

# Technical Datasheet



## Performance Series Diaphragm Operated Pressure Switch

Models: 204, 208 & 209

### Key Features

- Precision stainless steel mechanism for arduous atmospheres and high humidity.
- Set point adjustable over whole range against calibrated scale with tamperproof adjuster.
- Weatherproof and Flameproof models ATEX and IECEx.
- Safety vented or blow out device as standard.
- NACE MR-01-75 compatibility.
- Hermetically sealed microswitch option.
- High Overload capacity (204).
- Open diaphragm (208).
- Hygiene connection (209).
- Ranges available up to 15 bar (200 psi).  
Static Pressure up to 206 bar (3,000 psi).

### Series Overview

- Designed in the mid-1970s and developed over subsequent years, the Performance Series switch range offers users the broadest range of options, the highest levels of set-point repeatability and the confidence of long term performance that a mature product such as this can prove.
- The model 204/208/209 Performance Series pressure switches utilise a stainless steel diaphragm based sensor. This, when coupled with a precision stainless steel mechanism designed to minimise friction in the moving parts, helps deliver the market leading performance customers have come to expect from the series.



### Product applications

The 204 Performance Series is suitable for a wide range of applications in:

- Oil & Gas
- Chemical
- Petrochemical
- Refining
- Power
- Food Industry

The choice of models available ensures that the 204/8/9 Performance Series is suitable for use in:

- Corrosive atmospheres
- Resistant to chemical attack

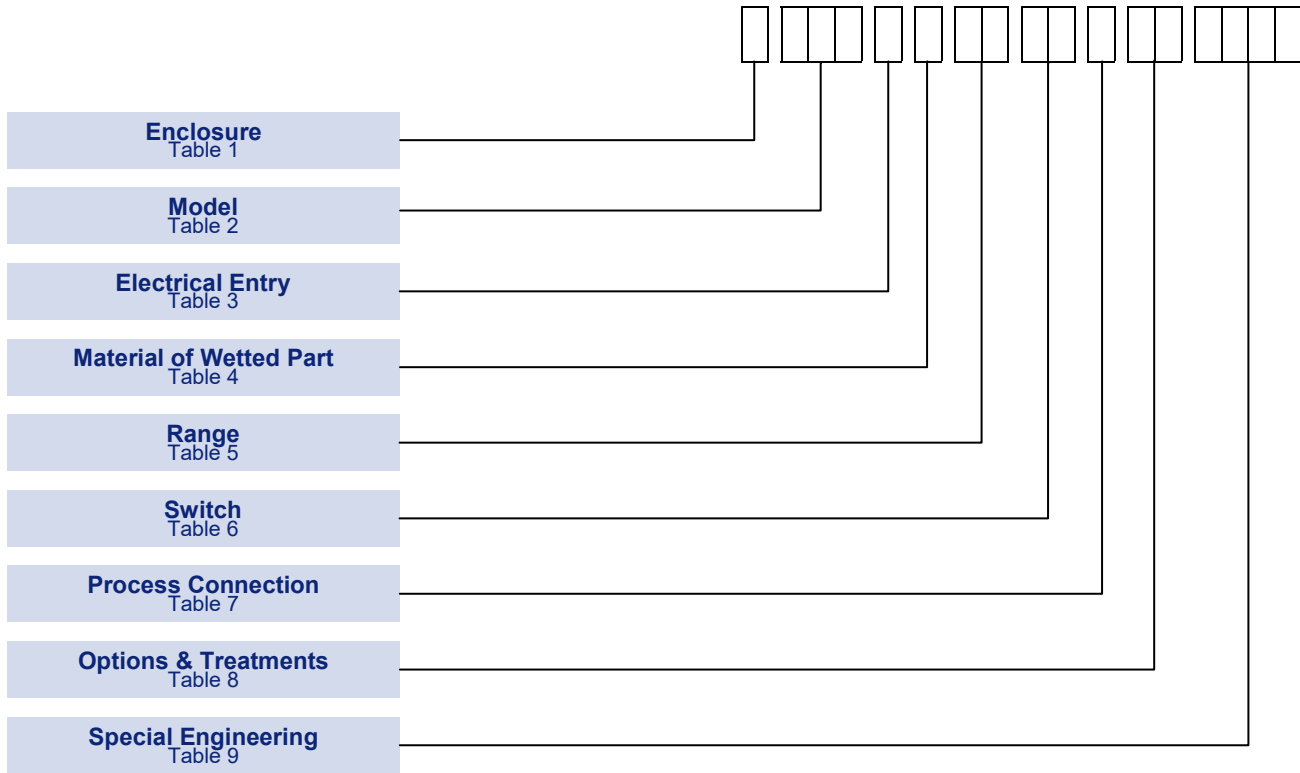
How can we help you?



Performance Series  
Models: 204, 208 & 209

## How to order

Switches can be configured by selecting codes representing the desired features from the tables that follow. The chart below, describes how the model code is built up. For assistance in configuring a switch that best suits your needs, please contact your local sales office.



**NOTE:** Options shaded in the following tables are the most common options and are available on the quickest lead-times and at the lowest cost.

**NOTE:** Only the most common options are shown in this data sheet. Should you require a feature that is not shown, please contact your local sales office for further details.

## Technical Specification

**Performance Series**  
Models: 204, 208 & 209

<b>Accuracy:</b>	Set point repeatability ± 1% of span at 20°C / 68°F ambient. Scale accuracy ± 3% of full scale.
<b>Storage Temperature:</b>	-25 to +60°C / -13 to +140°F.
<b>Ambient Temperature:</b>	-25 to +60°C / -13 to +140°F. Special build is also available for temperatures down to -60°C (-76°F).
<b>Maximum Process Temperature:</b>	Subject to appropriate installation practice, the component parts will withstand up to +60°C (+140°F). For process temperatures up to +120°C (+248°F), order WETTED PARTS *Code A (Table 4). For higher temperatures, refer to SPECIAL ENGINEERING. *Applies to 204 and 209 only.
<b>Enclosure classification:</b>	IP66 / NEMA 4X / Flameproof Ex d.
<b>Switch output:</b>	SPDT or DPDT snap action microswitch (standard). Hermetically sealed (optional).
<b>Electrical rating:</b>	See Table 6.
<b>Process Connection:</b>	Rc 1/4 (BSP), 1/4 NPT Internal, 1/2 NPT Internal & 1/2 NPT External.
<b>Approximate weight:</b>	Enclosures: <b>“W &amp; N”</b> from 2.6kg/5.7lb to 4.8kg/10.6lb; <b>“A &amp; O”</b> from 3.6kg/7.9lb to 5.8kg/12.7lb; <b>“H”</b> from 4.1kg/9.1lb to 6.3kg/14.0lb; <b>“K”</b> from 8.9kg/19.6lb to 11.1kg/24.5lb.

## Enclosure

### FINISH

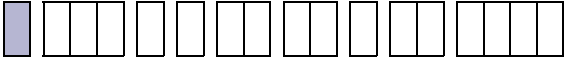
All enclosures except Type A are finished in light grey epoxy resin paint. Special finishes to order.




### INTRINSIC SAFETY

Because of the low voltages and currency of I.S. circuits, we recommend using gold and/or sealed contacts.


Temperatures in Table 1 refer to limitations for certified enclosures.

See **TECHNICAL SPECIFICATION**

TABLE 1 

ENCLOSURE TYPES	Code
<b>Weatherproof Enclosures</b>	
<b>General Purpose</b> The basic enclosure is pressure die-cast in zinc alloy, offering weather protection not less than NEMA 4 + 13/IP66.	W
<b>For Aggressive Atmospheres</b> Investment cast enclosure in austenitic stainless steel with weather protection not less than NEMA 4X + 13/IP66.	A
<b>Flameproof Enclosures Category 2 (Zone 1)</b>	
<b>ATEX Ex db IIC T6 (-60 to +40°C), T4 (-60 to +80°C) II 2 G D</b> Gravity die-cast enclosure in aluminium-silicon alloy. Suitable for outdoor use, IP66 / NEMA 4.  II 2 G D	H
<b>IECEX Ex db IIC</b>	
<b>ATEX Ex db IIC T6 (-60 to +40°C), T4 (-60 to +80°C) II 2 G D</b> As Code H, but sand cast in high quality grey iron.  II 2 G D	K
<b>IECEX Ex db IIC</b>	
<b>Exn Enclosures Category 3 (Zone 2).</b>	
<b>Type of Protection Exn II T6 (-25 to +40°C), T4 (-25 to +80°C) II 3 G D</b> As code 'W' but Exn. Weatherproof to NEMA 4/IP66. <b>Limited switching facility (see Table 6).</b>  II 3 G D	N
As 'N' but with investment cast enclosure in austenitic stainless steel as 'A'.	O

## Models

TABLE 2 

	Code
<b>High Overload Capacity.</b> High sensitivity over the operating range while permitting continuous application at very high pressure.	204
<b>Open Diaphragm.</b> Direct mounting flanged connection for fluids or processes likely to block conventional sensing elements.	208
<b>Hygiene Connection.</b> Direct mounting crevice free connection for food, brewing or other biologically active processes.	209

Performance Series  
Models: 204, 208 & 209

## Electrical Entry

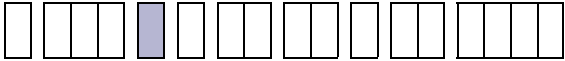
Adaptors are available for other popular thread sizes.

### Enclosures 'W' and 'N'

Standard option code 1(22mm dia) is provided with a nylon 22/20 reducer and fibre washer suitable for a standard M20 cable gland and back nut. Option code 0 elbow adaptor is factory fitted. Adaptor kits may also be provided retrospectively to fit at site if required. Ask for details. See diagrams for dimensions.

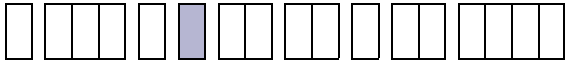
### 'W' and 'N' SAFETY NOTE

If a metal cable gland is site fitted it must either be earthed locally or an earth/gland plate must be used to connect the body of the gland at the enclosure earthing point. Earth/gland plates can be provided either factory fitted or in kit form for site assembly. Ask for details.

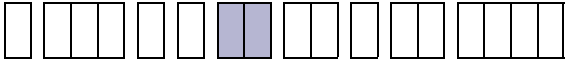
TABLE 3 

	Code
Enclosures W & N: Clearance for 20mm (3/4 in) outside dia conduit.	1
Enclosures H, K, A & O: M20 x 1.5 ISO thread (direct).	0
Enclosures H & K: M20 x 1.5 ISO thread, dual entry.	5
Enclosures H & K: 1/2-NPT INT.	2
Enclosures H & K: 3/4-NPT INT.	3
Enclosures H & K: 3/4-NPT INT dual entry.	6
Enclosure W: M20 x 1.5 elbow adaptor.	0
Enclosure N: M20 x 1.5 straight adaptor (Approved).	0

## Material of Wetted Parts

TABLE 4 

Model		Code
204/209	316 stainless steel diaphragm, process connection and Viton O-ring seal.	A
204	316 stainless steel diaphragm, process connection and nitrile O-ring seal.	G
	Nickel alloy (Monel) diaphragm. All other wetted parts 316 stainless steel and nitrile seals.	P
	For wetted parts required to conform with Sour Gas or Sour Crude applications as laid down in NACE standard MR-01-75.	K
208	316 Stainless steel wetted parts and P.T.F.E. seals.	F

TABLE 5 

Range			
mbar / bar	Code	in Hg / psi	Code
<b>-1000 to 0</b>	A0	<b>-30 to 0</b>	AB
-1 to +1.5	G3	-14.5 to +20	GK
<b>*50 to 350</b>	E8	1 to 5	E7
*0.3 to 1.5	G7	4 to 20	GT
*0.7 to 4	J2	10 to 60	J7
*0.7 to 7	M2	10 to 100	M8
*1.5 to 15	P8	20 to 200	PK

Performance Series  
Models: 204, 208 & 209

## Setting Ranges

$P_{max}$  = maximum working pressure

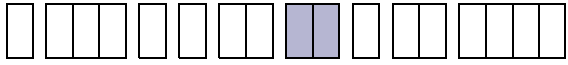
Model 204, 206 bar (3000 psi)

\*Model 208, limited by flange rating. Range of operation chosen must be compatible with pressure/temperature rating of flange, refer to appropriate flange standard.

Model 209, 20 bar (300 psi)

\*Unsuitable for use below 0 gauge pressure.

## Switch Options

TABLE 6 

A much wider variety of switching options can be engineered to customer's requirements including heavy DC, manual latching, pneumatic output etc. Please consult our engineers for further information.

All Models								
CSA RATING (RESISTIVE) § see note	IEC947-5-1 / EN 60947-5-1 RATING						Contact	Code
	Designation & Utilisation Category	Rated operational current $I_e$ (A) at rated operational voltage $U_e$	$U_i$	$U_{imp}$	VA Rating			
					Make	Break		
5 Amps @ 110/250V AC Light Duty for AC only	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.8kV	432 28	72 28	SPDT DPDT	00 01
5 Amps @ 110/250V AC & 2 Amps @ 30V DC General purpose precision	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.8kV	432 28	72 28	SPDT DPDT	02 03
1 Amp @ 125V AC & § 100mA @ 30V DC Gold Alloy contacts for low voltage switching	1A @ 125 VAC RESISTIVE (IEC 1058-1 / EN 61058-1)						SPDT DPDT	04 05
§ 5 Amps @ 110/250V AC & 5 Amps @ 30V DC Environmentally sealed	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.5kV	432 28	72 28	SPDT* DPDT*	08 09
§ 1 Amp @ 30V AC & 30V DC Environmentally sealed with gold contacts	AC14 E150	0.3A @ 120 V AC	125V	0.5kV	216	36	SPDT* DPDT*	0G 0H
5 Amps @ 250V AC & 2 Amps @ 30V DC Hermetically sealed. Gold plated silver contacts	AC14 D300 DC13 R300	0.6/0.3A @ 120/240 V AC 0.22/0.1A @ 125/250V DC	250V	0.5kV	432 28	72 28	SPDT DPDT	H2 H3 <sup>†</sup> , H6 <sup>‡</sup>


† 2 Single pole, double throw, simultaneous falling under pressure.  
‡ 2 Single pole, double throw, simultaneous rising under pressure.

The electrical rating is dependent on the microswitch fitted to the instrument. The electrical ratings defined by each approval that the microswitch complies with and is shown on the product nameplate, ie CSA, or IEC. It should be noted that the instrument must be used within the electrical rating specified from the approval you require. This table lists the actual IEC ratings against the Designation & Utilization Category marked on the nameplates. In the absence of any verification by CSA the microswitch § manufacturer's rating is stated in **italics and bold**. **If in doubt seek guidance from the factory.**

**NOTE:** For low energy circuits e.g. 30V and up to 100mA, we recommend using gold alloy contact switches.  
 $U_i$  = rated insulation voltage       $U_{imp}$  = rated impulse to withstand voltage across contacts.

\*Suitable for use with Exn Enclosures (see Table 1).

## Process Connection

TABLE 7 

### For Model 204

Other thread specifications and sizes are available without using adaptors.

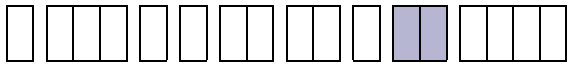
Adaptors are available for applications where their use is permitted.

<b>Model 204</b>	<b>Code</b>
Rc 1/4 (1/4 BSP tr INT) to ISO 7/1	A
1/4 – 18NPT INTERNAL	F
1/2 – 14NPT INTERNAL	H
1/2 – 14NPT EXTERNAL	J
<b>Model 208</b>	<b>Code</b>
EN 1092-1 (BS4504) PN 16 DN50	5
ANSI B16.5 2in CLASS 150 RF	6
<b>Model 209</b>	<b>Code</b>
IDF 2in with nut and gasket to ISO2853 (BS4825) (Not range E8)	7
IDF 2.5in with nut and gasket to ISO2853 (BS4825) (Range E8 only)	8

**Performance Series**  
Models: 204, 208 & 209

## Options & Treatments

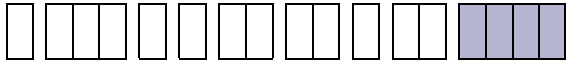
Combinations available, apply for details.

TABLE 8 

	Code
Tropicalisation High humidity atmospheres.	01
Marine and Offshore Saline atmosphere or salt spray.	02
Ammonia Process (wetted) parts and construction suitable for atmospheric ammonia.	03
Oxygen Service 2: Process (wetted) parts are cleaned for oxygen .	04
Oxygen Service 3: Process and non-process parts are cleaned for use with oxygen.	05
Stainless Steel Pipe Mounting Bracket Permits local 2" pipe work to be utilized for mounting the instrument.	10
Tagging - Variety of tagging methods are available.	APPLY FOR DETAILS
Applies when - no option is required and selection is made from special engineering.	00

## Special Engineering

Last 4 digits of model code only used when special engineering is required.

TABLE 9 

	Code
Please consult Delta sales engineering for special requirements.	TBA

## Performance Data

TABLE 10

## Bar Units

**TABLE 10A:  
ALL MODELS FIXED SWITCHING  
DIFFERENTIAL**

ALL MODELS		mbar units					TABLE 10A				
Range Code	Range mbar/bar	SPDT OPTIONS					DPDT OPTIONS				
		00	02	04	08/0G	H2	01	03	05	09/0H	H3/H6
A0	-1000 to 0	50	150	50	125	125	100	200	100	200	190
G3	-1 to +1.5	100	300	100	250	250	200	300	200	375	375
E8	50 to 350	15	45	15	30	30	30	60	30	45	45
G7	0.3 to 1.5	30	100	30	100	100	60	120	60	150	150
J0	0.7 to 4	70	200	70	270	270	140	280	140	350	405
M2	0.7 to 7	100	300	100	650	650	200	400	200	1000	975
P8	1.5 to 15	200	600	200	1000	1000	400	800	400	1500	1500

## PSI Units

**TABLE 10B:  
ALL MODELS FIXED SWITCHING  
DIFFERENTIAL**

Due to manufacturing tolerances the figures quoted in these tables are for guidance only and are typical for weatherproof models.

Flameproof models may be up to 2 times higher depending on the range. Should the differential be critical for specific applications our engineers should be consulted prior to ordering.

ALL MODELS		in.Hg / PSI units					TABLE 10B				
Range Code	Range in.Hg/psi	SPDT OPTIONS					DPDT OPTIONS				
		00	02	04	08/0G	H2	01	03	05	09/0H	H3/H6
AB	-30 to 0	1.5	4.5	1.5	3.8	3.8	3.0	6.0	3.0	6	5.6
GK	-14.5 to +20	1.5	4.5	1.5	3.8	3.8	3	4.5	3	6	6
E7	1 to 5	0.2	0.7	0.2	0.45	0.45	0.5	0.9	0.5	0.7	0.7
GT	4 to 20	0.5	1.5	0.5	1.5	1.5	0.9	1.7	0.9	2.3	2.3
J7	10 to 60	1	3	1	4.0	4.0	2	4	2	5	6.5
M8	10 to 100	1.5	4.5	1.5	10	10	3	6	3	15	14.5
PK	20 to 200	3	9	3	15	15	6	12	6	22	22

## Electrical Connections

### Terminal Block

Cable entry is to a non-pinching terminal block made of a non-hygroscopic thermosetting plastic, suitable for cables up to 2.5mm<sup>2</sup>/14AWG.

### Earthing/Grounding

An earthing stud is provided inside all weatherproof enclosures, adjacent to the entry. External earthing is standard on flameproof versions. Safety note see Table 3.

### Dielectric Strength

The electrical assembly is capable of withstanding \*2kV between live parts and earth/ground and 500V between open contacts.

\* 1.2kV for micro switch Codes H2, H3 and H6. Refer to Table 6.

### Electrical Entry

Standard options are listed in Table 3. Other threads can be accommodated by adaptors. Dual entry available, see Table 3.

## Optional Extras

### Chemical Seals

Chemical seals of our own or proprietary manufacture can be fitted when required.

### Mounting Position/Location/Installation

Vertical as shown, IN DIMENSIONS, taking care to avoid siting in locations that transmit excessive shock or vibration. For further advice contact our engineers.

### Pollution degree (EN60947-5-1)

All products are suitable for use in pollution degree 3. For extreme conditions where condensation may readily form, then sealed contacts should be used. See Table 6 Codes 08/09, 0G/0H, H2/H3/H6.

### Electrical Isolation

These products are not suitable for electrical isolation. Always isolate circuit separately to carry out any electrical work.

## Approvals

### EUROPEAN DIRECTIVES



**Low voltage Directive (LVD) 2014/35/EU**  
Compliant to LVD

**Pressure Equipment Directive (PED) 97/23/EC:**

This product has a process connection size <=DN25 and is therefore categorised as sound engineering practice under Cat 3.3

### ATEX APPROVALS



**FLAMEPROOF:**

Certificate No. BAS01ATEX2426X  
EN 60079-0, EN 60079-1, EN 60079-31

For Zone 1 models (**Enclosure code H/K, see Table 1**)

	II	2 GD	Ex db IIC T4 (Tamb -60°C to +80°C) Gb
			Ex tb IIIC T135°C (Tamb -60°C to +80°C) Db IP66
	II	2 GD	Ex db IIC T6 (Tamb -60°C to +40°C) Gb
			Ex tb IIIC T85°C (Tamb -60°C to +40°C) Db IP66

### GLOBAL CERTIFICATION



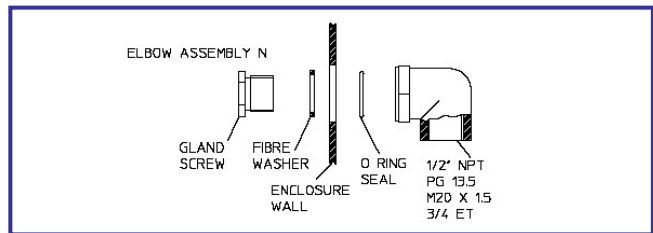
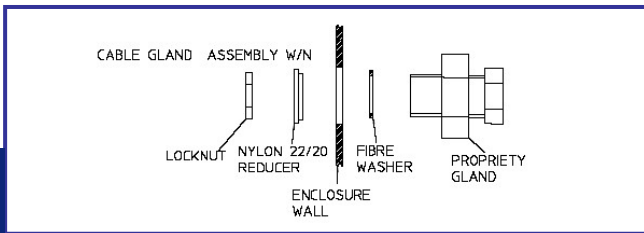
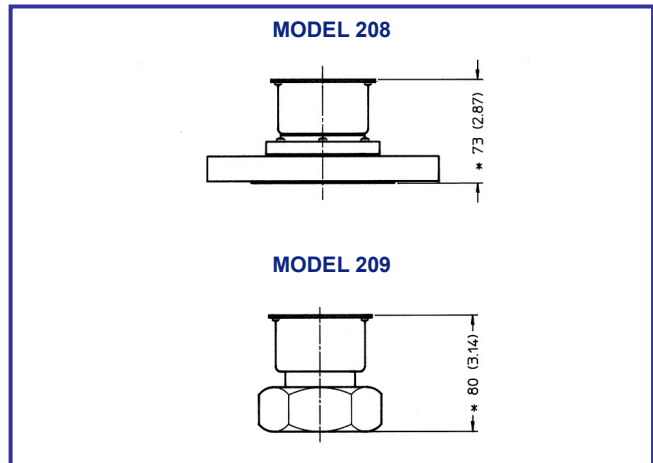
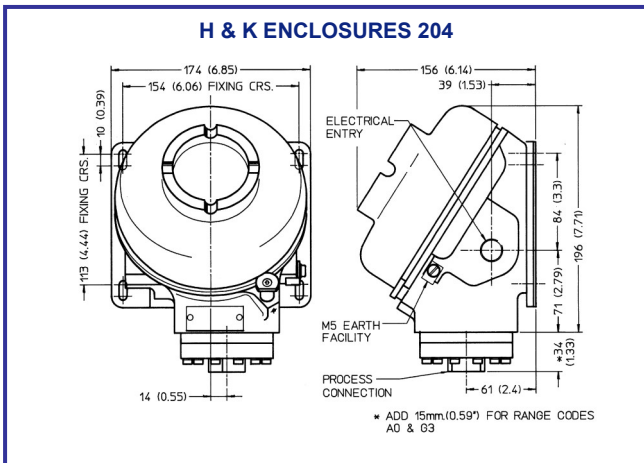
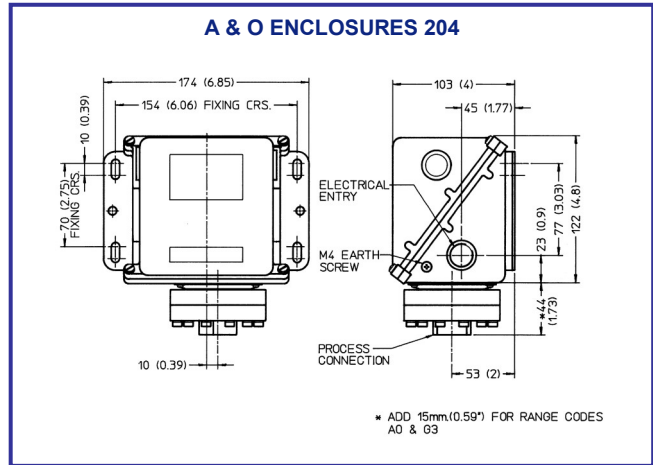
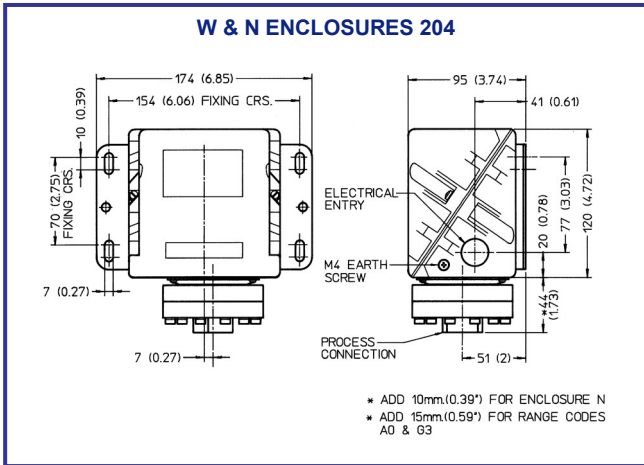
**IECEx Certified**

Ex db IIC T4 (Tamb -60°C to +80°C) Gb  
Ex db IIC T6 (Tamb -60°C to +40°C) Gb

Certificate No. IECEx ITS 04.0006X  
IEC 60079-0, EN 60079-1

# Dimensions

All dimensions mm (inches)



Performance Series  
Models: 204, 208 & 209

In the interest of development and improvement Delta Controls Ltd, reserves the right to amend, without notice, details contained in this publication. No legal liability will be accepted by Delta Controls Ltd for any errors, omissions or amendments.

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