with insulating tape before calibration.

Turn on the power supply.

Switching Delay

Switching delay can be adjusted between approx. 0.5 s and 20 s. See Fig. 17. It is the same time interval for the sensor whether free or covered.
Select the optimum time for your application.

Accurate adjustment with a free probe is possible:
- Touch the central screw in the electronic insert with the screwdriver. After a preset time, the Nivocompact switches, the LED goes off or comes on.
- Keep altering the adjustment until the exact switching delay is set.

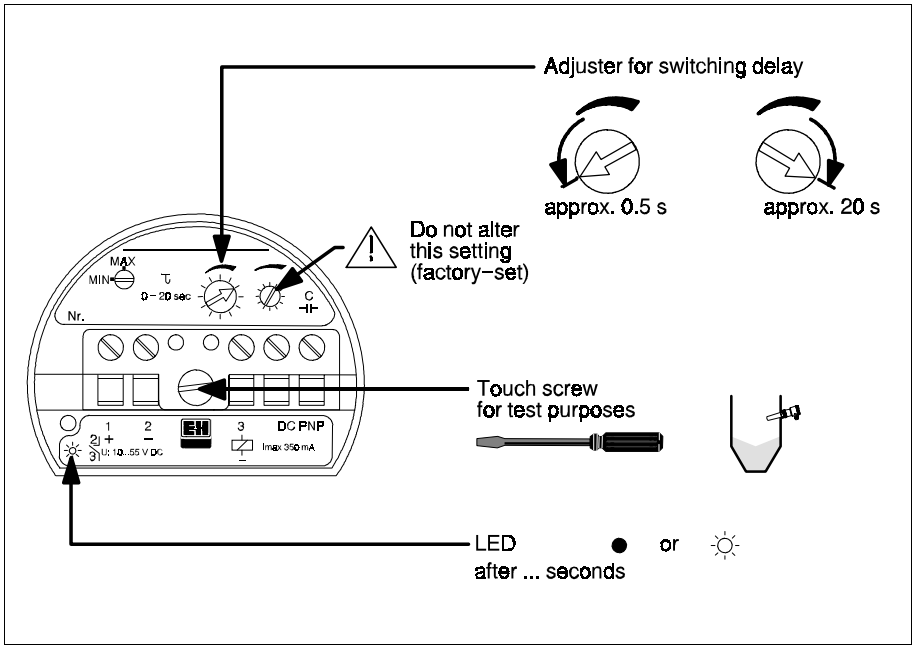


Fig. 17
Setting the switching delay.

Safety Switching

By using the rotary switch, select the fail-safe mode for your particular application:

- Maximum fail-safe: the current circuit is blocked if the probe is covered or the power supply fails.
- Minimum fail-safe: The current circuit is blocked if the probe is uncovered of the power supply fails.

Changing the fail-safe mode, also changes the LED status.

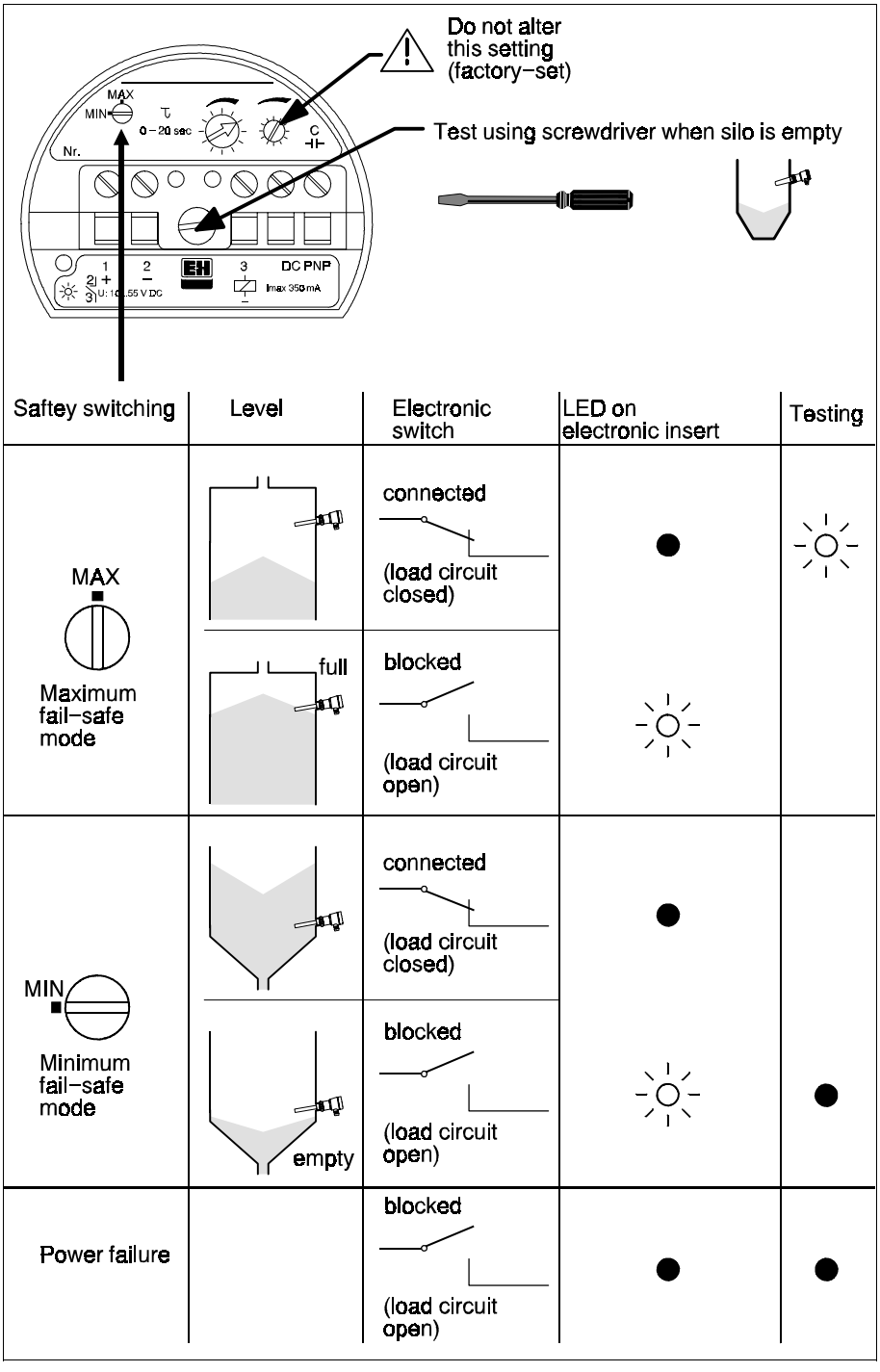


Fig. 18
Selecting the fail-safe mode and function.

Particular Cases

Capacitance Calibration (Changing Factory Setting)

If:
- the installation cannot be carried out according to Fig. 7 b,
- the dielectric constant ε_r of the bulk solid is lower than 2.0, e.g. plastic granulate,

then it may be necessary to change the factory-set adjustment.
Adjustment to $\varepsilon_r > 1.6$ is possible.

For this capacitance calibration, the silo must be empty or the level must be at least 100 mm below the level of the probe.
The adjuster for the calibration requires approx. 30 turns from one end of the range to the other.

Please carry out the sequence shown in the diagrams Fig. 19 to Fig. 21.

Capacitance Calibration, Initial Settings

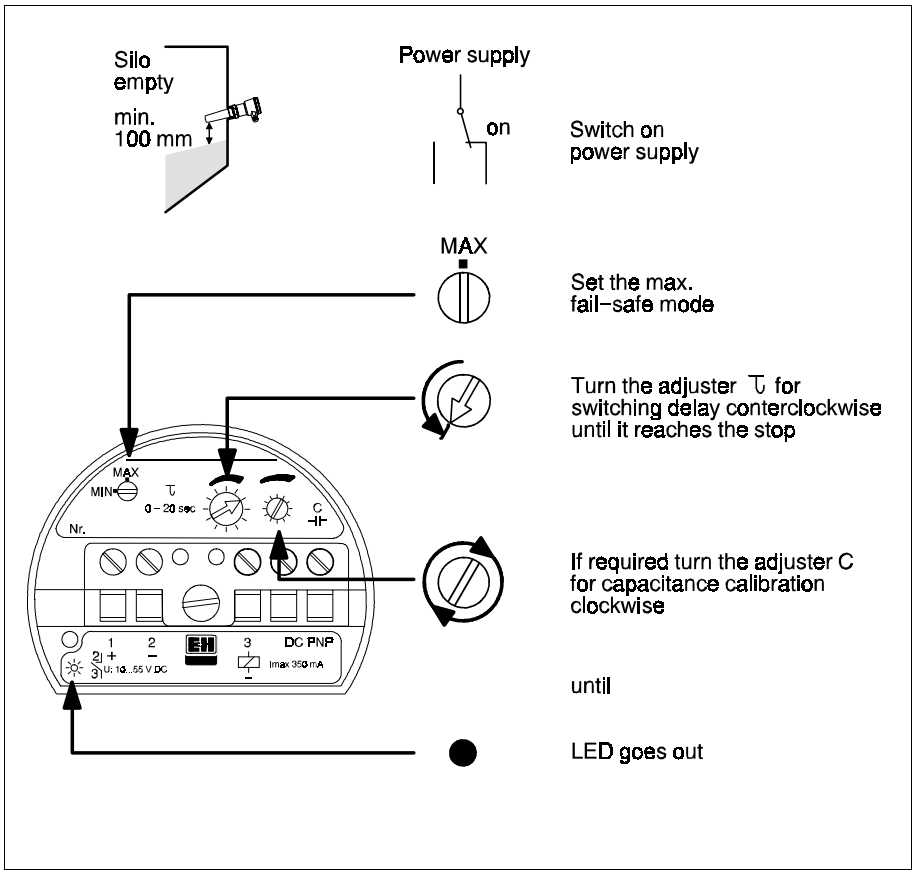


Fig. 19
These initial settings must be done before capacitance calibration.

Determining the Switching Point

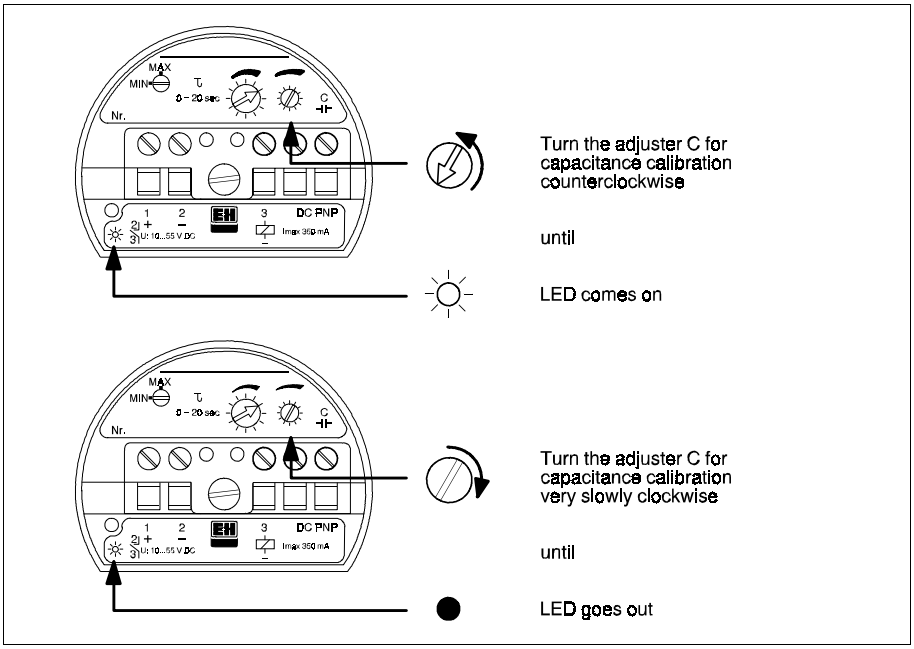
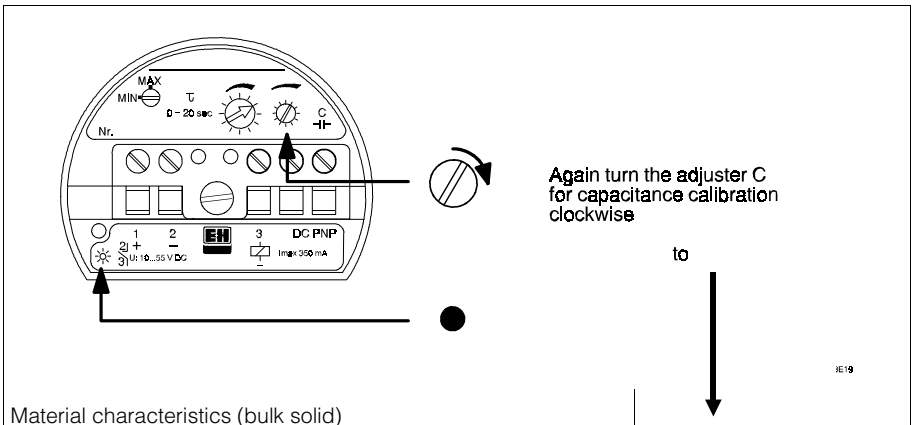


Fig. 20
Capacitance calibration must be carried out both slowly and carefully.

Adjusting for Material Characteristics



Material characteristics (bulk solid)		
Very low dielectric constant ε_r approx. 1.6...2.0	No build-up	approx. 90° (2 divisions)
	With low build-up	approx. 135° (3 divisions)
Low dielectric constant ε_r approx. 2.0...2.5	No build-up	approx. 180° (4 divisions)
	With low build-up	approx. 270° (6 divisions)
Average dielectric constant ε_r approx. 2.5...4.0	No build-up	approx. 270° (6 divisions)
	With low build-up	approx. 1 complete turn
High dielectric constant or conducting bulk solid	No build-up	approx. 1 complete turn
	With low build-up	approx. 2 complete turns

Fig. 21
Accurate adjustment ensures high switching reliability.

When the probe is covered with non-conductive bulk solid having a low dielectric constant, then the Nivocompact only switches when the rod probe is completely covered with the material.
The degree of covering depends on the calibration.
Turning the fine calibrating element clockwise causes the Nivocompact to become less sensitive.

Remember!

- Set the switching delay (refer to Page 18)
- Select the safety switching (refer to Page 19)

Function Control

With the probe uncovered, touch the central retaining screw of the electronic insert with a screwdriver holding it by the insulated handle.
This simulates the bulk solid covering the probe.
The LED indicates a change of status.

This is only a function control test of the instrument.
Please also check for the correct operation for limit detection by filling and emptying the silo over the installation point!

Final Points

Screw the housing cover securely down after connection and calibration so that the standards comply to Protection IP 55 or IP 66.

For applications in the open, a protective sun cover (accessory) is to be used to cover the aluminium housing of the Nivocompact.

Maintenance

The capacitive level limit switch Nivocompact FTC 731 requires no maintenance when correctly installed and used properly under the normal conditions specified by the system.

When cleaning and checking the silo:
- Examine the probe to check for damage to the installation, especially around the threaded boss
- Remove material build-up, especially at the tip of the probe

With initial but consistently low material build-up:
Recalibrate the Nivocompact after the material build-up has occurred, if it does not always switch correctly.

Ensure that the cable gland and housing cover are tight fitting so that no moisture can enter.

Troubleshooting

When an error is indicated, first check to make sure that
- The Nivocompact is properly connected
- There is good earthing and ground connection
- A power supply exists at the terminals
- All instruments connected are operating correctly
- In the case of the electronic insert EC 30, the minimum required load of the connected instruments is at least present
- The correct fail-safe mode has been selected
- The switching delay has been correctly adjusted
- The capacitance calibration has been carried out correctly

Carry out a function control (see above)

Refer to the Error Tables, Fig. 22 and Fig. 23.

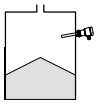
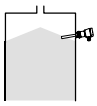
Error with maximum fail-safe mode 	Possible causes
Probe free (level below maximum)  but with electronic switch blocked  LED on 	- High material build-up on the vessel wall or on probe rod - Water in housing
Probe covered (level above maximum)  but with electronic switch connected  LED off	- Dielectric constant of the material too small - Drier (or different) material now in silo than expected on calibration

Fig. 22
Troubleshooting with maximum fail-safe mode.

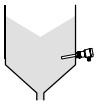
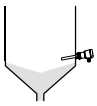
Error with minimum fail-safe mode 	Possible causes
Probe covered (level above minimum)  but with electronic switch blocked  LED on 	- Dielectric constant of the material too small - Drier (or different) material now in silo than expected on calibration - Material has formed cavities - Probe rod broken off
Probe free (level below minimum)  but with electronic switch connected  LED off	- High material build-up on the vessel wall or on probe rod - Water in housing

Fig. 23
Troubleshooting with minimum fail-safe mode.

Guarantee

Our guarantee terms are included with the documents included with delivery. Copies may also be obtained from the agent responsible.
Any modification carried within the instrument during the guarantee period invalidates the terms of the guarantee.

Replacement of Parts

Replacing the Electronic Insert

Switch off all sources of power to the Nivocompact

Removal

- Remove the electrical connections to the electronic insert
- Remove the central screw in the electronic insert
- Lift out the electronic insert from the housing using the handle

Insertion

- Push the new electronic insert carefully into the plug in the housing
- Tighten the central screw
- Connect up the electrical wires
- Set the switching delay
- Select the same fail-safe mode as it was for the old electronic insert.

Function Test

- Turn on the power supply
- Fill and empty the silo by the installation point of the probe and check the switching of the instrument.
  This is extremely important with bulk solids having low dielectric constants or with critical installations.
- If required: Carry out a capacitance calibration.

Returning Parts for Repair

If a Nivocompact FTC 731 cannot be repaired and needs to be sent back to Endress+Hauser, then please note the following:

Cleaning the Probe

Remove all material residue attached to the probe.
This is especially important as the material may be of a dangerous nature, e.g. corrosive, poisonous, carcinogenic, radioactive etc.
Please return parts only after they have been thoroughly cleaned of dangerous materials. Check in particular scratches and the possibility of diffusion through plastic material.

Stating Material and Defect

When returning the probe, please state exactly the material in which it was used and its chacteristics.
A brief description of the error will also help us to diagnose the reason for it and at the same time lower your costs.

Thank you for your cooperation.

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