

SWITCHES FOR SOLIDS APPLICATIONS

The design of a vibrating level switch for solids must be fundamentally different to the design described for liquids. If two large parallel blades were used on powders or solids it would be too easy for product to build-up and become lodged between the blades causing the oscillations of the switch to stop regardless of product level.

For solids applications on products ranging from cornflakes to coal, it is preferable to have only one blade in contact with the product. This eliminates the potential for bridging between the forks and ensures that the switch does not give false alarms.

DP120, 140 & 150 DIAMOND POINT

The design of the Diamond Point produces the most rugged but sensitive switch for solids applications. The hollow diamond shaped blade houses the second vibrating rod inside. The blade is very strong in the vertical direction to withstand falling solids and to ensure that product does not build upon it, but retains its flexibility and sensitivity in the horizontal mode enabling it to sense products with very low bulk densities.

DP600/660

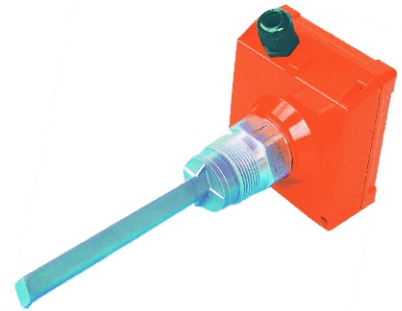
The DP600 series uses the piezo element to excite an 85mm long stainless steel rod to its resonant frequency of 460Hz. When the material covers the rod it stops the vibration.

The DP600 is suitable for use on pellets and granules. It will detect the presence of solid materials with bulk density greater than 90 grams per litre. It is not suitable for sticky materials or materials that tend to hang-up.

The DP660 model is a low-cost OEM product designed specifically to be supplied in volume and fitted into other companies products. It has a 1 inch NPT or DIN 2999 G1 process connection and a PNP or relay output. This is also suitable for products with bulk density of 90 grams per litre or greater.

TYPICAL SOLIDS APPLICATIONS

- ◆ Powered milk
- ◆ Frozen chips
- ◆ Beans
- ◆ Sugar
- ◆ Sweets
- ◆ Coffee beans
- ◆ Coffee (ground)
- ◆ Peanuts
- ◆ Tobacco
- ◆ Grain
- ◆ Tea (leaf)
- ◆ Salt
- ◆ Flour
- ◆ Spices
- ◆ Soda
- ◆ Animal food
- ◆ Cornflakes
- ◆ Pellets
- ◆ Carbon black
- ◆ Chemicals
- ◆ Foundry sand
- ◆ Wood shavings
- ◆ Chalk
- ◆ Styrofoam
- ◆ Cellulose
- ◆ Glass (ground)
- ◆ Granular plastics
- ◆ Powdered clay
- ◆ Polystyrene
- ◆ Gravel
- ◆ Sawdust
- ◆ Filler materials
- ◆ Cement
- ◆ Lime



Diamond Point DP120, 130, 140 & 150



DP600 Series



660 Series Low Cost for OEM

LEVEL SWITCHES FOR SOLIDS

The Diamond Point Level Switch is designed specifically for use with dry products ranging from stone aggregates and heavy materials such as cement, to very low density materials like cornflakes and fine powder or flour.

Its unique principle of operation and shape ensures that it is self-cleaning and because it is only sensitive at its tip it is not influenced by build-up on the silo walls.

DIAMOND POINT: SINGLE BLADE

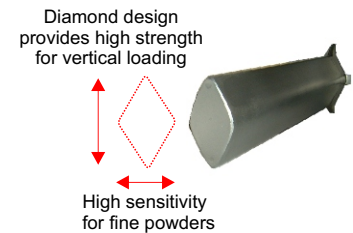
The single blade design with its reinforced diamond shaped vibrating blade prevents material build-up or bridging which are typical problems associated with the dual blade "tuning fork" design.

Being very sensitive in the lateral mode the level switch can be used for extremely light materials with densities as low as 20 grams per litre.

The strong stainless steel construction gives the Diamond Point level switch strength in the vertical direction for use with heavy materials such as cement or aggregates.

Material build-up on the container wall has no influence on the function of the Diamond Point level switch as only the tip of the vibrating blade is sensitive and not the base.

The electronic circuit of the Diamond Point level switch includes indication of power failure. Fail safe high or low is selectable.



DIAMOND POINT: DP120

The standard model DP120 has an insertion length of approx. 173 mm and can be mounted to the container from top or from side for both high or low level detection. Connection to the container or vessel is made via thread 1 ½" BSP, NPT or DIN.



WELDED EXTENSION: DP130

If the application requires longer insertion length, this model offers the possibility to adapt the insertion length exactly to the length required by means of a pipe which is welded between the vibrating probe and the 1 ½" mounting socket. Maximum insertion length for DP130 is 2.0 metres. The DP130 is suitable for top mounting.



THREADED EXTENSION: DP140

The DP140 provides the flexibility of different insertion lengths up to 4.0 metres. The extension is performed by a 1" pipe with threads on both ends screwed between the vibrating probe and the 1 ½" mounting socket. As no special equipment is necessary for making the extension it is possible for the customer to obtain and mount the extension tube at the site which helps to reduce spares and save costs for transportation. The DP140 is suitable for top mounting.



FLEXIBLE CABLE EXTENSION: DP150

The DP150 can be supplied with up to 20 metres of a polyurethane sheathed, steel rope reinforced cable. The DP150 is for top mounting only. The connection to the container is made by thread 1 ½" DIN or NPT. The DP150 has the advantage of offering very long insertion lengths but also provides easy transport as it can be shipped in very compact boxes in comparison to the extension tube models DP130 and Dp140. The DP150 can be used for the detection of solids or for the detection of sediment below the liquid level.



LEVEL SWITCHES FOR SOLIDS - LOW COST

The DP600 series has a single solid stainless steel rod which is vibrated by the piezo electric element. Due to its small size it is ideal for use in small hoppers containing granular materials or pellets, like plastics, food or grain, but the circular construction of the DP600 means that it is not as sensitive to light materials. The 600 series should only be used on materials which have a bulk density greater than 90 grams per litre.

LOW COST DESIGN - DP600 AND DP660



DIAMOND POINT 100 SERIES PRODUCT SELECTOR

Code	Product				
DP1	Diamond Point Vibrating Probe				
	Code Probe Type				
	20 Standard unit DP120				
	30 Welded extension to 2m DP130				
	40 Screwed extension to 2m DP140				
	50 Flexible extension to 6m DP150				
	Code Probe Type				
	D 1.5" DIN 2999 Process connection				
	N 1.5" NPT Process connection				
	Code Cable Gland				
	-1 Single				
	-2 Double				
	Code Options				
	02-2 Remote electronics with 2.4m cable				
	-3 Sediment detection in water				
	-9 DPDT Relay				
	-19 External LED status				
	-25 High temperature version 150°C				
	,-STEX ATEX Dust approval zone 21/21/22 see pg 10				
	,-xxxx Extension length in mm for DP140/150 only				
DP1	20	D	-1	,-STEX	,-xxxx

DIAMOND POINT 600 SERIES PRODUCT SELECTOR

Code	Product		
DP600	Diamond Point Vibrating Probe		
DP660	Diamond Point Vibrating Probe for OEM		
	Code Probe Type		
	D 1" DIN 2999 Process connection		
	N 1" NPT Process connection		
	Code M16 Cable Gland		
	1 Single N/A on DP660		
	2 Double N/A on DP660		
	Code Options		
	02-2 Remote electronics with 2m cable N/A on DP660		
	25 High temperature version 150°C N/A on DP660		
	STEX ATEX Dust approval zone 20/21/22 see pg 10 N/A on DP660		
DP600	D	1	STEX

SPECIFICATION

Enclosure	DP120/130/140/150	DP600	DP660
	Die Cast Aluminium	Die Cast Aluminium	Stainless Steel
	IP66/67	IP66/67	IP66
Electrical Connection	PG13.5 (Option for 2)	M16 (Option for 2)	DIN 43650
Material Wetted Parts	Stainless Steel 1.4301	Stainless Steel 1.4301	Stainless Steel 1.4301
Process Connection	1½ DIN 2999 or 1½ NPT	1"BSPT/DIN 2999/1"NPT	1"BSPT/DIN 2999/1"NPT
Max. Vertical Load at end of Blade	1000N	80 N	80N
Max. System Pressure	10 bar	10 bar	10 bar
Max. External length	20m	-	-
System Temperature	-20°C to +80°C	-20°C to +80°C	70°C
Power Supply	20 - 250 V AC or DC	20 - 250 V AC or DC	24 V DC
Power Consumption	3 VA	2 VA	-
Output	Relay SPDT or DPDT	Relay SPDT	Relay SPDT
	250 V AC 5A	250 V AC 5A	50 V 1A
Indication (internal)	Relay – Red	Relay – Red	Relay - Red
	Power – Yellow	Power – Yellow	
Switch Delay	1 – 5 seconds	1 - 5 seconds	1 – 5 seconds
Min. Product Density	20 grams per litre	90 grams per litre	90 grams per litre
Ambient Temp. range	-20°C to +60°C	-20°C to +60°C	-20°C to +60°C

Approvals

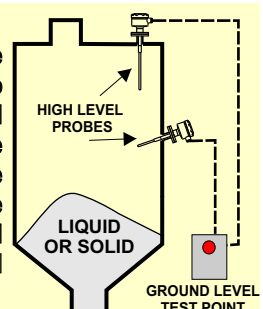
CE Approval	EMC 890/336/EEC	-	-
Low Voltage	73/23/EEC	-	-
ATEX	Group II Cat 1/2 D For DP120, 130 & 150	Yes	Yes
Ground Level Test Facility	Optional	No	No

The instruments are ATEX classified as follows:

	Equipment Group	Category	Suitable for zones
Vibrating Probe:	II	1 D	20, 21, 22 or non-explosive atmospheres
Enclosure with electronics:	II	2 D	21, 22 or non-explosive atmospheres
Protection is provided according to EN5028-1-1-1:		- dust-tight enclosure IP6CX - limited surface temperature	
Applied standards are EN50014 and EN650928-1-1-1			

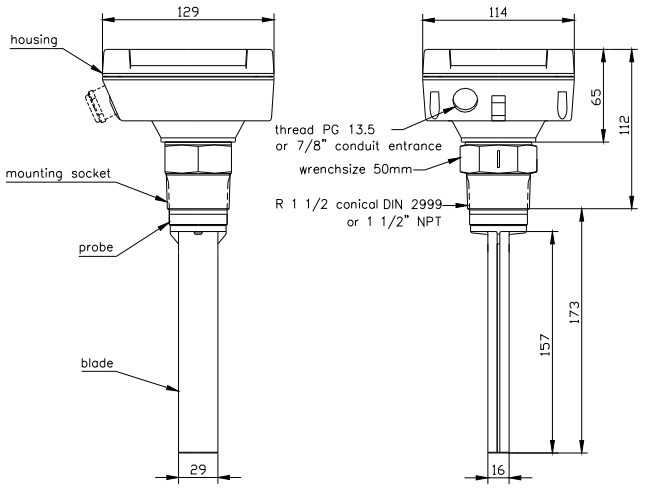
Ground Level Test Facility

Vibrating switches have the facility to be connected to a test switch or panel, mounted at the bottom of the tank or silo, which allows the high level probes to be tested without the need to climb to the top of the silo. The test is designed to be operated before each tank fill starts and the 'GLT' (ground level test) button is simply pressed on the control panel to stop the probe vibrating and test the probe electronics are working satisfactorily. Any alarms which are connected will also operate during the test to check that they are functioning correctly. The 'GLT' feature has the added benefit of helping to reduce product wastage and avoid the need for costly clean up operations from any overspill incident as well as improving the overall safety in the working environment.

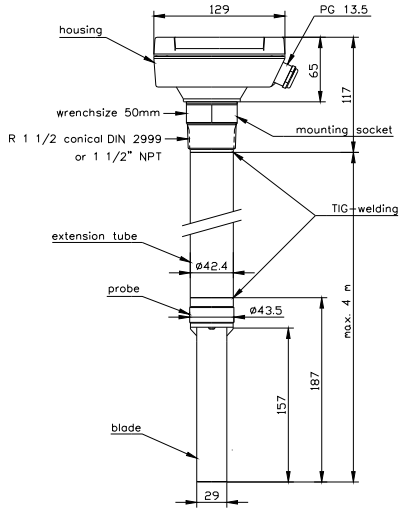


DRAWINGS

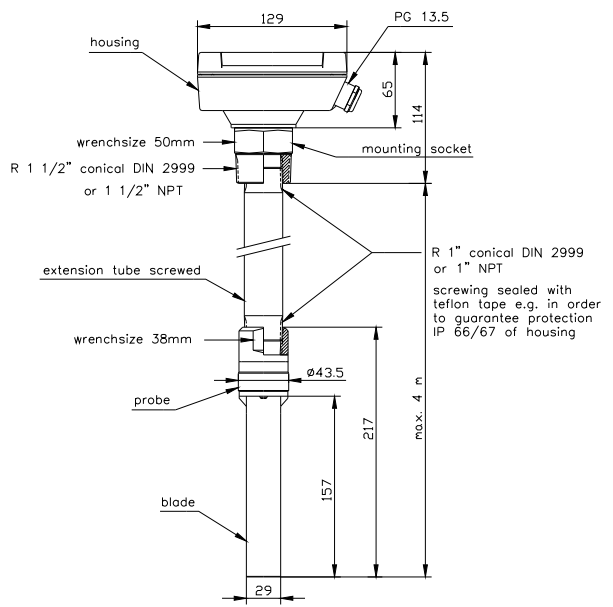
DP120



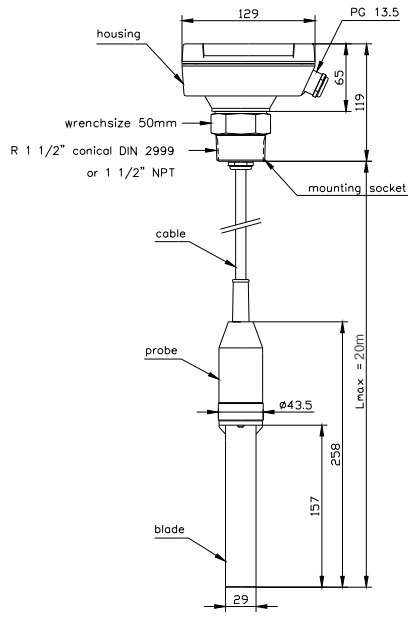
DP130



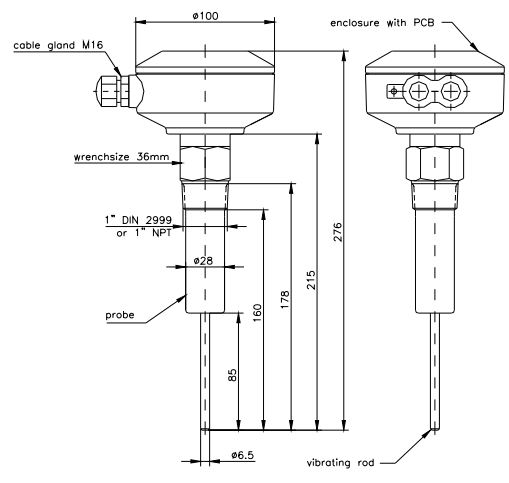
DP140



DP150



DP600



DP660

