

COMPACT LEVEL LIMIT SWITCH



Type: **FUELL**

- BULK GOODS IN SILOS
- POTENTIAL-FREE CHANGE-OVER
- FLANGE DN100
- UP TO +400 °C IN THE SILO



ORDER CODE

Code	Field	Meaning
FG	series	Compact Level Limit Switch
0	measuring element	capacitive
0	switching range	0 ... 0.5 m
0	output	1 potential-free change-over contact
0	supply	21 ... 250 V AC/DC
0	process connection	DIN flange DN100
0	other / accessories	customized model

The manufacturer document gives the code as F G with six positions; the standard model carries a zero in each of them.



OVERVIEW

Probe tube and silo wall are the two electrodes of a capacitor. With air between them the capacitance has a given value; when bulk material with a higher dielectric constant replaces the air, the capacitance rises and the charging time with it. The electronics evaluate that change and switch the relay contact when the adjusted limit is reached. The probe is a zinc-plated steel tube of 1 inch and 1000 mm carried by a Pythagoras ceramic; the angle between probe and body is adjustable between 90 and 180 degrees. The device is flanged to the silo with DN100 and a mating flange welded to the wall, which makes it suitable for steel silos and steel hoppers; with a modified mounting — a counter electrode of grating — concrete silos are possible too. Inside the silo it works up to +400 °C. The output is one potential-free change-over contact; a red LED shows the switching state.

MEASUREMENT AND OUTPUT

- Capacitive against the silo wall
- Bulk goods with dielectric constant > 2.5
- Initial capacitance adjustable to approx. 400 pF
- Switching range 0 ... 0.5 m
- Output 1 potential-free change-over contact
- 250 V AC / 4 A, 100 V DC / 4 A
- Switching delay approx. 0.5 s plus 1.5 s
- Red LED shows the switching state

DEVICE AND MOUNTING

- Process connection flange DN100/114
- Mating flange DN100 to weld onto the silo
- Probe steel tube 1", zinc plated, 1000 mm
- Carrier Pythagoras ceramic Ø 65 x 283 mm
- Probe angle 90 ... 180°, adjustable
- Enclosure diecast aluminium, IP 65
- Cable entry 1 x M 20 x 1.5, up to 2.5 mm²
- In the silo 0 ... +400 °C, weight approx. 20 kg



TECHNICAL DATA

INPUT

Measurement	capacitive
Medium	sand, gravel, lime, plaster, cement, pumice, dolomite, kaolin, glass aggregate, flour, moulding sand, crushed ore, grain, aluminium shavings, sugar beet chips, fodder and similar bulk solids
Dielectric constant	> 2.5
Initial capacitance	adjustable to approx. 400 pF
Measuring frequency	approx. 770 kHz for short probes up to 4 m · approx. 450 kHz for long probes
Switching range	0 ... 0.5 m
Switching delay	approx. 0.5 s

MECHANICS AND PROCESS

Enclosure	diecast aluminium
Probe	steel tube 1", zinc plated, 1000 mm
Carrier	Pythagoras ceramic Ø 65 × 283 mm
Probe angle	90 ... 180°, adjustable
Process connection	flange DN100/114 DIN 2633 C22.8 with 8 screws M16 × 60 and sealing; mating flange DN100 DIN 2527 RSt 37.2 to weld onto the silo wall; other versions customized
Range of pressure	probe PN10 · flange PN16 · system pressure 10 bar maximum
Cable entry	up to 2.5 mm ² through 1 × M 20 × 1.5
Protection class	IP 65
Weight	approx. 20 kg

OUTPUT

Relay	1 change-over contact, potential free
Contact rating, AC	250 V AC / 4 A / 1000 VA / 500 VA (cos phi = 0.7)
Contact rating, DC	100 V DC / 4 A / 100 W
Operating life	> 10 ⁵ switchings at maximum contact load
Switching delay	additional 1.5 s
Status indication	red LED

POWER SUPPLY

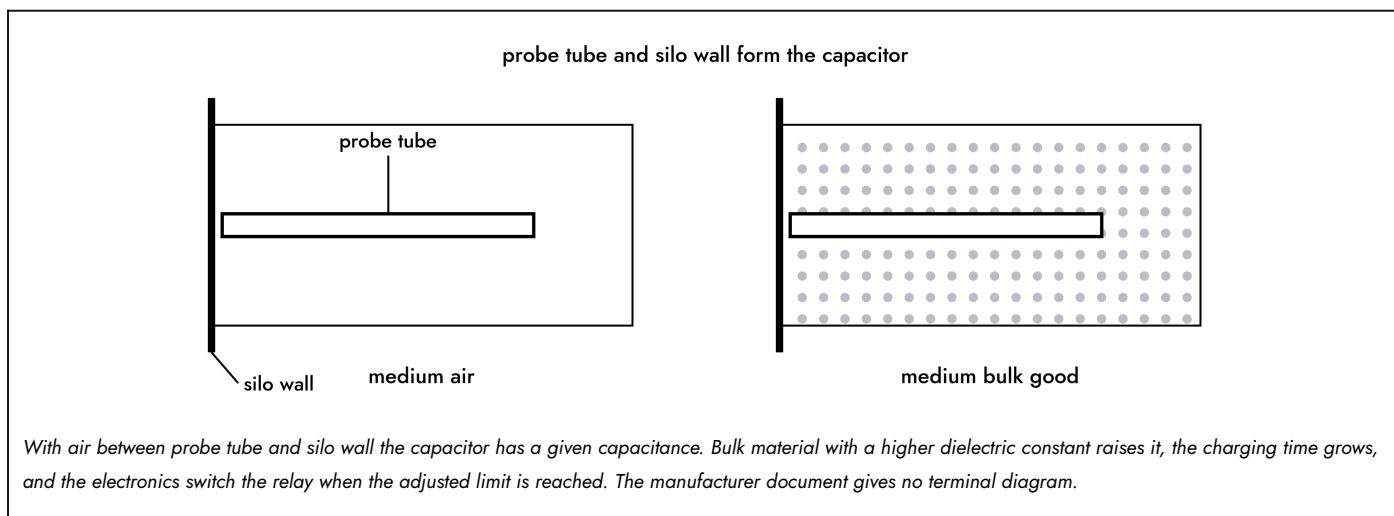
Supply voltage	20 ... 125 V DC in a hazardous area · 20 ... 200 V DC outside · 21 ... 250 V AC, 50/60 Hz
Current consumption	5 mA maximum (eff.)
Peak inrush current	200 mA maximum, 5 ms maximum
Pulse current	50 mA maximum, 5 ms maximum
Pulse frequency	approx. 1.5 s

AMBIENT CONDITIONS AND ADJUSTMENT

Temperature	in the silo 0 ... +400 °C · ambient -20 ... +60 °C · storing -40 ... +85 °C
Adjustment	rotary switch for fail-safe mode, rotary switch for probe length, adjusting elements for capacitance fine and coarse, and an LED indicating the switching state — all inside the enclosure



MEASURING PRINCIPLE



ACCESSORIES

Mating flange	DN100 DIN 2527 RSt 37.2, to weld onto the silo wall
Customized model	process connection and probe to specification, on request

For concrete silos a counter electrode of grating takes the place of the steel wall.

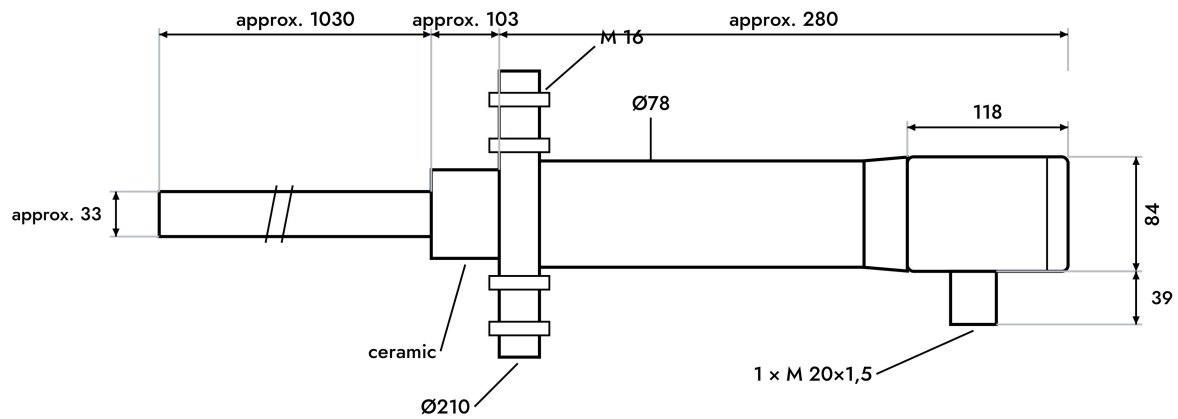
COMPLIANCE

 IP65	Protection class	IP 65
 Galvanized Steel	Probe	steel tube 1", zinc plated
 Aluminum Alloy	Enclosure	diecast aluminium

The supply section distinguishes a hazardous from a non-hazardous area, but no Ex approval for this device is documented in the manufacturer document.



DIMENSIONS (mm)



Drawn by octogon from the manufacturer document; the dimensioned values are taken from it, the outline is schematic and the lengths are not to scale — the probe tube is broken, as in the manufacturer drawing.

