# filsa

## Membrane level controllers for easy flowing bulk materials under atmospheric pressure

# Models AD – CD – PD – CDS – PDS – CDES – PDES – A100

Essentially, these controllers consist of a switch actuated by a membrane. The movement of the switch is the result of the pressure exerted by the bulk material against the membrane which obliges this membrane to move backwards, reversing the position of the switch. These controllers are used for easy flowing materials, with specific gravities ranging from 0.3 to 2.5 tons per cubic metre.

CE

## Operation

The membrane of the controller should be exposed to the material to be controlled.

When the material entering the silo piles up and covers the membrane, the pressure exerted obliges the membrane to move backwards, actuating on the mechanism which drives the switch.

This switch can be used to start or stop optical or acoustic signals or the loading and unloading mechanisms of the silo or container.

## Location and assembly

Whenever possible, the controllers should be mounted on vertical surfaces.

The vertical position assures the free flow of material to and from the membrane, making the operation of the device easier.

For low density materials, the vertical membrane must be totally covered to actuate the switch.
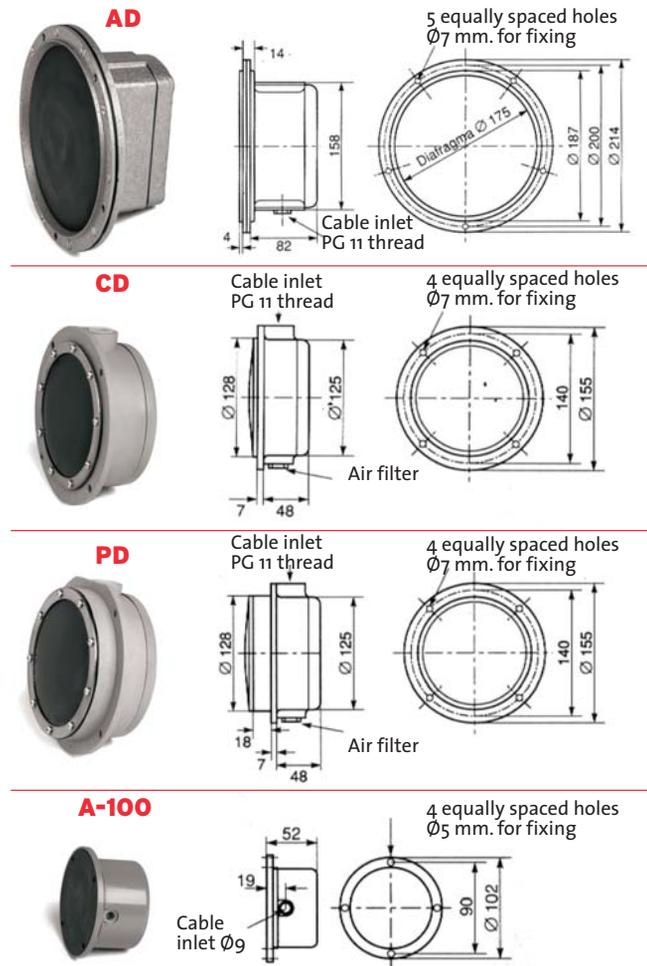
They can also be mounted horizontally to detect obstructions in conveying systems or on surfaces whose slope is not greater than 40º (with respect to a vertical plane) and provided the materials flowing through the silo or the conduit leave the membrane completely free upon emptying.

The high level controllers should be mounted "low enough" for the material to reach and totally cover the membrane before the high level signal is necessary.

The low level controllers should be mounted "high enough" for the material to leave the membrane free with sufficient anticipation to act on the control systems.

## DIMENSIONS     Approximated measures are given in mm.

### AD

5 equally spaced holes Ø7 mm. for fixing

14 · 158 · 4 · 82 · Diafragma Ø175 · Ø187 · Ø200 · Ø214

Cable inlet PG 11 thread

### CD

Cable inlet PG 11 thread

4 equally spaced holes Ø7 mm. for fixing

Ø128 · Ø125 · 140 · Ø155 · 7 · 48

Air filter

### PD

Cable inlet PG 11 thread

4 equally spaced holes Ø7 mm. for fixing

Ø128 · Ø125 · 140 · Ø155 · 18 · 7 · 48

Air filter

### A-100

4 equally spaced holes Ø5 mm. for fixing

52 · 19 · 90 · Ø102

Cable inlet Ø9

To control the low level in large silos and hoppers, use PD or CD with stainless steel membrane.
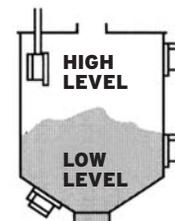
HIGH LEVEL

LOW LEVEL

# Membrane level controllers for easy flowing bulk materials under atmospheric pressure

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## SENSITIVITY REGULATION

### AD

The sensitivity is regulated by adding or removing washers (provided with the controller).

When the number of washers in the counterweight is increased, the material needs to exert more effort to actuate the switch, reducing the sensitivity. Decreasing the number of washers, the material moves the switch with less pressure and the sensitivity is increased. Sufficient weight should be left in the controller to assure the return of the membrane and the correct operation. The air filter, located at the lower part, should be kept unobstructed. It compensates the pressure and assures the sensitivity of the device.

### CD - PD - CDS - PDS

When the supporting bracket is moved towards the centre, the material must exert more pressure to actuate the switch.

## CD - PD WITH ADJUSTABLE SENSITIVITY

The sensibility is changed by tightening or loosening the nut in the regulation mechanism. This obliges the material to exert more or less pressure to actuate the switch.

### CDES - PDES

It is not advisable to regulate their sensitivity. They leave the factory adjusted to the maximum sensitivity. These controllers should be mounted in a vertical position, in order to assure the backward movement of the membrane when the container is emptied. The air filter, located at the lower part, should be kept unobstructed. It compensates the pressure and assures the sensitivity of the device.

### A - 100

Tightening or loosening the screw which puts pressure on the regulation spring, increases or decreases the force required for actuating the switch.
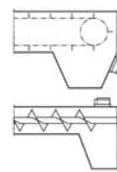
## AUTOMATIC LEVEL CONTROL FOR LOADING A SILO
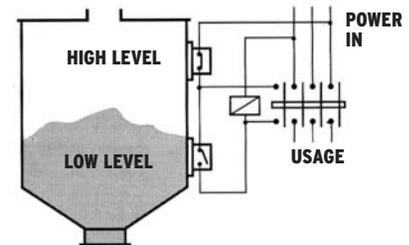


This is a typical diagram of an automatic control which responds to the fluctuating level inside the silo.
When the material leaves the lower membrane free, the filling devices start.



They stop when the high level membrane is covered. The cycle re-starts when the low level membrane is free of material.



Load control in pipes working at full flow or obstruction control when the material circulates freely.



Obstruction control in chain and screw conveyors.

## TECHNICAL CHARACTERISTICS

| | Case and cover | Membrane | Operating temperature | Actuation pressure | Switch | Cable inlet | Protection |
|---|---|---|---|---|---|---|---|
| **Model AD** | Die cast aluminium | Standard: NBR On request: Neoprene, Viton, stainless steel | NBR: -20 to +80ºC Neoprene -20 to +80ºC Viton -20 to +150ºC Stainless steel -20 to +180ºC | NBR 60 - 200 g. Neoprene 60 - 200 g. Viton 60 - 200 g. Stainless steel 100 to 250 g. | Single pole, inverter micro-switch. 15 Amp. 230V a.c. Voltage free. Two switches on request | Threaded hole PG11 bottom | IP53 |
| **Model CD Model PD** | Reinforced plastic Aluminium on request | Standard: NBR On request: Neoprene, Viton, stainless steel | -20 to +80ºC. Please consult for higher temperatures | CD - PD minimum 60 g. CD - PD with adjustable sensitivity 60 - 200 g. CD - PD with st.st. membrane 150 - 500 g. | Single pole, inverter micro-switch. 10 Amp. 250V a.c. Voltage free. Two switches, 5 Amp. 250V a.c. on request | Threaded hole PG11 top | IP53 |
| **Model CDS Model PDS** | Reinforced plastic Aluminium on request | Standard: NBR On request: Neoprene, Viton | -20 to +80ºC. Please consult for higher temperatures | CDS 25 g. min. PDS 25 g. min. | Single pole, inverter micro-switch. 5 Amp. 250V a.c. Voltage free. Two switches on request | Threaded hole PG11 top | IP53 |
| **Model CDES Model PDES** | Reinforced plastic Aluminium on request | Standard: NBR On request: Neoprene, Viton | -20 to +80ºC. Please consult for higher temperatures | CDES 10 g. min PDES 10 g. min | Single pole, inverter micro-switch. 15 Amp. 250V a.c. Voltage free. | Threaded hole PG11 top | IP53 |
| **Model A-100** | Plastic | Standard: NBR On request: Neoprene, Viton | -10 to +60ºC | Adjustable, 8 g. minimum | Single pole, inverter 5 Amp. 250V a.c. Voltage free. | Ø 9 mm or PG7 packing gland, depending of model | IP50 |

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