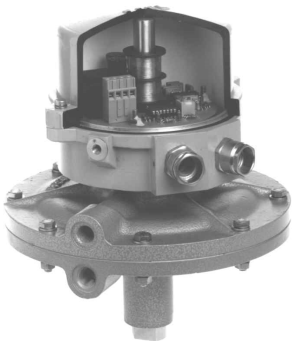
EARL Low pressure control switches and meters for

Differential pressure	**EARL type 241**
Negative pressure	**EARL type 244**
Positive pressure	**EARL type 246**

Application

These spring supported diaphragm units are designed for long term operation and are used for the precise control and measurement of pressures in industrial plant, high value machines and apparatus. They are capable of controlling and measuring low pressures from 0.1 mbar to 2.5 bar whilst remaining undamaged by high media pressure often experienced with differential pressure. The set point of the control unit is available either fixed or adjustable.



Models

- ***Type 241 Differential pressure switch*** — side process connections; control range of series 0.1 mbar to 2.5 bar; for maximum static pressure of 120 bar; suitable for use without pressure balance valve.
- ***Type 244 Negative pressure switch*** — bottom process connection, measuring range of series for negative pressures from 800 mbar to 0.1 mbar against atmosphere.
- ***Type 246 Positive pressure switch*** — top process connection, measuring range of series for positive pressures from 0.1 mbar to 2.5 bar against atmosphere.
- ***Type 241(Ex)i; 244(Ex)i; 246(Ex)i*** — suitable for the use in intrinsically safe circuits.
- ***Type 241vind.; 244vind.; 246vind.*** — with inductive proximity sensor (Namur, direct switching 2-and 3-wire system).

Operation

- Types 241; 241(Ex)i;244; 244(Ex)i;246; 246(Ex)i;

  The differential pressure acts upon a spring loaded diaphragm. A permanent magnet fixed to the diaphragm and guided within a rising tube operates one encapsulated reed contact situated adjacent to the rising tube or a pneumatically operated switch contact.

- Types 244; 244ind., 244(Ex)i;, 246, 246(Ex)i, 246vind.

  The movement of the diaphragm is sensed via a core fixed to the diaphragm which operates either a micro switch, an inductive proximity sensor.

Advantages

- The units are sensitive and the simple construction makes them highly reliable.
- High static pressures do not damage the unit or affect adjustment.
- Reliable and suitable for long term operation.
- Models available for use in maritime and humid tropical climates.
- Simple installation.
- No maintenance needed.
- Long term continuity of spares availability.

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Suitability of differential pressure switches

- Flow control in combination with differential pressure sensors, such as Pitot tube, orifice plate or Venturi tube.
- Filter control.
- Level control of pressurised containers.
- Leakage detection.
- Control of pressure fluctuations in compressors.
- Differential pressure control in gas turbines.
- Flap valve control.
- Burst control of containers.

Suitability for positive pressure switches

- Pressure control of forced ventilation, e. g. in enclosed electrical installations.
- Control of scavenging air in hazardous areas by means of pressurised apparatus (Ex)p – type 246(Ex) – when combined with air flow switch type 171(Ex).
- Ventilation control.
- Monitoring of liquid levels under atmospheric pressure.
- Leakage detection.

Suitability for negative pressure switches

- Control of negative pressure in forced ventilation, e.g. turbo machines and enclosed electrical installations.
- Suction sided control of pumps.
- Ventilation control for feed and exhaust air.
- Leakage detection.

Technical data

Measuring ranges	0.1 -	10.0	mbar with diaphragm chamber-∅	300 mm
	0.3 -	10.0	mbar with diaphragm chamber-∅	250 mm
	3.0 -	100.0	mbar with diaphragm chamber-∅	200 mm
	30.0 -	2500.0	mbar with diaphragm chamber-∅	150 mm

Adjustable set point

Type 244; 246: in the range 1 : 3, e.g. 2 - 6 mbar.

Type 241 in the range 1 : 10, e.g. 1 - 10 mbar.

Admissible deviation of actual value

+/- 5 % of set value.

Repeatability of actual value

+/- 5 % of set value.

Hysteresis between on and off

at 0.1 to 0.5 mbar about 100 % of adjusted set point.

at 0.6 to 2.0 mbar max. 50 % of adjusted set point.
at 2.0 mbar to 1.0 bar max. 30 % of adjusted set point.
from 1 bar max. 20 % of adjusted set point.

(dependent upon switch contact)

Indicating range

Types 244az; 246az; 241az: in the ratio 1 : 5, e.g. 2 - 10 mbar.

Accuracy of indication

+/- 1 % of max. indicated value.

Pressure protection [bar] depending upon diaphragm chamber-∅ and material

diaphragm chamber ∅ [mm]

100	150	200	250	300	
---	----	0,3	0,2	0,1	Aluminium
----	16	3	1,5	1	Gun metal
16	30	16	12	12	Stainless steel
----	0,3	0,2	0,15	0,1	PTFE/PVC

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Special model for high pressure	Material No. 1.4571 for max. pressure 120 bar.
Max. temperature	Standard model: max. 60 °C within the unit.
	Special model: max. 200 °C within the unit.
Materials:	
Diaphragm chamber	aluminium, sea water resistant gun metal Rg10, stainless steel, material no. 1.4571 (similar to 316Ti), PVC; PTFE; HC4.
Diaphragm	a fabric with fluorocarbon-polymer coating with FEP, PTFE.
Moving parts	material no. 1.4571, Hastelloy C.
Switch housing	aluminium, stainless steel, material no. 1.4408 (similar to AISI CF-8M).
Cable entry	M20 x 1.5 ISO.
Protection class to DIN 60 5290	Types 241; 241ind.BZ; 241(Ex)i; 244(Ex)i; 246(Ex)i:IP 65. Types 241az; 244az; 246az: IP 54. Types 241vind.; 244vind.; 246vind.: IP 65 with angular plug connection.
Explosionproof:	Class: Ex ib intrinsically safe; with encapsulated magnetic contact: SPDT type Ex177GWW (ATEX 2162U)

Switch contact (S.P.D.T.)

Typ	Contact-material	U max	I max	P max
GWW / GWW ht	AgSnO	250 V AC/DC	3 A	450 VA / 300 W
GWG / GWG ht	Gold	42 V AC/DC	300 mA	13 VA / 13 W
177 GWW	AgSnO	250 V AC/DC	2 A	450 VA / 300 W
177 GWG	Gold	42 V AC/DC	300 mA	13 VA / 13 W

Inductive proximity switch (S.P.S.T.) Ui = 16V; Ii = 25 mA; Pi = 64 mW

Note

If a mounting bracket is requested with the order, the unit will be delivered ready mounted to the bracket, the bracket is to be fixed to the wall by means of 4 x M8 screws.

If not specified in the order the unit is mounted vertically with switch housing uppermost.
For de-aeration the units can be supplied with screws for venting. Both chambers have to be filled with the liquid and then agitated until all the air has escaped.

The two connecting pipes are connected to the unit in such a way that the over pressure pipe is connected to the threaded process marked „**+**“.

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