SPECIFIER'S GUIDE FOR

PRESSURE SWITCHES

PRESSURE DIFFERENCE SWITCHES

VACUUM SWITCHES

TEMPERATURE SWITCHES

FLAMEPROOF SWITCHES

FC

PESO

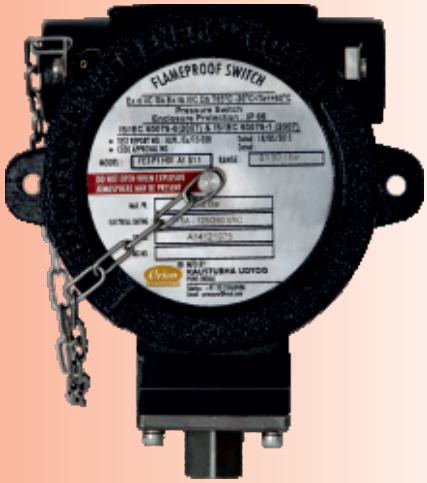
CML No.: 7775906



FE

PESO

CML No.: 7775906



Bulletin No. KA231020

About Us



Established in 1977, Kaustubha Udyog, now an ISO 9001:2015 company, has emerged as a leading manufacturer of pressure switches, with a customer base spanning a wide spectrum : Light & Heavy Engineering, Automation Systems, Paint Systems, Gas Mixing Systems, Boilers, Process Industries, R & D Labs, Medical Equipments and Space & Defence Applications.

We make pressure switches from vacuum to 600 bar, available in fixed differential, adjustable differential and pressure difference models. We also supply flameproof switches for applications in hazardous areas and various media like oil, water, steam, saline, paints, corrosive and non-corrosive gases.

Many of our pressure switches are today working silently and reliably on Machine Tools, Lubrication Systems, Compressors and highly sensitive and vital Medical Equipments.

Our wide-ranging product mix, our obsession with quality, very competitive pricing and the willingness to work to customer needs and budgets has seen us multiplying our turnover every year.

If you do not find an answer to your needs in our product range, we will work with you to evolve a right and cost effective solution tailored to your unique needs.

We shall be happy to hear from you.

CUSTOM DESIGN

This catalogue lists most of the popular models of Orion and Parus pressure switches. A variety of other nonstandard models are not listed.

If you do not find an answer for your particular application, please get in touch with us. We will work with you to evolve a right solution, one that is not overbuilt or underbuilt, and in the most cost-effective way.

In many cases, more than one product may provide a solution to your needs. For a cost-effective solution, compare prices and characteristics / features. Always remember that the end cost to you includes initial product price, plus the installation and also the service.

ABOUT QUALITY

Quality assurance is an attitude of everyone at Kaustubha Udyog. The emphasis from everyone at Kaustubha Udyog is not on defect detection, but on defect prevention and elimination. The QA team is not under Production and reports directly to Management.



bsi.

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Kaustubha Udyog
Survey No. 36/1/1
Pune - Sinhgad Road
Vadgaon Khurd
Pune 411 041
Maharashtra
India

Holds Certificate No: FM 72815

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

Design, Manufacture and Supply of Pressure Switches, Pressure Difference Switches, Vacuum Switches, Temperature Switches and IIoT Enabled Smart Gauges for Hazardous and Non-Hazardous Applications.

For and on behalf of BSI:

Theuns Kotze, Managing Director Assurance - IMETA

Original Registration Date: 2003-02-11
Latest Revision Date: 2023-10-16

Effective Date: 2023-12-13
Expiry Date: 2026-12-12

Page: 1 of 1

...making excellence a habit.

Contents

Using the Catalogue.....3
How to Use this Catalogue.....4
FC Introduction..... 6
FC Typical Switch Construction.....7
FE Introduction.....8
FE Typical Switch Construction.....9
International Certifications for FC series.....10
Indian Certifications for FC series.....12
Indian Certifications for FE series.....13
FC Pictorial Index.....14
FE Pictorial Index.....16
FC/FE Product Selection Guide.....18

Pressure Switches:

High Range.....26
High Proof High Range.....30
Low range.....34
Low Range High Proof.....38
Ultra Low Range.....42
Hydraulic Diaphragm.....46
Flanged.....50

Pressure Difference Switches:

High Range.....54
High Range DP.....58
Hydraulic Range DP.....62
Low Range.....66
Low DP High Proof.....70
Low ΔP High Proof.....74
Ultra Low Range PD.....78
Vacuum Switches.....82

Compound switches:

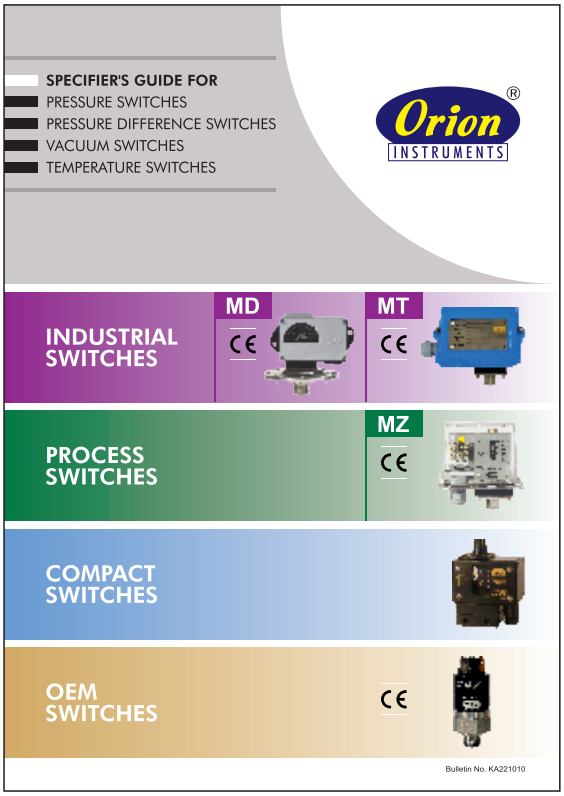
High Range Compound.....86
Low Range Compound.....90

Pneumatic Switches:

High Range Air Relay.....95
Hydraulic Diaphragm Air Relay.....99
Low DP High Proof Air Relay.....103
Vacuum Air Relay.....107
Temperature switches.....110
Direct Mounted Temperature switches.....114
Flange Code Table.....118
Microswitch Options.....120
Accessories.....122
General Specifications and Application Notes.....125
Definitions & Terminology.....126
How to Select a pressure switch for your application.....127
Ex Marking Guide.....128
Protection Concepts.....129
Area Class, Apparatus Grouping & T Codes.....130
Reference Data.....131

Only flameproof FC & FE series are covered in this catalogue. Following types of pressure switches are covered in seperate catalogues. Please contact sales office for more information.

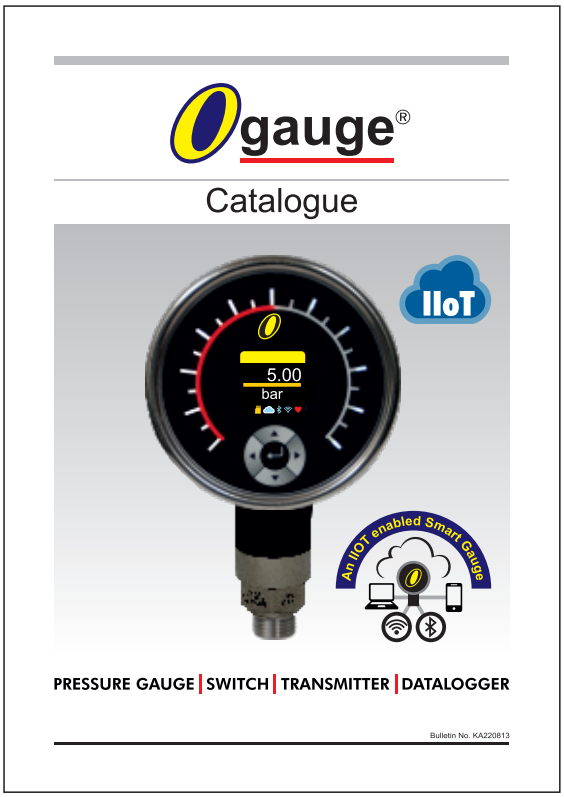
Other Products :



Consolidated Catalogue

- **Industrial switches**: These switches have been designed for heavy duty applications, where products should withstand vibrations or should have an exceptionally long life and repeat accuracy.
- **Process switches**: These switches have been designed for lighter applications requiring precise switching, for equipment mounted in open air, where the internal operation of the switch needs to be visible.
- **Compact switches**: These are compact, low cost and meant for light duty applications for the OEM industry.
- **OEM switches**: These are used in most general purpose applications. These switches cannot be configured and intended for stock and sell.

Scan Me - Consolidated Catalogue



Oguage Catalogue

Ogauge is the world's first IIoT pressure gauge, a pathbreaking device that combines functions in instrumentation like, Pressure gauge, Switch, Transmitter, a Datalogger ***AND also has IoT capability.***

Other special features:

- Full colour OLED informative display
- 4 time relays, switching points and switch-back points can be adjusted very simply and independently of one another using the onboard capacitive touch keypad, still simpler via mobile app
- Programming is also possible through a cloud based dashboard
- It is a industry 4.0 ready. Monitoring of process parameters possible in real time, from anywhere, by pairing it to any wifi router
- Can be paired to a mobile via app to check live pressures
- Analog output signal configurable
- Can be set to display values in any unit of measurements e.g.: kN, kg, psi,...
- And many useful additional functions….

Scan Me - Ogauge Catalogue

Using the Catalogue

By taking a few minutes to familiarise yourself with how the catalogue is organized, you will find it very easy to use.

Catalogue Purpose :

This catalogue is a representative of the Kaustubha Udyog flameproof product line. It presents simplified ordering information on most products and references products not catalogued. This catalogue is intended to familiarise users with the broad product offering and provide ordering information for most popular listings, many available off the shelf from local authorised distributors.

This section helps you make a logical choice in selecting the best product for a particular application. It allows a user familiar with our product line to locate the exact page the product is listed on. For those not familiar with our products, a logical sequence is given to help the user pick the best product for their need.

By taking a few minutes to familiarise yourself with the catalogue organisation, you will find it very easy to locate the product / information you need.

1. The distinguishing factors of FC and FE switches are given on pages 6 to 9. It will help for selection of right product for your application.
2. The contents page lists the broad outline in which the catalogue is organised, and will help the user familiar with products to select the page on which the product or other useful information is listed.
3. Need Product Selection help ?
   Product selection help will start with the “Pictorial Index” (Page No. 14 to 17) of selected section, where the products are broadly classified. A brief description of each product group , a typical photo of the product within the group and the page number on which it is listed are given.

   If the user is not familiar with the products, a product selection guide is provided in each individual section, where photos for each product and important specifications are given to help determine and select the best product for the application.

   By evaluating and comparing these parameters, a logical selection can be made. Turn to the page on which the product information for the selected product is listed, for :

   Capsule Construction details
   Physical sizes
   Special features
   Ranges, hysterisis, electrical ratings etc.
   Ordering information
   Some applications

   In many cases, more than one product may work. For the most cost effective solution, compare prices and consider alternatives. Remember, the end cost includes initial product price, plus the installation, plus the service.
4. Need information on Accessories? (see page 124)
   Turn to page 124 for information on important accessories. These will give information on only important accessories, and information needed, when these are to be supplied with our products.
5. Need the terminology explained? (see page 128)

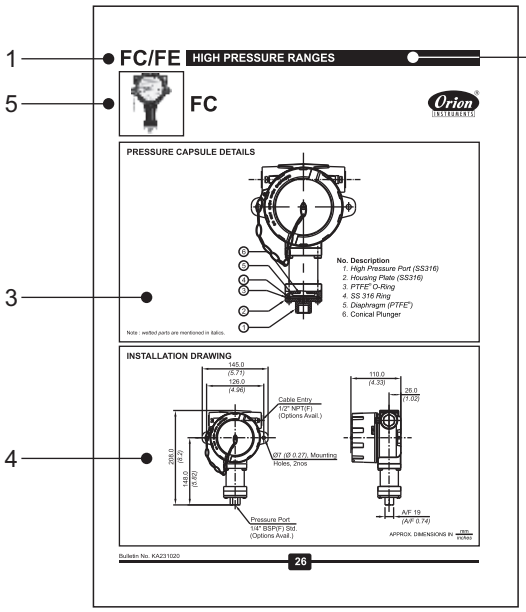
   Turn to page 128 for the definitions and terminology. This will help you familiarise with the terms used throughout the catalogue.
6. Need selection guidance? (see page 129)
   A logical procedure on page 129 will help you to consider most of the important factors when selecting a pressure switch.

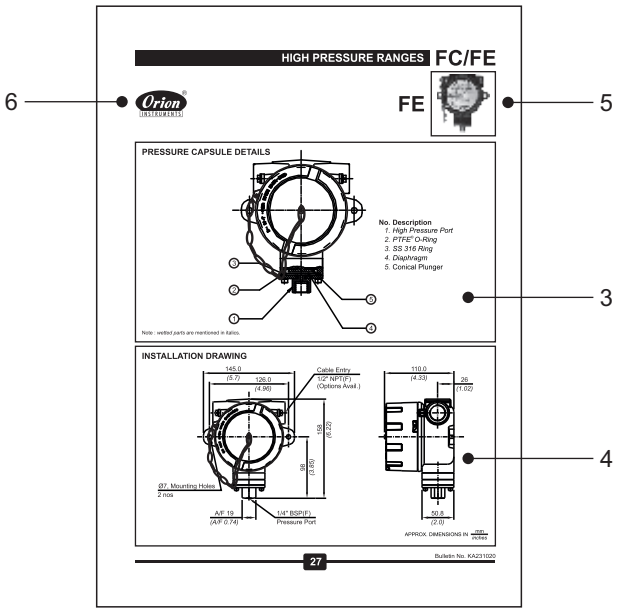
Due to the variety in product types and their salient features, catalogue page formats may vary. But generally the following format is adhered to.

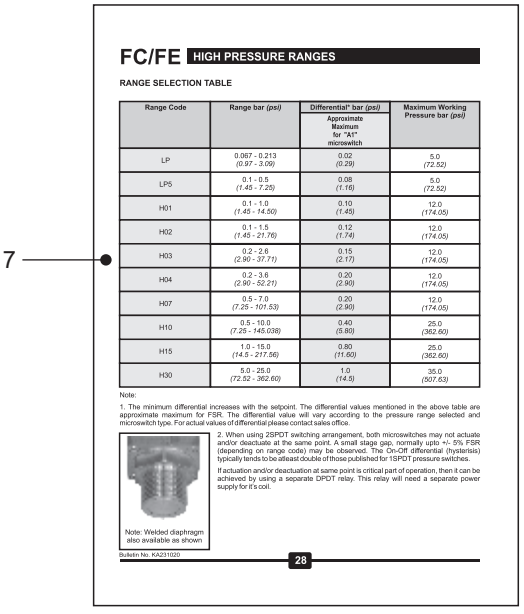
How to Use this Catalogue

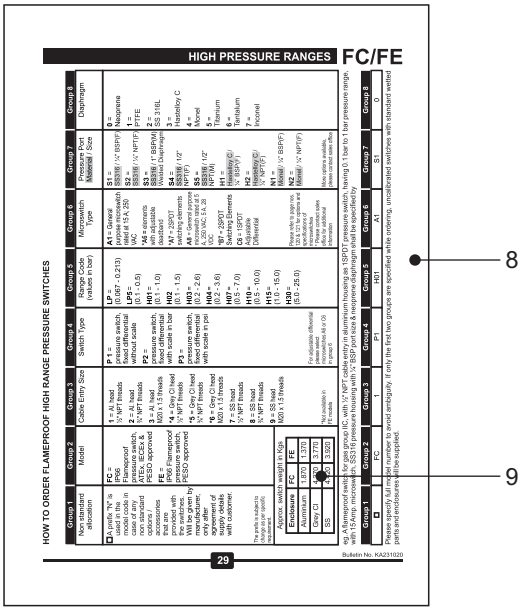
Elements appearing on each page will be (see pg.no. 5):

1. Product family / series - A product family / series will appear on the outside page corner, depending on the left / right hand page, and will be in large bold type.
2. Product section - will appear immediately following the product family / series at top of the page and will be in bold type.
3. Pressure capsule details - will show the construction of the pressure capsule and all it's internal parts. If the process/working medium is variable, the wetted parts will be mentioned in italics. If the wetted parts are unique, the material of construction (MOC) will be mentioned alongside in brackets. Where the material of construction is not specified, it will vary and the options are to be selected by the user considering the compatibility of the process / working medium. Modifications can be made to suit any particular medium, if the answer for your needs is not in the standard MOC listed. Pressure capsule details of accessories are not given.
4. Installation drawing - will show the typical installation dimensions of products as they exist in their standard forms. The dimensions are mentioned in millimetres and also in inches to facilitate the user. The dimensions of accessories will have to be added to these to arrive at any particular general arrangement (GA) drawings. The dimensions are approximate and for precise dimensions, where mounting space is restricted, the user may contact the nearest sales office. Installation drawings of only fast moving accessories are given.
5. Photos - will appear on the top of the relevant page for products. If there are mounting variations / styles, all the styles for standard products will appear for easy identification. Options, if included in the photograph, are for demonstration only, and are not a part of the standard equipment. For accessories, the photos are not given due to the sheer variety and range available.
6. Logo - will appear on top of initial section page to identify the manufacturer.
7. Characteristics - This section contains the range selection table in which user can choose different range code according to application. This table specifies the total range, differential value and maximum working pressure.
8. Ordering guide - In this section, codes are alloted for switch type, Range code, Microswitch type, Pressure port, Diaphragms etc. The complete final code of the switch is shown at bottom of the page. This code is used to order the switch from our sales office. Any additional accessories or modifications required for the product need to be mentioned in text by the user.
9. Switch weight - Approximate net weight (in Kgs) for a particular switch model will appear here, in how to order tables.
10. Numerous combinations are possible when pressure switches are provided with accessories like chemical seals, snubbers, remote seals, pipe mounting brackets, combination of switches mounted in a panel etc. Users are requested to provide the details of accessories required in text / drawings, as separate identification codes are provided for pressure switches fitted and supplied with accessories.


1
FC/FE HIGH PRESSURE RANGES
2
5
FC
Orion INSTRUMENTS
PRESSURE CAPSULE DETAILS
No. Description
1. High Pressure Port (SS316)
2. Housing Plate (SS316)
3. PTFE* O-Ring
4. SS 316 Ring
5. Diaphragm (PTFE*)
6. Conical Plunger
Note : wetted parts are mentioned in italics.
3
INSTALLATION DRAWING
145.0 (5.71)
126.0 (4.96)
Cable Entry 1/2" NPT(F) (Options Avail.)
110.0 (4.33)
35.0 (1.02)
Ø7 (Ø 0.27), Mounting Holes, 2nos
208.0 (8.2)
146.0 (5.62)
4
Pressure Port 1/4" BSP(F) Std. (Options Avail.)
A/F 19 (A/F 0.74)
APPROX. DIMENSIONS IN mm inches
Bulletin No. KA231020
26


6
Orion INSTRUMENTS
HIGH PRESSURE RANGES FC/FE
FE
5
PRESSURE CAPSULE DETAILS
No. Description
1. High Pressure Port
2. PTFE* O-Ring
3. SS 316 Ring
4. Diaphragm
5. Conical Plunger
Note : wetted parts are mentioned in italics.
3
INSTALLATION DRAWING
145.0 (5.7)
126.0 (4.96)
Cable Entry 1/2" NPT(F) (Options Avail.)
110.0 (4.33)
26 (1.02)
158 (6.22)
99 (3.85)
Ø7, Mounting Holes 2 nos
4
A/F 19 (A/F 0.74)
1/4" BSP(F) Pressure Port
50.8 (2.0)
APPROX. DIMENSIONS IN mm inches
Bulletin No. KA231020
27


7
FC/FE HIGH PRESSURE RANGES
RANGE SELECTION TABLE
Range Code
Range bar (psi)
Differential* bar (psi)
Approximate Maximum for "A1" microswitch
Maximum Working Pressure bar (psi)
LP 0.067 - 0.213 (0.97 - 3.09) 0.02 (0.29) 5.0 (72.52)
LP5 0.1 - 0.5 (1.45 - 7.25) 0.08 (1.16) 5.0 (72.52)
H01 0.1 - 1.0 (1.45 - 14.50) 0.10 (1.45) 12.0 (174.05)
H02 0.1 - 1.5 (1.45 - 21.76) 0.12 (1.74) 12.0 (174.05)
H03 0.2 - 2.6 (2.90 - 37.71) 0.15 (2.17) 12.0 (174.05)
H04 0.2 - 3.8 (2.90 - 52.21) 0.20 (2.90) 12.0 (174.05)
H07 0.5 - 7.0 (7.25 - 101.53) 0.20 (2.90) 12.0 (174.05)
H10 0.5 - 10.0 (7.25 - 145.038) 0.40 (5.80) 25.0 (362.60)
H15 1.0 - 15.0 (14.5 - 217.56) 0.80 (11.60) 25.0 (362.60)
H30 5.0 - 25.0 (72.52 - 362.60) 1.0 (14.5) 35.0 (507.63)
Note:
1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.
2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.
If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.
Note: Welded diaphragm also available as shown
Bulletin No. KA231020
28


HIGH PRESSURE RANGES FC/FE
HOW TO ORDER FLAMEPROOF HIGH RANGE PRESSURE SWITCHES
8
9
Group 1
Group 2
Group 3
Group 4
Group 5
Group 6
Group 7
Group 8
Diaphragm
Pressure Port Material Size
Microswitch Type
Range Code (values in bar)
Switch Type
Cable Entry Size
Model
Non standard calculation
Approx. switch weight in Kgs
Enclosure
FC
FE
Aluminium
1.870
1.370
Grey CI
3.770
SS
4.250
3.500
Bulletin No. KA231020
29

FC Introduction

Introduction

ATEX & IECEx certified FC series pressure and temperature switches have been designed for use in hazardous areas and for severe applications in the Oil and Gas sectors like oil and gas pipelines, petrochemical plants, refineries and generally in atmospheres which are potentially explosive. All switches are designed for gas group IIC, the most severe of the explosive gases, and hence can be used in lower severity atmospheres, typically in IIA and IIB. With grey cast iron enclosures, these can also be used in mines.

SS enclosures can also be offered for highly corrosive atmospheres. Switches can be configured with a lot of options like electrical elements and sensing element configurations to suit the intended working media.

Applications:

- Oil & Gas
- Petrochemical
- Refineries
- Bulk Drug & Pharma
- Chemical Industries

Product Specifications:

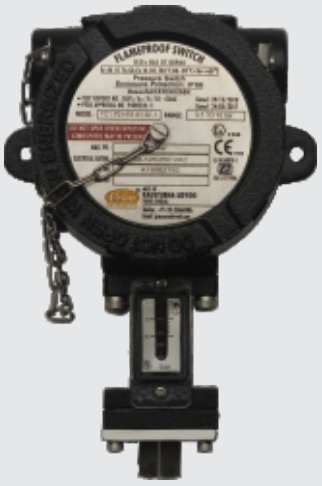
- Storage Temp. : Atmospheric temperature
- Operating ambient Temp. : 0 to 60 degree C
- Media Temp.:- for non-metallic diaphragms 80 C max.,
- higher with metal diaphragms
- Set point repeatability : +/- 1% over full range
- Enclosure details : Al grade LM6 / Grey Cast Iron / Stainless steel Casing & Cover
- Enclosure Specifications :
  Ⓔx II 2 GD, Ex db IIC T6 Gb, Ex tb IIIC T85°C Db (-20°C < Ta < +60°C)
- Protection : IP66
- Switch output 1 SPDT and 2 SPDT

Complies to :

- IEC 60079-0:2017, IEC 60079-1:2014, IEC 60079-31:2013
- EN 60079-0:2018, EN 60079-1:2014, EN 60079-31:2014

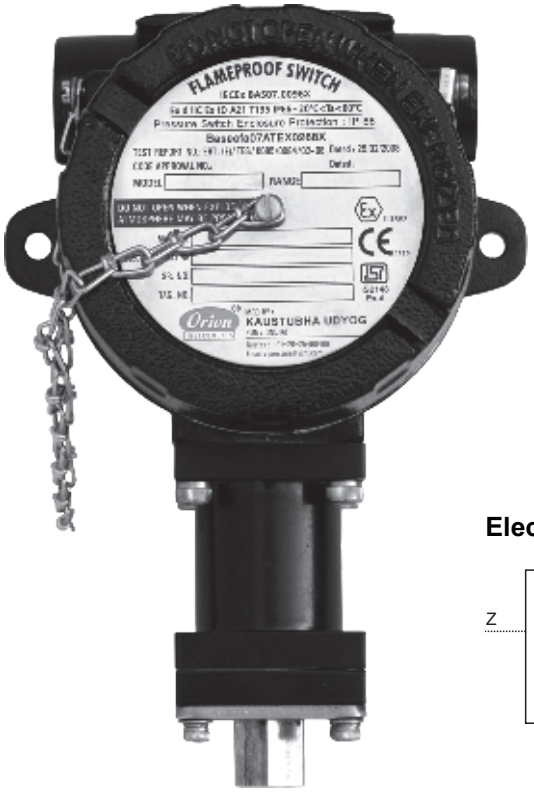
Features

- Compact, rugged Design
- Reliable, accurate micro switches used
- Customised Micro switch arrangement can be provided, on request
- Easy, safe wiring connections
- High/low pressure options available
- Warranty 2 Years

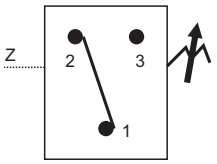


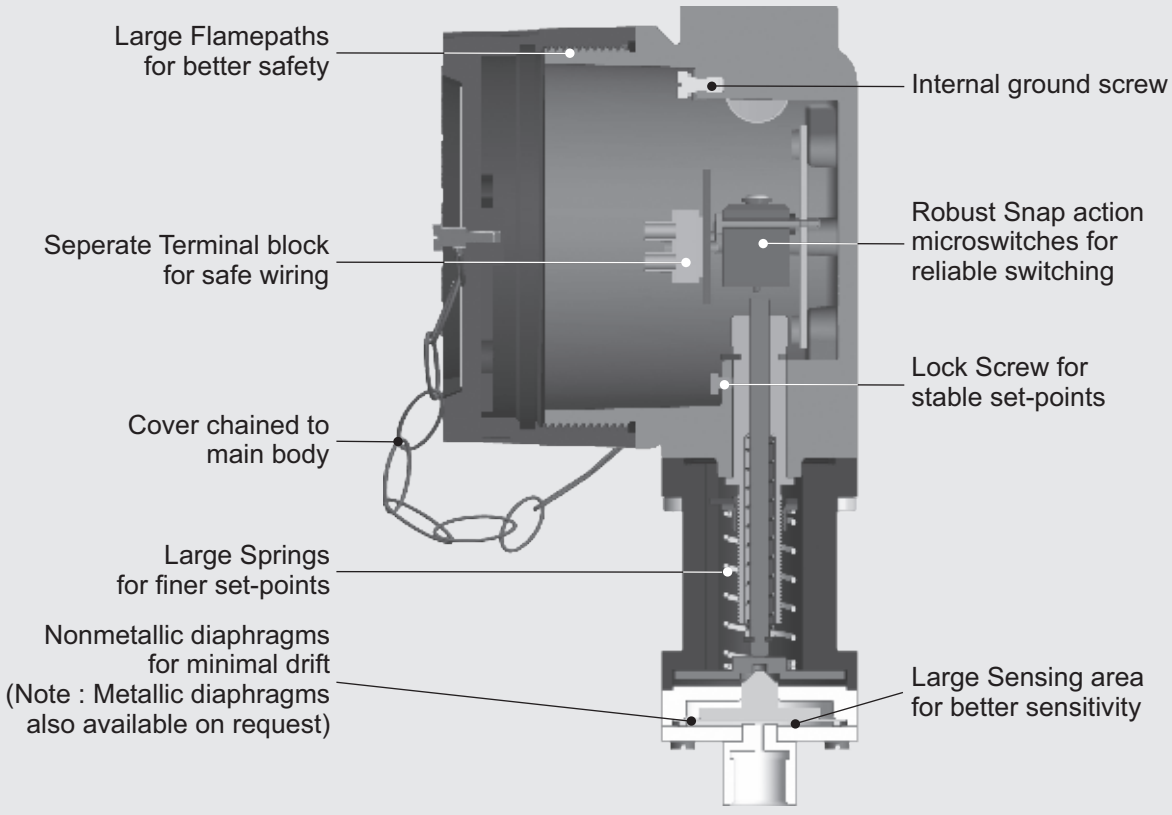
Advantages of FC switches:

- Large spring for accurate setpoint
- Better accuracy
- External scale for visible setpoint (optional)
- Approvals suitable across the world.
  - ATEX
  - IECEx
  - BIS
  - PESO



Electrical Connection :





FE Introduction

Introduction

PESO certified FE series pressure and temperature switches have been designed for use in hazardous areas and for severe applications in the Oil and Gas sectors like oil and gas pipelines, petrochemical plants, refineries and generally in atmospheres which are potentially explosive. All switches are designed for gas group IIC, the most severe of the explosive gases, and hence can be used in lower severity atmospheres, typically in IIA and IIB. With grey cast iron enclosures, these can also be used in mines.

SS enclosures can also be offered for highly corrosive atmospheres. Switches can be configured with a lot of options like electrical elements and sensing element configurations to suit the intended working media.

Applications:

- Oil & Gas
- Petrochemical
- Refineries
- Bulk Drug & Pharma
- Chemical Industries

Product Specifications:

- Storage Temp. : Atmospheric temperature
- Operating ambient Temp. : 0 to 60°C
- Media Temp.:- for non-metallic diaphragms 80°C max.,
- Higher with metal diaphragms
- Set point repeatability : +/- 1% over full range
- Enclosure details : Al grade LM6
- Enclosure Specifications :
  Exd IIC T6 Gb (-20°C < Ta < +60°C) Ex tb IIIC T 85°C Db
- Protection : IP66
- Switch output 1 SPDT and 2 SPDT

Complies to :

- IS/IEC 60079-0-2011,
- IS/IEC 60079-1: 2014

Features

- Compact, rugged Design
- Reliable, accurate micro switches used
- Customised Micro switch arrangement can be provided, on request
- Easy, safe wiring connections
- High/low pressure options available
- Warranty 2 Years



Advantages of FE switches:

- Compact
- Double diaphragm seal
- Cost effective
- Certifications & Approvals for Indian market -
  - BIS
  - PESO

Approximate Weight :

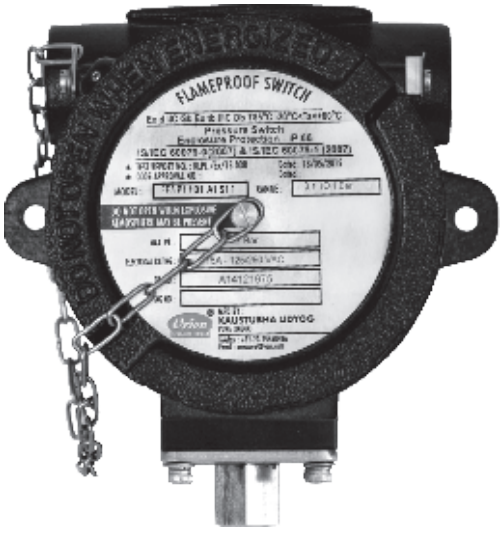
Pressure switches with Aluminium enclosure : 1.9 Kg./4.1 Pound

Pressure switches with Grey CI enclosure : 4.3 Kg./9.4 Pound

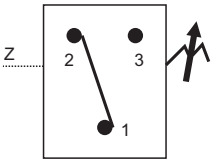
Pressure switches with SS enclosure : 4.4 Kg./9.7 Pound

Some Applications :

Used in hazardous areas for applications like fire fighting systems, LPG bottling plants, etc. For any type of corrosive and non-corrosive gases and fluids.

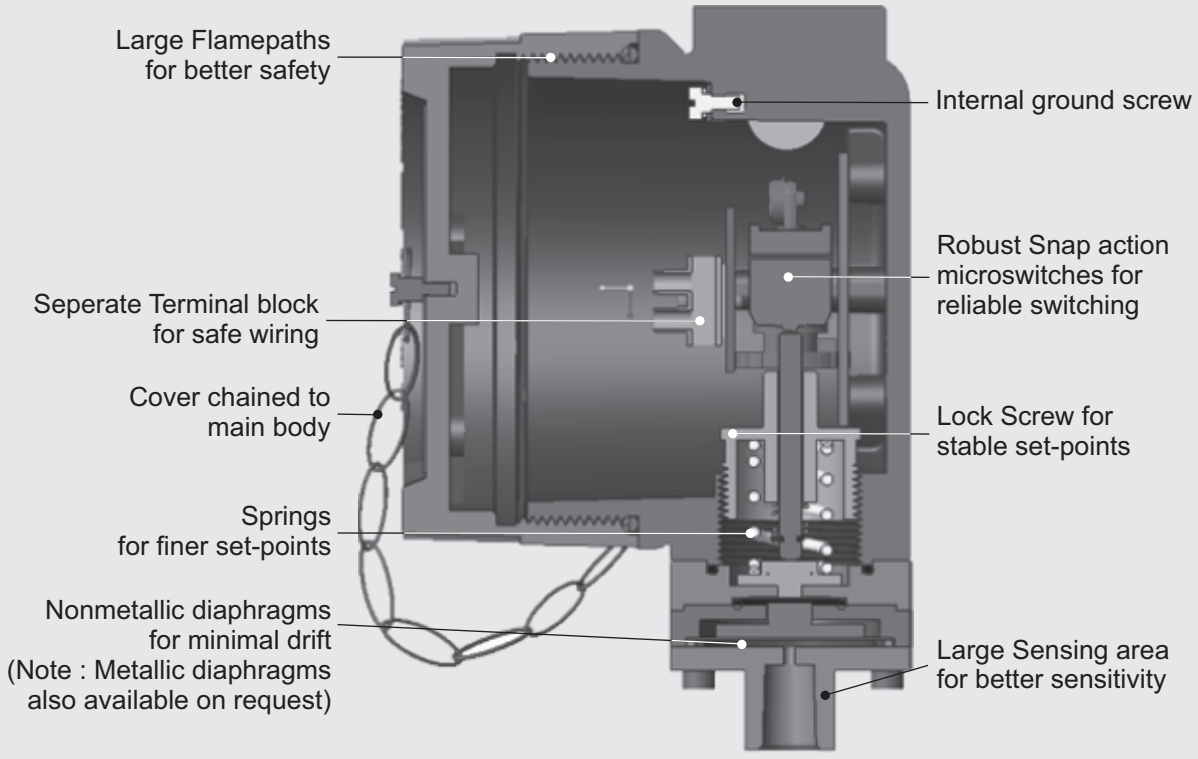


Electrical Connection :



Approximate Weight :
Pressure switches with Aluminium enclosure : 1.37 Kg.

Some Applications :
Used in hazardous areas for applications like fire fighting systems, LPG bottling plants, etc. For any type of corrosive and non-corrosive gases and fluids.



International Certifications for FC series







IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx BAS 07.0090X
Issue No: 4
Certificate history:
Issue No. 4 (2019-05-29)
Issue No. 3 (2016-08-17)
Page 1 of 4
Issue No. 2 (2013-01-22)
Issue No. 1 (2010-12-06)
Issue No. 0 (2008-03-06)

Status: Current

Date of Issue: 2019-05-29

Applicant: Kaustubha Udyog
7, Parichaya Society
1000/6D
Navi Peth
Pune 411 030
India

Equipment: FC Series Flameproof Switch
Optional accessory:

Type of Protection: Flameproof 'db'; Dust protection by enclosure 'tb'

Marking: Ex db IIC T6 Gb,
Ex tb IIIC T85°C Db (-20°C ≤ Ta ≤ +60°C) IP66

Approved for issue on behalf of the IECEx Certification Body: R S Sinclair

Position: Technical Manager

Signature: (for printed version) M POWNEY Certification Manager

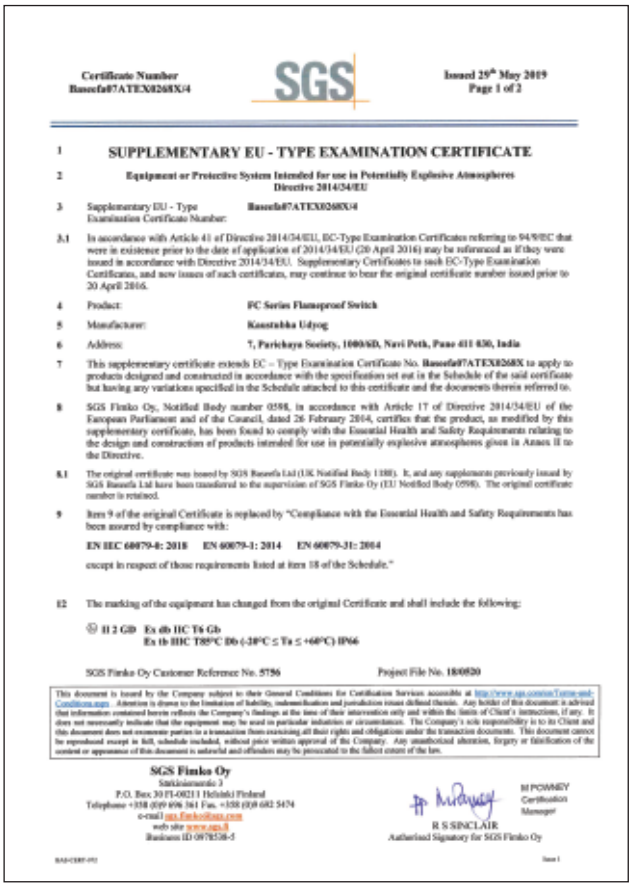
Date: 29/5/19

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:
SGS Baseefa Limited
Rockhead Business Park
Staden Lane
Buxton, Derbyshire, SK17 9RZ
United Kingdom

SGS Baseefa

International Certifications for FC series



Certificate Number
Baseefa07ATEX0268X/4

SGS

Issued 29th May 2019
Page 1 of 2

1 **SUPPLEMENTARY EU - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU**

3 Supplementary EU - Type Examination Certificate Number: **Baseefa07ATEX0268X/4**

3.1 In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary Certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.

4 Product: **FC Series Flameproof Switch**

5 Manufacturer: **Kaustubha Udyog**

6 Address: **7, Parichaya Society, 1080/8D, Navi Peth, Pune 411 030, India**

7 This supplementary certificate extends EC – Type Examination Certificate No. **Baseefa07ATEX0268X** to apply to products designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

8 SGS Fimko Oy, Notified Body number 0598, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that the product, as modified by this supplementary certificate, has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

8.1 The original certificate was issued by SGS Baseefa Ltd (UK Notified Body 1188). It, and any supplements previously issued by SGS Baseefa Ltd have been transferred to the supervision of SGS Fimko Oy (EU Notified Body 0598). The original certificate number is retained.

9 Item 9 of the original Certificate is replaced by "Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0: 2018 EN 60079-1: 2014 EN 60079-31: 2014

except in respect of those requirements listed at item 18 of the Schedule."

12 The marking of the equipment has changed from the original Certificate and shall include the following:

⟨Ex⟩ **II 2 GD Ex db IIC T6 Gb**
Ex tb IIIC T85°C Db (-20°C ≤ Ta ≤ +60°C) IP66

SGS Fimko Oy Customer Reference No. **5756** Project File No. **18/0020**

This document is issued by the Company subject to its General Conditions for Certification Services accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx . Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained herein reflects the Company's findings at the time of their intervention only and within the limits of Client's instructions, if any. It does not necessarily indicate that the equipment may be used in particular industries or circumstances. The Company's sole responsibility is to its Client and this document does not exonerate parties in a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, schedule included, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Fimko Oy
Särkiniemenkatu 3
P.O. Box 30 FI-00211 Helsinki Finland
Telephone +358 (0)9 696 361 Fax. +358 (0)9 682 5474
e-mail sgs.fimko@sgs.com
web site www.sgs.fi
Business ID 0878528-5

M POWNEY
Certification Manager

R S SINCLAIR
Authorised Signatory for SGS Fimko Oy

BAS/CERT/07 Issue 1



Certificate Number
Baseefa07ATEX0268X/4

SGS

Issued 29th May 2019
Page 2 of 2

13 **Schedule**

14 **Certificate Number Baseefa07ATEX0268X/4**

15 **Description of the variation to the Product**

Variation 4.1

To confirm that the equipment covered by this certificate has been reviewed against the requirements of EN IEC 60079-0: 2018 in respect of the differences from the standard to which this certificate was previously issued.

16 **Report Number**

SGS Baseefa certification report GB/BAS/ExTR19.0021/00.

17 **Specific Conditions of Use**

None additional to those listed previously.

18 **Essential Health and Safety Requirements**

Compliance with the Essential Health and Safety Requirements is affected as follows.

Clause	Subject	Compliance
1.2.7	LVD type requirements	Pass
1.2.8	Overloading of equipment (protection relays, etc.)	Pass
1.4.1	External effects	Pass
1.4.2	Aggressive substances, etc	Pass

19 **Drawings and Documents**

Number	Sheets	Issue	Date	Description
A24 BF 001	1 to 4	4	03.05.19	General Assembly Drawing

These drawings are common to, and held with, IECEx BAS 07.0096X

BAS/CERT/07 Issue 1

Indian Certifications for FC series

KLPL Test Report



Karandikar Laboratories

Ex EQUIPMENT TYPE EXAMINATION REPORT

1) TE Report Number: KLPL/Ex/10 -006X Issue no.01 Dated: 21-09-2022

2) Ex Equipment: Flameproof Pressure / Temperature Switch (ORION Brand - Model FC/ FA / FM)

3) Manufacturer: Kaustubha Udyog
S. No. 36/1/1, Sinhgad Road, Vadgaon Khurd, Pune 411041

4) This equipment and any acceptable variation thereto are specified in the schedule to this report and the documents therein referred to

5) Karandikar Laboratories Pvt. Ltd. reports that this equipment has been found to comply with requirements of the following standards relating to the design and construction of equipment for explosive gas atmospheres as applicable.

6) This TE Report was issued as verification that a sample, was assessed, tested and found to comply with the IS / IEC standards listed below.
IS/IEC 60079-0: 2017, IS/IEC 60079-1: 2014

7) The Examination and Test results are recorded in KLPL's confidential Report No.: KLPL/Ex/KSU-21/001 Dated: 21-09-2022

8) The sign X if placed after the TE report number; it indicates that the equipment is subject to specific conditions of use specified in the schedule to this TE Report.

9) This Report does not indicate compliance with electrical safety and performance requirements other than those expressly included in the above listed standards.

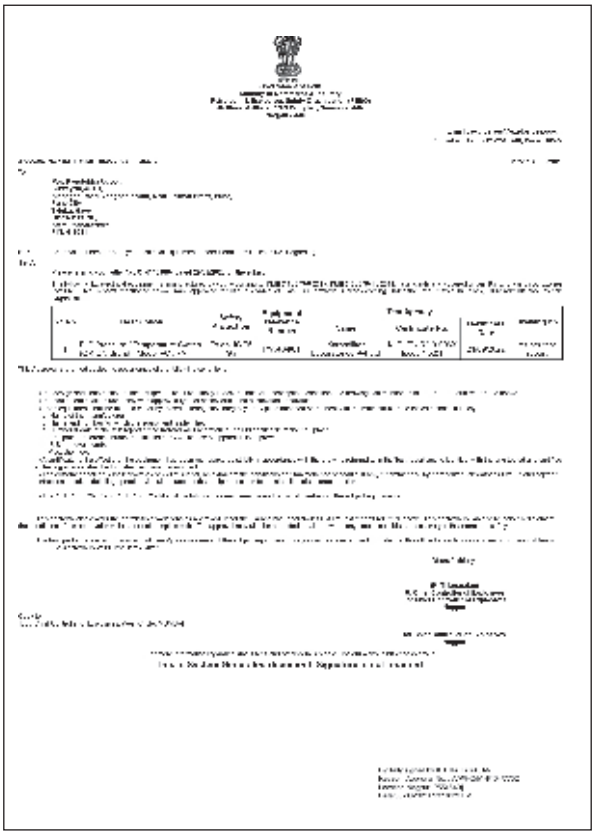
10) The marking of the Equipment shall include the following:
Ex db I Mb
Ex db IIC T6 Gb (-20°C ≤ Ta ≤ +60°C)

11) Page 1 of 4

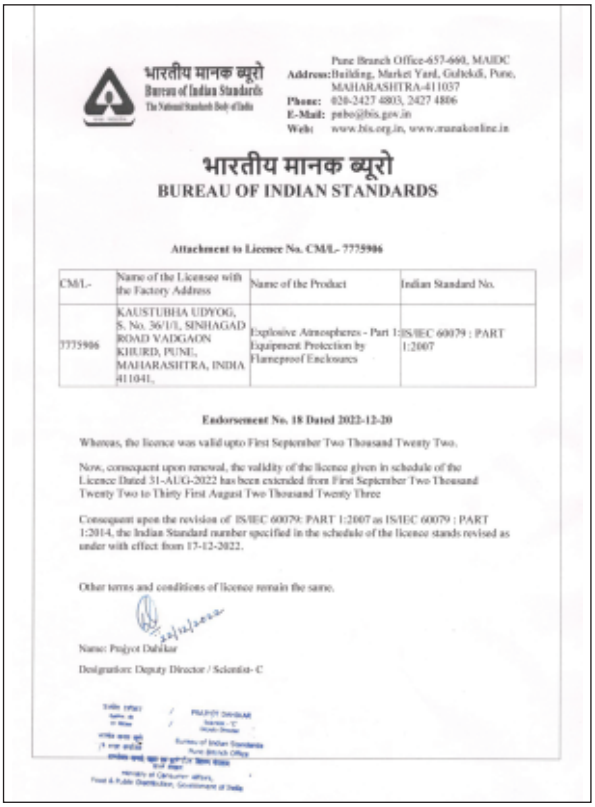
Ravi Parange
Director (Operations)

Karandikar Laboratories Pvt. Ltd.

PESO Approval



BIS License



भारतीय मानक ब्यूरो
Bureau of Indian Standards

Pune Branch Office-657-660, MAIDC
Address: Building, Market Yard, Gultekdi, Pune, MAHARASHTRA-411037
Phone: 020-2427 4803, 2427 4806
E-Mail: pubo@bis.gov.in
Web: www.bis.org.in, www.manakonline.in

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

Attachment to Licence No. CM/L- 7775906

CM/L-	Name of the Licensee with the Factory Address	Name of the Product	Indian Standard No.
7775906	KAUSTUBHA UDYOG, S. No. 36/1/1, SINHAGAD ROAD VADGAON KHURD, PUNE, MAHARASHTRA, INDIA 411041.	Explosive Atmospheres - Part 1: Equipment Protection by Flameproof Enclosures	IS/IEC 60079 : PART 1:2007

Endorsement No. 18 Dated 2022-12-20

Whereas, the licence was valid upto First September Two Thousand Twenty Two.

Now, consequent upon renewal, the validity of the licence given in schedule of the Licence Dated 31-AUG-2022 has been extended from First September Two Thousand Twenty Two to Thirty First August Two Thousand Twenty Three

Consequent upon the revision of IS/IEC 60079: PART 1:2007 as IS/IEC 60079 : PART 1:2014, the Indian Standard number specified in the schedule of the licence stands revised as under with effect from 17-12-2022.

Other terms and conditions of licence remain the same.

Name: Prajyot Dahikar

Designation: Deputy Director / Scientist- C

Indian Certifications for FE series

KLPL Test Report



Karandikar Laboratories

1) Ex EQUIPMENT TYPE EXAMINATION REPORT

2) TE Report Number: KLPL/Ex/17 -068K Issue no.01 Dated: 13-10-2022

3) Ex Equipment: Flameproof Switch, Model No. : FE Series

4) Manufacturer: Kaustubha Udyog
S. No. 38/1/1, Sinhgad Road, Vadgaon Khurd, Pune-411041

5) This equipment and any acceptable variation thereto are specified in the schedule to this report and the documents therein referred to

6) Karandikar Laboratories Pvt. Ltd. reports that this equipment has been found to comply with requirements of the following standards relating to the design and construction of equipment for explosive gas & dust atmospheres as applicable.

7) This TE Report was issued as verification that a sample, was assessed, tested and found to comply with the IS / IEC standards listed below.
IS/IEC 60079-0: 2017, IS/IEC 60079-1: 2014, IS/IEC 60079-31:2015

8) The Examination and Test results are recorded in KLPL's confidential
Report No.: KLPL/Ex/KSU-22/001 Dated: 13-10-2022

9) The sign X if placed after the TE report number; it indicates that the equipment is subject to specific conditions of use specified in the schedule to this TE Report.

10) This Report does not indicate compliance with electrical safety and performance requirements other than those expressly included in the above listed standards.

11) The marking of the Equipment shall include the following:
Ex db IIC T6 Gb (-20°C ≤ Ta ≤ +60°C)
Ex tb IIIC T85°C Db

Page 1 of 4

Ravi Paranjpe
Director (Operations)

Karandikar Laboratories Pvt. Ltd.

PESO Approval



Government of India
Ministry of Commerce & Industry
Petroleum & Explosives Safety Organization (PESO)

Approval No : A/P/HQ/MH/104/7488 (P004883)

To,
M/s. Kaustubha Udyog,
Sinhagad Road, Vadgaon Khurd, Near Lokmat Press, Pune,
Pune City,
Taluka: Haveli,
District: Pune,
State: Maharashtra,
PIN: 411041

Sub : Approval of Flame Proof Type Electrical Equipment under Petroleum Rules 2002- Regarding.

Sir(s),

Please refer to your letter No. 09/10/0045 dated 24/12/2022 on the subject.

The following Ex electrical equipment(s) manufactured by you according to IS/IEC 60079-0:2017, IS/IEC 60079-1 : 2014, standards and covered under Karandikar Laboratories Pvt. Ltd Test reports mentioned below were approved for use in Zone 1/ Zone 2/ Zone 21/ Zone 22 hazardous areas coming under the the Petroleum Rules, 2002 administered by this Organization.

Sr. No	Description	Safety Protection	Equipment reference Number	Test Agency			Drawing no
				Name	Certificate No.	Certificate Date	
1	Flameproof Switch, Model No. FE Series	Ex db IIC T6 Gb	P004883(1)	Karandikar Laboratories Pvt Ltd	KLPL/Ex/17-068K Issue No. 01	13/10/2022	A44 KL 001 LC No 05

This Approval is granted subject to observance of the following conditions:-

1) The design and construction of the equipment shall be strictly in accordance with description, condition and drawings as mentioned in the Test Reports referred to above.
2) The equipment shall be used only with approved type of accessories and associated apparatus.
3) Each equipment shall be marked either by raised lettering cast integrally on its plate attached permanently to the main structure to indicate conspicuously -
(a) Name of the manufacturer
(b) Name and number by which the equipment is identified
(c) Number & date of the test report of the Karandikar Laboratories Pvt.Ltd applicable to the equipment.
(d) Equipment reference number of this letter by which sum of apparatus is approved.
(e) PESO approval number.
(f) Protection level.
4) A certificate to the effect that the equipment has been manufactured strictly in accordance with the drawing referred to in the Test report and is identical with the one tested and certified by testing agency shall be furnished with each equipment.
5) The user/end user shall be supplied with a copy of this letter, an extract of the conditions and maintenance schedule, if any, recommended by Karandikar Laboratories Pvt Ltd and copy of instructions booklet detailing operation & maintenance of the equipment(s) so as to maintain its safe characteristics.
6) The IS/IEC 60079-17 and IS/IEC 60079-19 shall be followed for maintenance and repair of overhaul of the subject equipments.

Conditions of the Approval:-
This approval for above equipment is subject to validity of ISO License No. CML 7775906.

This approval also covers the permissible variations as approved under the Karandikar Laboratories Pvt Ltd test reports referred above. This approval is liable to be cancelled if any of the conditions of the approval is violated or non-complied with. The approval may also be amended or withdrawn at any time, if considered necessary in the interest of safety.

The field performance report from actual users/your customers of the subject equipment may please be collected and furnished to this office for verification and record on annual basis.
This Approval is Valid upto 31/12/2027

Yours faithfully,

(Nirmal Baburao Kawade)
Dy. Controller of Explosives
For Chief Controller of Explosives
Nagpur

for Chief Controller of Explosives
Nagpur

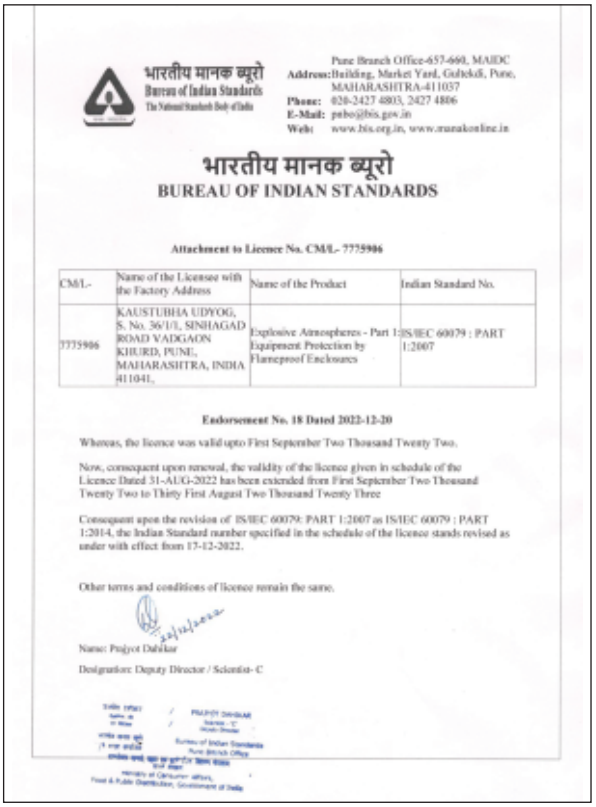
Copy to:
1. JT. Chief Controller of Explosives, Pune Circle, MUMBAI

(For more information regarding status,fees and other details please visit our website http://peso.gov.in)

This is System Generated document. Signature is not required.

Digitally signed by NIWAS GARVADE
Reason: Approval No. : A/P/HQ/MH/104/7488
Location/Region: [PESO]CC]
Date:11-01-2023 10:00:30 PM

BIS License



भारतीय मानक ब्यूरो
Bureau of Indian Standards
The National Standards Body of India

Pune Branch Office-657-660, MAIDC
Address:Building, Market Yard, Gultekdi, Pune, MAHARASHTRA-411037
Phone: 020-2427 4803, 2427 4806
E-Mail: pnbo@bis.gov.in
Web: www.bis.org.in, www.manakonline.in

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

Attachment to Licence No. CM/L- 7775906

CM/L-	Name of the Licensee with the Factory Address	Name of the Product	Indian Standard No.
7775906	KAUSTUBHA UDYOG, S. No. 36/1/1, SINHAGAD ROAD VADGAON KHURD, PUNE, MAHARASHTRA, INDIA 411041,	Explosive Atmospheres - Part 1: Equipment Protection by Flameproof Enclosures	IS/IEC 60079 : PART 1:2007

Endorsement No. 18 Dated 2022-12-20

Whereas, the licence was valid upto First September Two Thousand Twenty Two.

Now, consequent upon renewal, the validity of the licence given in schedule of the Licence Dated 31-AUG-2022 has been extended from First September Two Thousand Twenty Two to Thirty First August Two Thousand Twenty Three

Consequent upon the revision of IS/IEC 60079: PART 1:2007 as IS/IEC 60079 : PART 1:2014, the Indian Standard number specified in the schedule of the licence stands revised as under with effect from 17-12-2022.

Other terms and conditions of licence remain the same.

Name: Prajyot Dahikar

Designation: Deputy Director / Scientist- C

FC Pictorial Index

PRESSURE SWITCHES

HIGH RANGE



Page No. 26

HIGH PROOF HIGH RANGE



Page No. 30

LOW RANGE



Page No. 34

LOW RANGE HIGH PROOF



Page No. 38

ULTRA LOW RANGE



Page No. 42

HYDRAULIC DIAPHRAGM*



Page No. 46

FLANGED



Page No. 50

PRESSURE DIFFERENCE SWITCHES

HIGH RANGE



Page No. 54

HIGH RANGE DP



Page No. 58

HYDRAULIC RANGE DP



Page No. 62

LOW RANGE



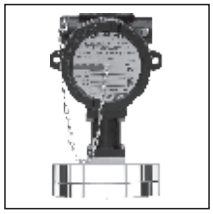
Page No. 66

LOW DP HIGH PROOF



Page No. 70

LOW ΔP HIGH PROOF



Page No. 74

ULTRA LOW RANGE PD



Page No. 78

*Hydraulic ranges are ranges typically from 2 bar to 700 bar, used in oil applications.
However, these switches can be used for other media depending on wetted parts compatibility.

FC Pictorial Index

VACUUM SWITCHES



Page No. 82

COMPOUND SWITCHES

HIGH RANGE



Page No. 86

LOW RANGE



Page No. 90

PNEUMATIC SWITCHES

HIGH RANGE AIR RELAY



Page No. 95

HYDRAULIC DIAPHRAGM AIR RELAY



Page No. 99

LOW DP HIGH PROOF AIR RELAY



Page No. 103

VACUUM AIR RELAY



Page No. 107

TEMPERATURE SWITCHES

DIRECT MOUNTED



Page No. 110



Page No. 114

*Pneumatic switches gives a pneumatic output instead electrical output. Since no electricity is involved thus no need of flameproof certification.

FE Pictorial Index

PRESSURE SWITCHES

HIGH RANGE



Page No. 27

HIGH PROOF HIGH RANGE



Page No. 31

LOW RANGE



Page No. 35

LOW RANGE HIGH PROOF



Page No. 39

ULTRA LOW RANGE



Page No. 43

HYDRAULIC DIAPHRAGM*



Page No. 47

FLANGED



Page No. 51

PRESSURE DIFFERENCE SWITCHES

HIGH RANGE



Page No. 55

HIGH RANGE DP



Page No. 59

HYDRAULIC RANGE DP



Page No. 63

LOW RANGE



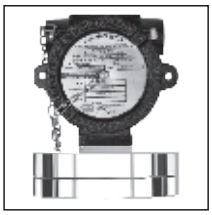
Page No. 67

LOW DP HIGH PROOF



Page No. 71

LOW ΔP HIGH PROOF



Page No. 75

ULTRA LOW RANGE PD



Page No. 89

*Hydraulic ranges are ranges typically from 2 bar to 700 bar, used in oil applications.
However, these switches can be used for other media depending on wetted parts compatibility.

FE Pictorial Index

VACUUM SWITCHES



Page No. 83

COMPOUND SWITCHES

HIGH RANGE



Page No. 87

LOW RANGE



Page No. 91

TEMPERATURE SWITCHES



Page No. 111

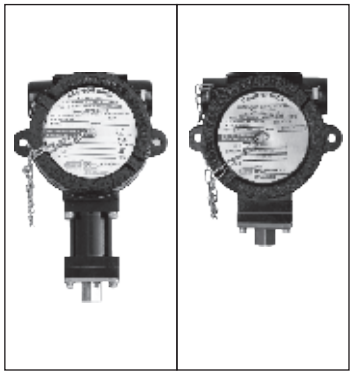
DIRECT MOUNTED



Page No. 115

FC/FE Product Selection Guide

High Range Pressure Switches
High Proof High Range Pressure Switches
Low Range Pressure Switches



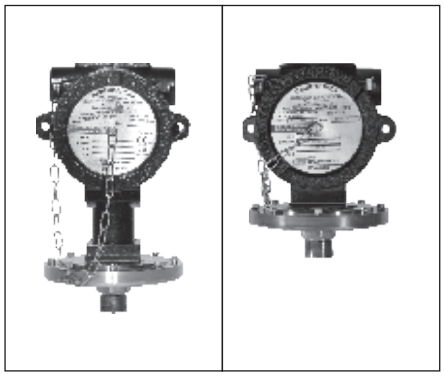


Page No. 26 Page No. 27 Page No. 30 Page No. 31 Page No. 34 Page No. 35

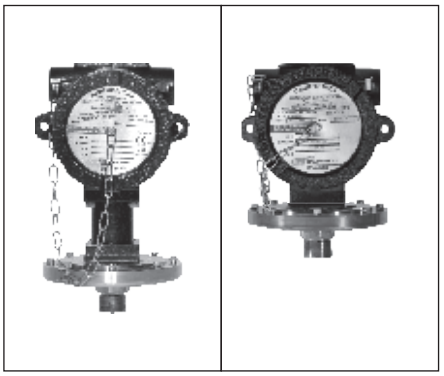
Switch type	High range pressure	High proof high range	Low range pressure
Repeatability* (% FSR)	± 1	± 1	± 2
Range covered	0.067 bar to 25 bar	0.1 bar to 25 bar	1.5 mbar to 350 mbar
Enclosure Protection	IP 66		
Enclosure Material	FC/FE 1, 2, 3 models (gas group IIC) : Diecast aluminium FC 4, 5, 6 models (gas group IIC) : Grey cast iron FC 7, 8, 9 models (gas group IIC) : Stainless Steel		
WETTED PARTS sensing element Standard Optional	Diaphragm nylon reinforced neoprene diaphragm PTFE, SS316L		
Pressure housing Standard Optional	SS 316 Hastelloy C, Monel		
Other Wetted Parts			
Optional wetted parts through chem. seal	SS316, Hastelloy B2, Hastelloy C4, Hastelloy C22, Hastelloy C276, Inconel Alloy 600, Monel Alloy 400, Monel Alloy K500, Nickel, Platinum, Tantalum, Titanium, Zirconium, Silver, PTFE		
Temp. of working medium	For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°C maximum. For higher temperature, please use impulse tubing/chemical seals.		
Switching element	SPDT Snap action switch A1 : General purpose rated at 15A, 250 VAC, 0.2 A, 250 VDC resistive. Other microswitches with gold plated contacts, hermetically sealed etc. also available. (Ref. Pg. 118)		

Accessories can be supplied with most of the switches. Please consult sales office.
*Repeatability changes with switch configuration.

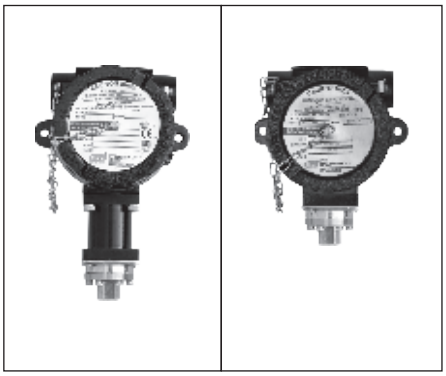
Low Range High Proof Switches
Ultra Low Range Switches
Hydraulic Range Switches



Page No. 38 Page No. 39



Page No. 42 Page No. 43

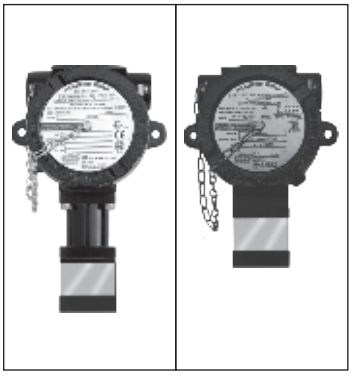
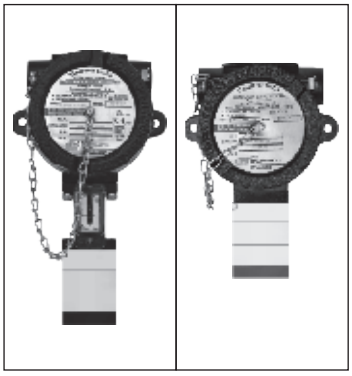


Page No. 46 Page No. 47

Low range high proof	Ultra low range	Hydraulic Diaphragm
± 1	± 1	± 2
1.5 mbar to 350 mbar	0.4 mbar to 4 mbar	0.5 bar to 1000 bar
IP 66		
FC/FE 1, 2, 3 models (gas group IIC) : Diecast aluminium FC 4, 5, 6 models (gas group IIC) : Grey cast iron FC 7, 8, 9 models (gas group IIC) : Stainless Steel		
Diaphragm nylon reinforced neoprene diaphragm PTFE, SS316L		Diaphragm SS316L PTFE, Neoprene, Hastelloy C, Monel, Titanium, Tantalum
SS 316		Aluminium SS 316
		PTFE, SS 316
SS316, Hastelloy B2, Hastelloy C4, Hastelloy C22, Hastelloy C276, Inconel Alloy 600, Monel Alloy 400, Monel Alloy K500, Nickel, Platinum, Tantalum, Titanium, Zirconium, Silver, PTFE		
For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°C maximum. For higher temperature, please use impulse tubing/chemical seals.		
SPDT Snap action switch A1 : General purpose rated at 15A, 250 VAC, 0.2 A, 250 VDC resistive. Other microswitches with gold plated contacts, hermetically sealed etc. also available. (Ref. Pg. 118)		

FC/FE Product Selection Guide

Flanged Switches
High Range Pressure Difference Switches
High Range DP

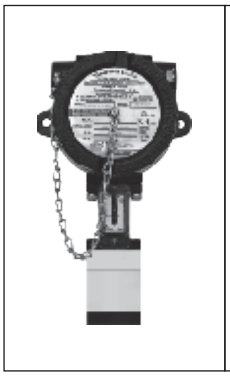
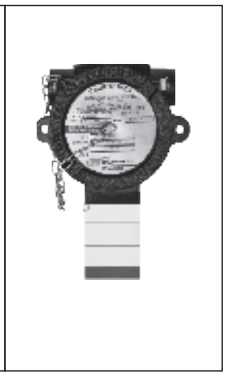
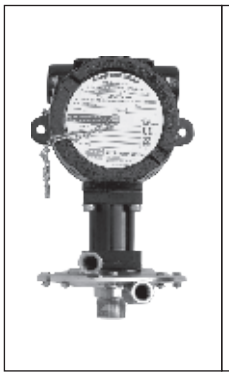
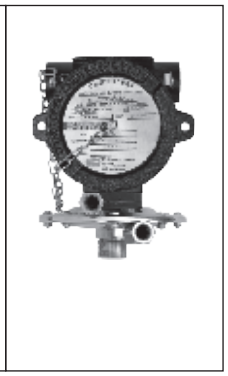
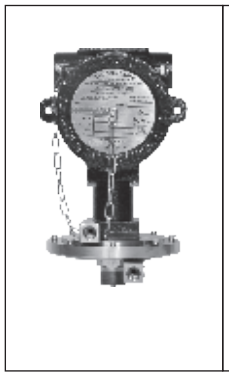
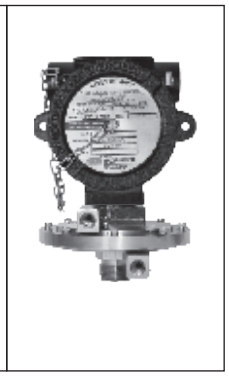




Page No. 50 Page No. 51 Page No. 54 Page No. 55 Page No. 58 Page No. 59

Switch type	Flanged	High range pressure difference	High range DP
Repeatability* (% FSR)	± 1	± 1	± 1
Range covered	0.1 bar to 200 bar	0.1 bar to 3.6 bar	0.1 bar to 25 bar
Enclosure Protection	IP 66		
Enclosure Material	FC/FE 1, 2, 3 models (gas group IIC) : Diecast aluminium FC 4, 5, 6 models (gas group IIC) : Grey cast iron FC 7, 8, 9 models (gas group IIC) : Stainless Steel		
WETTED PARTS sensing element Standard Optional		PTFE, SS316L, Monel	Diaphragm nylon reinforced neoprene diaphragm, PTFE
Pressure housing Standard Optional	Flange SS316L Hastelloy C, Titanium, Monel, Tantalum	Aluminium SS 316, Monel	Aluminium SS 316, Monel
Other Wetted Parts	PTFE	PTFE, SS 316	PTFE, SS 316
Optional wetted parts through chem. seal	Neoprene, PTFE	SS316, Hastelloy B2, Hastelloy C4, Hastelloy C22, Hastelloy C276, Inconel Alloy 600, Monel Alloy 400, Monel Alloy K500, Nickel, Platinum, Tantalum, Titanium, Zirconium, Silver, PTFE	
Temp. of working medium	For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°C maximum. For higher temperature, please use impulse tubing/chemical seals.		
Switching element	SPDT Snap action switch A1 : General purpose rated at 15A, 250 VAC, 0.2 A, 250 VDC resistive. Other microswitches with gold plated contacts, hermetically sealed etc. also available. (Ref. Pg. 118)		

Accessories can be supplied with most of the switches. Please consult sales office.
*Repeatability changes with switch configuration.

Hydraulic Range DP Switches
Low range Pressure Difference Switches
Low DP High Proof Switches

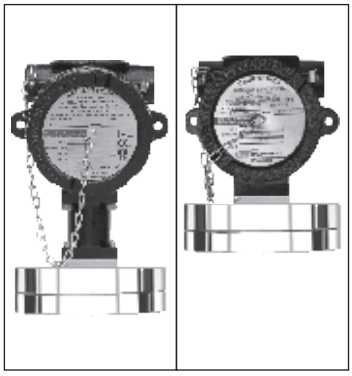
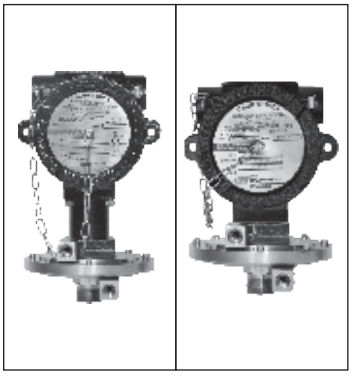
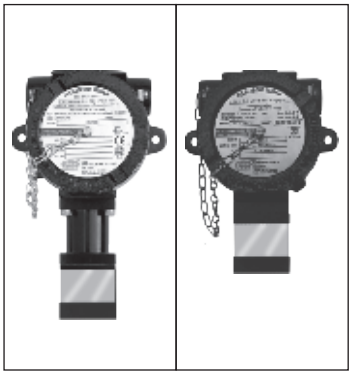







Page No. 62 Page No. 63 Page No. 66 Page No. 67 Page No. 70 Page No. 71

Hydraulic range DP	Low range pressure difference	Low DP High Proof
± 1	± 2	± 2
0.1 bar to 400 bar	1.5 mbar to 350 mbar	1.5 mbar to 350 mbar
IP 66		
FC/FE 1, 2, 3 models (gas group IIC) : Diecast aluminium FC 4, 5, 6 models (gas group IIC) : Grey cast iron FC 7, 8, 9 models (gas group IIC) : Stainless Steel		
Diaphragm nylon reinforced neoprene PTFE, SS316L, Monel	Diaphragm nylon reinforced neoprene	Diaphragm nylon reinforced neoprene diaphragm PTFE
Aluminium SS 316	SS 316	
PTFE, SS 316	Al, Neoprene, SS, Nitrile, M.S.	
SS316, Hastelloy B2, Hastelloy C4, Hastelloy C22, Hastelloy C276, Inconel Alloy 600, Monel Alloy 400, Monel Alloy K500, Nickel, Platinum, Tantalum, Titanium, Zirconium, Silver, PTFE	Neoprene, PTFE	
For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°C maximum. For higher temperature, please use impulse tubing/chemical seals.		
SPDT Snap action switch A1 : General purpose rated at 15A, 250 VAC, 0.2 A, 250 VDC resistive. Other microswitches with gold plated contacts, hermetically sealed etc. also available. (Ref. Pg. 118)		

FC/FE Product Selection Guide

Low ΔP High Proof Switches
Ultra Low Range PD Switches
Vacuum Switches

Page No. 74 Page No. 75 Page No. 78 Page No. 79 Page No. 82 Page No. 83

Switch type	Low Δp High Proof	Ultra low range PD	Vacuum
Repeatability* (% FSR)	± 2	± 1	± 2
Range covered	5 mbar to 350 mbar	0.4 mbar to 4 mbar	760 mmHg to 100 mmHg
Enclosure Protection	IP 66		
Enclosure Material	FC/FE 1, 2, 3 models (gas group IIC) : Diecast aluminium FC 4, 5, 6 models (gas group IIC) : Grey cast iron FC 7, 8, 9 models (gas group IIC) : Stainless Steel		
WETTED PARTS sensing element Standard Optional	Diaphragm nylon reinforced neoprene diaphragm PTFE		
Pressure housing Standard Optional	SS 316		Aluminium SS 316
Other Wetted Parts		PTFE / SS 316 / Neoprene	SS 316, PTFE
Optional wetted parts through chem. seal	Neoprene, PTFE		SS316, Hastelloy B2, Hastelloy C4, Hastelloy C22, Hastelloy C276, Inconel Alloy 600, Monel Alloy 400, Monel Alloy K500, Nickel, Platinum, Tantalum, Titanium, Zirconium, Silver, PTFE
Temp. of working medium	For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°C maximum. For higher temperature, please use impulse tubing/chemical seals.		
Switching element	SPDT Snap action switch A1 : General purpose rated at 15A, 250 VAC, 0.2 A, 250 VDC resistive. Other microswitches with gold plated contacts, hermetically sealed etc. also available. (Ref. Pg. 118)		

Accessories can be supplied with most of the switches. Please consult sales office.
*Repeatability changes with switch configuration.

Compound High Range Switches
Compound Low Range Switches
High Range Air Relay Switches







Page No. 86 Page No. 87 Page No. 90 Page No. 91 Page No. 95

Compound high range	Compound low range	High range air relay
± 2	± 1	± 1
-1 bar to 7 bar	-100 mbar to 100 mbar	0.067 bar to 25 bar
IP 66		
FC/FE 1, 2, 3 models (gas group IIC) : Diecast aluminium FC 4, 5, 6 models (gas group IIC) : Grey cast iron FC 7, 8, 9 models (gas group IIC) : Stainless Steel		
Diaphragm nylon reinforced neoprene diaphragm	Diaphragm nylon reinforced neoprene diaphragm PTFE	Diaphragm nylon reinforced neoprene diaphragm PTFE, SS316L, Hastelloy C, Monel, Titanium, Inconel
SS 316		
SS, PTFE		
Neoprene, PTFE		SS316, Hastelloy B2, Hastelloy C4, Hastelloy C22, Hastelloy C276, Inconel Alloy 600, Monel Alloy 400, Monel Alloy K500, Nickel, Platinum, Tantalum, Titanium, Zirconium, Silver, PTFE
For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°C maximum. For higher temperature, please use impulse tubing/chemical seals.		
SPDT Snap action switch A1 : General purpose rated at 15A, 250 VAC, 0.2 A, 250 VDC resistive. Other microswitches with gold plated contacts, hermetically sealed etc. also available. (Ref. Pg. 118)		

FC/FE Product Selection Guide

High Range Air Relay Switches
Low DP High Proof Air Relay Switches
Vacuum Air Relay Switches

Note:
Air Relay Switches available only in FC series







Page No. 99 | Page No. 103 | Page No. 107

Switch type	Hydraulic diaphragm air relay	Low DP high proof air relay	Vacuum air relay
Repeatability* (% FSR)	± 1	± 1	± 1
Range covered	0.5 bar to 1000 bar	5 mbar to 350 mbar	1.760 mmHg to 100 mmHg
Enclosure Protection	IP 66		
Enclosure Material	FC 1, 2, 3 models (gas group IIC) : Diecast aluminium FC 4, 5, 6 models (gas group IIC) : Grey cast iron FC 7, 8, 9 models (gas group IIC) : Stainless Steel		
WETTED PARTS sensing element Standard Optional	Diaphragm nylon reinforced neoprene diaphragm PTFE, SS316L, Hastelloy C, Monel, Titanium, Inconel	Diaphragm nylon reinforced neoprene diaphragm Neoprene, PTFE	Diaphragm nylon reinforced neoprene diaphragm Neoprene, PTFE, Monel, Titanium, Inconel
Pressure housing Standard Optional	SS 316		
Other Wetted Parts			
Optional wetted parts through chem. seal	SS316, Hastelloy B2, Hastelloy C4, Hastelloy C22, Hastelloy C276, Inconel Alloy 600, Monel Alloy 400, Monel Alloy K500, Nickel, Platinum, Tantalum, Titanium, Zirconium, Silver, PTFE	Neoprene, PTFE	SS316, Hastelloy B2, Hastelloy C4, Hastelloy C22, Hastelloy C276, Inconel Alloy 600, Monel Alloy 400, Monel Alloy K500, Nickel, Platinum, Tantalum, Titanium, Zirconium, Silver, PTFE
Temp. of working medium	For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°C maximum. For higher temperature, please use impulse tubing/chemical seals.		
Switching element	SPDT Snap action switch A1 : General purpose rated at 15A, 250 VAC, 0.2 A, 250 VDC resistive. Other microswitches with gold plated contacts, hermetically sealed etc. also available. (Ref. Pg. 118)		

Accessories can be supplied with most of the switches. Please consult sales office.
*Repeatability changes with switch configuration.





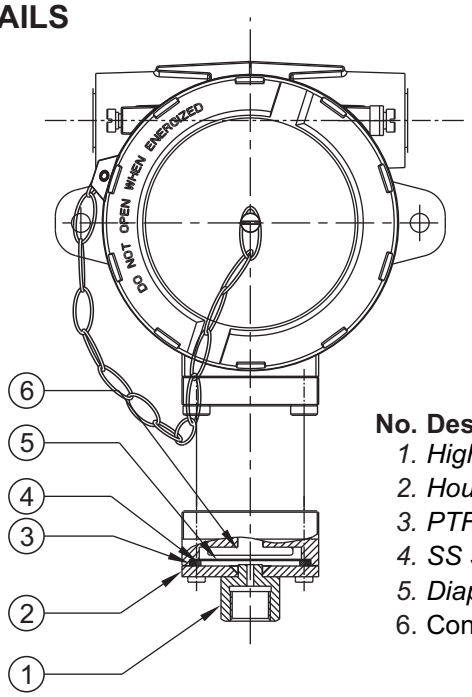

Page No. 110 Page No. 111 Page No. 114 Page No. 115

Temperature	Direct Mounted Temperature	
	± 1	
25°C to 215°C	25°C to 215°C	
FC/FE 1, 2, 3 models (gas group IIC) : Diecast aluminium FC 4, 5, 6 models (gas group IIC) : Grey cast iron FC 7, 8, 9 models (gas group IIC) : Stainless Steel		
Bulb/probe Brass		
For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°C maximum.		
SPDT Snap action switch A1 : General purpose rated at 15A, 250 VAC, 0.2 A, 250 VDC resistive. Other microswitches with gold plated contacts, hermetically sealed etc. also available. (Ref. Pg. 118)		



FC

PRESSURE CAPSULE DETAILS

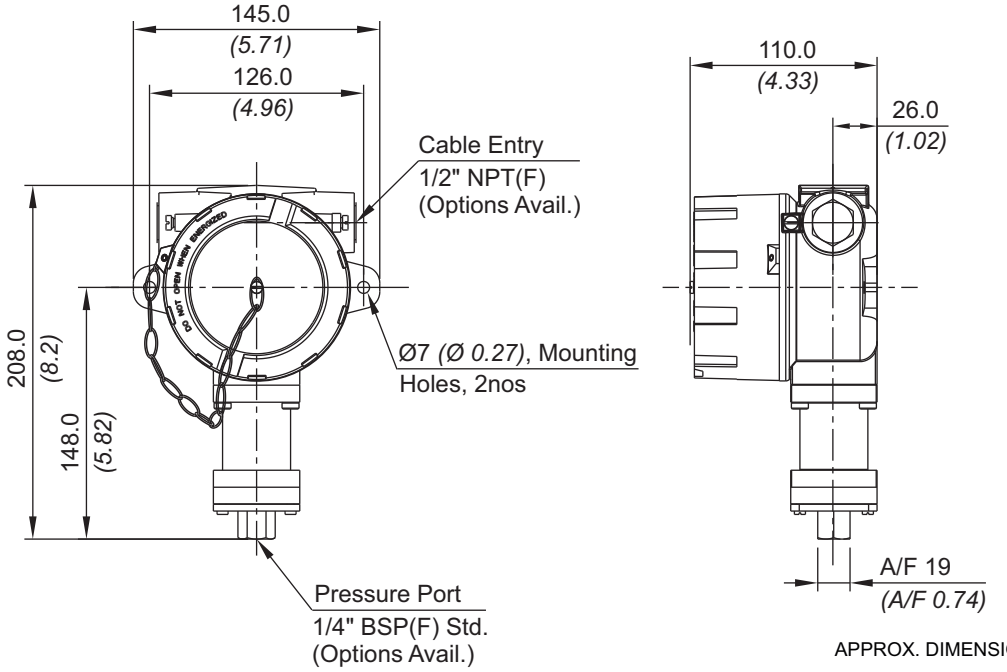


No. Description

1. *High Pressure Port (SS316)*
2. *Housing Plate (SS316)*
3. *PTFE® O-Ring*
4. *SS 316 Ring*
5. *Diaphragm (PTFE®)*
6. Conical Plunger

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



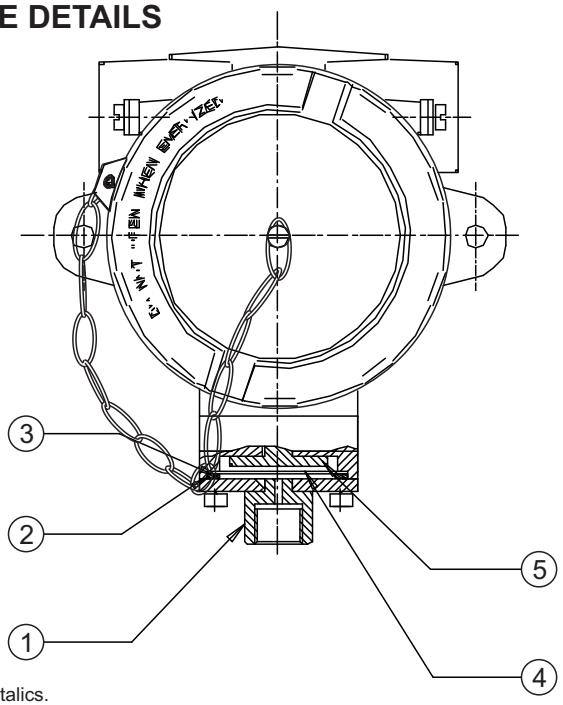
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS

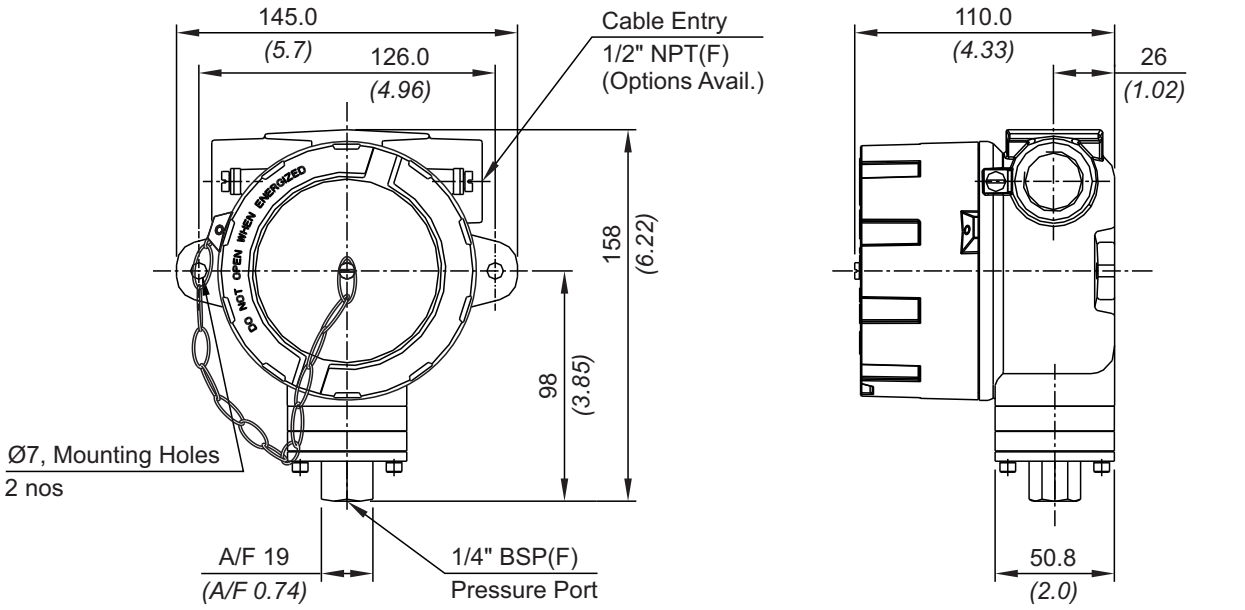


No. Description

1. *High Pressure Port*
2. *PTFE® O-Ring*
3. *SS 316 Ring*
4. *Diaphragm*
5. Conical Plunger

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

FC/FE HIGH PRESSURE RANGES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
LP	0.067 - 0.213 *(0.97 - 3.09)*	0.02 *(0.29)*	5.0 *(72.52)*
LP5	0.1 - 0.5 *(1.45 - 7.25)*	0.08 *(1.16)*	5.0 *(72.52)*
H01	0.1 - 1.0 *(1.45 - 14.50)*	0.10 *(1.45)*	12.0 *(174.05)*
H02	0.1 - 1.5 *(1.45 - 21.76)*	0.12 *(1.74)*	12.0 *(174.05)*
H03	0.2 - 2.6 *(2.90 - 37.71)*	0.15 *(2.17)*	12.0 *(174.05)*
H04	0.2 - 3.6 *(2.90 - 52.21)*	0.20 *(2.90)*	12.0 *(174.05)*
H07	0.5 - 7.0 *(7.25 - 101.53)*	0.20 *(2.90)*	12.0 *(174.05)*
H10	0.5 - 10.0 *(7.25 - 145.038)*	0.40 *(5.80)*	25.0 *(362.60)*
H15	1.0 - 15.0 *(14.5 - 217.56)*	0.80 *(11.60)*	25.0 *(362.60)*
H30	5.0 - 25.0 *(72.52 - 362.60)*	1.0 *(14.5)*	35.0 *(507.63)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.



Note: Welded diaphragm also available as shown

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF HIGH RANGE PRESSURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**P 1** = pressure switch, fixed differential without scale **P2** = pressure switch, fixed differential with scale in bar **P3** = pressure switch, fixed differential with scale in psi For adjustable differential please select microswitches A6 or C6 in group 6	**LP** = (0.067 - 0.213) **LP5** = (0.1 - 0.5) **H01** = (0.1 - 1.0) **H02** (0.1 - 1.5) **H03** = (0.2 - 2.6) **H04** = (0.2 - 3.6) **H07** = (0.5 - 7.0) **H10** = (0.5 - 10.0) **H15** = (1.0 - 15.0) **H30** = (5.0 - 25.0)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) **S3** = SS316 / 1" BSP(M) Welded Diaphragm **S4** = SS316 / 1/2" NPT(F) **S5** = SS316 / 1/2" NPT(M) **H1** = Hastelloy C / ¼" BSP(F) **H2** = Hastelloy C / ¼" NPT(F) **N1** = Monel / ¼" BSP(F) **N2** = Monel / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE **2** = SS 316L **3** = Hastelloy C **4** = Monel **5** = Titanium **6** = Tantalum **7** = Inconel

Approx. switch weight in Kgs

Enclosure	FC	FE
Aluminium	1.870	1.370
Grey CI	4.270	3.770
SS	4.420	3.920

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT pressure switch, having 0.1 bar to 1 bar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	P1	H01	A1	S1	0

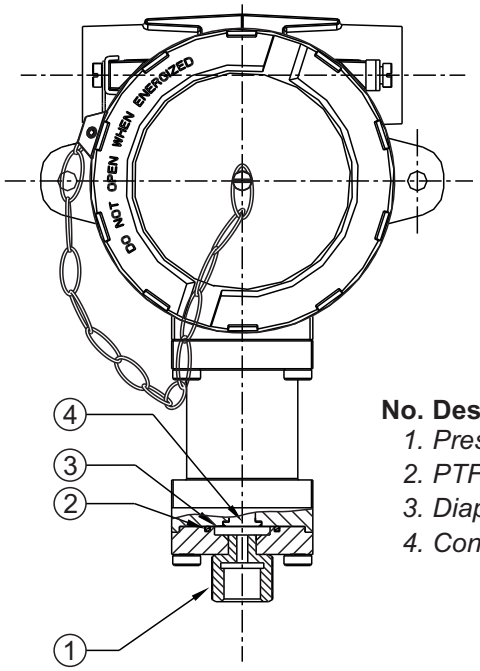
Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.

FC/FE HIGH PROOF HIGH RANGE SWITCHES



FC

PRESSURE CAPSULE DETAILS

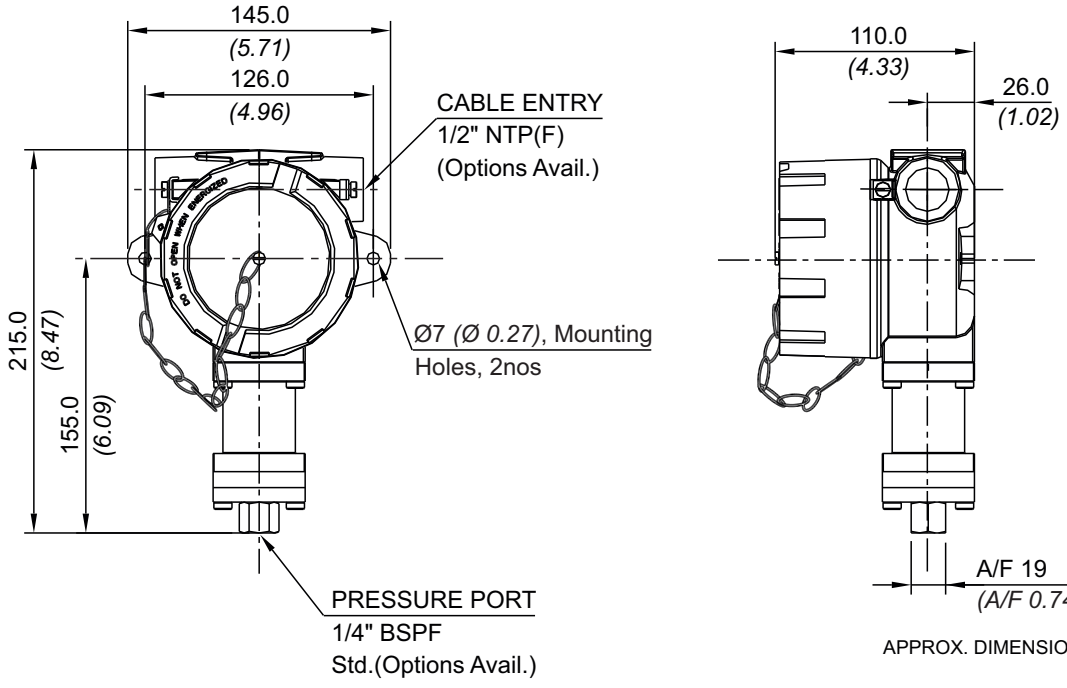


No. Description

1. *Pressure Housing*
2. *PTFE O-Ring*
3. *Diaphragm*
4. *Conical Plunger*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



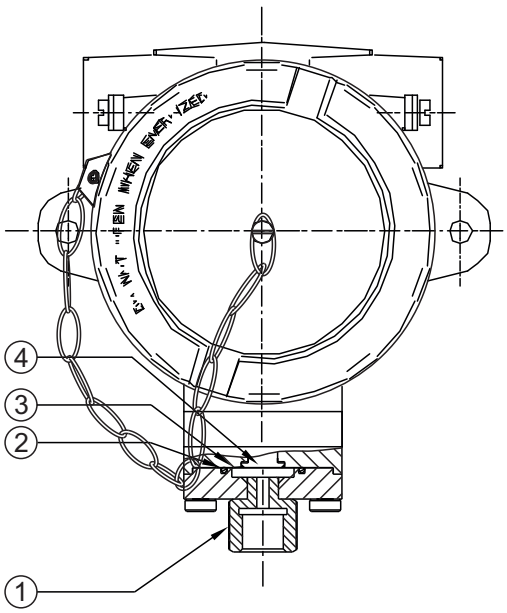
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS

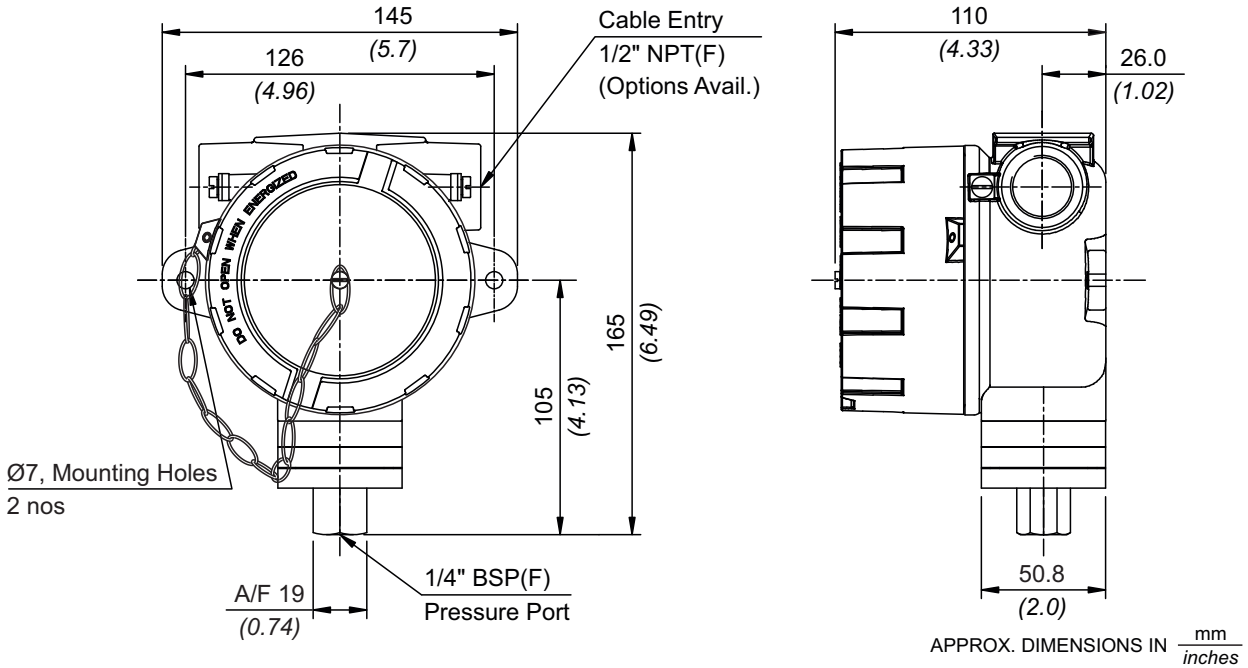


No. Description

1. *Pressure Housing*
2. *PTFE O-Ring*
3. *Diaphragm*
4. *Plunger*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

FC/FE HIGH PROOF HIGH RANGE SWITCHES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
P01	0.1 to 1.0 *(1.45 to 14.50)*	0.20 *(2.9)*	70.0 *(1015.26)*
P02	0.1 to 1.5 *(1.45 to 21.76)*	0.20 *(2.9)*	70.0 *(1015.26)*
P03	0.2 to 2.6 *(2.90 to 37.71)*	0.30 *(4.35)*	70.0 *(1015.26)*
P04	0.2 to 3.6 *(2.90 to 52.21)*	0.40 *(5.80)*	70.0 *(1015.26)*
P07	0.5 to 7.0 *(7.25 to 101.53)*	0.50 *(7.25)*	70.0 *(1015.26)*
P10	0.5 to 10.0 *(7.25 to 145.04)*	0.80 *(11.6)*	70.0 *(1015.26)*
P15	1.0 to 15.0 *(14.50 to 217.56)*	1.50 *(21.76)*	70.0 *(1015.26)*
P30	5.0 to 25.0 *(72.52 to 362.60)*	1.50 *(21.76)*	70.0 *(1015.26)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.



Note: Welded diaphragm also available as shown

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF HIGH PROOF HIGH RANGE PRESSURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**P 1** = pressure switch, fixed differential without scale **P2** = pressure switch, fixed differential with scale in bar **P3** = pressure switch, fixed differential with scale in psi For adjustable differential please select microswitches A6 or C6 in group 6	**P01** = (0.1 - 1.0) **P02** = (0.1 - 1.5) **P03** = (0.2 - 2.6) **P04** = (0.2 - 3.6) **P07** = (0.5 - 7.0) **P10** = (0.5 - 10.0) **P15** = (1.0 - 15.0) **P30** = (5.0 - 25.0)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) **S3** = (welded diaphragm) SS316 / 1" BSP(M) **S4** = SS316 / 1/2" NPT(F) **S5** = SS316 / 1/2" NPT(M) **H1** = Hastelloy C / ¼" BSP(F) **H2** = Hastelloy C / ¼" NPT(F) **N1** = Monel / ¼" BSP(F) **N2** = Monel / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE **2** = SS 316L **3** = Hastelloy C **4** = Monel

Approx. switch weight in Kgs

Enclosure	FC	FE
Aluminium	1.870	1.370
Grey CI	4.270	3.770
SS	4.420	3.920

eg. A high proof high range flameproof switch with ½" NPT cable entry in aluminium housing as 1 SPDT pressure switch, fixed differential without scale, having 0.1 bar to 1 bar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & SS316L diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	P1	P01	A1	S1	2

Please specify full model number to avoid ambiguity.

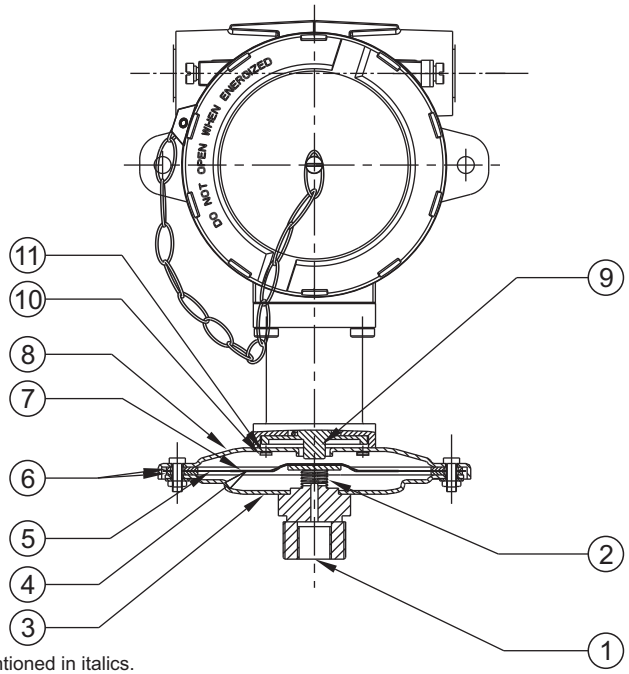
Bulletin No. KA231020

FC/FE LOW PRESSURE RANGES



FC

PRESSURE CAPSULE DETAILS



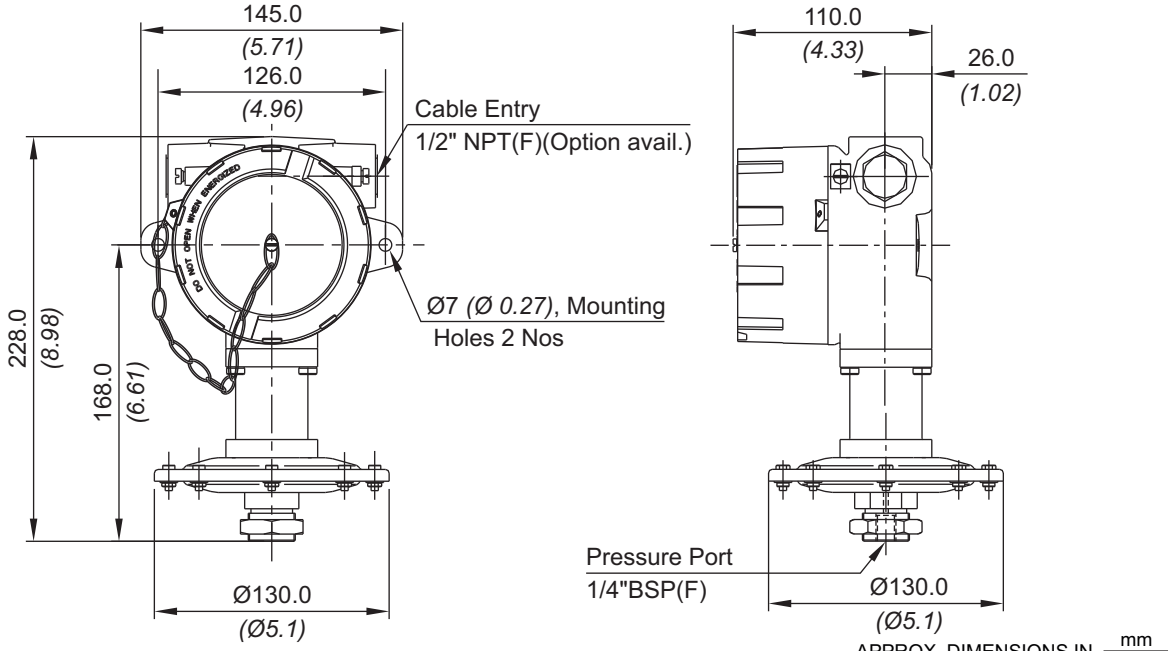
No. Description

1. *Pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)*
4. *Support plate (Aluminium)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. Top plate (Aluminium)
8. Top flange (S.S.)
9. Plunger (Aluminium)
10. Top flange screw (S.S.)
11. Sealing 'O' ring (Nitrile)

*Pressure port is welded with flange

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



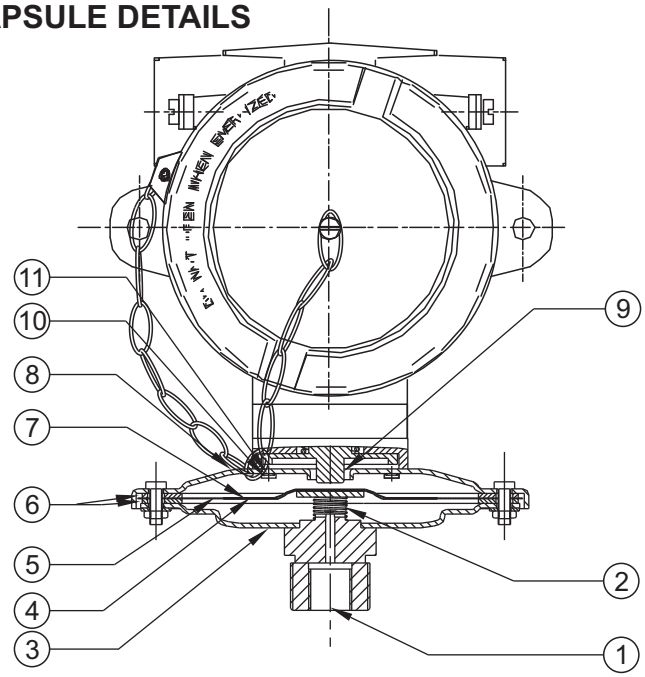
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS



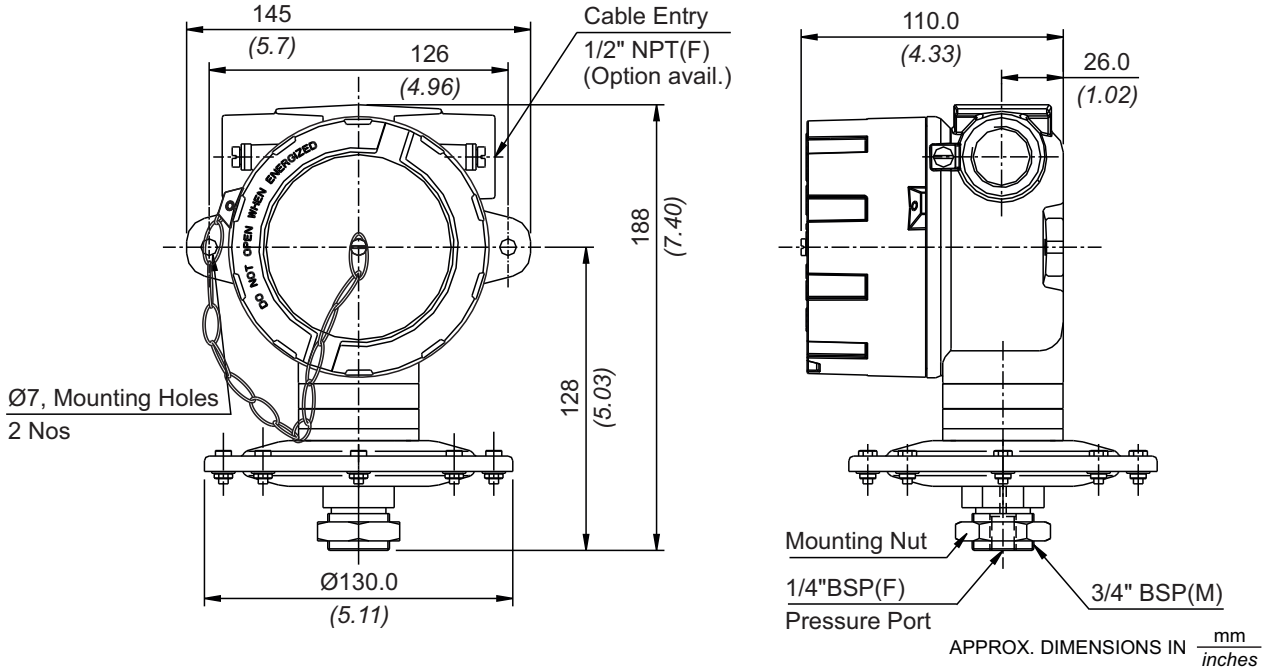
No. Description

1. *Pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)*
4. *Support plate (Aluminium)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. Top plate (Aluminium)
8. Top flange (S.S.)
9. Plunger (Aluminium)
10. Top flange screw (S.S.)
11. Sealing 'O' ring (Nitrile)

*Pressure port is welded with flange

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

FC/FE LOW PRESSURE RANGES

RANGE SELECTION TABLE

Range Code	Range mbar *("wc)*	Differential* mbar *("wc)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
L02	1.5 to 15 *(0.602 to 6.021)*	3.0 *(1.205)*	2.0 *(29.00)*
L03	5 to 25 *(2.009 to 10.046)*	5.0 *(2.009)*	2.0 *(29.00)*
L05	10 to 50 *(4.018 to 20.093)*	5.0 *(2.009)*	2.0 *(29.00)*
L10	10 to 100 *(4.018 to 40.186)*	5.0 *(2.009)*	2.0 *(29.00)*
L15	10 to 150 *(4.018 to 60.280)*	10.0 *(4.019)*	2.0 *(29.00)*
L25	20 to 250 *(8.037 to 100.460)*	10.0 *(4.019)*	2.0 *(29.00)*
L35	50 to 350 *(20.093 to 140.653)*	25.0 *(10.046)*	2.0 *(29.00)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF LOW RANGE PRESSURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in mbar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**P 1** = pressure switch, fixed differential without scale **P2** = pressure switch, fixed differential with scale in mbar **P3** = pressure switch, fixed differential with scale in "wc For adjustable differential please select microswitches A6 or C6 in group 6	**L02** = (1.5 - 15) **L03** = (5 - 25) **L05** = (10 - 50) **L10** = (10 - 100) **L15** = (10 - 150) **L25** = (20 - 250) **L35** = (50 - 350)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE **2** = SS316L

Approx. switch weight in Kgs

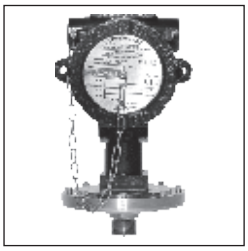
Enclosure	FC	FE
Aluminium	2.250	1.750
Grey CI	4.650	4.140
SS	4.740	4.230

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT pressure switch, having 5 mbar to 25 mbar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	P1	L03	A1	S1	0

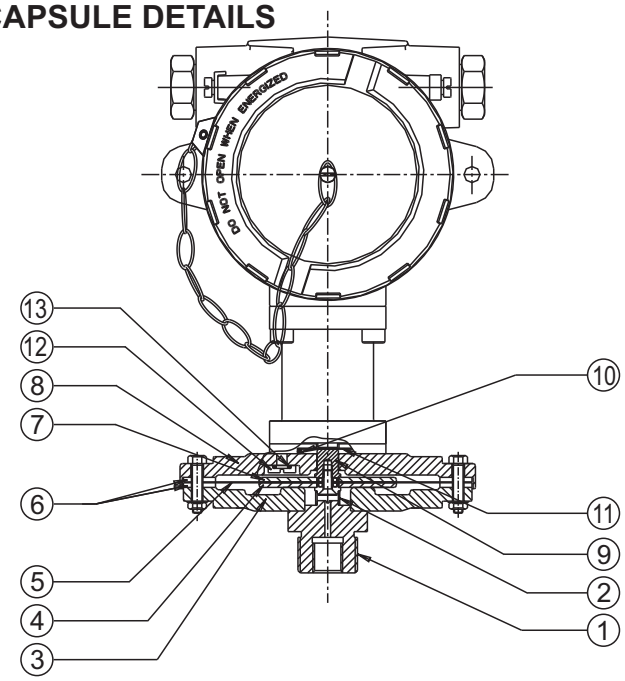
Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.

FC/FE LOW RANGE HIGH PROOF PRESSURE SWITCHES



FC

PRESSURE CAPSULE DETAILS



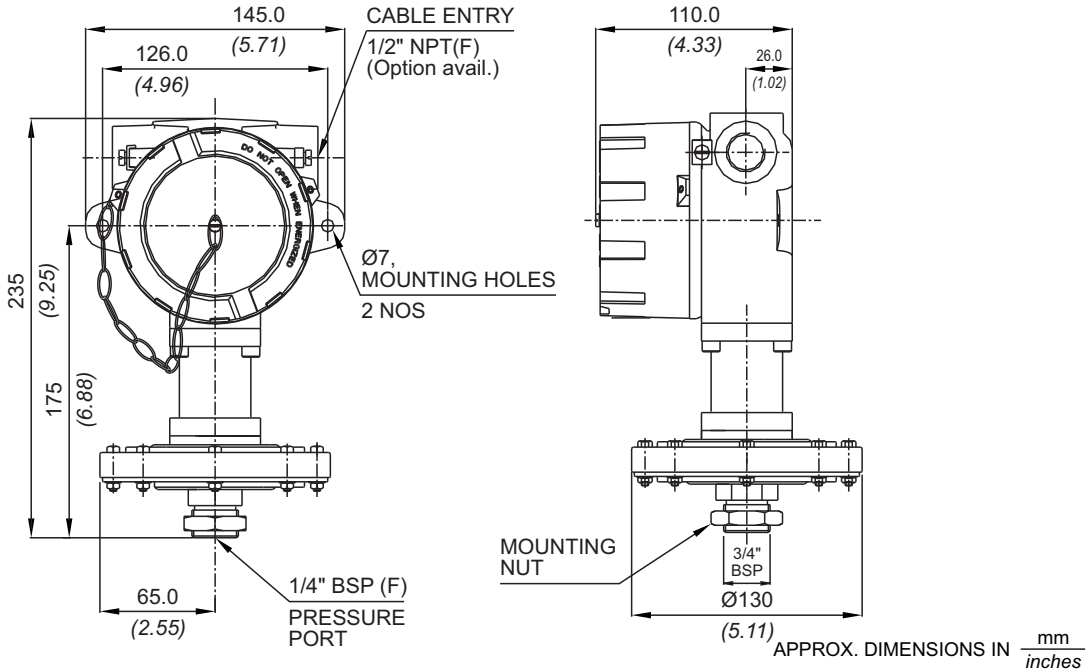
No. Description

1. *Pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)**
4. *Support plate (S.S.)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. *Top plate (S.S.)*
8. *Top flange (S.S.)**
9. *Transfer pin (S.S.)*
10. *'O' ring (Nitrile)*
11. *Sealing diaphragm (Nitrile)*
12. *Top flange screw (S.S.)*
13. *Sealing 'O' ring (Nitrile)*

*Pressure ports are welded with flange

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



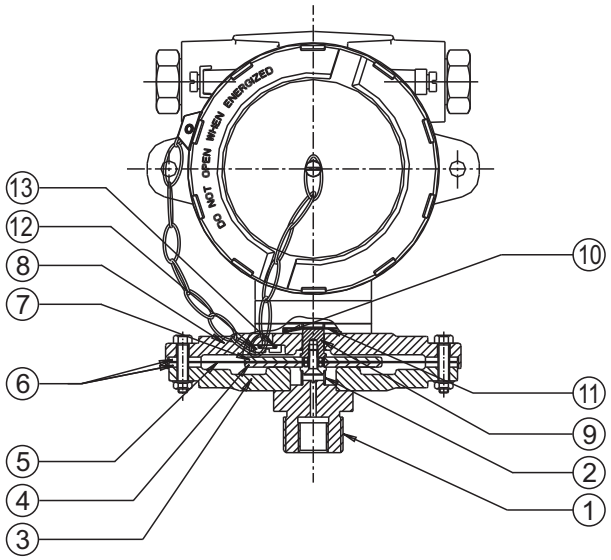
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS



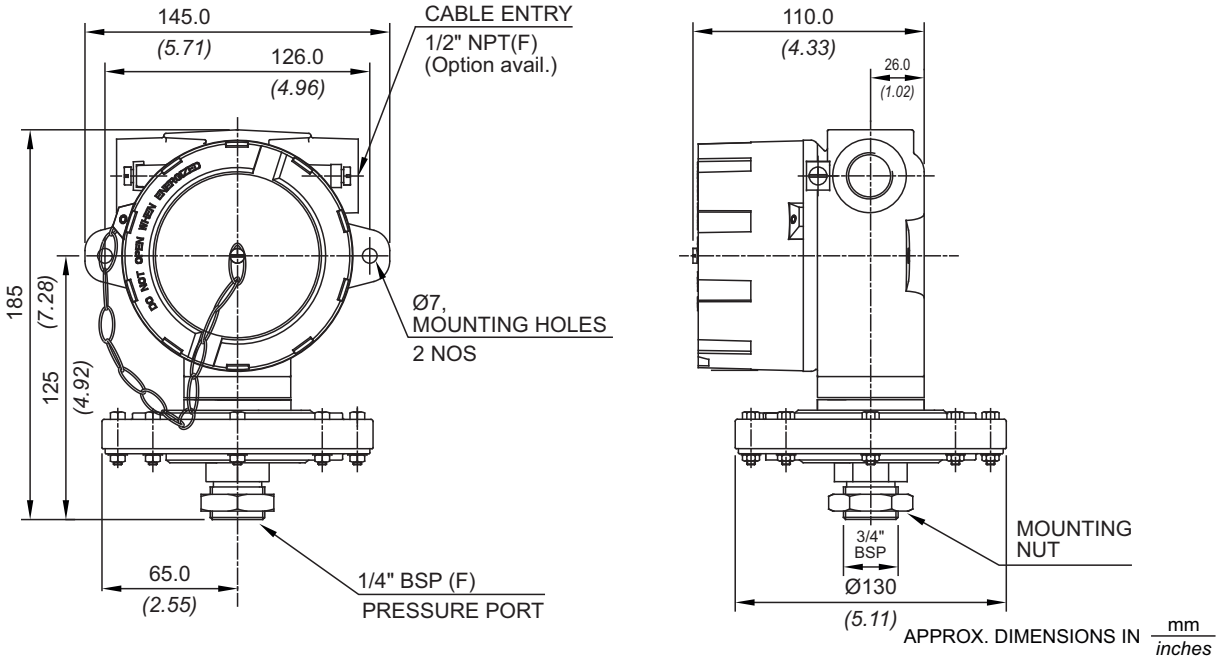
No. Description

1. *Pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)**
4. *Support plate (S.S.)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. *Top plate (S.S.)*
8. *Top flange (S.S.)**
9. *Transfer pin (S.S.)*
10. *'O' ring (Nitrile)*
11. *Sealing diaphragm (Nitrile)*
12. *Top flange screw (S.S.)*
13. *Sealing 'O' ring (Nitrile)*

*Pressure ports are welded with flange

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



FC/FE LOW RANGE HIGH PROOF PRESSURE SWITCHES

RANGE SELECTION TABLE

Range Code	Range mbar *("wc)*	Differential* mbar *(" wc)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
N02	1.5 to 15 *(0.602 to 6.02)*	3.0 *(1.205)*	20.0 *(290.075)*
N03	5 to 25 *(2.009 to 10.046)*	5.0 *(2.009)*	20.0 *(290.075)*
N05	10 to 50 *(4.018 to 20.093)*	5.0 *(2.009)*	20.0 *(290.075)*
N10	10 to 100 *(4.018 to 40.186)*	10.0 *(4.018)*	20.0 *(290.075)*
N15	10 to 150 *(4.018 to 60.270)*	10.0 *(4.018)*	20.0 *(290.075)*
N25	20 to 250 *(8.03 to 100.460)*	15.0 *(6.027)*	20.0 *(290.075)*
N35	50 to 350 *(20.093 to 140.653)*	35.0 *(14.060)*	20.0 *(290.075)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF LOW RANGE HIGH PROOF PRESSURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in mbar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**P1 =** pressure switch, fixed differential without scale **P2 =** pressure switch, fixed differential with scale in mbar **P3 =** pressure switch, fixed differential with scale in "Wc For adjustable differential please select microswitches A6 or C6 in group 6	**N02** = (1.5 - 15) **N03** = (5 - 25) **N05** = (10 - 50) **N10** = (10 - 100) **N15** = (10 - 150) **N25** = (20 - 250) **N35** = (50 - 350)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE **2** = SS316L

Approx. switch weight in Kgs

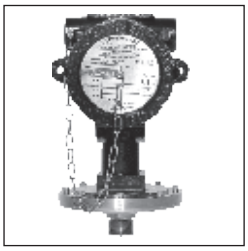
Enclosure	FC	FE
Aluminium	3.950	3.450
Grey CI	6.350	5.850
SS	6.450	5.950

eg. Flameproof switch for gas group, with ½" NPT cable entry in aluminium housing as 1SPDT pressure switch, fixed differential without scale, having 5 mbar to 25 mbar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	P1	N03	A1	S1	0

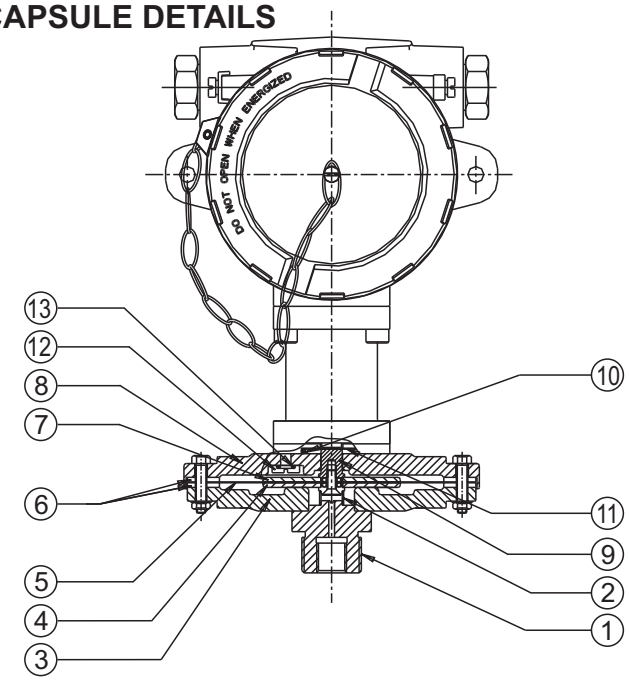
Please specify full model number to avoid ambiguity.

FC/FE ULTRA LOW RANGE PRESSURE SWITCHES



FC

PRESSURE CAPSULE DETAILS



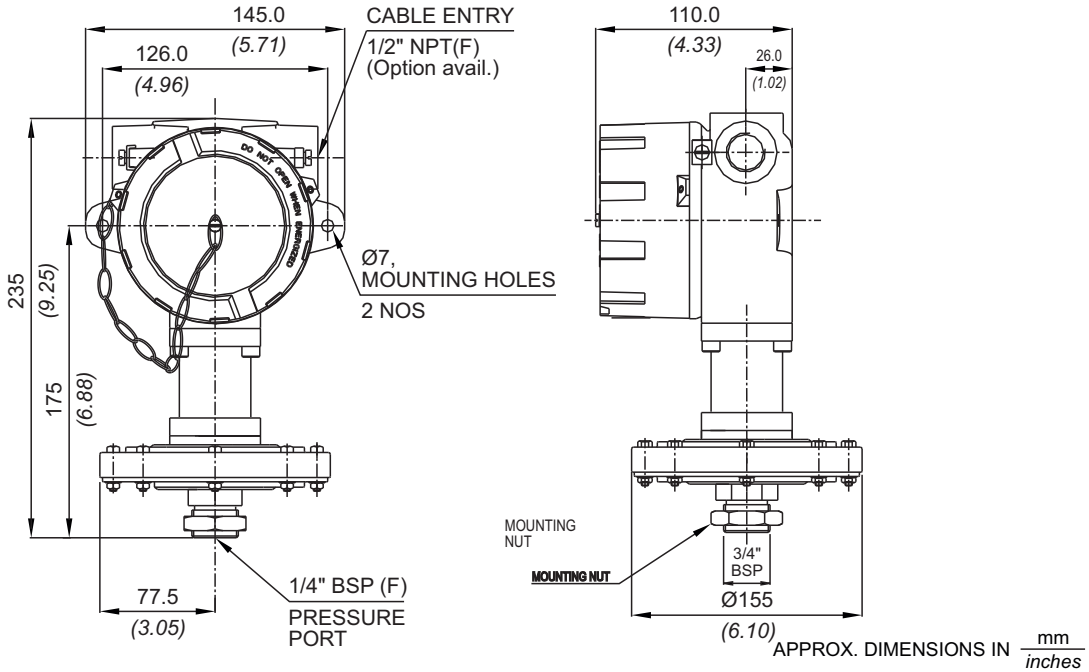
No. Description

1. *Pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)**
4. *Support plate (S.S.)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. *Top plate (S.S.)*
8. *Top flange (S.S.)**
9. *Transfer pin (S.S.)*
10. *'O' ring (Nitrile)*
11. *Sealing diaphragm (Nitrile)*
12. *Top flange screw (S.S.)*
13. *Sealing 'O' ring (Nitrile)*

*Pressure ports are welded with flange

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



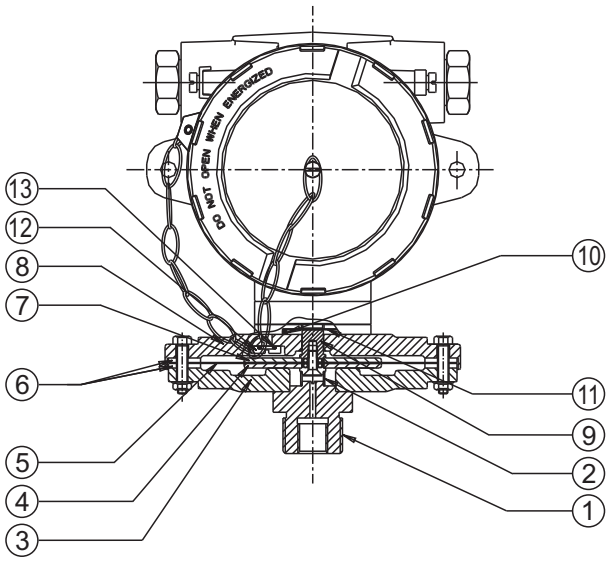
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS



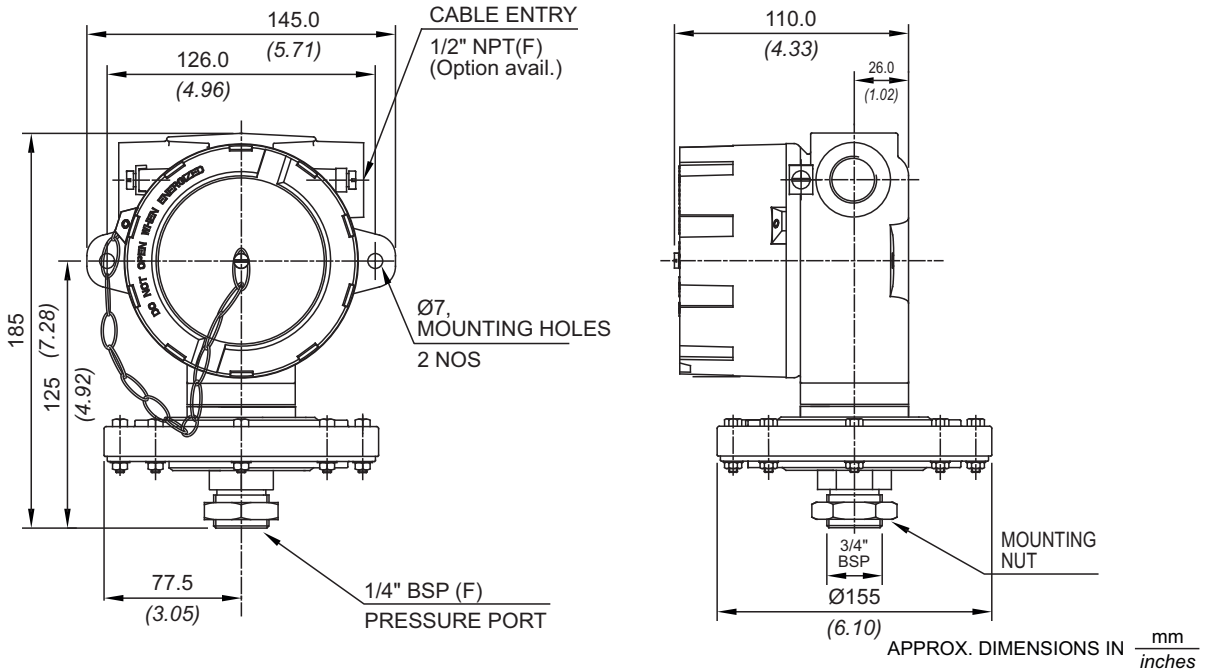
No. Description

1. *Pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)**
4. *Support plate (S.S.)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. *Top plate (S.S.)*
8. *Top flange (S.S.)**
9. *Transfer pin (S.S.)*
10. *'O' ring (Nitrile)*
11. *Sealing diaphragm (Nitrile)*
12. *Top flange screw (S.S.)*
13. *Sealing 'O' ring (Nitrile)*

*Pressure ports are brazed with flange

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

RANGE SELECTION TABLE

Range Code	Range mbar *("Wc)* (Falling set point)	Differential* mbar *("Wc)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
U15	0.4 to 1.5 *(0.16 to 0.603)*	0.40 *(0.16)*	0.5 *(7.25)*
U25	0.5 to 2.5 *(0.20 to 1.100)*	0.60 *(0.24)*	0.5 *(7.25)*
U40	1.0 to 4.0 *(0.40 to 1.067)*	0.80 *(0.32)*	0.5 *(7.25)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF ULTRA LOW RANGE PRESSURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in mbar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**P1** = pressure switch, fixed differential without scale **P2** = pressure switch, fixed differential with scale in mbar **P3** = pressure switch, fixed differential with scale in "Wc For adjustable differential please select microswitches A6 or C6 in group 6	**U15** = (0.4 - 1.5) **U25** = (0.5 - 2.5) **U40** = (1.0 - 4.0)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE

Approx. switch weight in Kgs

Enclosure	FC	FE
Aluminium	3.920	3.420
Grey CI	6.310	5.810
SS	6.420	5.920

eg. Flameproof switch for gas group, with ½" NPT cable entry in aluminium housing as 1SPDT pressure switch, fixed differential without scale, having 0.16 to 0.60 "Wc pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

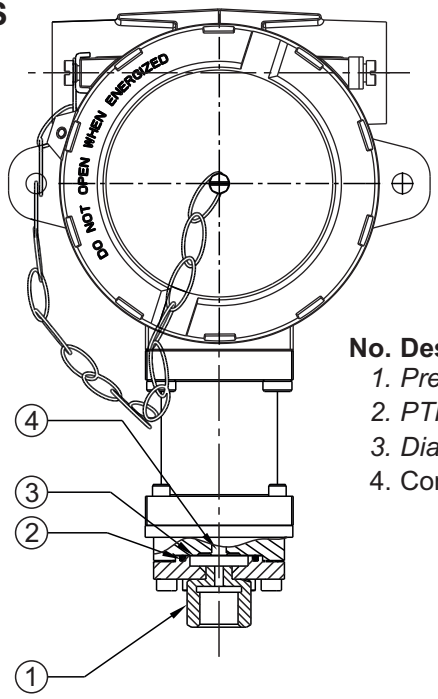
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	P1	U15	A1	S1	0

Please specify full model number to avoid ambiguity.



FC

PRESSURE CAPSULE DETAILS

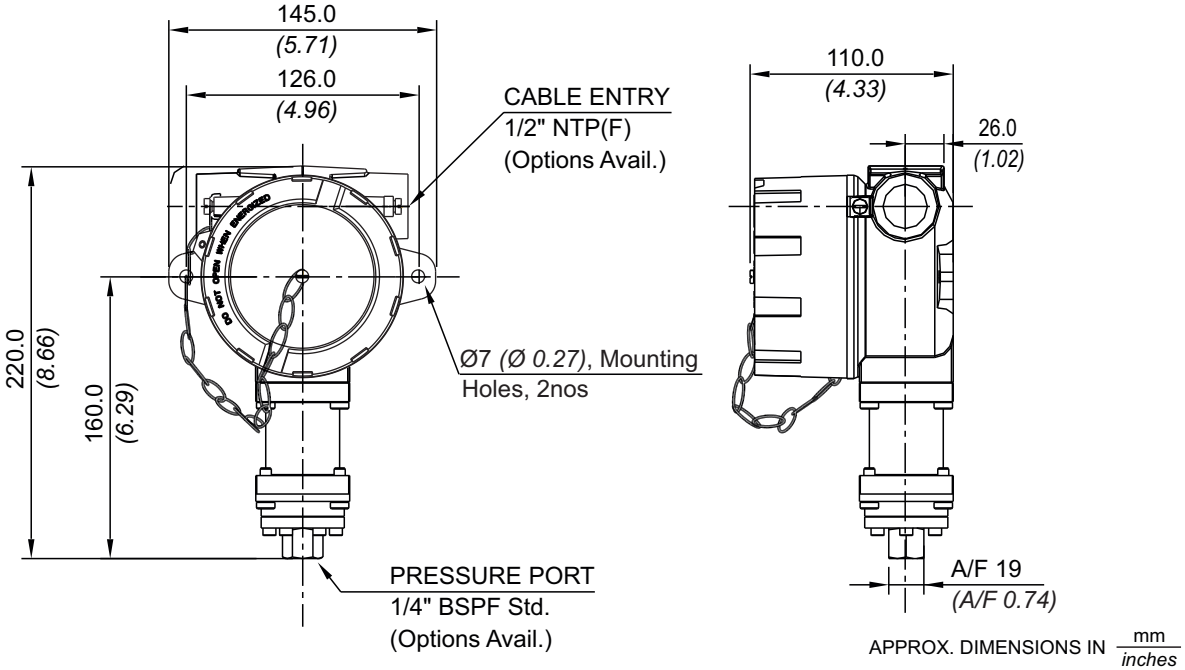


No. Description

1. *Pressure Port*
2. *PTFE O-Ring*
3. *Diaphragm*
4. Conical Plunger

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



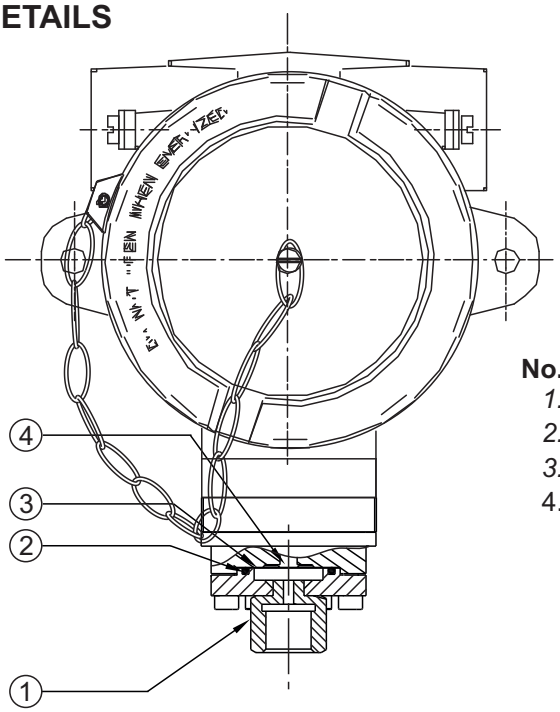
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS

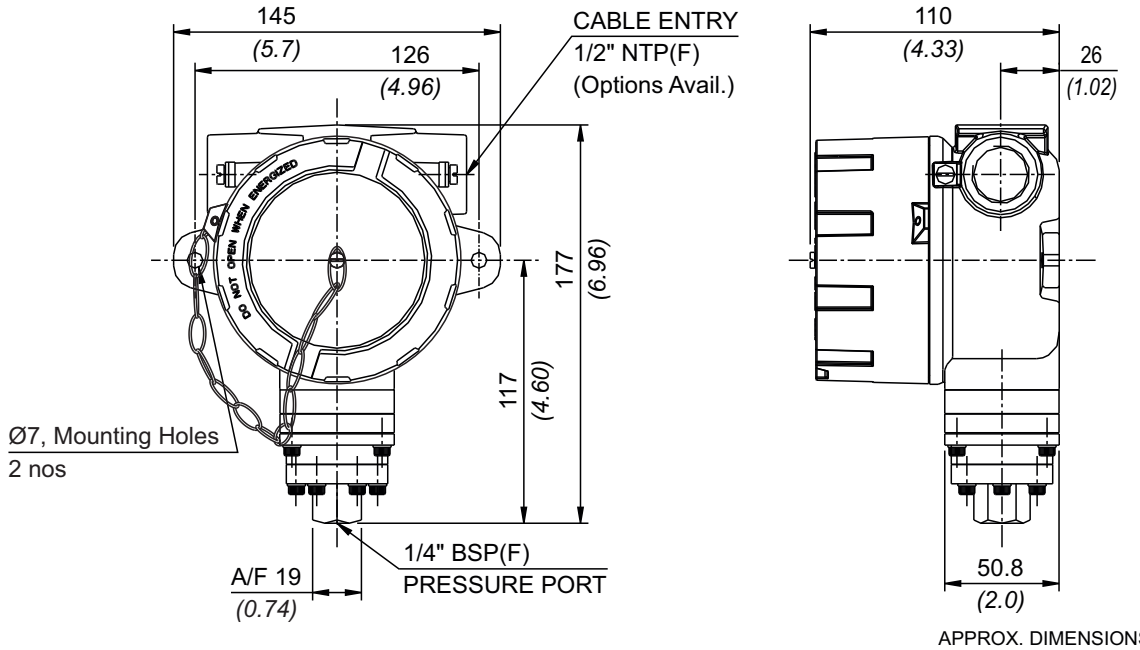


No. Description

1. *Pressure Port*
2. *PTFE O-Ring*
3. *Diaphragm*
4. Conical Plunger

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

FC/FE HYDRAULIC DIAPHRAGM RANGES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)* Approximate Maximum for "A8" microswitch	Maximum Working Pressure bar *(psi)*
H1T	0.5 - 10 *(7.25 - 145.04)*	1 *(14.50)*	150 *(2175.51)*
H2T	2 - 20 *(29.00 - 290.07)*	2 *(29.00)*	200 *(2900.76)*
H4T	5 - 40 *(72.52 - 580.15)*	5 *(72.52)*	200 *(2900.76)*
H1H	10 - 100 *(146.04 - 1450.38)*	12 *(174.05)*	200 *(2900.76)*
H2H	7 - 200 *(101.52 - 2900.76)*	24 *(348.09)*	400 *(5801.52)*
H4H	40 - 400 *(580.15 - 5801.52)*	50 *(725)*	500 *(7251.88)*
H7H	70 - 700 *(1015.26 - 10152.64)*	60 *(870)*	800 *(11603)*
H1K	100 - 1000 *(1450.37 - 14503.77)*	70 *(1015.26)*	1100 *(15954.15)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.



Note: Welded diaphragm also available as shown

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF HYDRAULIC RANGE PRESSURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**P 1** = pressure switch, fixed differential without scale **P2** = pressure switch, fixed differential with scale in bar **P3** = pressure switch, fixed differential with scale in psi For adjustable differential please select microswitches A6 or C6 in group 6	**H1T** = (0.5 - 10) **H2T** = (2 - 20) **H4T** = (5 - 40) **H1H** = (10 - 100) **H2H** = (7 - 200) **H4H** = (40 - 400) **H7H** = (70 - 700) **H1K** = (100 - 1000)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) **S3** = (welded diaphragm) SS316 / 1" BSP(M) **S4** = SS316 / 1/2" NPT(F) **S5** = SS316 / 1/2" NPT(M) **H1** = Hastelloy C / ¼" BSP(F) **H2** = Hastelloy C / ¼" NPT(F) **N1** = Monel / ¼" BSP(F) **N2** = Monel / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE **2** = SS 316L **3** = Hastelloy C **4** = Monel **5** = Titanium **6** = Tantalum **7** = Inconel

Approx. switch weight in Kgs

Enclosure	FC	FE
Aluminium	2.210	1.710
Grey CI	4.620	4.120
SS	4.720	4.220

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT pressure switch, having 5 bar to 40 bar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & SS316L diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	P1	H4T	A1	S1	2

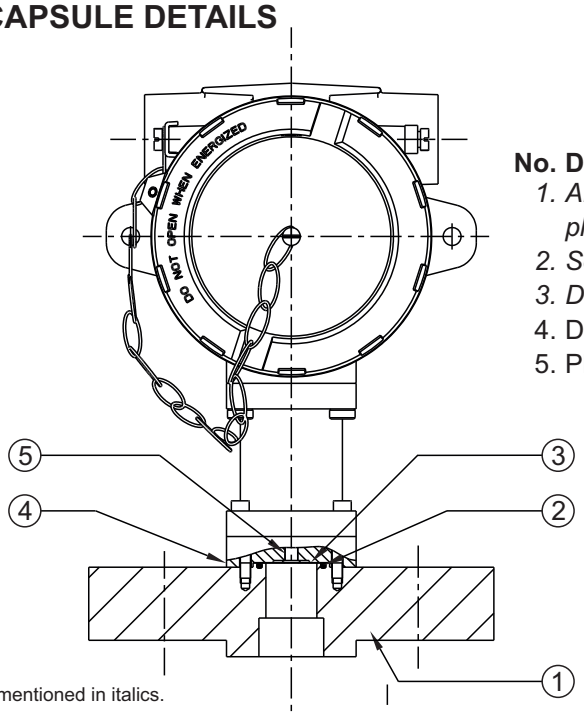
Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.

FC/FE FLANGED PRESSURE SWITCHES



FC

PRESSURE CAPSULE DETAILS

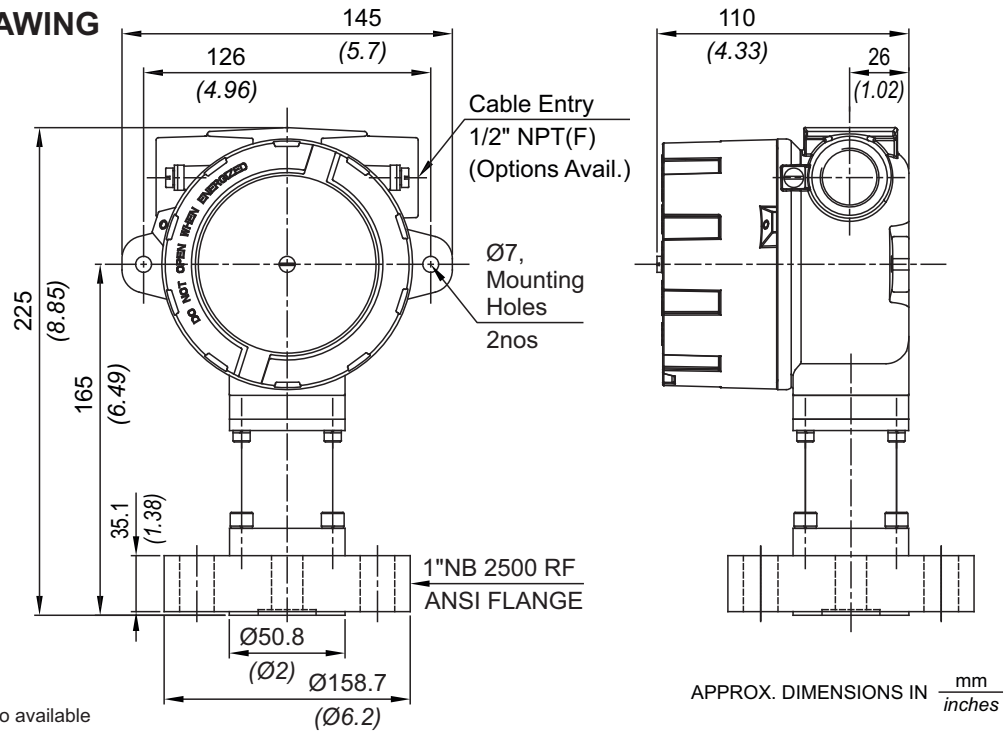


No. Description

1. *ANSI FLANGE to your specifications please refer table for possible combinations*
2. *Sealing Ring*
3. *Diaphragm*
4. Disc
5. Plunger

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



Note : Other flange options are also available

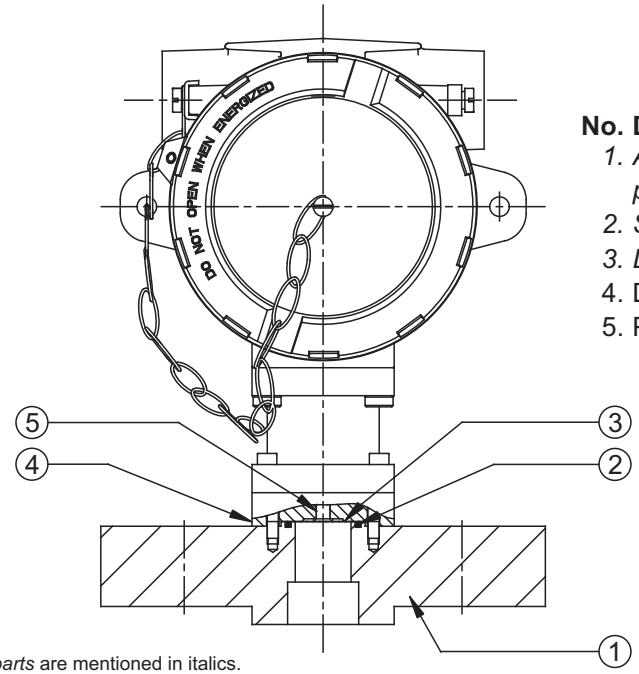
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS

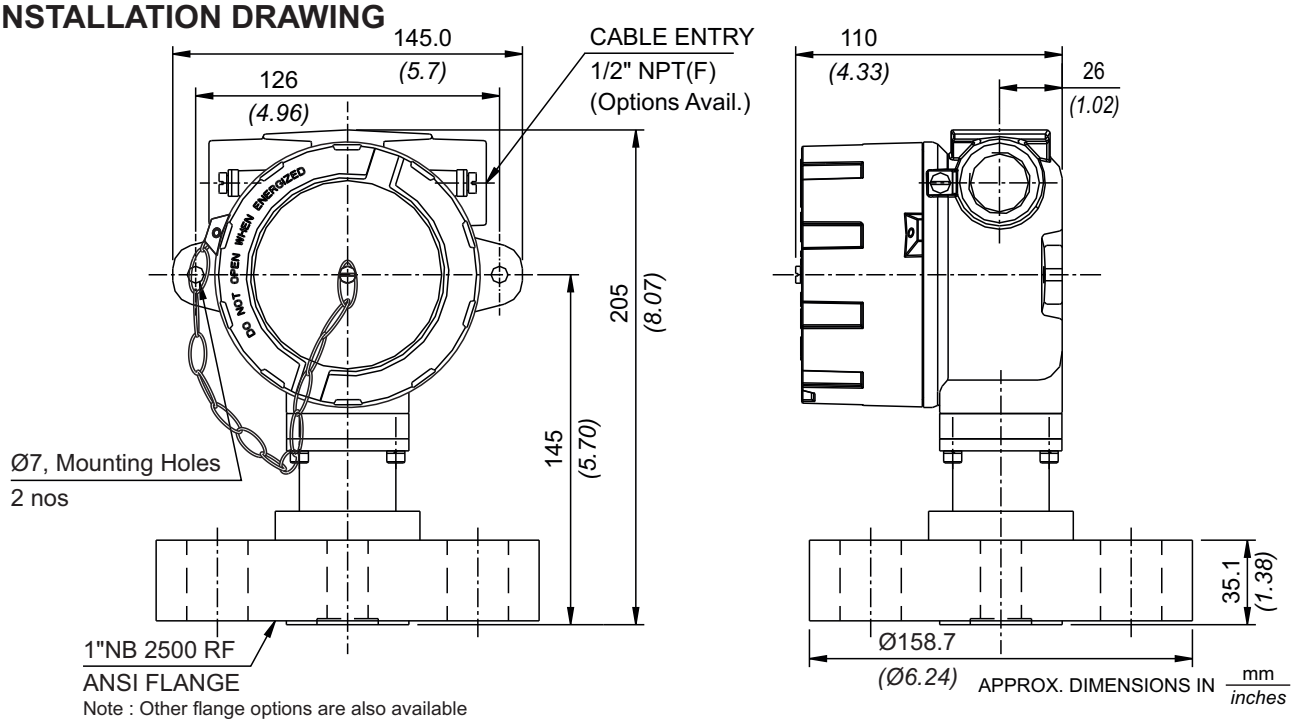


No. Description

1. *ANSI FLANGE to your specifications please refer table for possible combinations*
2. *Sealing Ring*
3. *Diaphragm*
4. Disc
5. Plunger

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



Note : Other flange options are also available

FC/FE FLANGED PRESSURE SWITCHES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
H01	0.1 to 1.0 *(1.45 to 14.50)*	0.10 *(1.45)*	As per the class of flange
H02	0.1 to 1.5 *(1.45 to 21.76)*	0.12 *(1.74)*	
H03	0.2 to 2.6 *(2.90 to 37.71)*	0.15 *(2.17)*	
H04	0.2 to 3.6 *(2.90 to 52.21)*	0.20 *(2.90)*	Please consult Sales Office in case you need clarification on availability of maximum working pressure for a particular range.
H07	0.5 to 7.0 *(7.25 to 101.53)*	0.40 *(5.80)*	
H10	0.5 to 10.0 *(7.25 to 145.04)*	0.60 *(8.70)*	
H15	1.0 to 15.0 *(14.50 to 217.56)*	1.00 *(14.50)*	
H30	5.0 to 25.0 *(72.52 to 362.59)*	1.50 *(21.75)*	
H4T	5.0 to 40.0 *(72.52 to 580.15)*	5.0 *(72.52)*	
H1H	10.0 to 100.0 *(145.04 to 1450.38)*	12.0 *(174.05)*	
H2H	7.0 to 200.0 *(101.53 to 2900.75)*	24.0 *(348.09)*	
H4H	40.0 to 400.0 *(580.151 to 5801.51)*	70.0 *(1015.26)*	

FLANGE CODE TABLE (Please refer page no. 120 & 121 for more options)

	SS316L		Hastelloy C276		Monel		Titanium		Tantalum	
	RF*	FF*	RF*	FF*	RF*	FF*	RF*	FF*	RF*	FF*
150 #										
1" NB	AC	BS	DI	EY	GO	IE	JU	LK	NA	OQ
2" NB	AF	BV	DL	FB	GR	IH	JX	LN	ND	OT
300#										
1" NB	AI	BY	DO	FE	GU	IK	KA	LQ	NG	OW
2" NB	AL	CB	DR	FH	GX	IN	KD	LT	NJ	OZ

*RF = Raised Face *FF = Flat Face

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

RANGE AVAILABILITY AS PER BORE SIZES

	H01 to H04	H07	H10	H15	H30	H4T to H2H
1" NB	NA	Yes	Yes	Yes	Yes	Yes
2" NB	Yes	Yes	Yes	Yes	Yes	Yes

Note : When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. Please refer note no. 7 on page no. 122.

HOW TO ORDER FLAMEPROOF FLANGED PRESSURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Flange Size and Material	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**A1** = ANSI Flanged pressure switch, fixed differential without scale **A2** = ANSI Flanged pressure switch, fixed differential with scale in bar **A3** = ANSI Flanged pressure switch, fixed differential with scale in psi For adjustable differential please select microswitches A6 or C6 in group 6	**H01** = 0.1 - 1.0 **H02** = 0.1 - 1.5 **H03** = 0.2 - 2.6 **H04** = 0.2 - 3.6 **H07** = 0.5 - 7.0 **H10** = 0.5 - 10.0 **H15** = 1.0 - 15.0 **H30** = 5.0 - 25.0 **H4T** = 5 - 40 **H1H** = 10 - 100 **H2H** = 7 - 200 **H4H** = 40 - 400	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	Please refer to the flange code table on Page nos. 118 & 119 for selection of the flange Please contact sales office for additional information	**0** = Neoprene **1** = PTFE **2** = SS316L **3** = Hastelloy C **4** = Monel 400 **5** = Titanium **6** = Tantalum

Approx. switch weight in Kgs

Enclosure	FC	FE
Aluminium	Switch weight varies with flange, please consult sales office	
Grey CI		
SS		

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing with an ANSI flange, having 0.5 bar to 7 bar pressure range, with 15 Amp. microswitch, 1" NB 150# RF SS316L flange & SS316L diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	A1	H07	A1	AC	2

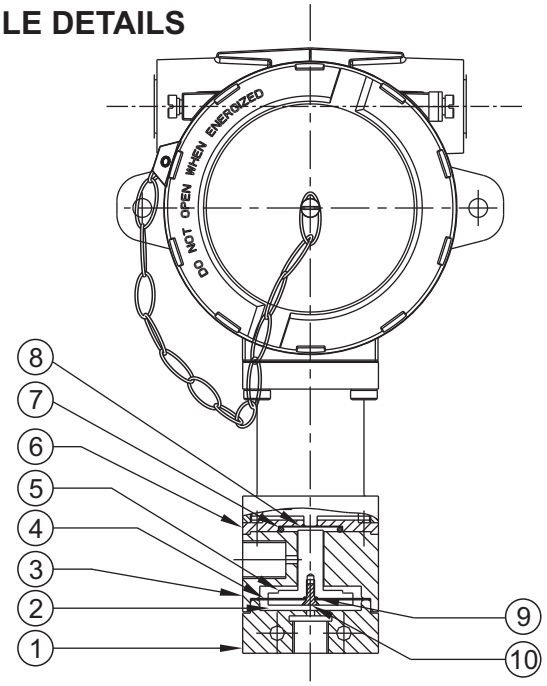
Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.

FC/FE HIGH RANGE PRESSURE DIFFERENCE SWITCHES



FC

PRESSURE CAPSULE DETAILS

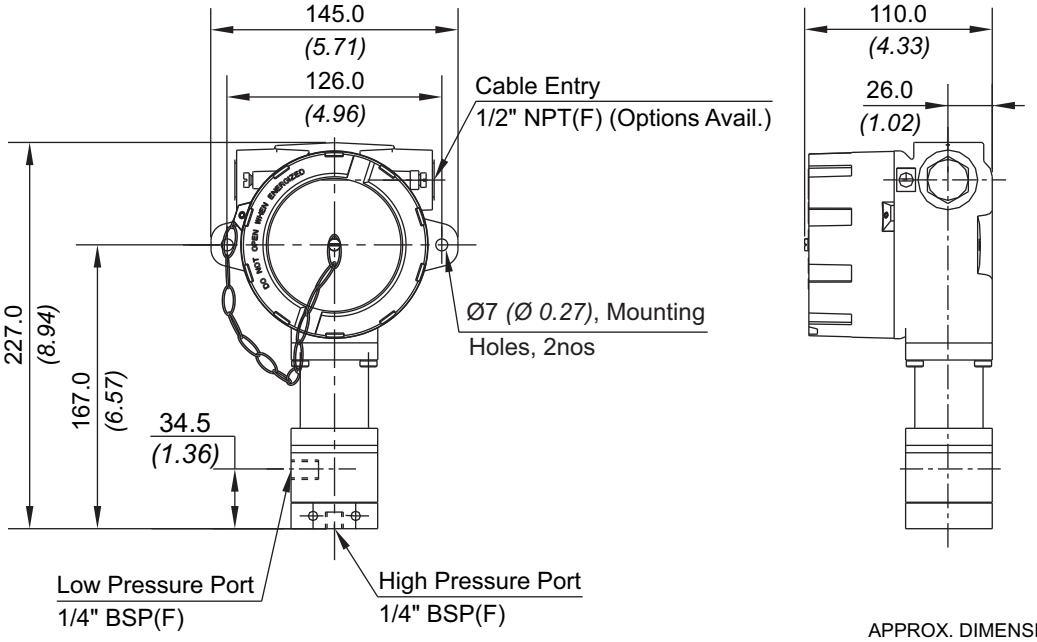


No. Description

1. *Pressure Housing*
2. *HP Plunger (SS316)*
3. *Disc*
4. *Diaphragm*
5. *LP Plunger (SS316)*
6. *Junction Plate*
7. *Sealing 'O' Ring (PTFE)*
8. *Sealing diaphragms (PTFE)*
9. *'O' ring (PTFE)*
10. *CSK screw (SS)*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



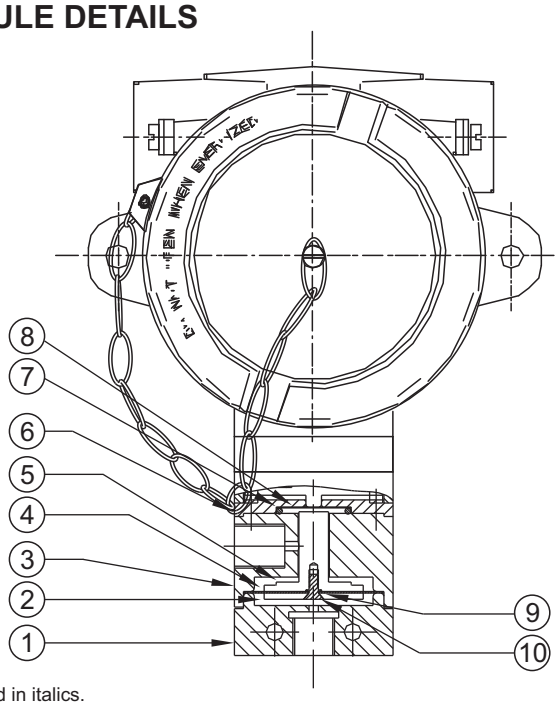
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS

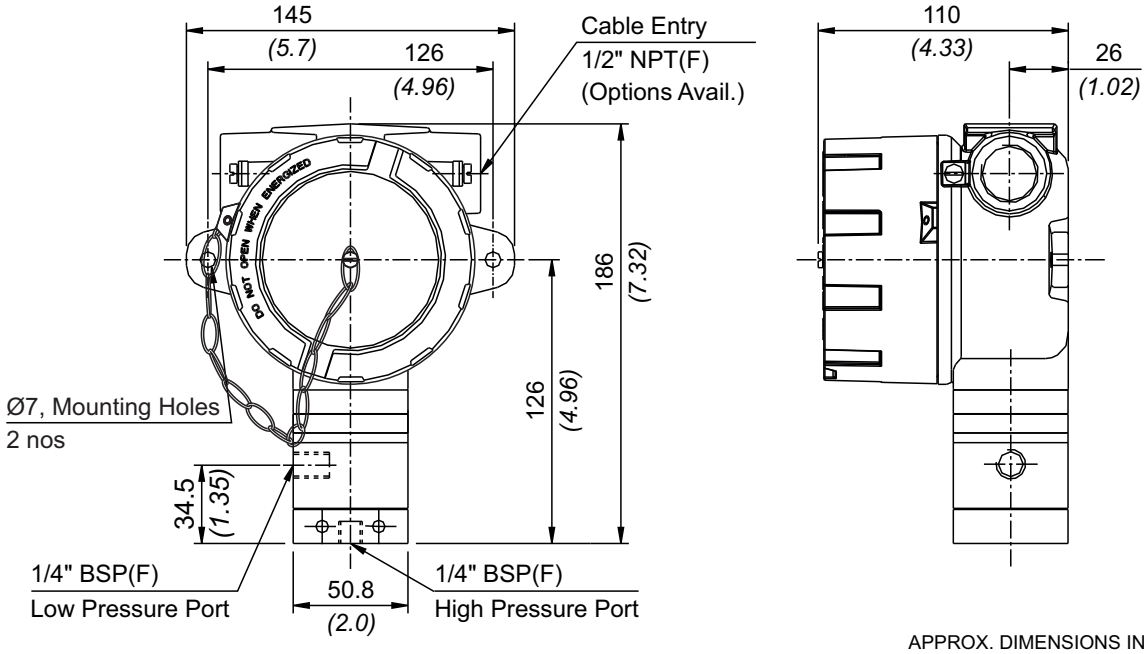


No. Description

1. *Pressure Housing*
2. *HP Plunger (SS316)*
3. *Disc*
4. *Diaphragm*
5. *LP Plunger (SS316)*
6. *Junction Plate*
7. *Sealing 'O' Ring (PTFE)*
8. *Sealing diaphragms (PTFE)*
9. *'O' ring (PTFE)*
10. *CSK screw (SS)*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

FC/FE HIGH RANGE PRESSURE DIFFERENCE SWITCHES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
H01	0.1 to 1.0 *(1.45 to 14.50)*	0.12 *(1.74)*	12.0 *(174.05)*
H02	0.1 to 1.5 *(1.45 to 21.76)*	0.20 *(2.90)*	12.0 *(174.05)*
H03	0.2 to 2.6 *(2.90 to 37.71)*	0.20 *(2.90)*	12.0 *(174.05)*
H04	0.2 to 3.6 *(2.90 to 52.21)*	0.30 *(4.35)*	12.0 *(174.05)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF HIGH RANGE PRESSURE DIFFERENCE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**D1** = pressure difference switch, fixed differential without scale **D2** = pressure difference switch, fixed differential with scale in bar **D3** = pressure difference switch, fixed differential with scale in psi For adjustable differential please select microswitches A6 or C6 in group 6	**H01** = (0.1 - 1.0) **H02** = (0.1 - 1.5) **H03** = (0.2 - 2.6) **H04** = (0.2 - 3.6)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6** = elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE
Approx. switch weight in Kgs Enclosure / FC / FE Aluminium 2.030 1.530 Grey CI 4.430 3.930 SS 4.560 4.060						For additional wetted part materials please contact Sales Office	

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT pressure difference switch, having 0.1 bar to 1 bar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

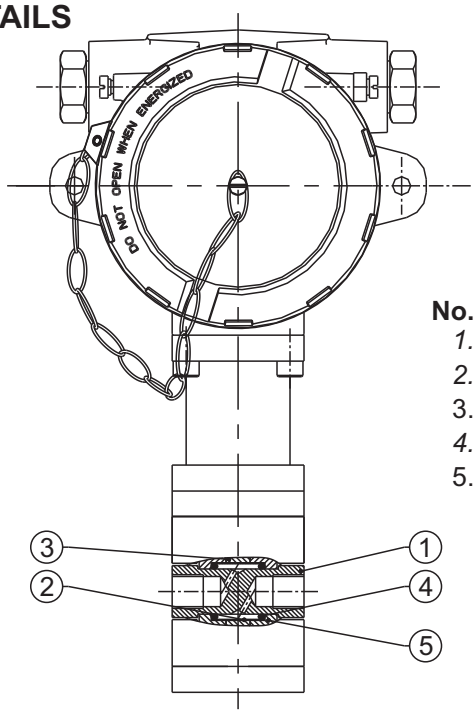
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	D1	H01	A1	S1	0

Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.



FC

PRESSURE CAPSULE DETAILS

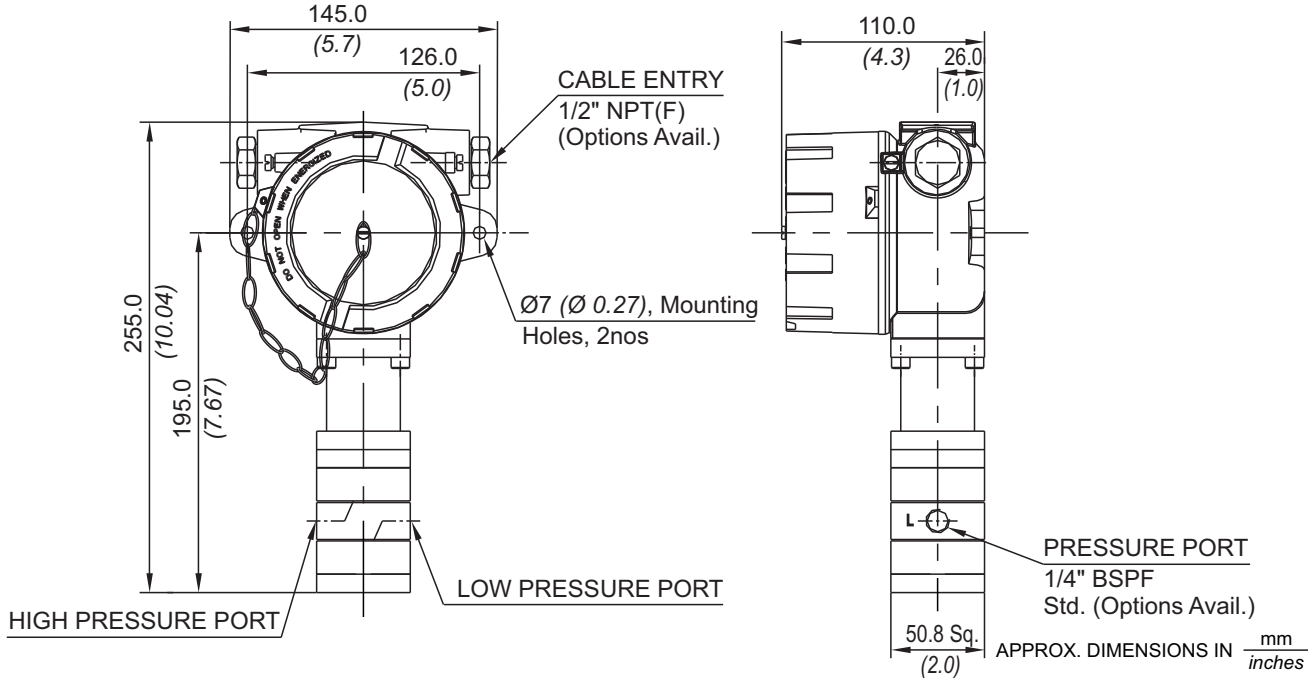


No. Description

1. *Pressure Housing*
2. *Diaphragm*
3. Plunger
4. *O-Ring*
5. Disc

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



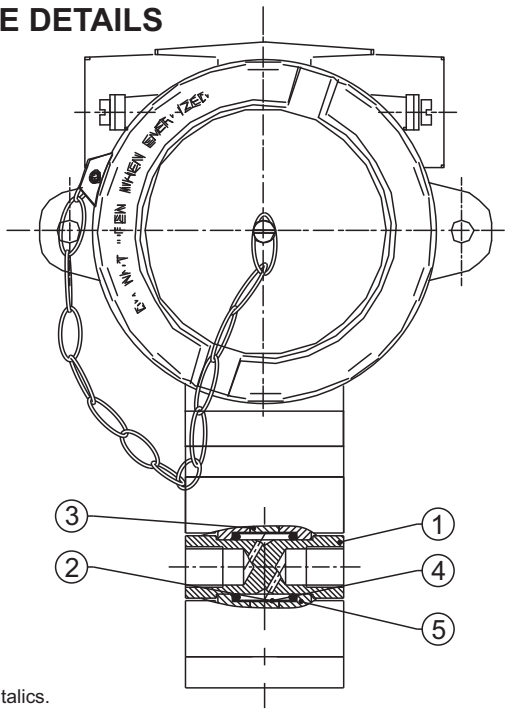
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS

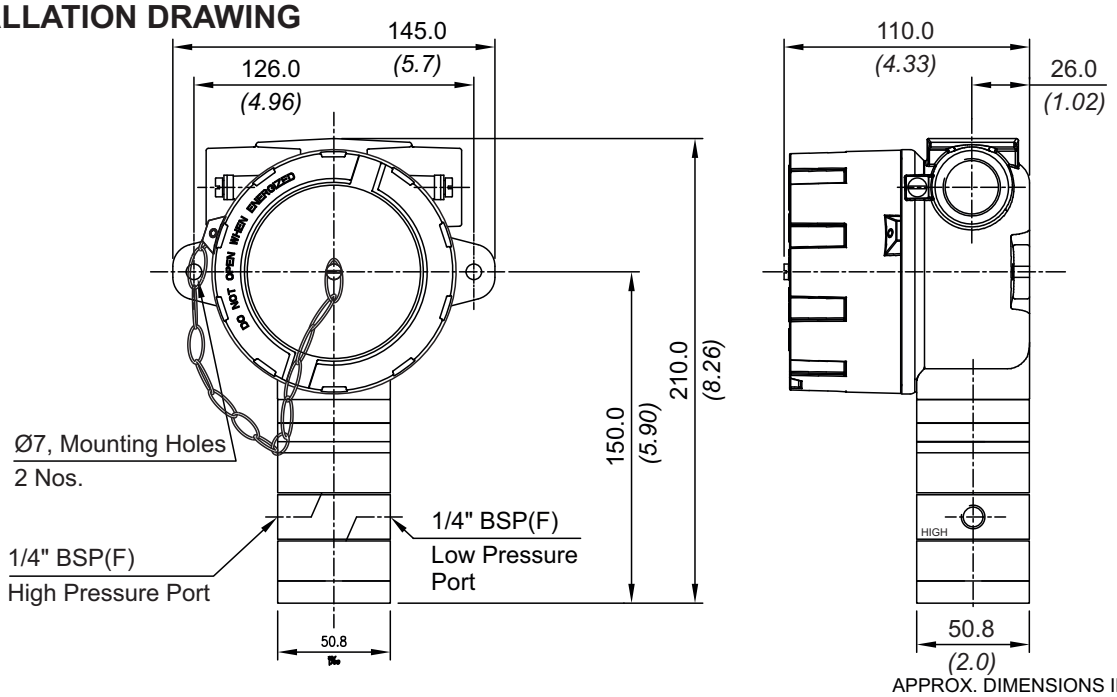


No. Description

1. *Pressure Housing*
2. *Diaphragm*
3. Plunger
4. *O-Ring*
5. Disc

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

FC/FE HIGH RANGE DP

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
D01	0.1 to 1.0 *(1.45 to 14.50)*	0.10 *(1.45)*	70.0 *(1015.26)*
D02	0.1 to 1.5 *(1.45 to 21.76)*	0.15 *(2.17)*	70.0 *(1015.26)*
D03	0.2 to 2.6 *(2.90 to 37.71)*	0.2 *(2.90)*	70.0 *(1015.26)*
D04	0.2 to 3.6 *(2.90 to 52.21)*	0.4 *(5.80)*	70.0 *(1015.26)*
D07	0.5 to 7.0 *(7.25 to 101.53)*	0.6 *(8.70)*	70.0 *(1015.26)*
D10	0.5 to 10.0 *(7.25 to 145.038)*	1.0 *(14.50)*	70.0 *(1015.26)*
D15	1.0 to 15.0 *(14.50 to 217.56)*	1.5 *(21.75)*	70.0 *(1015.26)*
D30	5.0 to 25.0 *(72.52 to 362.59)*	2.0 *(29.00)*	70.0 *(1015.26)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF HIGH RANGE DP SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**D1** = pressure difference switch, fixed differential without scale **D2** = pressure difference switch, fixed differential with scale in bar **D3** = pressure difference switch, fixed differential with scale in psi For adjustable differential please select microswitches A6 or C6 in group 6	**D01** = (0.1 - 1.0) **D02** (0.1 - 1.5) **D03** = (0.2 - 2.6) **D04** = (0.2 - 3.6) **D07** = (0.5 - 7.0) **D10** = (0.5 - 10.0) **D15** = (1.0 - 15.0) **D30** = (5.0 - 25.0)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6** = elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) **N1** = Monel / ¼" BSP(F) **N2** = Monel / ¼" NPT(F) **H1** = Hastelloy C / ¼" BSP(F) **H2** = Hastelloy C / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE **2** = SS316L **4** = Monel **7** = Inconel
Approx. switch weight in Kgs Enclosure / FC / FE Aluminium 2.730 2.230 Grey CI 5.120 4.620 SS 5.250 4.720						For additional wetted parts please contact Sales Office	

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT pressure difference switch, having 0.1 bar to 1 bar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

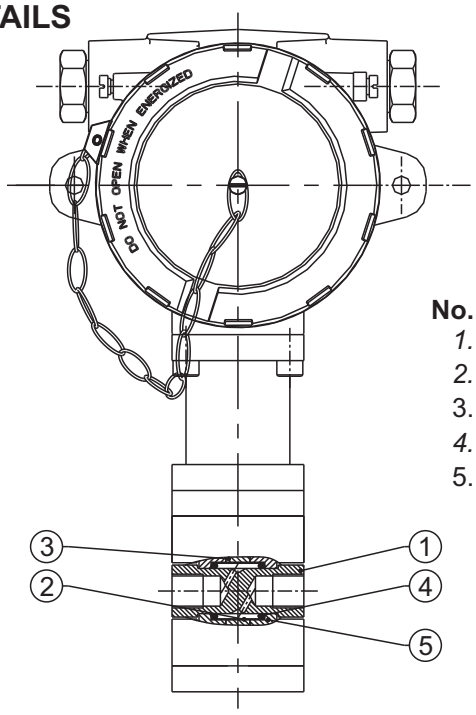
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	D1	D01	A1	S1	0

Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.



FC

PRESSURE CAPSULE DETAILS

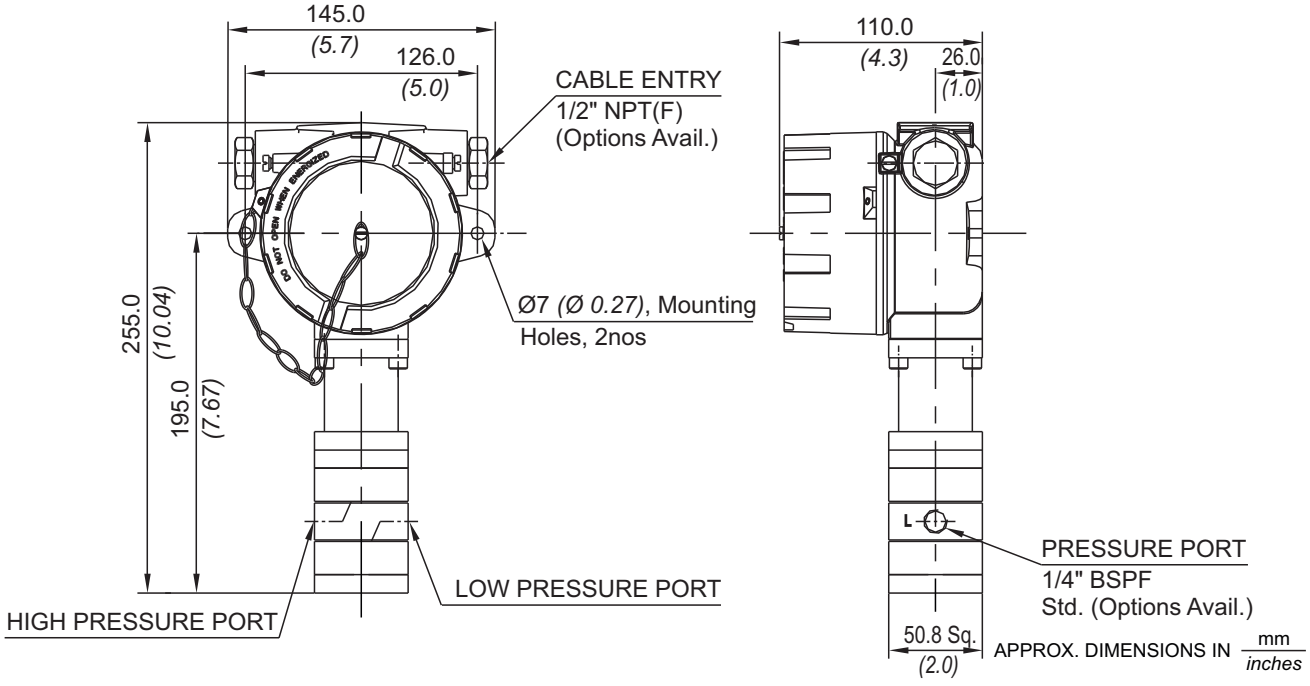


No. Description

1. *Pressure Housing*
2. *Diaphragm*
3. Plunger
4. *O-Ring*
5. Disc

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING

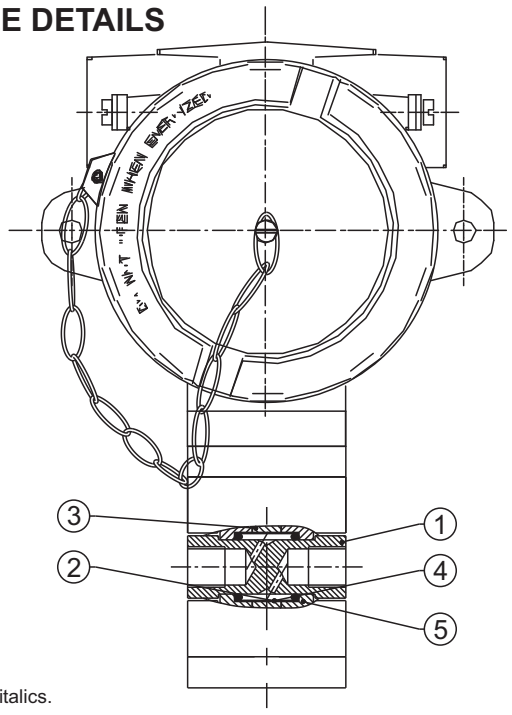


Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS

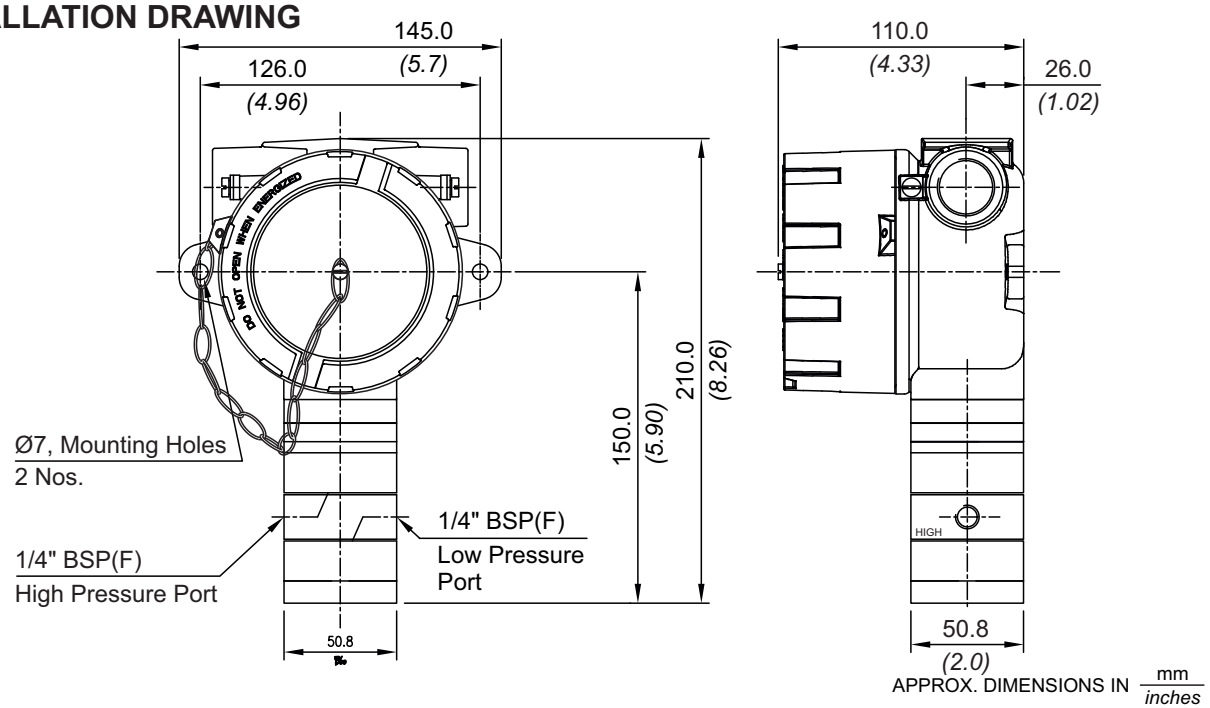


No. Description

1. *Pressure Housing*
2. *Diaphragm*
3. Plunger
4. *O-Ring*
5. Disc

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

FC/FE HYDRAULIC RANGE DP

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
H1U	0.1 to 1.0 *(1.45 to 14.50)*	0.30 *(4.35)*	150.0 *(2175.57)*
H2U	0.1 to 1.5 *(1.45 to 21.75)*	0.30 *(4.35)*	150.0 *(2175.57)*
H3U	0.2 to 2.6 *(2.90 to 37.70)*	0.40 *(5.8)*	150.0 *(2175.57)*
H4U	0.2 to 3.6 *(2.90 to 52.21)*	0.60 *(8.70)*	150.0 *(2175.57)*
H7U	0.5 to 7.0 *(7.25 to 101.53)*	1.0 *(14.50)*	150.0 *(2175.57)*
D1T	0.5 to 10.0 *(7.25 to 145.04)*	1.5 *(21.75)*	200.0 *(2900.75)*
D2T	1.0 to 15.0 *(14.50 to 217.56)*	3.0 *(43.51)*	200.0 *(2900.75)*
D3T	5.0 to 25.0 *(72.52 to 362.60)*	4.0 *(58.01)*	200.0 *(2900.75)*
D4T	5.0 to 40.0 *(72.52 to 580.15)*	5.0 *(72.52)*	400.0 *(5801.51)*
D1H	10 to 100 *(145.4 to 1450.38)*	12.0 *(174.04)*	400.0 *(5801.51)*
D2H	7.0 to 200 *(101.53 to 2900.75)*	24.0 *(348.10)*	400.0 *(5801.51)*
D4H	40.0 to 400 *(580.151 to 5801.51)*	70.0 *(1015.26)*	500.0 *(7251.89)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF HYDRAULIC RANGE DP SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**D1** = pressure difference switch, fixed differential without scale **D2** = pressure difference switch, fixed differential with scale in bar **D3** = pressure difference switch, fixed differential with scale in psi For adjustable differential please select microswitches A6 or C6 in group 6	**H1U** = (0.1 - 1.0) **H2U** = (0.1 - 1.5) **H3U** = (0.2 - 2.6) **H4U** = (0.2 - 3.6) **H7U** = (0.5 - 7.0) **D1T** = (0.5 - 10.0) **D2T** = (1.0 - 15.0) **D3T** = (5.0 - 25.0) **D4T** = (5.0 - 40.0) **D1H** = (10 - 100) **D2H** = (7.0 - 200) **D4H** = (40 - 400)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) **H1** = Hastelloy C / ¼" BSP(F) **H2** = Hastelloy C / ¼" NPT(F) **N1** = Monel / ¼" BSP(F) **N2** = Monel / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE **2** = SS 316L **3** = Hastelloy C **4** = Monel
Approx. switch weight in Kgs Enclosure / FC / FE Aluminium 1.950 1.450 Grey CI 4.350 3.950 SS 4.450 3.950						For additional wetted parts please contact Sales Office	

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT pressure difference switch, having 0.1 bar to 1 bar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	D1	H1U	A1	S1	0

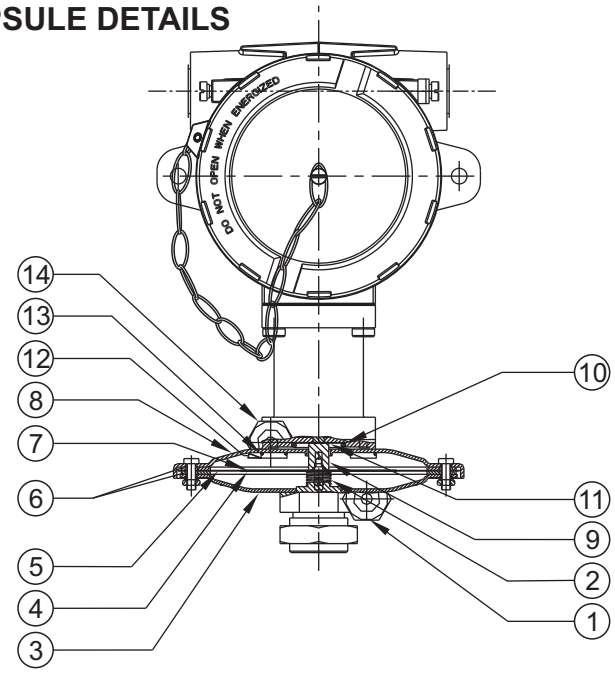
Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.

FC/FE LOW RANGE PRESSURE DIFFERENCE SWITCHES



FC

PRESSURE CAPSULE DETAILS



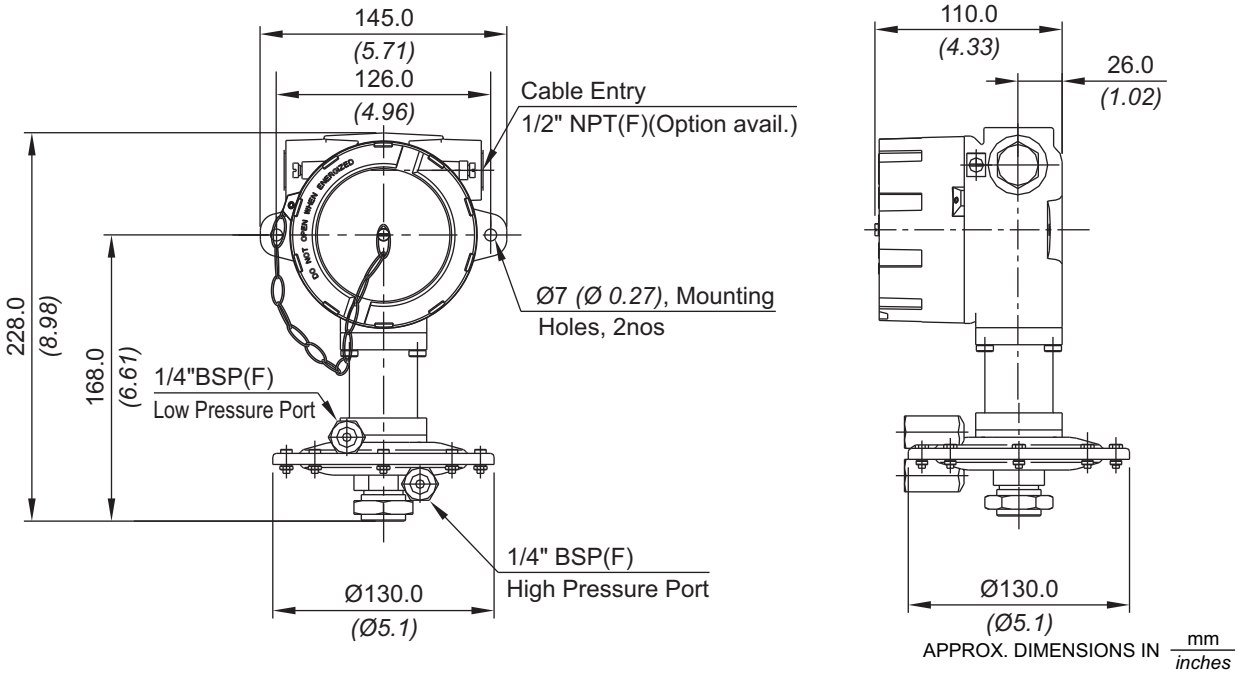
No. Description

1. *High pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)*
4. *Support plate (Aluminium)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. *Top plate (Aluminium)*
8. *Top flange (M.S.)**
9. *Transfer pin (Aluminium)*
10. *'O' ring (Nitrile)*
11. *Sealing diaphragm (Nitrile)*
12. *Top flange screw (S.S.)*
13. *Sealing 'O' ring (Nitrile)*
14. *Low pressure port (S.S.)**

* Pressure ports are welded with flange

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



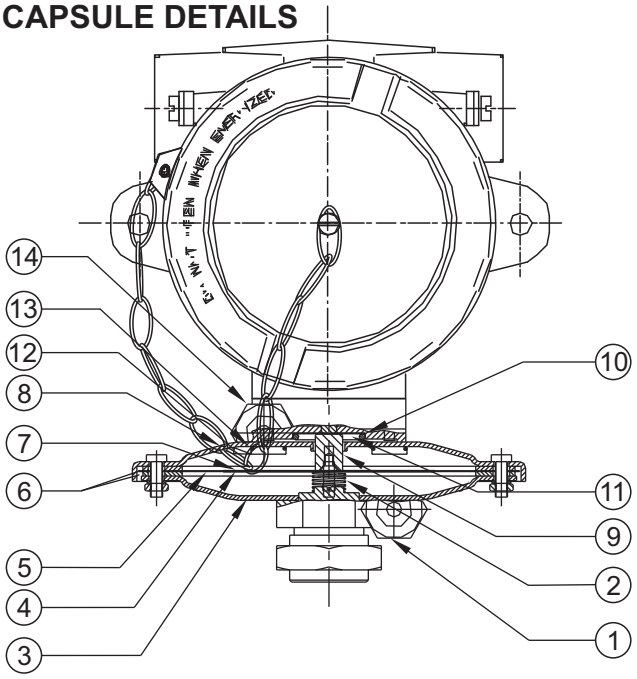
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS



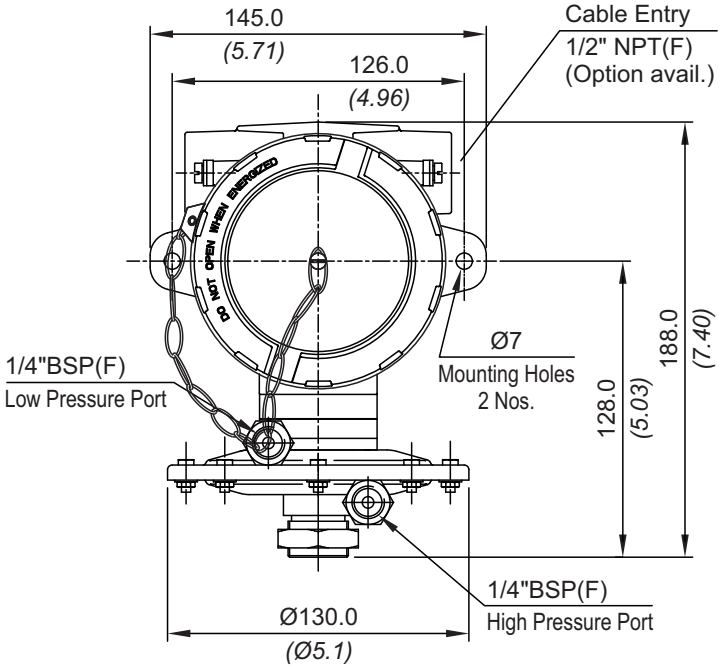
No. Description

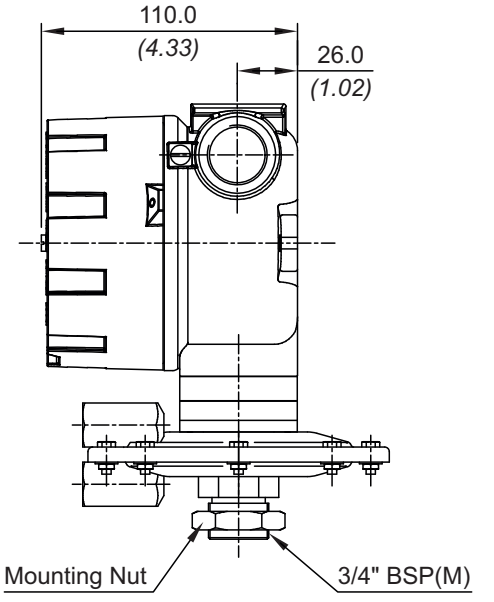
1. *High pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)*
4. *Support plate (Aluminium)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. *Top plate (Aluminium)*
8. *Top flange (M.S.)**
9. *Transfer pin (Aluminium)*
10. *'O' ring (Nitrile)*
11. *Sealing diaphragm (Nitrile)*
12. *Top flange screw (S.S.)*
13. *Sealing 'O' ring (Nitrile)*
14. *Low pressure port (S.S.)**

* Pressure ports are welded with flange

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING





APPROX. DIMENSIONS IN $\frac{mm}{inches}$

FC/FE LOW RANGE PRESSURE DIFFERENCE SWITCHES

RANGE SELECTION TABLE

Range Code	Range mbar *("wc)*	Differential* mbar *(" wc)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
L02	1.5 to 15 *(0.60 to 6.030)*	3.0 *(1.205)*	2.0 *(29.00)*
L03	5 to 25 *(2.009 to 10.047)*	5.0 *(2.009)*	2.0 *(29.00)*
L05	10 to 50 *(4.018 to 20.093)*	5.0 *(2.009)*	2.0 *(29.00)*
L10	10 to 100 *(4.018 to 40.180)*	5.0 *(2.009)*	2.0 *(29.00)*
L15	10 to 150 *(4.015 to 60.280)*	10.0 *(4.018)*	2.0 *(29.00)*
L25	20 to 250 *(8.037 to 100.466)*	10.0 *(4.018)*	2.0 *(29.00)*
L35	50 to 350 *(20.093 to 140.650)*	35.0 *(14.065)*	2.0 *(29.00)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF LOW RANGE PRESSURE DIFFERENCE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in mbar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**D1** = pressure difference switch, fixed differential without scale **D2** = pressure difference switch, fixed differential with scale in mbar **D3** = pressure difference switch, fixed differential with scale in "wc For adjustable differential please select microswitches A6 or C6 in group 6	**L02** = (1.5 - 15) **L03** = (5 - 25) **L05** = (10 - 50) **L10** = (10 - 100) **L15** = (10 - 150) **L25** = (20 - 250) **L35** = (50 - 350)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE
Approx. switch weight in Kgs Enclosure / FC / FE Aluminium 2.250 1.750 Grey CI 4.650 4.150 SS 4.730 4.250						For additional wetted parts please contact Sales Office	

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT pressure switch, having 0.1 bar to 1 bar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	D1	L03	A1	S1	0

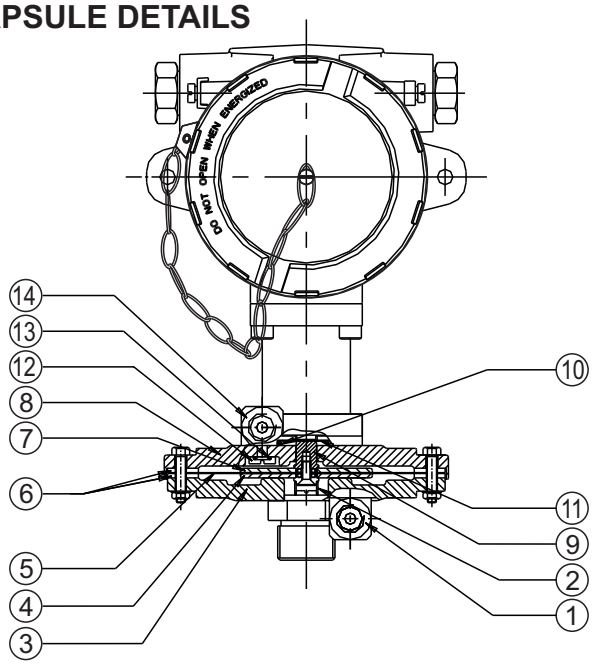
Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.

FC/FE LOW DP HIGH PROOF PRESSURE DIFFERENCE SWITCHES



FC

PRESSURE CAPSULE DETAILS



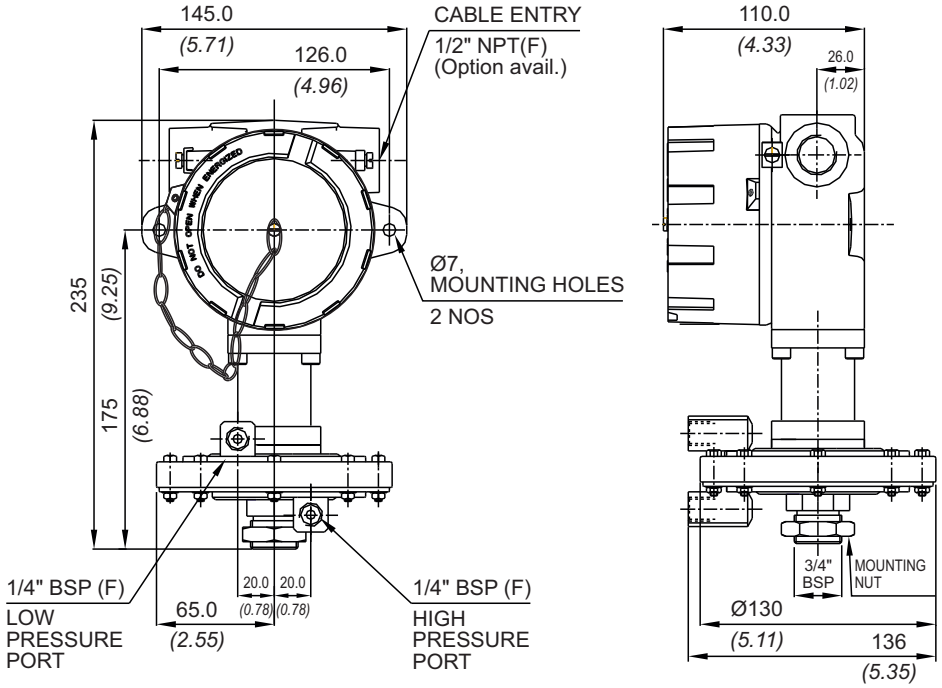
No. Description

1. *High pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)**
4. *Support plate (S.S.)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. *Top plate (S.S.)*
8. *Top flange (S.S.)**
9. *Transfer pin (S.S.)*
10. *'O' ring (Nitrile)*
11. *Sealing diaphragm (Nitrile)*
12. *Top flange screw (S.S.)*
13. *Sealing 'O' ring (Nitrile)*
14. *Low pressure port (S.S.)**

Note : *wetted parts* are mentioned in italics.

*Pressure ports are welded with flange

INSTALLATION DRAWING



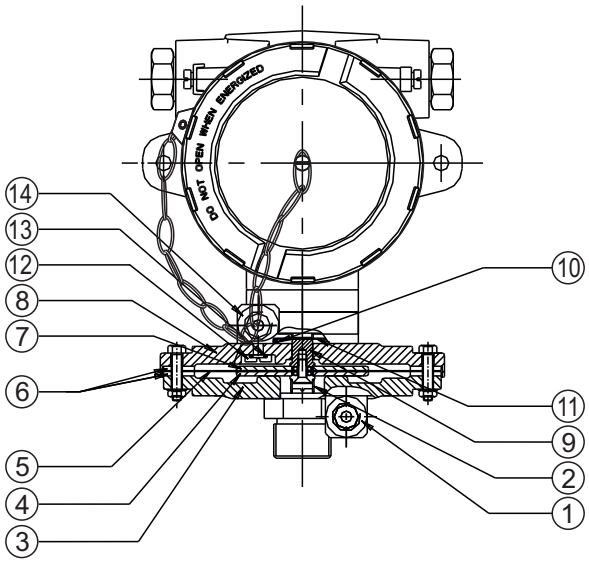
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS



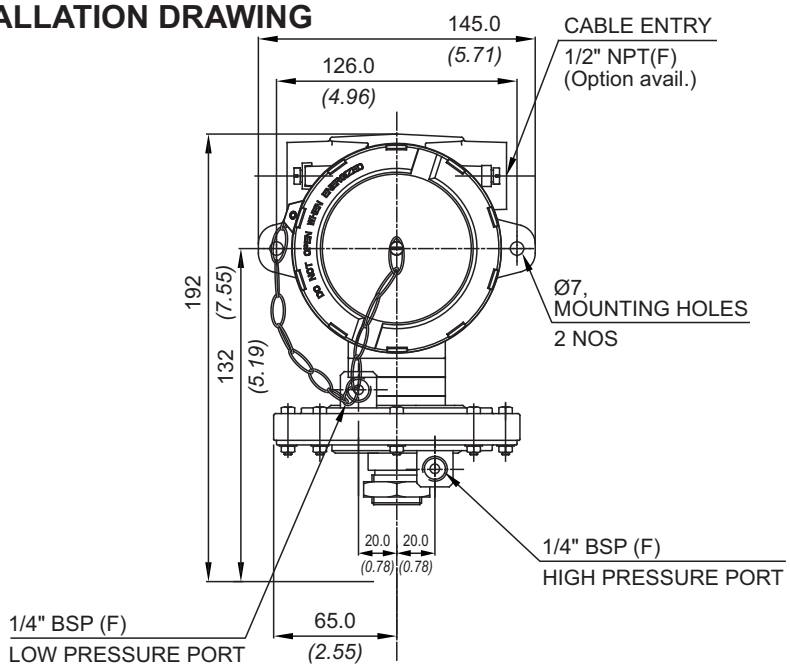
No. Description

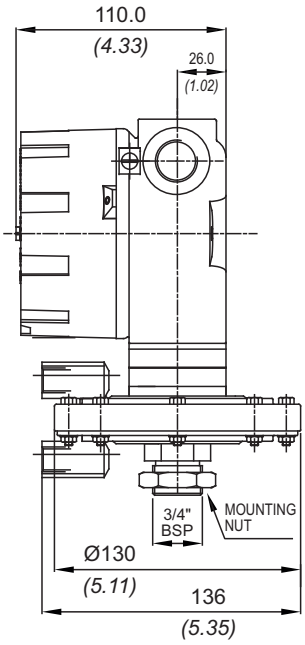
1. *High pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)**
4. *Support plate (S.S.)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. *Top plate (S.S.)*
8. *Top flange (S.S.)**
9. *Transfer pin (S.S.)*
10. *'O' ring (Nitrile)*
11. *Sealing diaphragm (Nitrile)*
12. *Top flange screw (S.S.)*
13. *Sealing 'O' ring (Nitrile)*
14. *Low pressure port (S.S.)**

*Pressure ports are welded with flange

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING





APPROX. DIMENSIONS IN mm / *inches*

RANGE SELECTION TABLE

Range Code	Range mbar *("wc)*	Differential* mbar *(" wc)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
N02	1.5 to 15 *(0.602 to 6.030)*	3.0 *(1.205)*	20.0 *(290.075)*
N03	5 to 25 *(2.009 to 10.046)*	5.0 *(2.009)*	20.0 *(290.075)*
N05	10 to 50 *(4.018 to 20.093)*	5.0 *(2.009)*	20.0 *(290.075)*
N10	10 to 100 *(4.018 to 40.186)*	10.0 *(4.018)*	20.0 *(290.075)*
N15	10 to 150 *(4.018 to 60.280)*	10.0 *(4.018)*	20.0 *(290.075)*
N25	20 to 250 *(8.037 to 100.466)*	15.0 *(6.030)*	20.0 *(290.075)*
N35	50 to 350 *(20.093 to 140.653)*	35.0 *(14.060)*	20.0 *(290.075)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF LOW DP HIGH PROOF PRESSURE DIFFERENCE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in mbar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**D1** = pressure difference switch, fixed differential without scale **D2** = pressure difference switch, fixed differential with scale in mbar **D3** = pressure difference switch, fixed differential with scale in "wc For adjustable differential please select microswitches A6 or C6 in group 6	**N02** = (1.5 - 15) **N03** = (5 - 25) **N05** = (10 - 50) **N10** = (10 - 100) **N15** = (10 - 150) **N25** = (20 - 250) **N35** = (50 - 350)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE
Approx. switch weight in Kgs Enclosure / FC / FE Aluminium 4.230 3.730 Grey CI 6.630 6.130 SS 6.720 6.220						For additional wetted parts please contact Sales Office	

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT pressure switch, having 0.1 bar to 1 bar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	D1	N03	A1	S1	0

Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.

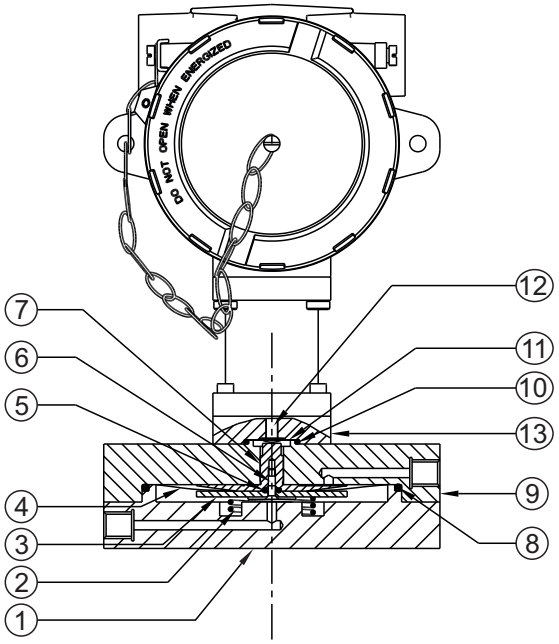
Bulletin No. KA231020

FC/FE LOW ΔP HIGH PROOF PRESSURE DIFFERENCE SWITCHES



FC

PRESSURE CAPSULE DETAILS

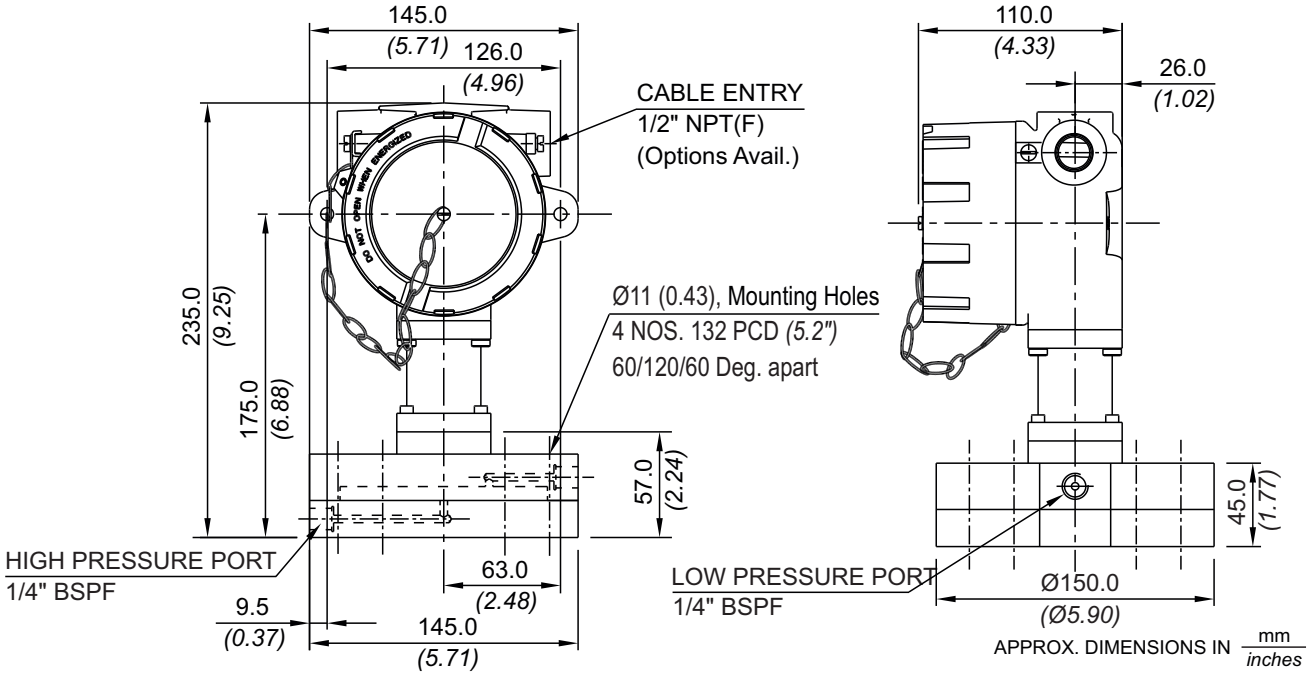


No. Description

1. *High Pressure Housing*
2. *Spring*
3. *H P Plunger*
4. *Diaphragm*
5. *Plunger 'O' ring*
6. *Plunger Screw*
7. *L P Plunger*
8. *Main Sealing 'O' ring*
9. *Low Pressure Housing*
10. *Sealing 'O' ring*
11. *Diaphragm*
12. *Small Plunger*

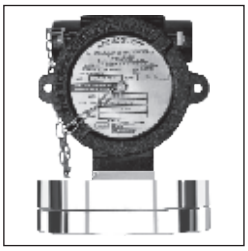
Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING

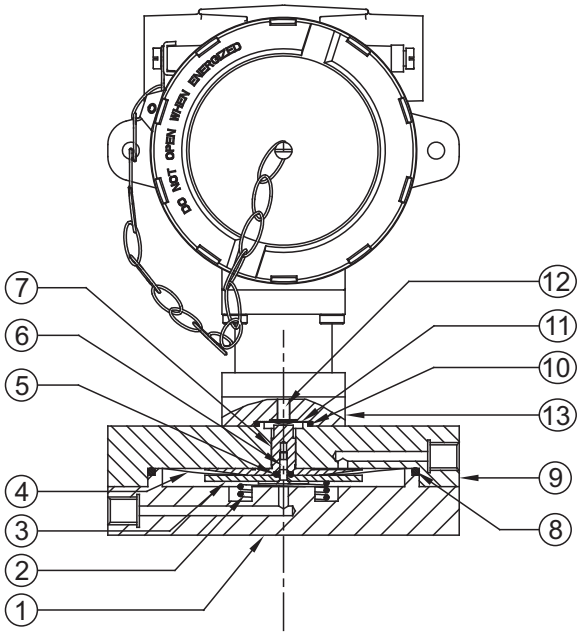


Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS

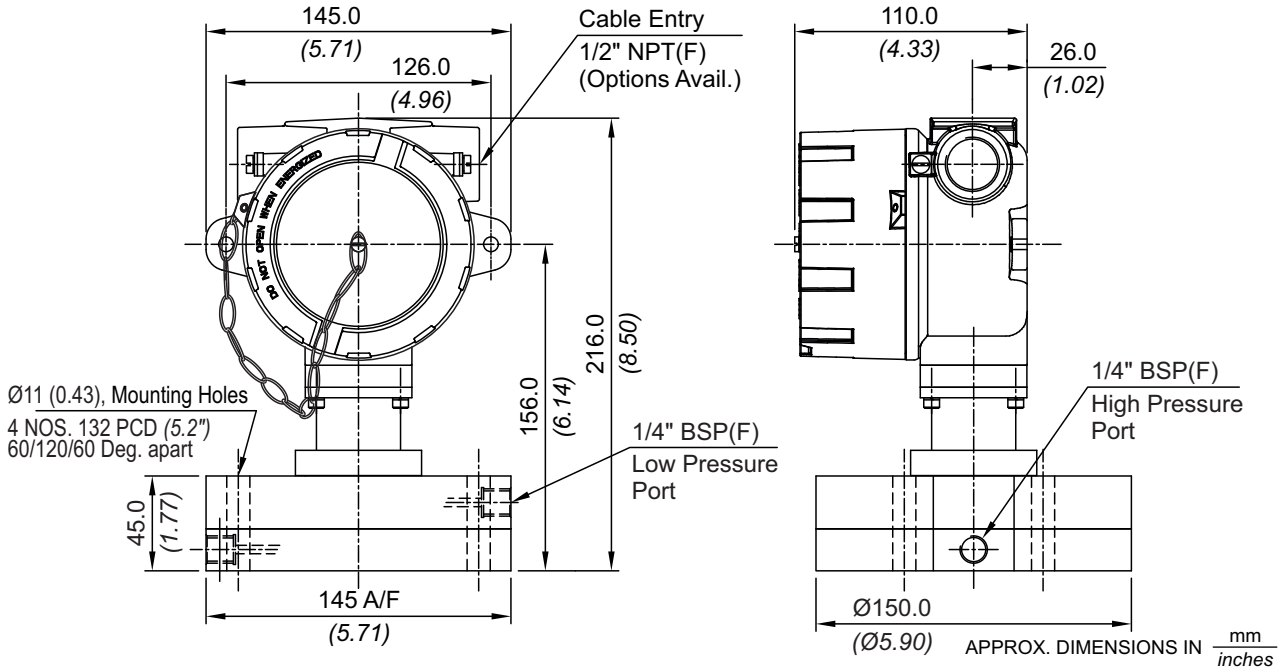


No. Description

1. *High Pressure Housing*
2. *Spring*
3. *H P Plunger*
4. *Diaphragm*
5. *Plunger 'O' ring*
6. *Plunger Screw*
7. *L P Plunger*
8. *Main Sealing 'O' ring*
9. *Low Pressure Housing*
10. *Sealing 'O' ring*
11. *Diaphragm*
12. *Small Plunger*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



FC/FE LOW ΔP HIGH PROOF PRESSURE DIFFERENCE SWITCHES

RANGE SELECTION TABLE

Range Code	Range mbar *("wc)*	Differential* mbar *("wc)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
M03	5 to 25 *(2.007 to 10.046)*	5.0 *(2.009)*	100.0 *(1450.38)*
M05	10 to 50 *(4.018 to 20.093)*	5.0 *(2.009)*	100.0 *(1450.38)*
M10	10 to 100 *(4.018 to 40.186)*	10.0 *(4.018)*	100.0 *(1450.38)*
M15	10 to 150 *(4.018 to 60.280)*	10.0 *(4.018)*	100.0 *(1450.38)*
M25	20 to 250 *(8.037 to 100.466)*	15.0 *(6.028)*	100.0 *(1450.38)*
M35	50 to 350 *(20.093 to 140.653)*	35.0 *(14.065)*	100.0 *(1450.38)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF LOW ΔP HIGH PROOF RANGE PRESSURE DIFFERENCE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in mbar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**D1** = pressure difference switch, fixed differential without scale **D2** = pressure difference switch, fixed differential with scale in mbar **D3** = pressure difference switch, fixed differential with scale in "wc For adjustable differential please select microswitches A6 or C6 in group 6	**M03** = (5 - 25) **M05** = (10 - 50) **M10** = (10 - 100) **M15** = (10 - 150) **M25** = (20 - 250) **M35** = (50 - 350)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE
Approx. switch weight in Kgs Enclosure / FC / FE Aluminium 7.870 7.370 Grey CI 10.270 9.770 SS 10.420 9.870						For additional wetted parts please contact Sales Office	

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT pressure switch, having 20 mbar to 250 mbar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

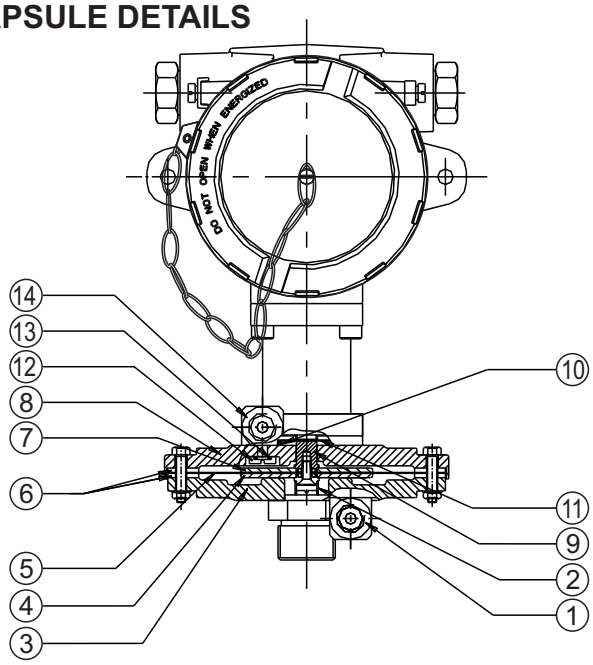
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	D1	M25	A1	S1	0

Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.



FC

PRESSURE CAPSULE DETAILS



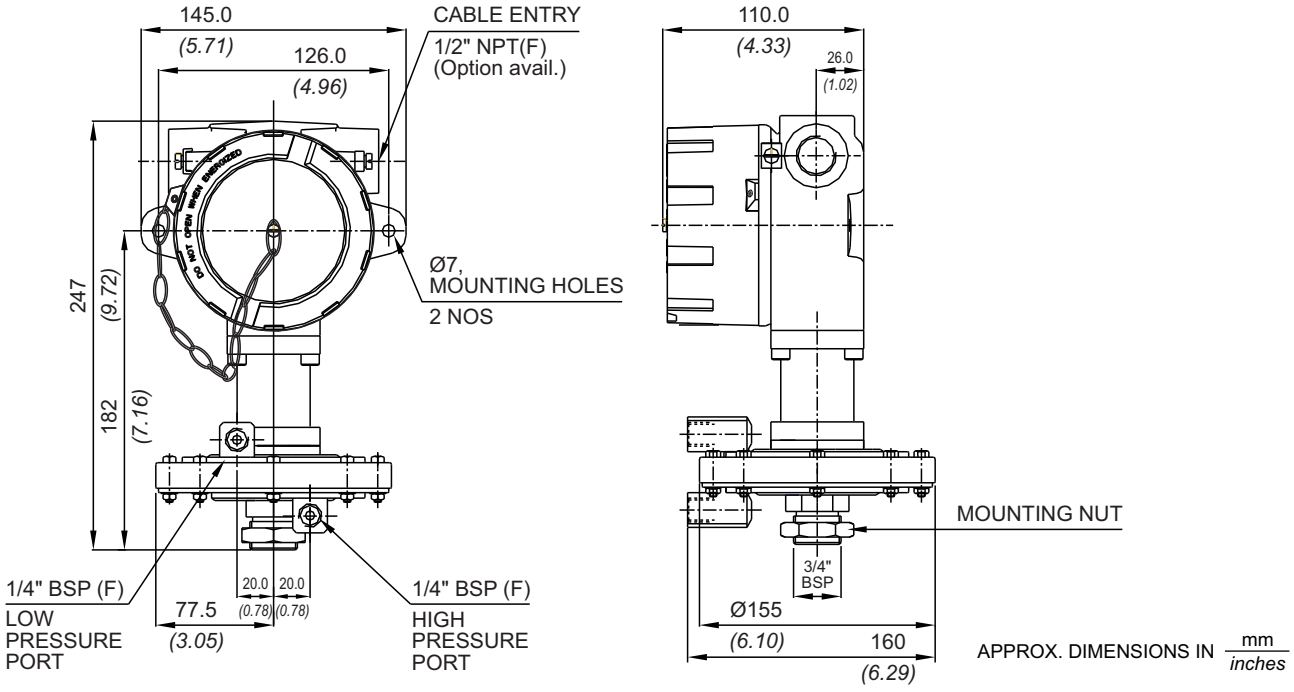
No. Description

1. *High pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)**
4. *Support plate (S.S.)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. *Top plate (S.S.)*
8. *Top flange (S.S.)**
9. *Transfer pin (S.S.)*
10. *'O' ring (Nitrile)*
11. *Sealing diaphragm (Nitrile)*
12. *Top flange screw (S.S.)*
13. *Sealing 'O' ring (Nitrile)*
14. *Low pressure port (S.S.)**

Note : *wetted parts* are mentioned in italics.

*Pressure ports are brazed with flange

INSTALLATION DRAWING



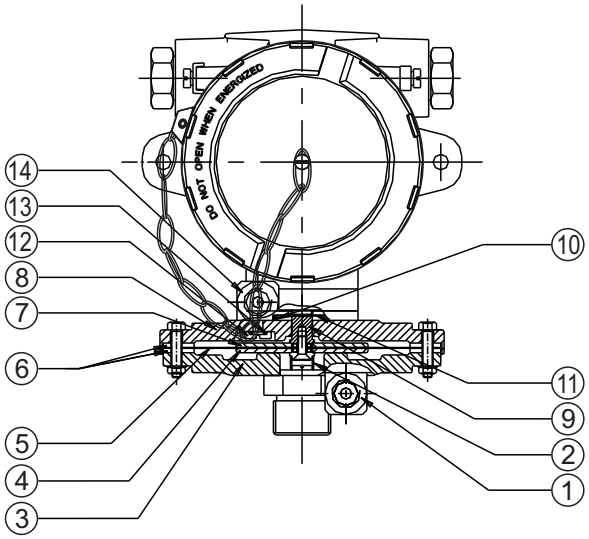
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS



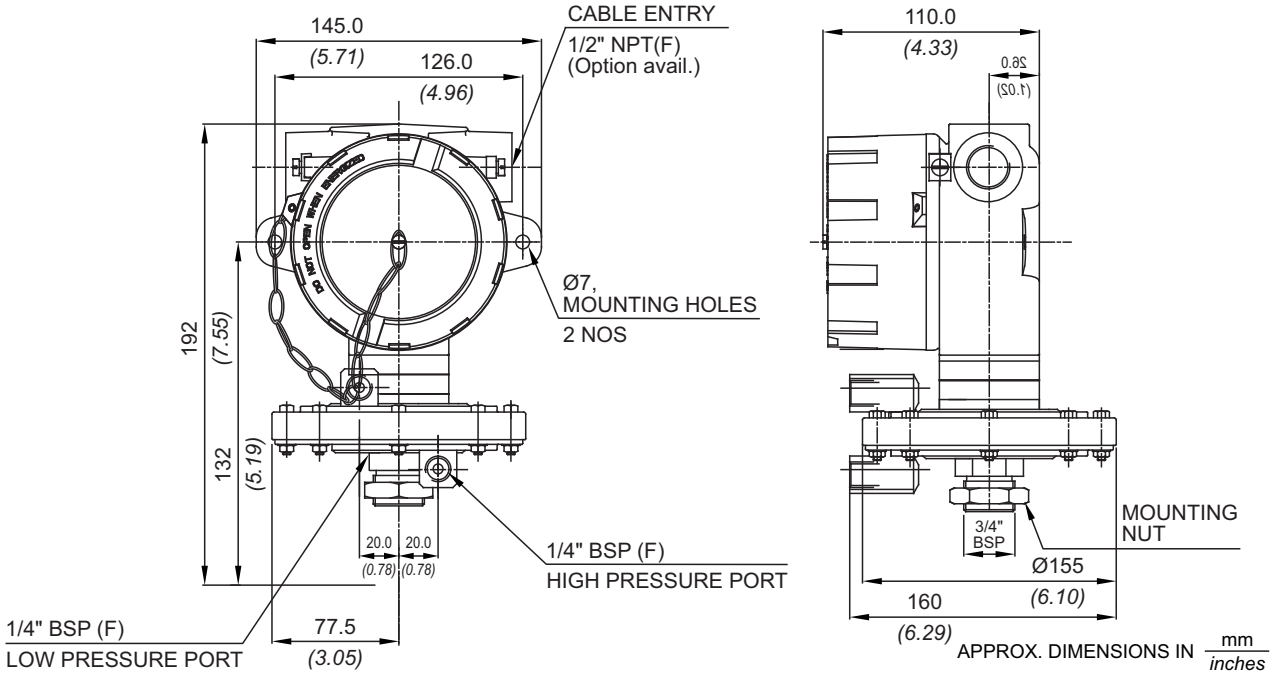
No. Description

1. *High pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)**
4. *Support plate (S.S.)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. *Top plate (S.S.)*
8. *Top flange (S.S.)**
9. *Transfer pin (S.S.)*
10. *'O' ring (Nitrile)*
11. *Sealing diaphragm (Nitrile)*
12. *Top flange screw (S.S.)*
13. *Sealing 'O' ring (Nitrile)*
14. *Low pressure port (S.S.)**

Note : *wetted parts* are mentioned in italics.

*Pressure ports are brazed with flange

INSTALLATION DRAWING



RANGE SELECTION TABLE

Range Code	Range mbar *("Wc)*	Differential* mbar *("Wc)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
U15	0.4 to 1.5 *(0.16 to 0.60)*	0.50 *(0.20)*	0.5 *(7.25)*
U25	0.5 to 2.5 *(0.20 to 1.00)*	0.80 *(0.32)*	0.5 *(7.25)*
U40	1.0 to 4.0 *(0.40 to 1.60)*	1.20 *(0.48)*	0.5 *(7.25)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF ULTRA LOW RANGE PRESSURE DIFFERENCE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in mbar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**D1** = pressure difference switch, fixed differential without scale **D2** = pressure difference switch, fixed differential with scale in mbar **D3** = pressure difference switch, fixed differential with scale in "Wc For adjustable differential please select microswitches A6 or C6 in group 6	**U15** = (0.4 - 1.5) **U25** = (0.5 - 2.5) **U40** = (1.0 - 4.0)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE

Approx. switch weight in Kgs

Enclosure	FC	FE
Aluminium	3.910	3.410
Grey CI	6.320	5.820
SS	6.410	5.910

eg. Flameproof switch for gas group, with ½" NPT cable entry in aluminium housing as 1SPDT pressure switch, fixed differential without scale, having 0.16 to 0.60 "Wc pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

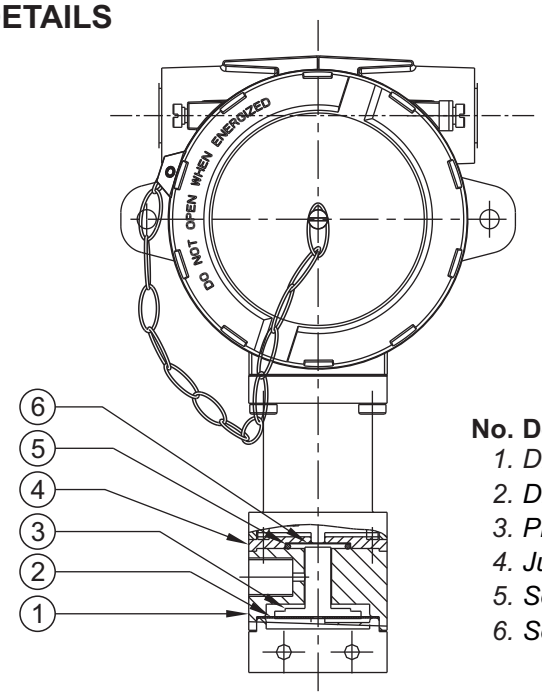
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	D1	U15	A1	S1	0

Please specify full model number to avoid ambiguity.



FC

PRESSURE CAPSULE DETAILS

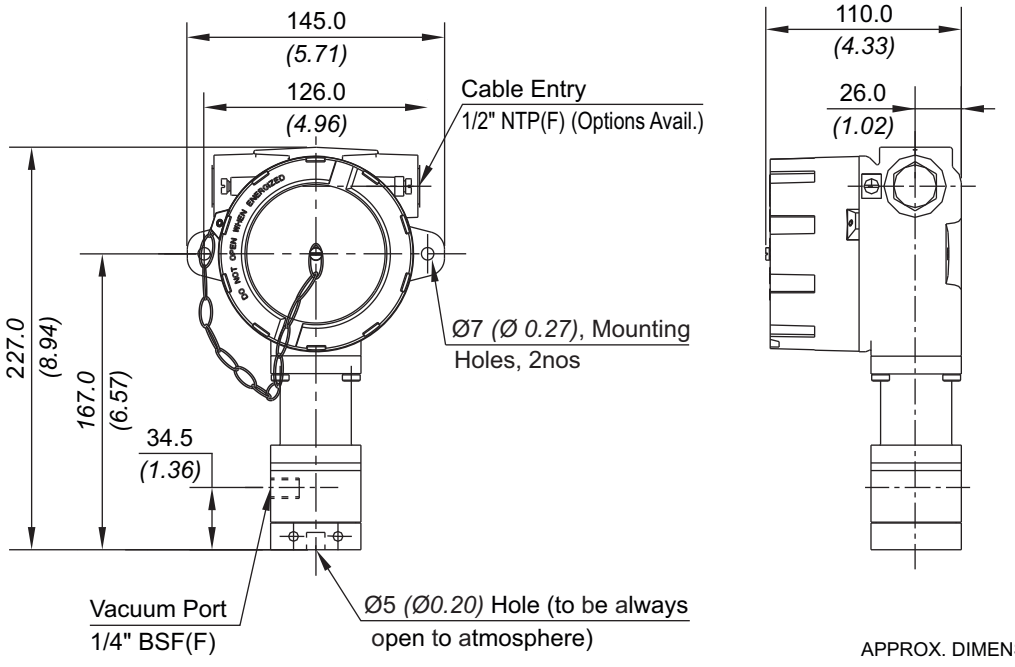


No. Description

1. *Disc*
2. *Diaphragm*
3. *Plunger (SS316)*
4. *Junction Plate*
5. *Sealing O-Ring (PTFE)*
6. *Sealing diaphragms (PTFE)*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



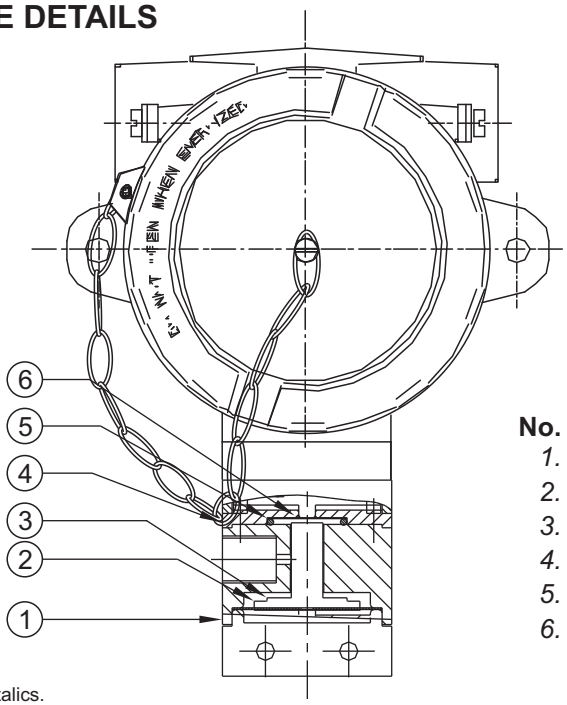
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS

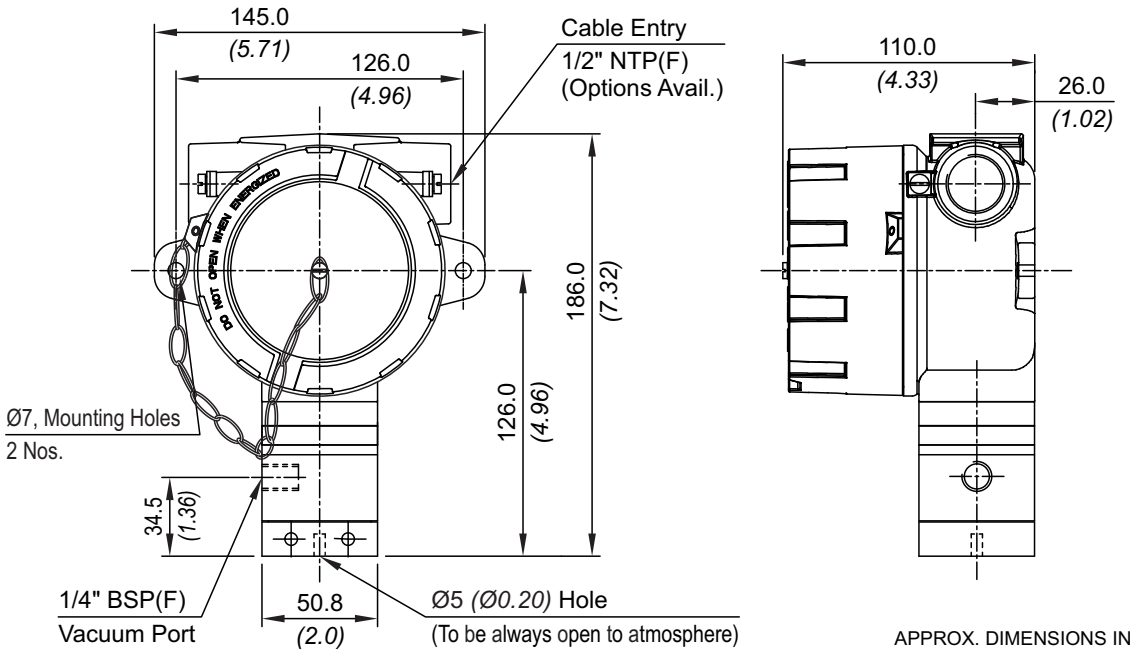


No. Description

1. *Disc*
2. *Diaphragm*
3. *Plunger (SS316)*
4. *Junction Plate*
5. *Sealing O-Ring (PTFE)*
6. *Sealing diaphragms (PTFE)*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

RANGE SELECTION TABLE

Range Code	Range mm Hg *(" Hg)*	Differential* mm Hg *("Hg)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
V00	† 760 to 100 *(29.92 to 3.94)*	20.0 *(0.78)*	12.0 *(174.05)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF VACUUM RANGE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in mmHg)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**V1** = vacuum switch, fixed differential without scale For adjustable differential please select microswitches A6 or C6 in group 6	**V00** = († 760 - 100)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE
Approx. switch weight in Kgs Enclosure / FC / FE Aluminium 2.030 1.530 Grey CI 4.430 3.950 SS 4.560 4.050						For additional wetted parts please contact Sales Office	

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT vacuum switch, having 760 mm Hg to 100 mm Hg vacuum range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

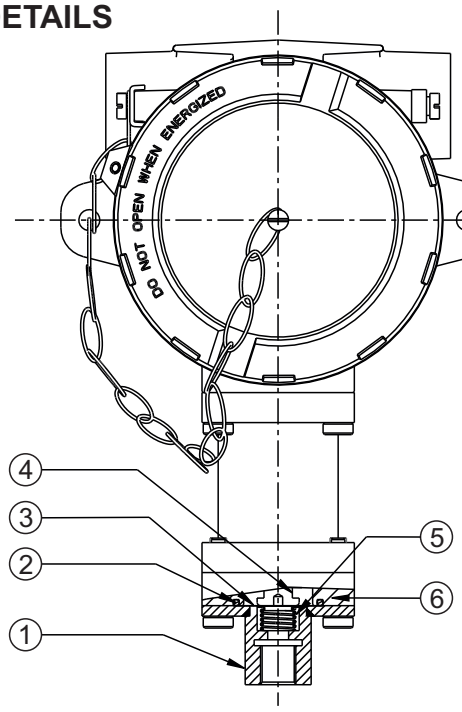
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	V1	V00	A1	S1	0

Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.



FC

PRESSURE CAPSULE DETAILS

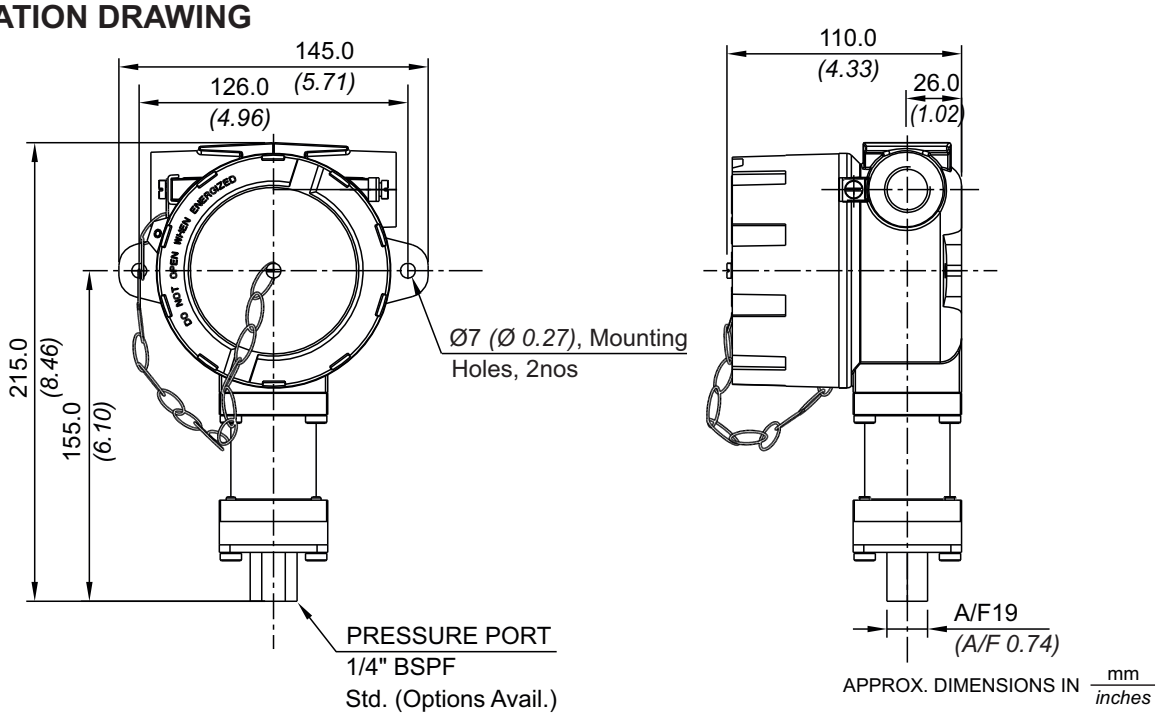


No. Description

1. *Pressure Housing*
2. *PTFE O-Ring*
3. *Diaphragm*
4. Conical Plunger
5. *Bottom Spring*
6. *Support Plate*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING

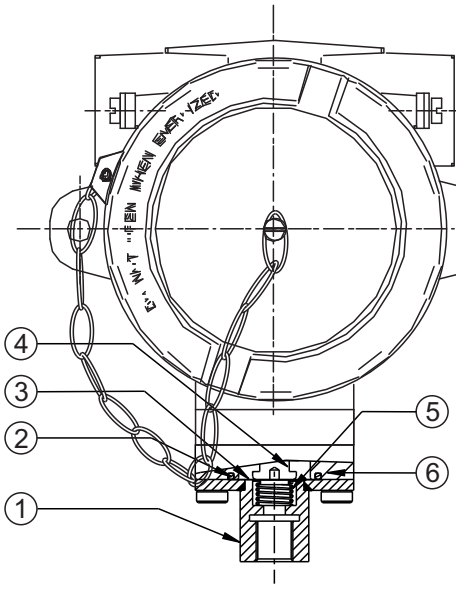


Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS

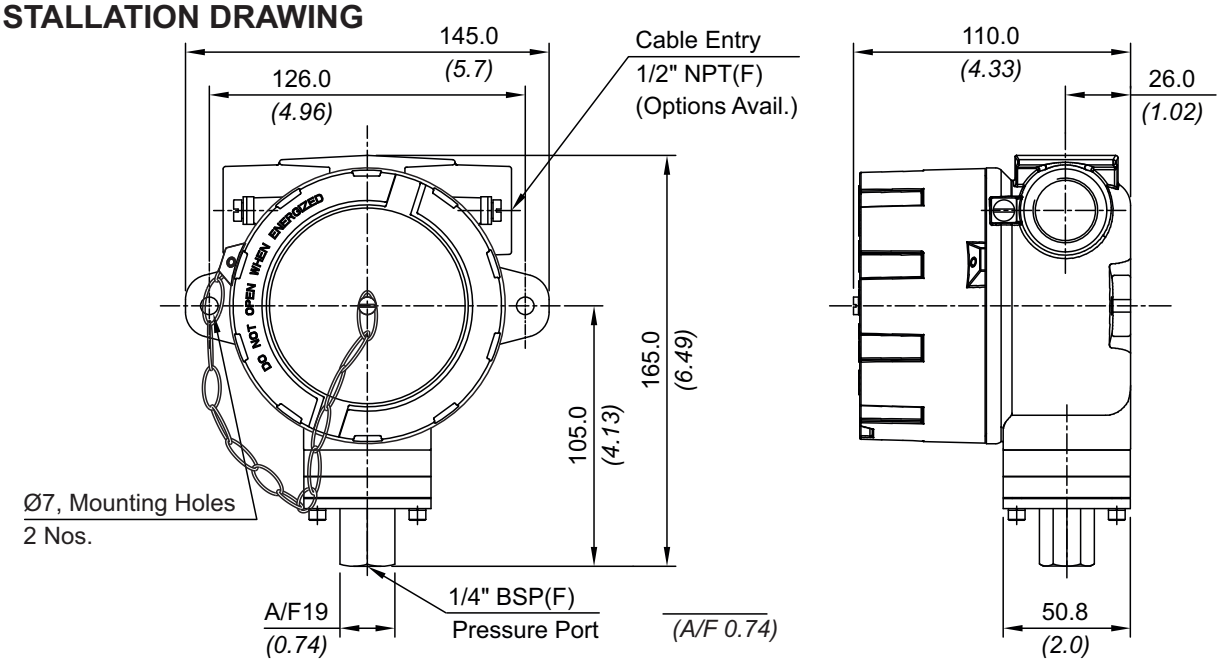


No. Description

1. *Pressure Housing*
2. *PTFE O-Ring*
3. *Diaphragm*
4. Conical Plunger
5. *Bottom Spring*
6. *Support Plate*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

FC/FE HIGH RANGE COMPOUND SWITCHES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
C01	-1 to 1.0 *(-14.50 to 14.50)*	0.15 *(2.17)*	12.0 *(174.05)*
C02	-1 to 1.5 *(-14.50 to 21.75)*	0.2 *(2.90)*	12.0 *(174.05)*
C03	-1 to 2.6 *(-14.50 to 37.71)*	0.3 *(4.35)*	12.0 *(174.05)*
C04	-1 to 3.6 *(-14.50 to 52.21)*	0.4 *(5.80)*	12.0 *(174.05)*
C07	-1 to 7 *(-14.50 to 101.53)*	0.8 *(11.603)*	12.0 *(174.05)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF COMPOUND RANGE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**C1** = compound switch, fixed differential without scale For adjustable differential please select microswitches A6 or C6 in group 6	**C01** = (-1 to 1.0) **C03** = (-1 to 2.6) **C04** = (-1 to 3.6) **C07** = (-1 to 7.0)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE **2** = SS 316L

Approx. switch weight in Kgs

Enclosure	FC	FE
Aluminium	2.110	1.510
Grey CI	4.520	3.920
SS	4.610	4.110

eg. A flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT pressure switch, having -1 bar to +1 bar pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & Neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	C1	C01	A1	S1	0

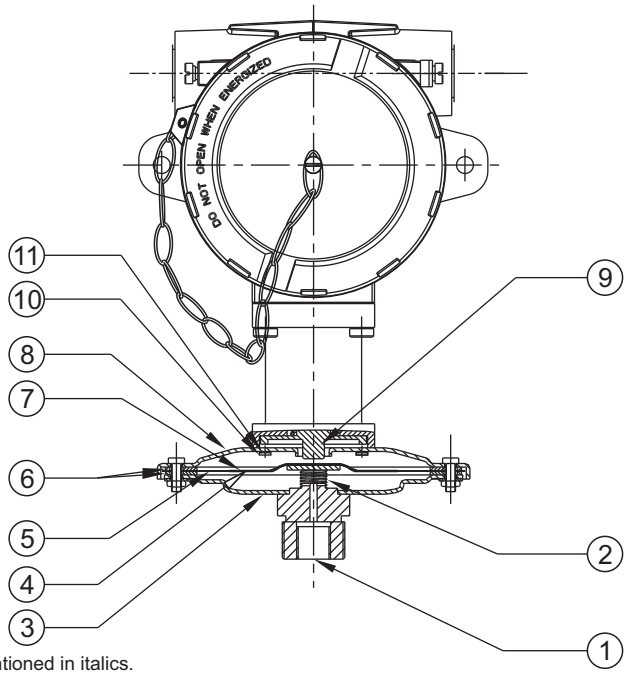
Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, uncalibrated switches with standard wetted parts and enclosures will be supplied.

FC/FE LOW RANGE COMPOUND SWITCHES



FC

PRESSURE CAPSULE DETAILS



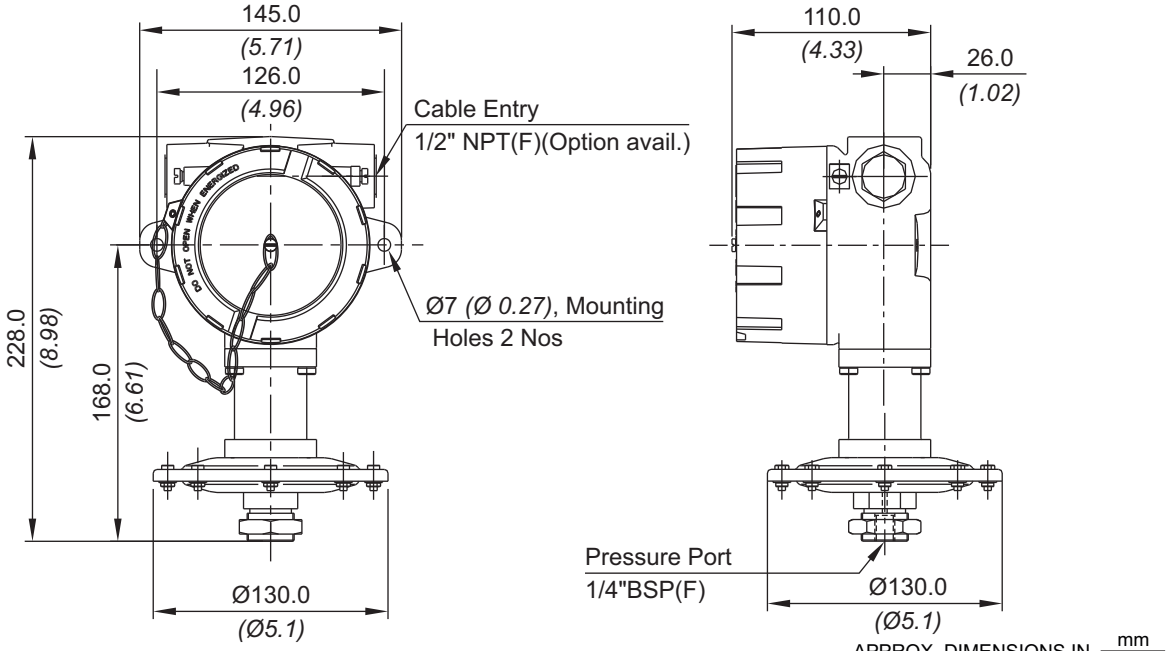
No. Description

1. *Pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)*
4. *Support plate (Aluminium)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. Top plate (Aluminium)
8. Top flange (S.S.)
9. Plunger (Aluminium)
10. Top flange screw (S.S.)
11. Sealing 'O' ring (Nitrile)

*Pressure port is welded with flange

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



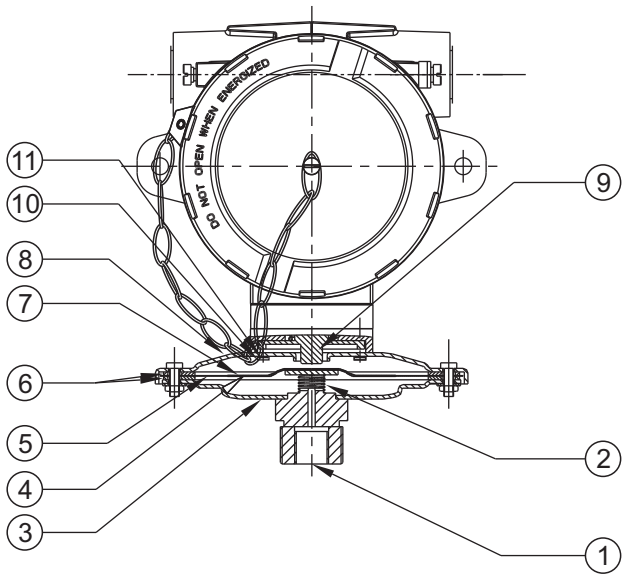
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



PRESSURE CAPSULE DETAILS



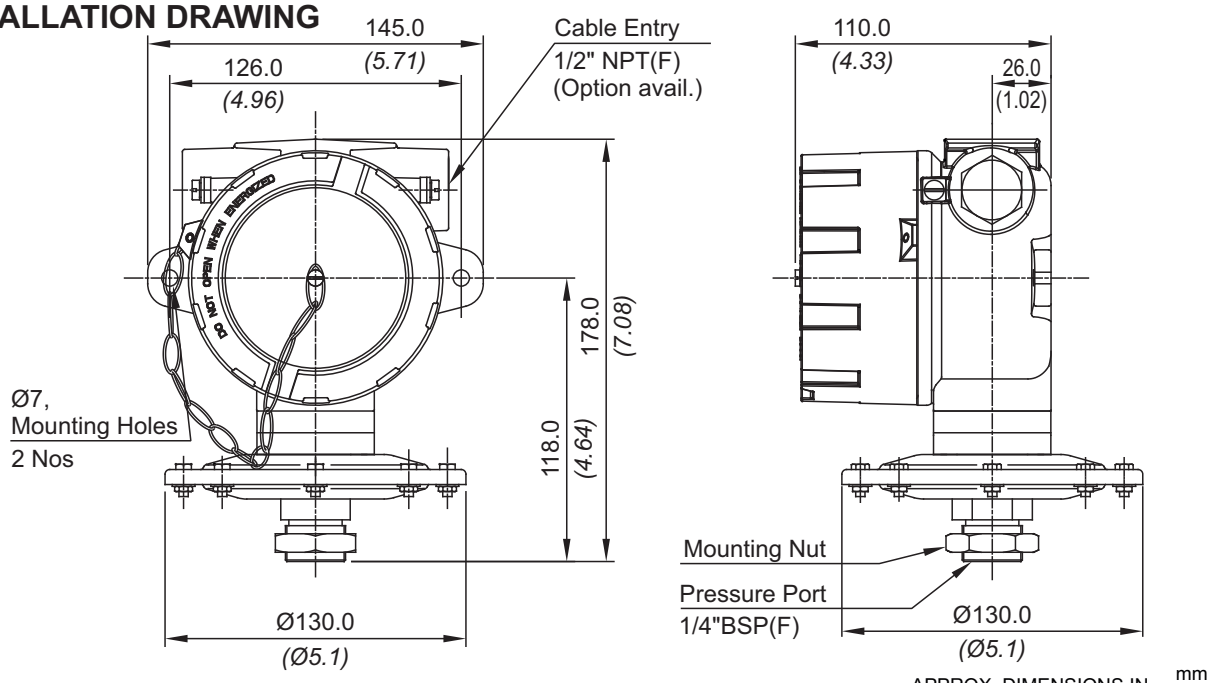
No. Description

1. *Pressure port (S.S.)**
2. *Support spring (S.S.)*
3. *Bottom flange (S.S.)*
4. *Support plate (Aluminium)*
5. *Diaphragm (Neoprene)*
6. *Gasket (Nitrile)*
7. Top plate (Aluminium)
8. Top flange (S.S.)
9. Plunger (Aluminium)
10. Top flange screw (S.S.)
11. Sealing 'O' ring (Nitrile)

*Pressure port is welded with flange

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

FC/FE LOW RANGE COMPOUND SWITCHES

RANGE SELECTION TABLE

Range Code	Range mbar *("Wc)*	Differential* mm wc *("Wc)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A1" microswitch	
CL2	-15 to 15 *(-6.030 to 6.030)*	40.0 *(1.574)*	2.0 *(29.00)*
CL3	-25 to 25 *(-10.047 to 10.047)*	60.0 *(2.362)*	2.0 *(29.00)*
CL5	-50 to 50 *(-20.093 to 20.093)*	100.0 *(3.937)*	2.0 *(29.00)*
CLX	-100 to 100 *(-40.186 to 40.186)*	150.0 *(5.90)*	2.0 *(29.00)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER LOW RANGE COMPOUND SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in mbar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**C1** = Compound switch, fixed differential without scale For adjustable differential please select microswitches A6 or C6 in group 6	**CL2**= (1.5 - 15) **CL3**= (-25 - 25) **CL5**= (-50 - 50) **CLX** = (-100 - 100)	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE

Approx. switch weight in Kgs

Enclosure	FC	FE
Aluminium	2.450	1.950
Grey CI	4.850	4.350
SS	4.950	4.450

eg. Flameproof switch for gas group IIC, with ½" NPT cable entry in aluminium housing as 1SPDT pressure switch, having -150 to 150 mm Wc pressure range, with 15 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	C1	CL2	A1	S1	0

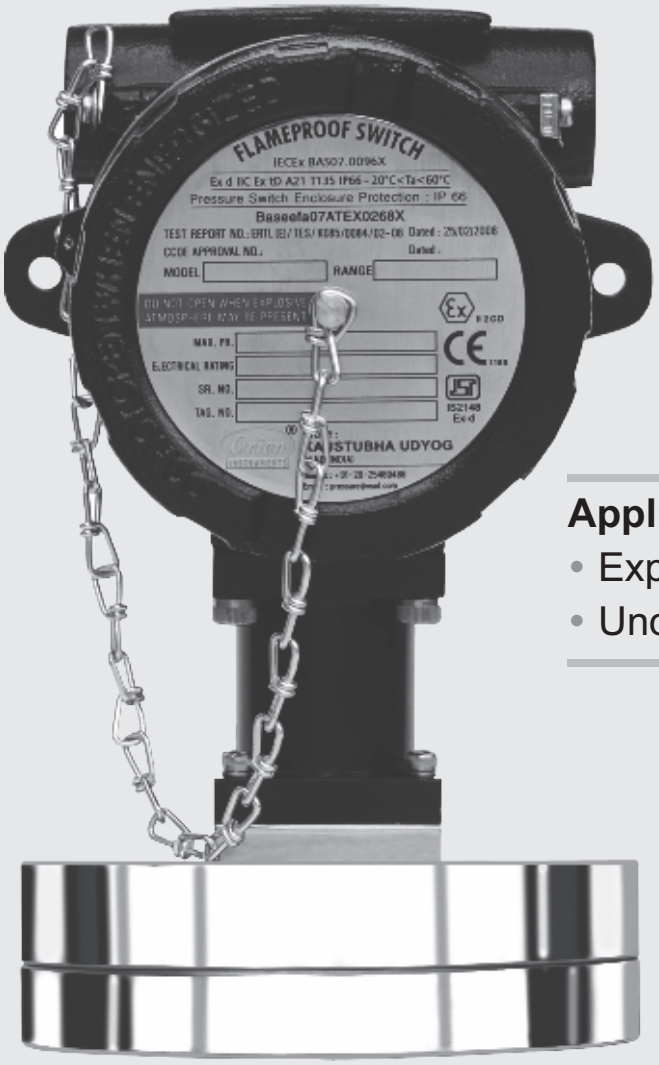
Please specify full model number to avoid ambiguity.

FC

Low DP High Proof

IECEx CoC

Baseefa APPROVED



Applications

- Explosive areas
- Underground mines

ΔP 1.5 mbar - 15 mbar
Pmax = 100 bar

Ex II2 GD Ex d IIC Gb Ex tb IIIC Db

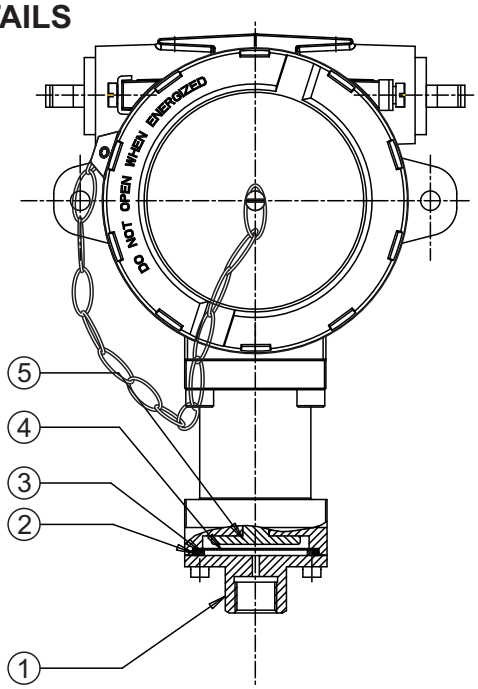
PRESSURE SWITCHES ΔP SWITCHES | **0.2 mbar to 1000 bar**

Orion® INSTRUMENTS

FC



PRESSURE CAPSULE DETAILS

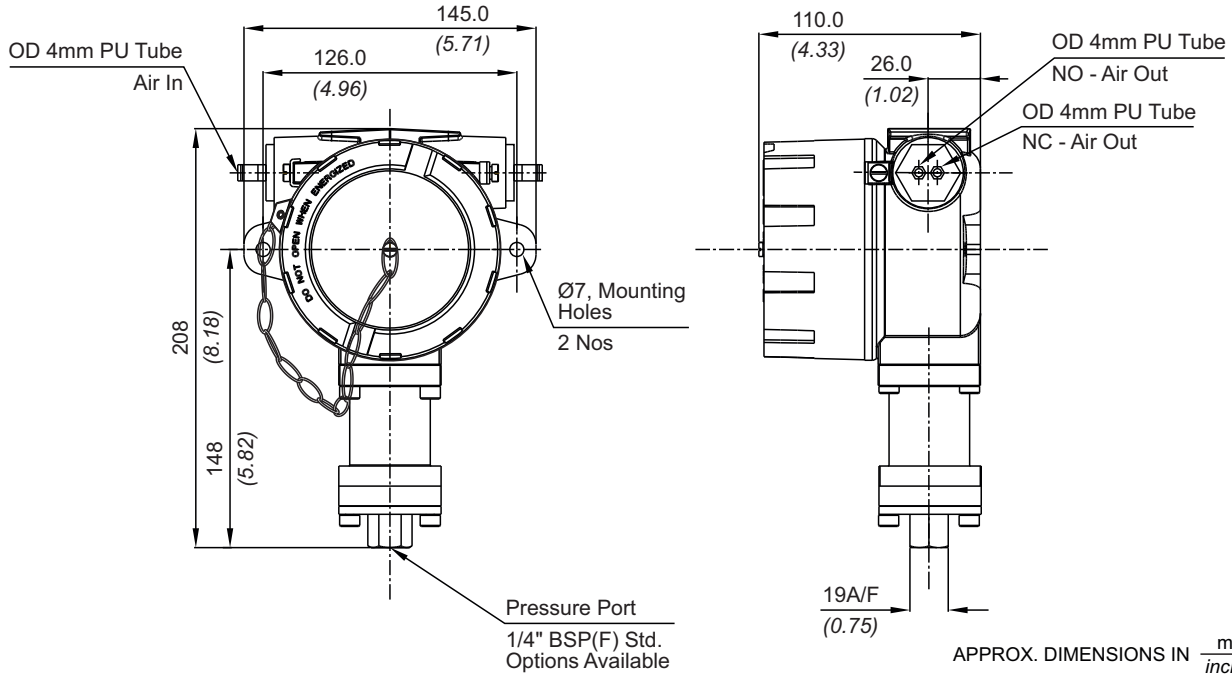


No. Description

1. *Pressure Port*
2. *PTFE O-Ring*
3. *Back Up Ring*
4. *Diaphragm*
5. Conical Plunger

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

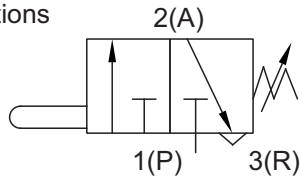
FC HIGH RANGE AIR RELAY SWITCHES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for P1 / P2 (Refer Group 6 of How to order table)	
LP	0.067 to 0.213 *(0.97 to 3.09)*	0.02 *(0.29)*	5.0 *(72.52)*
LP5	0.1 to 0.5 *(1.45 to 7.25)*	0.08 *(1.16)*	5.0 *(72.52)*
H01	0.1 to 1.0 *(1.45 to 14.50)*	0.10 *(1.45)*	12.0 *(174.05)*
H02	0.1 to 1.5 *(1.45 to 21.76)*	0.3 *(4.35)*	12.0 *(174.05)*
H03	0.2 to 2.6 *(2.90 to 37.71)*	0.4 *(5.80)*	12.0 *(174.05)*
H04	0.2 to 3.6 *(2.90 to 52.21)*	0.5 *(7.25)*	12.0 *(174.05)*
H07	0.5 to 7.0 *(7.25 to 101.53)*	0.6 *(8.70)*	12.0 *(174.05)*
H10	0.5 to 10.0 *(7.25 to 145.037)*	1.0 *(14.50)*	25.0 *(362.6)*
H15	1.0 to 15.0 *(14.50 to 217.56)*	1.5 *(21.75)*	25.0 *(362.6)*
H30	5.0 to 25.0 *(72.52 to 362.60)*	2.0 *(29.00)*	35.0 *(507.63)*

Pneumatic valve specifications

NO = Normally Open
or
NC = Normally Closed



CAUTION : Supply pressure of air/inert gas = min. 2 and max. 7 bar

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER HIGH RANGE AIR RELAY SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Air Inlet/Outlet Ports	Switch Type	Range Code (values in bar)	Valve Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = Air Relay switch Note: Flameproof certification not applicable for Air Relay Switch	**A1** = Al. head PU tube 4mm OD ***A4** = Grey CI PU tube 4mm OD **A7** = SS head PU tube 4mm OD *Not available in FE models	**P1** = pressure switch, fixed differential without scale	**LP** = (0.067 - 0.213) **LP5** = (0.1 - 0.5) **H01** = (0.1 - 1.0) **H02** (0.1 - 1.5) **H03** = (0.2 - 2.6) **H04** = (0.2 - 3.6) **H07** = (0.5 - 7.0) **H10** = (0.5 - 10.0) **H15** = (1.0 - 15.0) **H30** = (5.0 - 25.0)	**P1**= NC valve **P2** = NO valve	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**1** = PTFE **2** = SS 316L **3** = Hastelloy C **4** = Monel **5** = Titanium **6** = Tantalum **7** = Inconel

Approx. switch weight in Kgs

Enclosure	FC
Aluminium	2.110
Grey CI	4.520
SS	4.620

eg. Flameproof air relay switch in aluminium housing with PU tube 4mm OD, fixed differential without scale, having 0.5 bar to 10 bar pressure range, with NC valve, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	A1	P1	H01	P1	S1	1

Please specify full model number to avoid ambiguity.

FC

Flameproof Pressure Switches

IECEx CoC

Baseefa APPROVED



With Adjustable Differential (Hysterisis)

Applications

- Oil and Gas sector
- Gas skids and cooling systems

Ideal for Gas Compressors

Ex II2 GD Ex d IIC Gb Ex tb IIIC Db

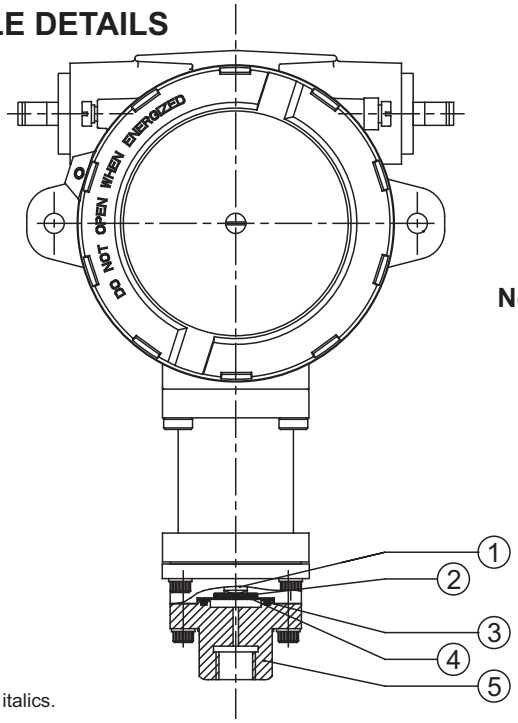
■ PRESSURE SWITCHES ■ ΔP SWITCHES | 0.2 mbar to 1000 bar

Orion® INSTRUMENTS

FC



PRESSURE CAPSULE DETAILS

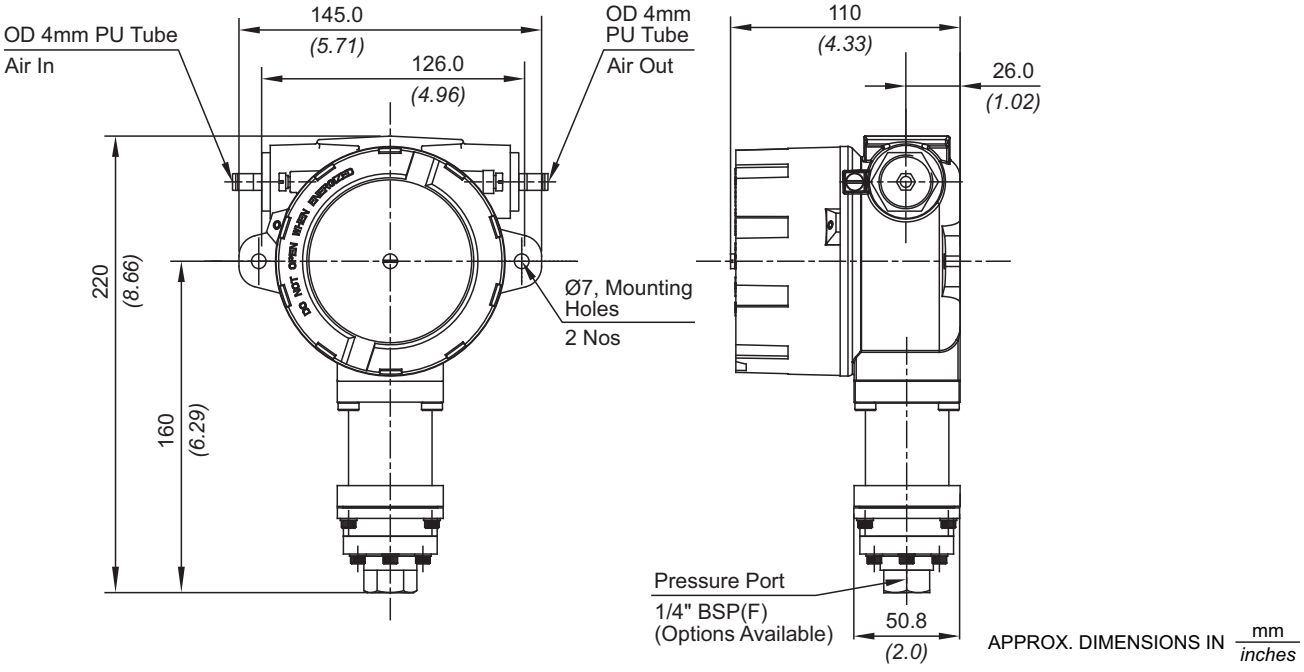


No. Description

1. Transfer PIN (SS)
2. Cushining Pad
3. *O-ring (PTFE®)*
4. *Diaphragm (PTFE®)*
5. *Pressure Housing (SS316)*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING

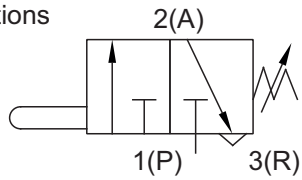


RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)* Approximate Maximum for P1 / P2 (Refer Group 6 of How to order table)	Maximum Working Pressure bar *(psi)*
H1T	0.5 - 10 *(7.25 - 145.04)*	1 *(14.50)*	150 *(2175.51)*
H2T	2 - 20 *(29.00 - 290.07)*	2 *(29.00)*	200 *(2900.76)*
H4T	5 - 40 *(72.52 - 580.15)*	5 *(72.52)*	200 *(2900.76)*
H1H	10 - 100 *(146.04 - 1450.38)*	12 *(174.05)*	200 *(2900.76)*
H2H	7 - 200 *(101.52 - 2900.76)*	24 *(348.09)*	400 *(5801.52)*
H4H	40 - 400 *(580.15 - 5801.52)*	50 *(725)*	500 *(7251.88)*
H7H	70 - 700 *(1015.26 - 10152.64)*	60 *(870)*	800 *(11603)*
H1K	100 - 1000 *(1450.37 - 14503.77)*	70 *(1015.26)*	1100 *(15954.15)*

Pneumatic valve specifications

NO = Normally Open
or
NC = Normally Closed



CAUTION : Supply pressure of air/inert gas = min. 2 and max. 7 bar

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER HIGH RANGE AIR RELAY SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Air Inlet/Outlet Ports	Switch Type	Range Code (values in bar)	Valve Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = Air Relay switch Note: Flameproof certification not applicable for Air Relay Switch	**A1** = Al. head PU tube 4mm OD ***A4** = Grey CI PU tube 4mm OD **A7** = SS head PU tube 4mm OD *Not available in FE models	**P1** = pressure switch, fixed differential without scale	**H1T** = (0.5 - 10) **H2T** = (2 - 20) **H4T** = (5 - 40) **H1H** = (10 - 100) **H2H** = (7 - 200) **H4H** = (40 - 400) **H7H** = (70 - 700) **H1K** = (100 - 1000)	**P1**= NC valve **P2** = NO valve	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**1** = PTFE **2** = SS 316L **3** = Hastelloy C **4** = Monel **5** = Titanium **6** = Tantalum **7** = Inconel

Approx. switch weight in Kgs

Enclosure	FC
Aluminium	2.220
Grey CI	4.720
SS	4.810

eg. Flameproof air relay switch in aluminium housing with PU tube 4mm OD, fixed differential without scale, having 0.5 bar to 10 bar pressure range, with NC valve, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	A1	P1	H01	P1	S1	1

Please specify full model number to avoid ambiguity.

Bulletin No. KA231020

FC

Ultra Low Pressure Difference Switches

IECEx CoC

Baseefa APPROVED

Ex

CE



Applications

- Oil and Gas sector
- Gas skids and cooling systems
- Offshore, turbine & HVAC

ΔP 4mm wg onwards

Ex II2 GD Ex d IIC Gb Ex tb IIIC Db

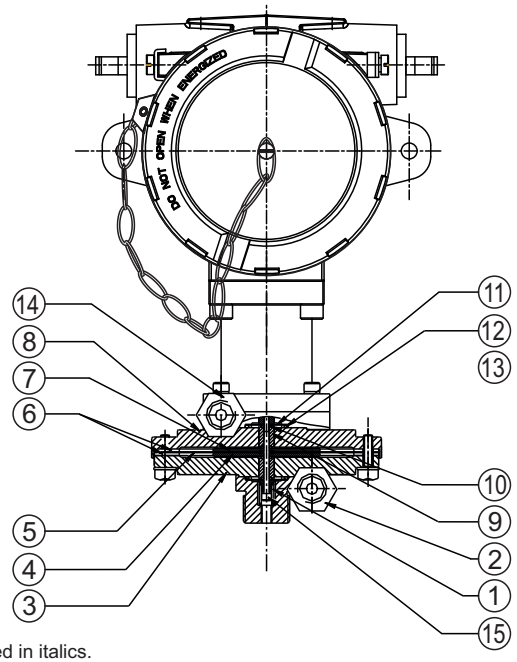
PRESSURE SWITCHES ■ ΔP SWITCHES | **0.2 mbar to 1000 bar**

Orion® INSTRUMENTS

FC



PRESSURE CAPSULE DETAILS

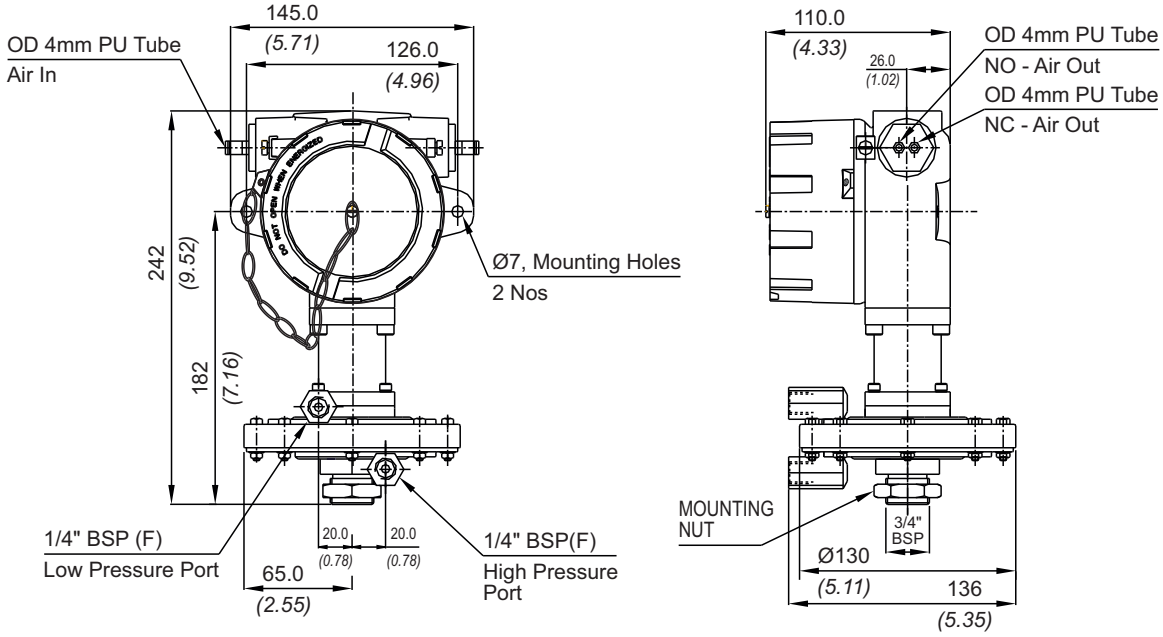


No. Description

1. Support spring (S.S.)
2. *High pressure port (S.S.)**
3. *Bottom flange (S.S.)**
4. *Support plate (S.S.)*
5. *Diaphragm (Neoprene)*
6. *Gasket (PTFE)*
7. *Top plate (S.S.)*
8. *Top flange (S.S.)**
9. *Transfer pin (S.S.)*
10. *'O' ring (Nitrile)*
11. *Sealing diaphragm (Nitrile)*
12. *PTFE O-Ring*
13. *SS 316 Ring*
14. *Low pressure port (S.S.)**
15. Holding screw (C.S.)

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

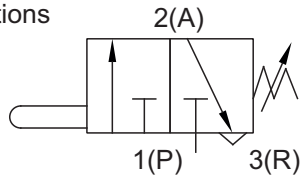
FC LOW DP HIGH PROOF AIR RELAY SWITCHES

RANGE SELECTION TABLE

Range Code	Range mbar *("wc)*	Differential* mbar *(" wc)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for P1 / P2 (Refer Group 6 of How to order table)	
N03	5 to 25 *(2.009 to 10.047)*	Please consult Sales Office for further information.	20.0 *(290.075)*
N05	10 to 50 *(4.018 to 20.093)*		20.0 *(290.075)*
N10	10 to 100 *(4.018 to 40.186)*		20.0 *(290.075)*
N15	10 to 150 *(4.018 to 60.280)*		20.0 *(290.075)*
N25	20 to 250 *(8.037 to 100.466)*		20.0 *(290.075)*
N35	50 to 350 *(20.093 to 140.653)*		20.0 *(290.075)*

Pneumatic valve specifications

NO = Normally Open
or
NC = Normally Closed



CAUTION : Supply pressure of air/inert gas = min. 2 and max. 7 bar

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF LOW DP HIGH PROOF AIR RELAY SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Air Inlet/Outlet Ports	Switch Type	Range Code (values in mbar)	Valve Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = Air Relay switch Note: Flameproof certification not applicable for Air Relay Switch	**A1** = Al. head PU tube 4mm OD ***A4** = Grey CI PU tube 4mm OD **A7** = SS head PU tube 4mm OD *Not available in FE models	**D1** = pressure difference switch, fixed differential without scale	**N03** = (5 - 25) **N05** = (10 - 50) **N10** = (10 - 100) **N15** = (10 - 150) **N25** = (20 - 250) **N35** = (50 - 350)	**P1**= NC valve **P2** = NO valve	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE

Approx. switch weight in Kgs

Enclosure	FC
Aluminium	2.210
Grey CI	6.710
SS	6.820

eg. Flameproof air relay switch in aluminium housing with PU tube 4mm OD, fixed differential without scale, having 5 mbar to 25 mbar pressure range, with NC valve, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

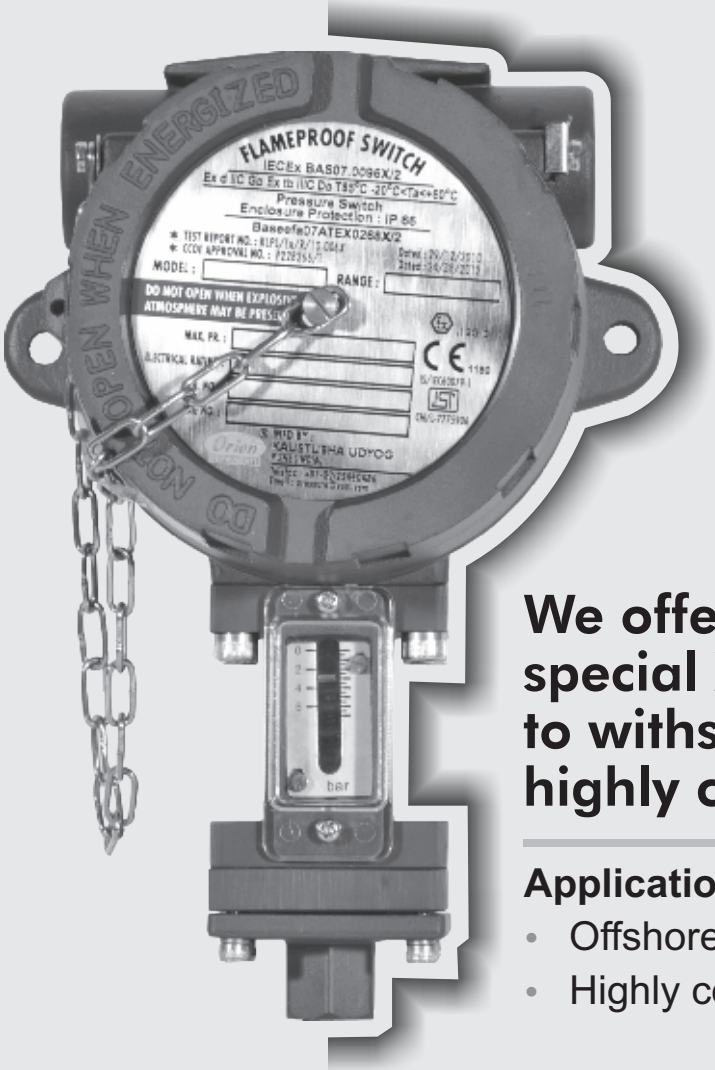
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	A	D1	N03	P1	S1	0

Please specify full model number to avoid ambiguity.

FC

Xylan

Coated for Offshore



We offer special Xylan coating to withstand highly corrosive environment

Applications

- Offshore
- Highly corrosive environment

IECEx CoC

Baseefa APPROVED

Ex

CE

PRESSURE SWITCHES ΔP SWITCHES

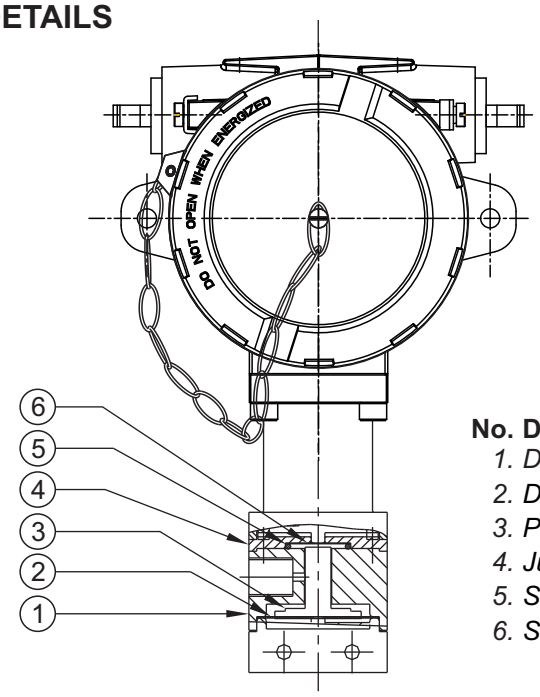
0.2 mbar to 1000 bar

Orion® INSTRUMENTS

FC



PRESSURE CAPSULE DETAILS

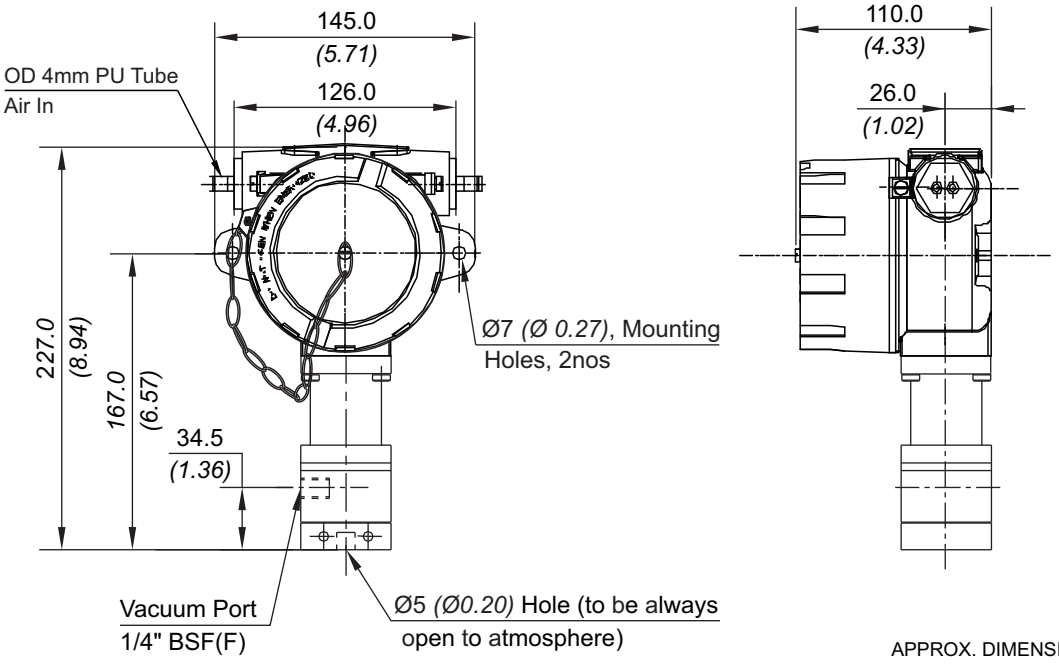


No. Description

1. *Disc*
2. *Diaphragm*
3. *Plunger (SS316)*
4. *Junction Plate*
5. *Sealing O-Ring (PTFE®)*
6. *Sealing diaphragms (PTFE®)*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

FC VACUUM AIR RELAY SWITCHES

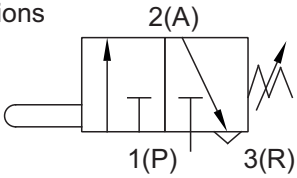
RANGE SELECTION TABLE

Range Code	Range mm Hg *(" Hg)*	Differential* mm Hg *("Hg)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for P1 / P2 (Refer Group 6 of How to order table)	
V00	† 760 to 100 *(29.92 to 3.94)*	20.0 *(0.78)*	12.0 *(174.05)*

*Minimum differential increases with set point (Graphs available on request)
† Typical values achieved at sea level, total vacuum that can be achieved varies mainly with altitude.
*Please indicate specifically the differential value in enquiry/order, when it is critical in your application.

Pneumatic valve specifications

NO = Normally Open
or
NC = Normally Closed



CAUTION : Supply pressure of air/inert gas = min. 2 and max. 7 bar

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER VACUUM AIR RELAY SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Air Inlet/Outlet Ports	Switch Type	Range Code (values in bar)	Valve Type	Pressure Port Material / Size	Diaphragm
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = Air Relay switch Note: Flameproof certification not applicable for Air Relay Switch	**A1** = Al. head PU tube 4mm OD ***A4** = Grey CI PU tube 4mm OD **A7** = SS head PU tube 4mm OD *Not available in FE models	**P1** = pressure switch, fixed differential without scale	**V00** = († 760 - 100)	**P1**= NC valve **P2** = NO valve	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) More options available, please contact sales office	**0** = Neoprene **1** = PTFE **2** = SS 316L

Approx. switch weight in Kgs

Enclosure	FC
Aluminium	2.430
Grey CI	4.830
SS	4.940

eg. Flameproof air relay switch in aluminium housing with PU tube 4mm OD, fixed differential without scale, having 0.5 bar to 10 bar pressure range, with NC valve, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	A	P1	V00	P1	S1	0

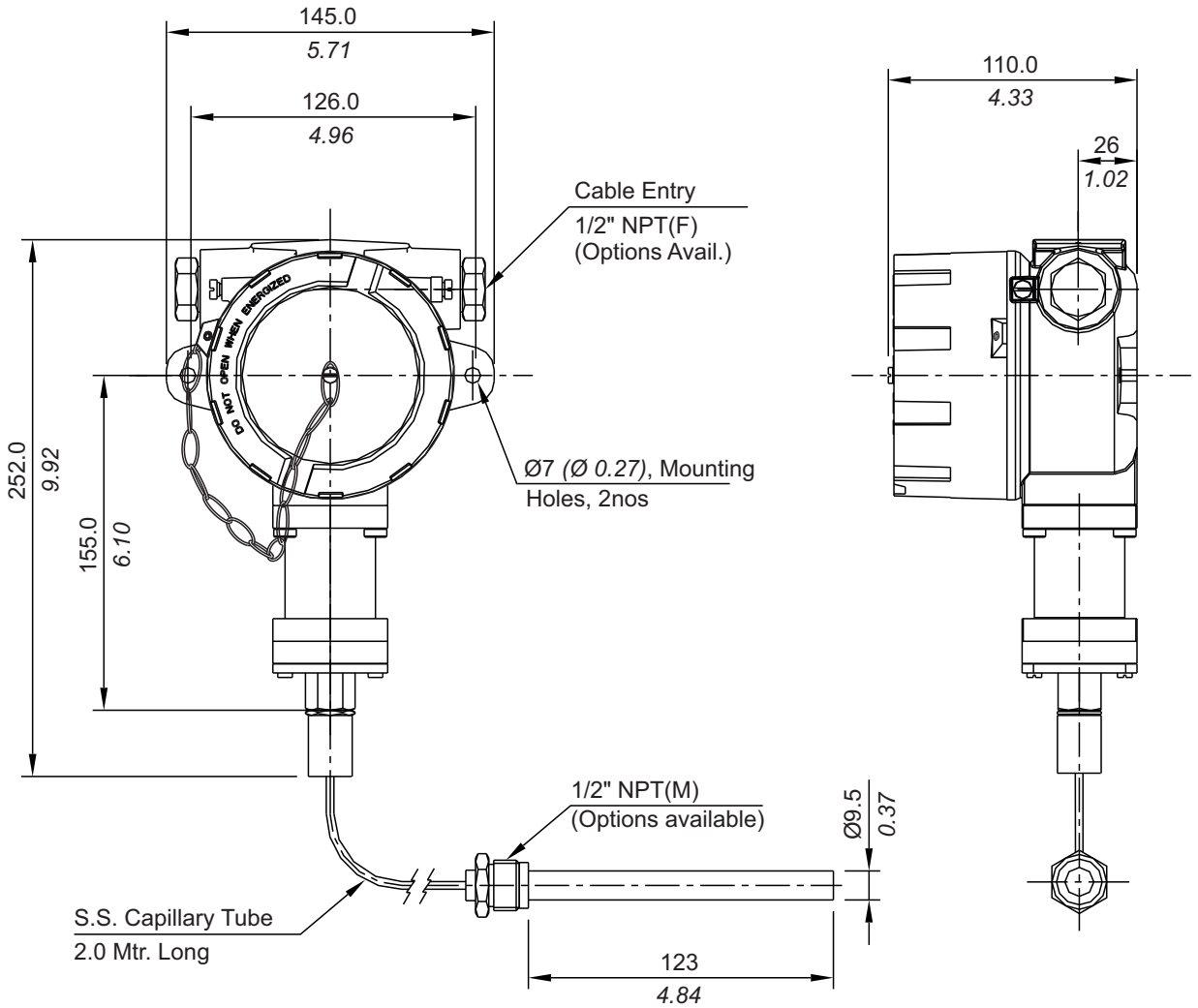
Please specify full model number to avoid ambiguity.

Bulletin No. KA231020



FC

INSTALLATION DRAWING



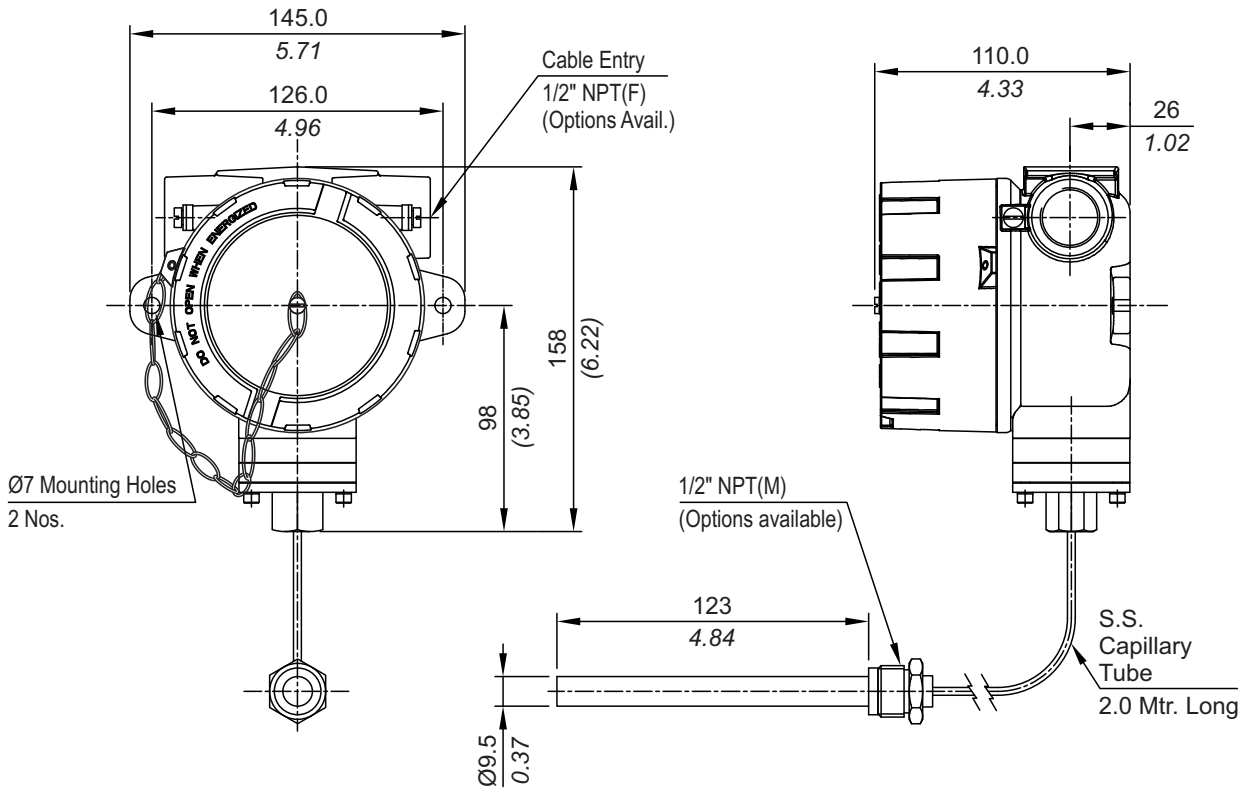
APPROX. DIMENSIONS IN mm / *inches*

Orion INSTRUMENTS

FE



INSTALLATION DRAWING



APPROX. DIMENSIONS IN $\frac{mm}{inches}$

RANGE SELECTION TABLE

Range Code	Range °C *(°F)*	Differential* °C *(°F)*	Maximum Working Temperature °C *(°F)*
		Approximate Maximum for "A1" microswitch	
T1H	25 to 90 *(77 to 194)*	15.0 *(59)*	150.0 *(302)*
T2H	70 to 150 *(158 to 302)*	20.0 *(68)*	200.0 *(392)*
T3H	120 to 215 *(248 to 419)*	30.0 *(86)*	300.0 *(572)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF TEMPERATURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in Deg. Cen.)	Microswitch Type	Temp. Bulb Material / Size	Capillary Material / Size
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. head ½" NPT threads **2** = Al. head ¾" NPT threads **3** = Al. head M20 x 1.5 threads ***4** = Grey CI head ½" NPT threads ***5** = Grey CI head ¾" NPT threads ***6** = Grey CI head M20 x 1.5 threads **7** = SS head ½" NPT threads **8** = SS head ¾" NPT threads **9** = SS head M20 x 1.5 threads *Not available in FE models	**T1** = Temperature Switch, fixed differential without scale **T2** = Temperature Switch, fixed differential with scale in °C For adjustable differential please select microswitches A6 or C6 in group 6	**T1H** = 25 - 90 **T2H** = 70 - 150 **T3H** = 120 - 215	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**B1** = Brass / Dia. 9.5 mm, 123 mm length, with 3/8" BSP (M) thermowell connection **B2** = Brass / Dia. 9.5 mm, 123 mm length, with 3/8" NPT (M) thermowell connection **B3** = Brass / Dia. 9.5 mm, 123 mm length, with 1/2" NPT (M) thermowell connection **S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) **S3** = SS316 / 1" BSP(M) Please contact sales office for additional information	**2** = SS316 / 2.0 meter

Approx. switch weight in Kgs

Enclosure	FC	FE
Aluminium	2.780	2.280
Grey CI	5.160	4.660
SS	5.230	4.730

E.g. A Flameproof Temperature switch, with 1/2"NPT cable entry in aluminum housing as 1 SPDT, fixed differential without scale, having 25˚C to 90˚C temperature range, with 15 Amp. microswitch, with Brass 9.5 mm diameter bulb, having length 123 mm with 3/8"BSP(M),with 2.0 meter SS316 capillary length shall be specified by

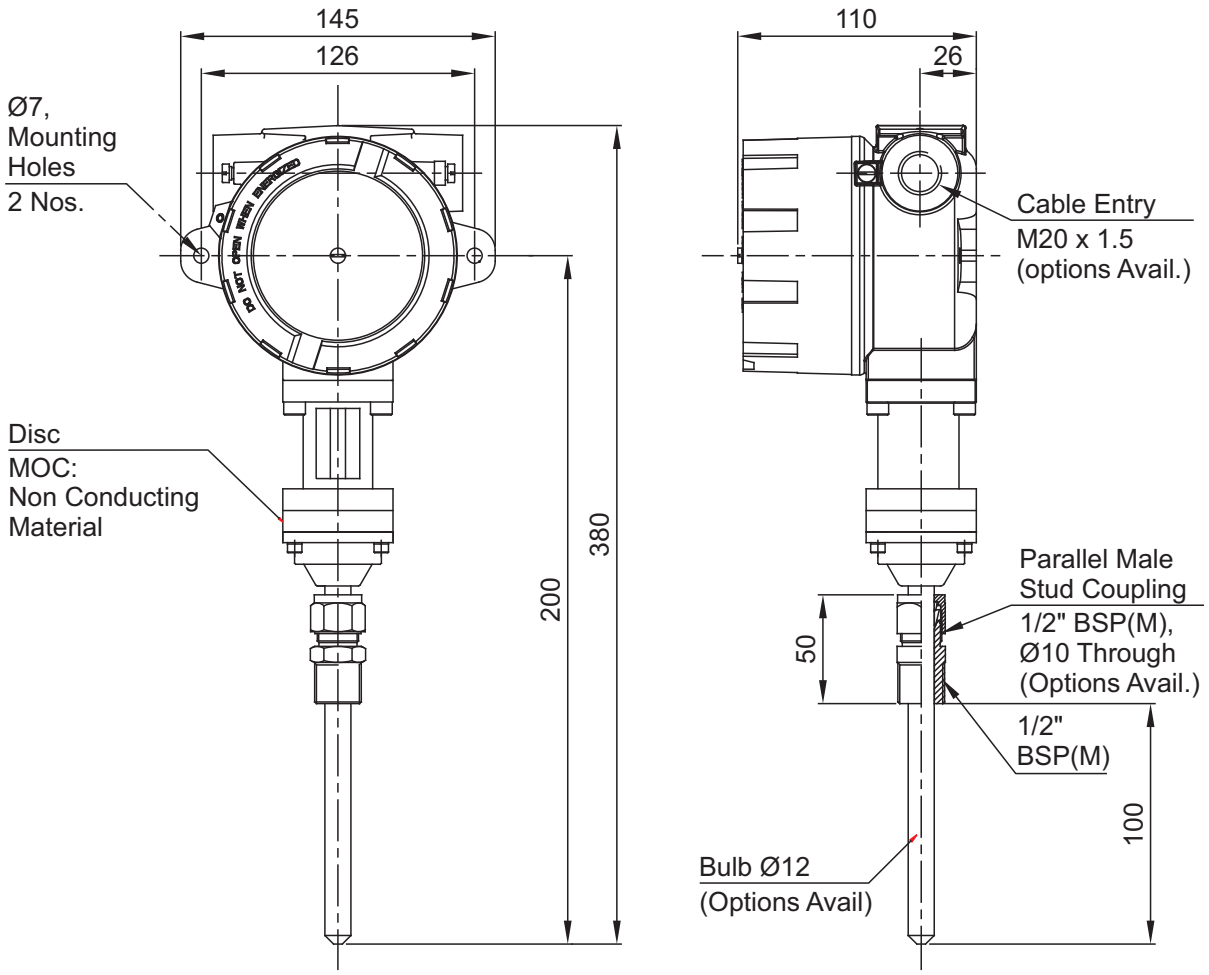
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FC	1	T1	T1H	A1	B1	2

Please specify full model number to avoid ambiguity.



FC

INSTALLATION DRAWING



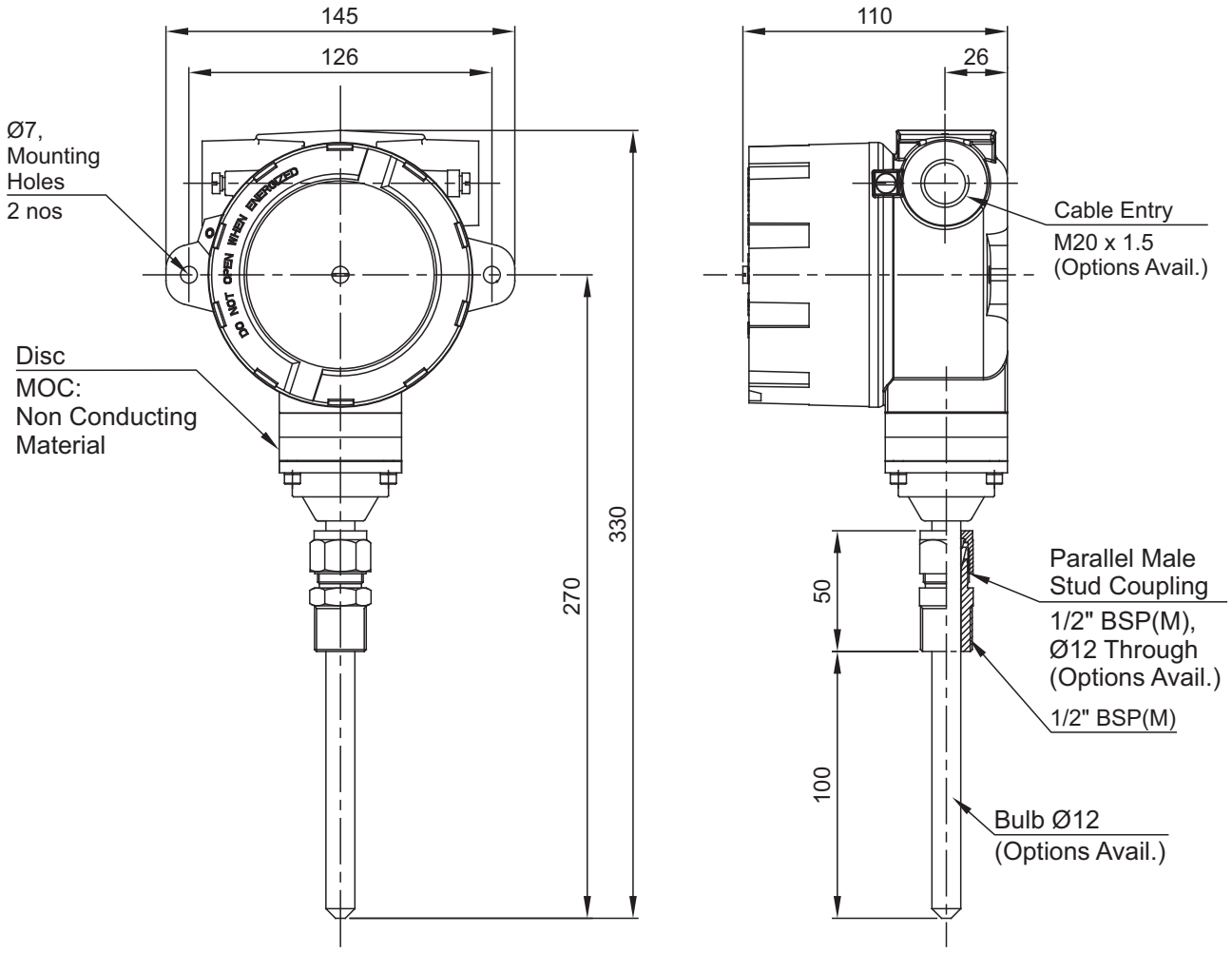
APPROX. DIMENSIONS IN mm / *inches*

Orion® INSTRUMENTS

FE



INSTALLATION DRAWING



APPROX. DIMENSIONS IN $\frac{mm}{inches}$

FC/FE DIRECT MOUNTED TEMPERATURE SWITCHES

RANGE SELECTION TABLE

Range Code	Range °C *(°F)*	Differential* °C *(°F)*	Maximum Working Temperature °C *(°F)*
		Approximate Maximum for "A1" microswitch	
T1H	25 to 90 *(77 to 194)*	15 *(59)*	150 *(302)*
T2H	70 to 150 *(158 to 302)*	20 *(68)*	200 *(392)*
T3H	120 to 215 *(248 to 419)*	30 *(86)*	300 *(572)*

Note:

1. The minimum differential increases with the setpoint. The differential values mentioned in the above table are approximate maximum for FSR. The differential value will vary according to the pressure range selected and microswitch type. For actual values of differential please contact sales office.

2. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.

If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

HOW TO ORDER FLAMEPROOF TEMPERATURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in Deg. Cen.)	Microswitch Type	Temp. Bulb Dia./Size	MOC of the Bulb
☐ A prefix "N" is used in the model code in case of any non standard options / accessories that are provided with the switches. Will be given by manufacturer, only after agreement of supply details with customer. The prefix is subject to change as per specific requirement.	**FC** = IP66 Flameproof pressure switch, ATEx, IECEx & PESO approved **FE** = IP66 Flameproof pressure switch, PESO approved	**1** = Al. enclosure ½" NPT threads ***2** = Al. enclosure ¾" NPT threads **3** = Al. enclosure M20 X 1.5 threads **7** = SS enclosure, SS Head ½" NPT threads ***8** = SS enclosure, SS Head ¾" NPT threads **9** = SS enclosure, SS Head M20 X 1.5 threads *Not available for FE model For dual cable entry contact Sales Office	**T1** = Temperature Switch, fixed differential without scale **T2** = Temperature Switch, fixed differential with scale in °C	**T1H** = 25 - 90 **T2H** = 70 - 150 **T3H** = 120 - 215	**A1** = General purpose microswitch rated at 15 A; 250 VAC ***A6 =** elements with adjustable deadband ***A7** = 2SPDT switching elements **A8** = General purpose microswitch rated at 5 A, 250 VAC; 5 A, 28 VDC ***B7** = 2SPDT Switching Elements **C6** = 1SPDT Adjustable Differential Please refer to page nos. 120 & 121 for options and specifications of microswitches * Please contact sales office for additional information	**D1=** Direct mounted temparature switch with 150mm bulb length; 12mm bulb diameter; 3/8" BSPM connection. **D2 =** Direct mounted temparature switch with 150mm bulb length; 12mm bulb diameter; 3/8" NPTM connection. **D3 =** Direct mounted temparature switch with 150mm bulb length; 12mm bulb diameter; 1/2" NPTM connection. Please contact sales office for customised dimensions of the bulb and process connections	**1** = Brass **2** = SS

Approx. switch weight in Kgs

Enclosure	FC	FE
Aluminium	2.240	1.740
Grey CI	NA	NA
SS	4.830	4.530

E.g. A Direct Mounted Flameproof Temperature Switch, with 1/2"NPT cable entry in aluminum housing as 1 SPDT, fixed differential without scale, having 25°C to 90°C temperature range, with 15 Amp. microswitch, with SS316 10mm diameter bulb of 100mm length with 1/2" NPT(M), shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	FE	1	T1	T1H	A1	D1	1

Please specify full model number to avoid ambiguity.

FLANGE CODE TABLE

Flanges conform to ANSI B16.5; maximum pressure is limited by flange rating

Class	Stainless Steel		Hastelloy		Alloy 400		Titanium		Tantalum	
	316 L		C276		Monel					
150#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	AA	BQ	DG	EW	GM	IC	JS	LI	MY	OO
3/4"	AB	BR	DH	EX	GN	ID	JT	LJ	MZ	OP
1"	AC	BS	DI	EY	GO	IE	JU	LK	NA	OQ
1 1/4"	AD	BT	DJ	EZ	GP	IF	JV	LL	NB	OR
1 1/2"	AE	BU	DK	FA	GQ	IG	JW	LM	NC	OS
2"	AF	BV	DL	FB	GR	IH	JX	LN	ND	OT
300#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	AG	BW	DM	FC	GS	II	JY	LO	NE	OU
3/4"	AH	BX	DN	FD	GT	IJ	JZ	LP	NF	OV
1"	AI	BY	DO	FE	GU	IK	KA	LQ	NG	OW
1 1/4"	AJ	BZ	DP	FF	GV	IL	KB	LR	NH	OX
1 1/2"	AK	CA	DQ	FG	GW	IM	KC	LS	NI	OY
2"	AL	CB	DR	FH	GX	IN	KD	LT	NJ	OZ
400#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	AM	CC	DS	FI	GY	IO	KE	LU	NK	PA
3/4"	AN	CD	DT	FJ	GZ	IP	KF	LV	NL	PB
1"	AO	CE	DU	FK	HA	IQ	KG	LW	NM	PC
1 1/4"	AP	CF	DV	FL	HB	IR	KH	LX	NN	PD
1 1/2"	AQ	CG	DW	FM	HC	IS	KI	LY	NO	PE
2"	AR	CH	DX	FN	HD	IT	KJ	LZ	NP	PF
600#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	AS	CI	DY	FO	HE	IU	KK	MA	NQ	PG
3/4"	AT	CJ	DZ	FP	HF	IV	KL	MB	NR	PH
1"	AU	CK	EA	FQ	HG	IW	KM	MC	NS	PI
1 1/4"	AV	CL	EB	FR	HH	IX	KN	MD	NT	PJ
1 1/2"	AW	CM	EC	FS	HI	IY	KO	ME	NU	PK
2"	AX	CN	ED	FT	HJ	IZ	KP	MF	NV	PL
900#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	AY	CO	EE	FU	HK	JA	KQ	MG	NW	PM
3/4"	AZ	CP	EF	FV	HL	JB	KR	MH	NX	PN
1"	BA	CQ	EG	FW	HM	JC	KS	MI	NY	PO
1 1/4"	BB	CR	EH	FX	HN	JD	KT	MJ	NZ	PP
1 1/2"	BC	CS	EI	FY	HO	JE	KU	MK	OA	PQ
2"	BD	CT	EJ	FZ	HP	JF	KV	ML	OB	PR

FLANGE CODE TABLE

Flanges conform to ANSI B16.5; maximum pressure is limited by flange rating

Class	Stainless Steel		Hastelloy		Alloy 400		Titanium		Tantalum	
	316 L		C276		Monel					
1500#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	BE	CU	EK	GA	HQ	JG	KW	MM	OC	PS
3/4"	BF	CV	EL	GB	HR	JH	KX	MN	OD	PT
1"	BG	CW	EM	GC	HS	JI	KY	MO	OE	PU
1 1/4"	BH	CX	EN	GD	HT	JJ	KZ	MP	OF	PV
1 1/2"	BI	CY	EO	GE	HU	JK	LA	MQ	OG	PW
2"	BJ	CZ	EP	GF	HV	JL	LB	MR	OH	PX
2500#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	BK	DA	EQ	GG	HW	JM	LC	MS	OI	PY
3/4"	BL	DB	ER	GH	HX	JN	LD	MT	OJ	PZ
1"	BM	DC	ES	GI	HY	JO	LE	MU	OK	QA
1 1/4"	BN	DD	ET	GJ	HZ	JP	LF	MV	OL	QB
1 1/2"	BO	DE	EU	GK	IA	JQ	LG	MW	OM	QC
2"	BP	DF	EV	GL	IB	JR	LH	MX	ON	QD

RANGE AVAILABILITY AS PER BORE SIZES

	H01 to H04	H07	H10	H15	H30	H2T to H2H
1" NB	NA	Yes	Yes	Yes	Yes	Yes
2" NB	Yes	Yes	Yes	Yes	Yes	Yes

MICROSWITCH OPTIONS

Sr. No.	Switch Type	Description	Rating AC			Rating DC			Adjustable Differential
			Res.	Ind.	Voltage	Res.	Ind.	Voltage	
1	A1	General purpose	15	-	125/250/480	-	-	-	
2	A2	1SPDT Hermetically sealed Silver	2	-	115	5	2	28	
3	A3	Gold plated contacts	1	-	250	1	-	30	
4	A4	DPDT configuration	10	-	125/250	0.15/0.25	-	250	
5	A5	High DC rating	-	-	-	10/3	-	125/250	
6	A6	Adjustable deadband	15	-	115/250	1	-	24	✓
7	A7	2 SPDT	5	-	250	5	3	28	
8	A8	General purpose	5	-	125/250	5	3	28	
9	A9	General purpose	15	-	250	5	-	28	✓
10	B1	General purpose AC/ DC	15	-	125/250/480	0.25	-	250	
11	B2	2SPDT Hermetically sealed Silver	2	2	115	4	2	28	
12	B3	2SPDT Gold plated	1	-	125	-	-	-	
13	B4	Manual reset	15	-	125/250/480	0.25	-	250	
14	B5	1SPDT Hermetically sealed, gold plated contact	-	-	-	1	0.25	28	
15	B6	2SPDT Hermetically sealed, gold plated contact	-	-	-	1	0.25	28	
16	B7	2 SPDT	15	-	250	5	-	28	
17	B9	2 SPDT Adjustable	15	-	250	5	-	28	✓
18	C6	1SPDT Adjustable Differential	5	-	250	5	3	28	✓
19	C7	2SPDT Adjustable Differential	5	-	250	5	3	28	✓
20	C8	1 SPDT High DC Rating	15	-	250	5	-	250	
21	C9	1 SPDT High AC Rating	20	-	125/250/277	-	-	-	
22	D1	Orion Hermatically Sealed SPDT 15A	15	-	125/250/480	-	-	-	
23	D2	Orion Hermetically sealed Silver 1 SPDT	5	-	125/250	5	3	28	
24	D3	D3 Orion Hermetically sealed Gold plated 2 SPDT (Sub Miniature)	1	-	250	1	-	30	
25	D4	Orion Hermetically sealed DPDT config	10	-	125/250	0.15/0.25	-	250	
26	D5	Orion Hermetically sealed Silver 2 SPDT (Sub miniature)	5	-	125/250	5	3	28	

Note : For adjustable differential in FC/FE series switches, please select A6/C6/C7 microswitches.

MICROSWITCH OPTIONS

Sr. No.	Switch Type	Description	Rating AC			Rating DC			Adjustable Differential
			Res.	Ind.	Voltage	Res.	Ind.	Voltage	
27	D6	Orion Hermetically sealed Gold 2 SPDT (Sub Sub Miniature)	7	-	250	5	-	30	
28	D7	Orion Hermetically sealed Silver 2SPDT	7	-	250	7	4	28	
29	D8	Orion Hermetically sealed Gold plated 1 SPDT	1	-	125	1	0.5	30	
30	D9	Orion Hermetically sealed Gold Plated Contact DPDT (Sub miniature)	1	-	125	1	0.5	30	
31	E1	Dual Current Gold Plated	0.1/0.5	-	250	-	-	-	
32	E2	General Purpose AC/DC	15	-	250	6	-	30	
33	E3	2 SPDT High DC Rating	15	-	250	5	-	250	
34	E4	Orion Gold plated 1 SPDT (Sub Sub Miniature)*	7	-	250	5	-	30	
35	E5	Orion Hermetically sealed Gold plated SPDT (Sub Sub Miniature)*	7	-	250	5	-	30	
36	E6	Orion Gold plated 2 SPDT (Sub Sub Miniature)*	7	-	250	5	-	30	
37	E7	1SPDT Hermetically sealed general purpose microswitch	15	-	250	5	-	30	

Note : For adjustable differential in FC/FE series switches, please select A6/C6/C7 microswitches.

ACCESSORIES

CHEMICAL SEALS (DIAPHRAGM SEALS):

General description:

Diaphragm seals are partitions used with pressure switches which prevent the measured medium from entering the pressure capsule of the pressure switch. Diaphragm seals solve many problems encountered in sensing, which are otherwise impossible to solve with only pressure switches. Some of the examples are:

- protection of pressure switch from aggressive, highly viscous solidifying or crystallizing measured media
- protection from high measured medium temperatures or fluctuations in temperature
- protection from vibrations by coupling via capillaries
- dead zone free sensing arrangements for particular hygienic applications
- use of special materials or surface coatings of the wetted parts for special applications.

CAUTION: Pressure switch and diaphragm seal are always a closed system and should not be separated by unauthorised persons.

When the pressure switch is to be kept away from undesirable temperatures or vibrations, a capillary can be used to connect the pressure switch and the diaphragm seal. Capillaries also have a throttling effect which is often desirable in pulsating process pressures. During setpoint adjustment, the weight of the liquid column between the diaphragm seal and the pressure switch needs to be taken into consideration, if they are mounted at different elevations.

Depending on the application, a variety of media with different properties are used as transmission liquids. For most of the general applications, silicon oil can be used. For food industries, a transmission liquid compatible with the process needs to be used.

A variety of chemical seals can be supplied with pressure switches and only the most commonly used arrangements / assemblies are shown here.

In most of the cases, the common wetted parts and diaphragms are of SS316. Alternate wetted materials that can be provided are:

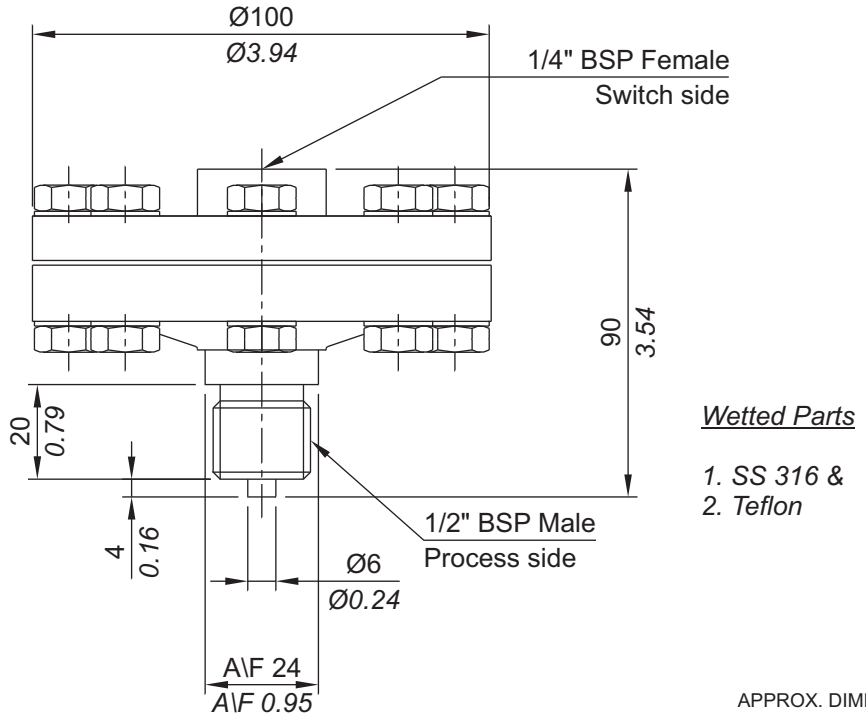
- HASTELLOY B2
- HASTELLOY C4
- HASTELLOY C22
- HASTELLOY C276
- INCONEL ALLOY 600
- MONEL ALLOY 400
- MONEL ALLOY K500
- NICKEL
- PLATINUM
- TANTALUM
- TITANIUM
- ZIRCONIUM
- SILVER
- PTFE

The on - off differentials of pressure switches fitted with chemical seals are likely to be higher than those mentioned in the catalogue. There is also a possibility of time lag (for sensing) being introduced, depending on the length of the tubing between the pressure switch and the seal.

While ordering, customer's are requested to specify all the process parameters including ambient conditions, operating conditions, the process to be sensed and response times allowable, temperature of the seal under sensing conditions and temperature outside the measuring / sensing sequences (e.g as in rinsing sequences) so that a proper sealing system can be suggested.

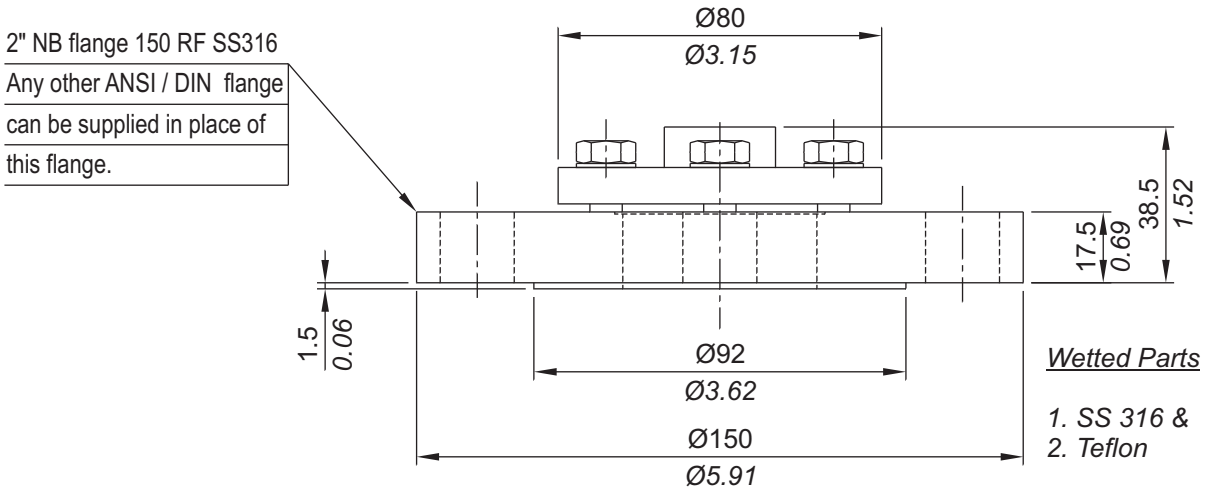
ACCESSORIES

STANDARD CHEMICAL SEAL SUITABLE FOR THREADED CONNECTION : (Type A)



APPROX. DIMENSIONS IN mm / inches

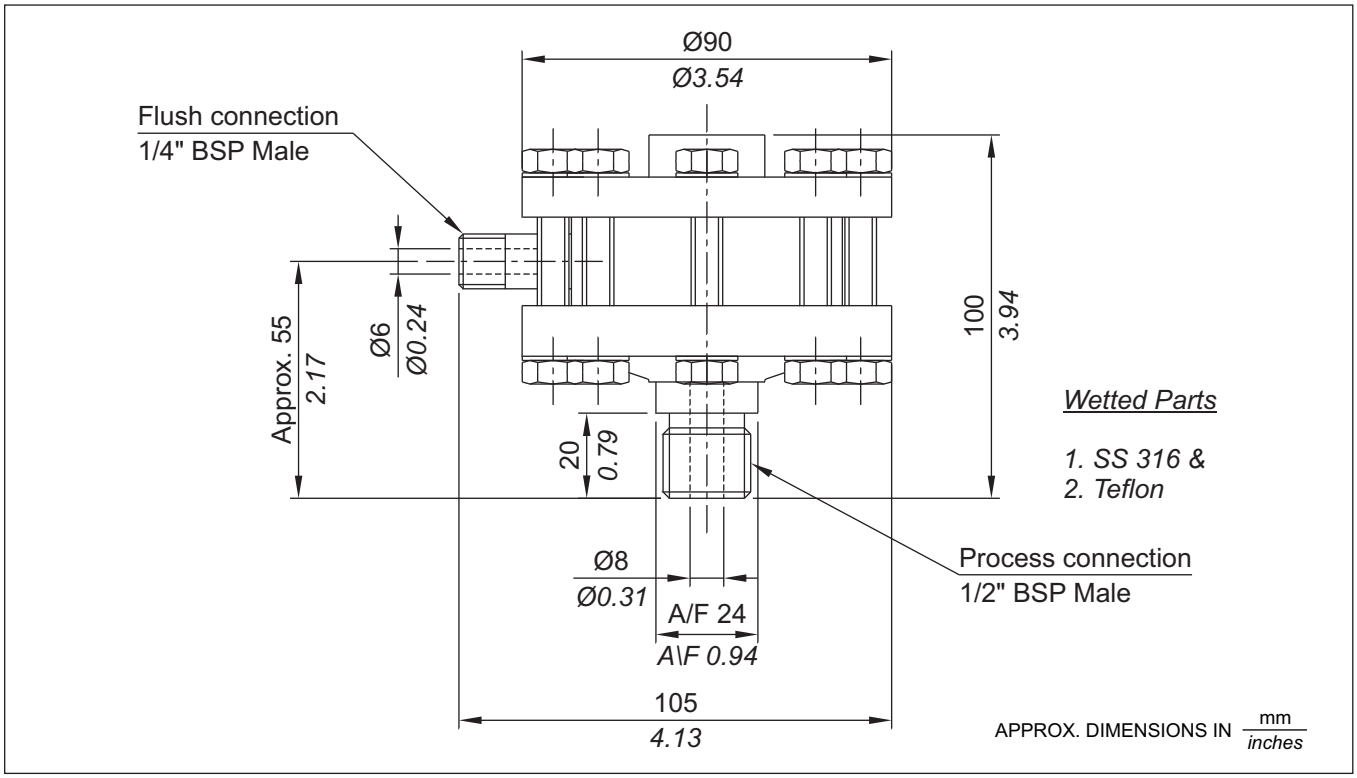
CHEMICAL SEAL SUITABLE FOR VARIABLE FLANGED CONNECTION : (Type B)



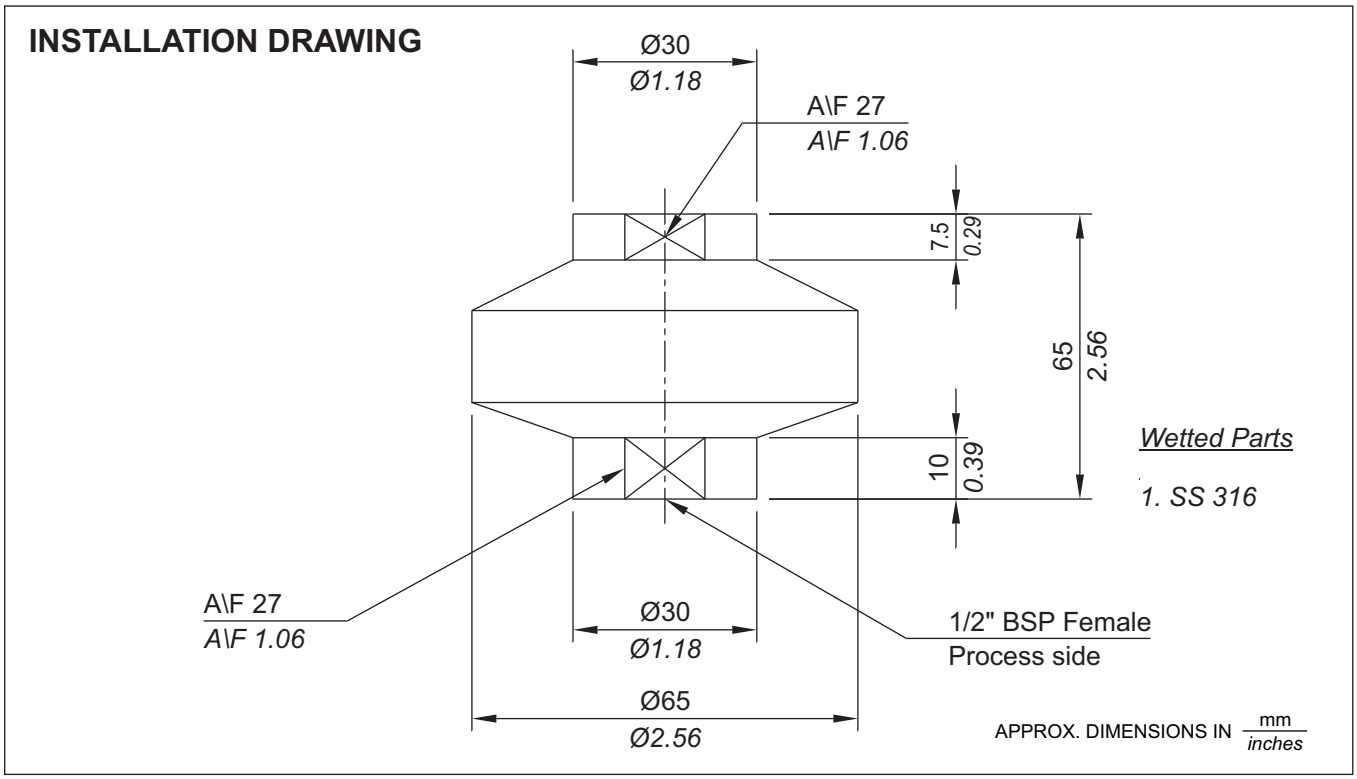
APPROX. DIMENSIONS IN mm / inches

ACCESSORIES

FLUSH TYPE CHEMICAL SEAL (Type C)



FULL WELDED CHEMICAL SEAL (Type D)



GENERAL SPECIFICATIONS AND APPLICATION NOTES

1. All the pressure switches contained in this catalogue are gauge pressure switches.
2. Pressure switches are switching instruments and not measuring ones. As such, the word "calibration" is used for the markings made on the scale to indicate the approximate setpoint of the pressure switch. No "calibration certificate" for this indication can be given in the proper sense of the word. However, the pressure switches can be supplied preset at user specified setpoints, provided the setpoints are indicated during the ordering stage itself.
3. Process temperature : can be 80 deg. C maximum. A pressure switch being a dead end, is not subjected to continuous process temperature(as in case of flow). As such, a proper length of impulse tubing of proper material (or chemical seals with adequate tubing) will substantially bring down the temperature, well within the specified limits. Normal pressure switches (without any modifications) have been used with working media having a temperature of upto 350 deg. C, only by employing an additional impulse tube.
4. Ambient temperature: can be from -10 deg. C to 60 deg. C for most of the standard pressure switches. Care should be taken that no icing occurs inside the enclosure where the atmospheres are humid, when pressure switches are used in subzero ambient temperature areas. Pressure switches for use in wider ambient temperatures can be developed should your application fall in such areas. If the process is likely to freeze / crystallize / solidify within this ambient range, chemical seals should be used alongwith the pressure switches.
5. All the pressure switches are tested on kerosene / air prior to despatch. For applications involving food grade material / oxygen service or processes not compatible with kerosene, such a note should be specifically made while ordering, so that pressure switches are tested accordingly.
6. All data published is under standard test conditions. Following conditions generally apply for Laboratory Evaluation tests:

   Temperature:Ambient room temperature (21 °C)

   Humidity : Ambient (50%)

   Proof pressure:1.5 times maximum working pressure

   Cycling rate:30 cycles/minute

   Pressure rise:compatible with above cycling rate (maximum)

   Life in no. of cycles:100,000 minimum

   The life and characteristics of pressure switches can be affected by temperature, humidity, airborne contamination, vibration and frequency of operation of the pressure switches. For specific switch selection, customers are requested to evaluate switch performance under actual application conditions or by simulating all the extreme application conditions and requirements. Laboratory Evaluation test data can never substitute customer's own product evaluation.

   The life of the pressure switches can be increased by incorporating changes in design or by substituting certain components. Customers are requested to contact our sales office for any such specific requirements.
7. When using 2SPDT switching arrangement, both microswitches may not actuate and/or deactuate at the same point. A small stage gap, normally upto +/- 5% FSR (depending on range code) may be observed. The On-Off differential (hysterisis) typically tends to be atleast double of those published for 1SPDT pressure switches.
   If actuation and/or deactuation at same point is critical part of operation, then it can be achieved by using a separate DPDT relay. This relay will need a separate power supply for it's coil.

DEFINITIONS & TERMINOLOGY FOR PRESSURE ACTUATED SWITCHES

Pressure Switch:- A pressure switch is an instrument that automatically senses a change in pressure and opens or closes an electrical switching element when a pre-determined pressure point is reached.

Pressure sensing element:- A pressure sensing element is the portion of the pressure switch that transmits motion due to change in pressure.

Electrical switching element:- The electrical switching element in a pressure switch opens or closes an electrical circuit in response to the actuating force it receives from the pressure sensing element. Orion pressure switches are fitted with single pole double throw (SPDT) snap action switch(es) as electrical switching element (s) for maximum reliability.

Normally open switching element:- No current can flow through the switching element until the switch is actuated.

Normally closed switching element:- Current flows through the switching element until the switch is actuated.

Set Point:- The set point is expressed in terms of exact pressure at which the snap-action switch is actuated to either open or close the electrical circuit (depending on how the switch is wired).

Differential (Dead band, Hysterisis):- Differential is the difference between the actuation point and the deactuation point, e.g. if a pressure switch is set to operate at 5 bar on increasing pressure, the switch will close when the pressure rises to that point. As the pressure drops to, say, 4.8 bar the switch may open (this is the deactuation point). The differential of this switch is then 0.2 bar, the difference between the set point of 5 bar and deactuation point of 4.8 bar. Differential is sometimes referred to as "deadband" or "hysterisis".

Set Point in relation to increasing pressure & decreasing pressure:- A pressure switch may be set to actuate at any desired point on rising pressure or falling pressure. The former is described as "set to actuate on increasing (or rising) pressure" & the latter as "set to actuate on decreasing (or falling) pressure". The preferred actuation must be specified clearly on orders for pressure switches that are to be factory set.

Range :- The span within which the set point of a pressure-actuated switch may be adjusted.

Proof Pressure :- Proof pressure is the highest pressure to which a switch may be subjected without permanent damage.

Maximum working pressure (MWP) :-The nominal pressure level that a system will operate at, including workload.

Differential pressure :- The difference between a reference pressure and a variable pressure.

Wetted parts :- The parts which come in contact with the working medium.

HOW TO SELECT A PRESSURE SWITCH FOR YOUR APPLICATION

Following are the general guidelines which should help you arrive at a proper selection of a pressure switch for your application.

Step1.

Service life of the switch. Expected service life is the first consideration to be made in selecting a pressure switch, regardless of sensitivity or pressure desired. A second consideration in choosing a pressure switch is the speed of cycling, regardless of the service life. A sensing element made of metal sheets is likely to fatigue at cycling speeds above 20 cycles per minute and is not recommended for service life of more than 1 million cycles. Orion and Parus pressure switches use nylon reinforced rubber or piston as a sensing element and have been tested at a cycling frequency of 30 cycles / minute for more than a million cycles. The working medium to be controlled must be considered and to simplify selection, wetted parts are indicated on the catalogue pages.

Step 2.

Proof pressure - Choice of type of pressure switch must also be governed by the highest pressure to which it will ever be subjected. The highest pressure in the system including surges, should not be more than the proof pressure of the switch. It must be remembered that, though there are surges in the system, a pressure gauge may register a constant reading, the surges being dampened out by the orifice in the gauge.

Step 3.

Function of the switch. Three types of Orion pressure switches, based on function, are described below, a) Single setting pressure switches : They sense a single pressure source and open or close a single electrical circuit by means of a snap action electrical switch. b) Pressure difference switches : They sense a change in relationship between two pressures and open or close a single electrical circuit by means of a snap action electrical switch. c) Adjustable differential pressure switches: They sense two pressure limits, within a desired adjustable range, from a single pressure source and open or close a single electrical circuit by means of a snap action electrical switch.

Step 4.

Selection of adjustable range. The range should be selected such that the setpoint lies as close as possible to the middle of the total adjustable range.This will ensure the most favourable combination of accuracy and life.

Step 5.

Working medium. The working medium should be compatible with the wetted parts. For easier selection, the wetted parts are given in the catalogue pages. The maximum temperature of the working medium is also important. A pressure switch, being a dead end, is not subjected to continuous temperature. If the temperature of the working medium exceeds 80 deg. C, an impulse tubing of appropriate length should be used between the process connection and pressure port of the switch. Where the working medium is likely to freeze at the sensing element, a diaphragm seal (chemical seal) with appropriate wetted parts should be used. In case of excessive temperature or mounting the pressure switch remotely, pressure switches can also be supplied with remote seals. The filling medium has to be compatible with the working medium, and needs to be specified while ordering. (Specially in case of food related industries / processes)

Step 6.

Environment. The environment in which the pressure switch will operate is very important. Orion pressure switches can be supplied in weatherproof enclosures for outdoor service. For use of pressure switches in hazardous areas Orion pressure switches can be supplied in flameproof enclosures.

Ex MARKING GUIDE

PROTECTION CONCEPTS

Method of Protection	Code	Permitted Use	Standard	Protection Principle
Increased Safety	AEx e	Class I, Zone 1,2	FM 3600* (ISA S12.16.01)	No arcs, sparks or hot surfaces
	EEx e	Zone 1,2	EN 50 019	
	Ex e	Zone 1,2	IEC 60079-7	
Non-incendive	(NI)	Class I, Div 2	FM3611	
Non-sparking	Ex nA	Zone 2	IEC 60079-15	
Explosionproof	(XP)	Class I, Division 1,2	FM 3615	Contain the explosion and quench the flame
Flameproof	AEx d	Class I, Zone 1,2	FM 3600* (ISA S 12.22.01)	
	EEx d	Zone 1,2	EN 50 018	
	Ex d	Zone 1,2	IEC 60079-1	
Powder Filled	A Ex q	Class I, Zone 1,2	FM 3600* (ISA S12.25.01)	
	EEx d	Zone 1,2	EN 50 017	
	Ex q	Zone 1,2	IEC 60079-5	
Enclosed Break	Ex nC	Zone 2	IEC 60079-15	
Intrinsic Safety	(IS)	Class I, Div 1,2	FM 3610 †	Limit energy of sparks and suface temperature
	AEx ia	Class I, Zone 0,1,2	FM 3610 †	
	AEx ib	Class I, Zone 1,2	FM 3610 †	
	EEx ia	Zone 0,1,2	EN 50 020/39	
	EEx ib	Zone 1,2	EN 50 020/39	
	Ex ia	Zone 0,1,2	IEC 60079-11	
	Ex ib	Zone 1,2	IEC 60079-11	
Limited Energy	Ex nA	Zone 2	IEC 60079-15	
Pressurized	Type X	Class I, Div 1	FM 3620	Keep Flammable gas out
	Type Y	Class I, Div 1	FM 3620	
	Type Z	Class I, Div 2	FM 3620	
	EEx p	Zone 1	EN 50 016	
	Ex p	Zone 1	IEC 60079-2	
Restricted Breaching	Ex nR	Zone 2	IEC 60079-15	
Encapsulation	AEx m	Class I, Zone 1,2	FM 3600*(ISA S12.23.01)	
	EEx m	Zone 1,2	EN 50 028	
	Ex m	Zone 1,2	IEC 60079-18	
Oil Immersion	AEx o	Class I, Zone 1,2	FM 3600*(ISA S12.26.01)	
	EEx o	Zone 1,2	EN 50 015	
	Ex o	Zone 1,2	IEC 60079-6	

*Also shall comply with ISA S12.0.01 † Based on ISA S12.2.01

AREA CLASSIFICATION

	Flammable Material Present		
	Continuously	Intermittently	Abnormally
IEC/ CENELEC	Zone 0 (Zone 20 - dust)	Zone 1 (Zone 21 - dust)	Zone 2 (Zone 22 - dust)
US NEC 505	Zone 0	Zone 1	Zone 2
US NEC 500	Division 1		Division 2

IEC Classification per IEC 60079-10
CENELEC classification per EN 60079-10
US classification per ANSI/NFPA 70 National Electric Code (NEC) Article 500 or Article 505

APPARATUS GROUPING

Typical Gas/dust/fibre	US (NEC 505) IEC CENELEC	US (NEC 500)
Acetylene	Group IIC	Class I/Group A
Hydrogen	(Group IIB + H_2)	Class I/Group B
Ethylene	Group IIB	Class I/Group C
Propane	Group IIA	Class I/Group D
Methane	Group I*	Mining*
Metal Dust	None	Class II/Group E
Coal Dust	None	Class II/Group F
Grain Dust	None	Class II/Group G
Fibres	None	Class III

*Not within scope of NEC. Under juridiction of MSHA
MSHA - Mine Safety & Health Administration

T-CODES

Maximum Surface Temperature	**US (NEC 505) IEC CENELEC**	**US (NEC 505)**
450°C	T1	T1
300°C	T2	T2
280°C	-	T2A
260°C	-	T2B
230°C	-	T2C
215°C	-	T2D
200°C	T3	T3
180°C	-	T3A
165°C	-	T3B
160°C	-	T3C
135°C	T4	T4
120°C	-	T4A
100°C	T5	T5
85°C	T6	T6

Reference Data

ENVIRONMENTAL RATINGS FOR ENCLOSURES BASED ON "NEMA" TYPE DESIGNATIONS	
Enclosure Type Designation	**Intended Use and Description**
1	Indoor use primarily to provide a degree of protection against limited amounts of falling dirt.
2	Indoor use primarily to provide a degree of protection against limited amounts of falling water and dirt.
3	Outdoor use primarily to provide a degree of protection against rain, sleet, wind blown dust and damage from external ice formation.
3R	Outdoor use primarily to provide a degree of protection against rain, sleet, and damage from external ice formation.
3S	Outdoor use primarily to provide a degree of protection against rain, sleet, windblown dust and to provide for operation of external mechanisms when ice laden.
4	Indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, hose-directed water and damage from external ice formation.
4X	Indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water, and damage from external ice formation.
5	Indoor use primarily to provide a degree of protection against settling airborne dust, falling dirt, and dripping noncorrosive liquids.
6	Indoor or outdoor use primarily to provide a degree of protection again hose-directed water, and the entry of water during occasional temporary submersion at a limited depth and damage from external ice formation.
6P	Indoor or outdoor use primarily to provide a degree of protection against hose-directed water, the entry of water during prolonged submersion at a limited depth and damage from external ice formation.
7	Indoor use in locations classified as Class I, Division 1, Groups A, B, C or D hazardous locations as defined in the National Electric Code (NFPA 70) (Commonly referred to as explosion-proof).
8	Indoor or outdoor use in locations classified as Class I, Division 2, Groups A, B, C or D hazardous locations as defined in the National Electric Code (NFPA 70) (commonly referred to as oil immersed).
9	Indoor use in locations classified as Class II, Division 1, Groups E, F and G hazardous locations as defined in the National Electric Code (NFPA 70) (commonly referred to as dust-ignition proof).
10	Intended to meet the applicable requirements of the Mine Safety and HealthAdministration (MSHA).
12 and 12K	Indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping noncorrosive liquids.
13	Indoor use primarily to provide a degree of protection against dust, spraying of water, oil, and noncorrosive coolant.

GROUP OF ENCLOSURE SUITABLE FOR PARTICULAR FLAMMABLE GAS / VAPOUR	
Group of enclosure	**Gas or Vapour**
I	Methane (firedamp)
IIA	Ammonia Industrial Methane * Blast Furnace Gas Carbon monoxide Propane Butane Pentane hexane Heptane Iso-Octane Decane Benzene Xylene Cyclohexane Acetone Ethyl methyl ketone Methyl acetate Ethyl acetate n-Propyl acetate n-Butyl acetate Amyl acetate Chloroethylene Methanol Ethanol Iso-butanol n-Butanol Amyl alcohol Ethyl nitrite
IIB	"1, 3-Butadine" Ethylene Dethyl ether Ethylene oxide Town gas # Coke-oven gas
IIC	Hydrogen

* Industrial methane includes methane mixed with not more than 10 percent by volume of Hydrogen.

Town gas may contain not more than 57 percent by volume of hydrogen and not more than 16 percent by volume of carbon monoxide, the remainder being a small mixture of paraffin, hydrocarbons and inert gas.

Thermal Engineering Data

ENERGY						
	kW hour	**kCal**	**Joule**	**HP Hour**	**MW Hour**	**BTU**
kW hour	1	859.8452	3600000	1.341022	0.001	3412.142
kCal	0.001163	1	4186.8	0.001559609	1.163e-006	3.968321
Joul	2.777778e-007	0.0002388459	1	3.725061e-007	2.777778e-010	0.0009478171
HP Hour	0.7456999	641.1865	2684520	1	0.0007456999	2544.434
MW Hour	1000	859845.2	3.6e+009	1341.022	1	3412142
BTU	0.0002930711	0.2519958	1055.056	0.0003930148	2.930711e-007	1

POWER & HEAT	
1 Btu	776 ft-lb 0.293 Watt-hr 252 cal
1 cal	0.003968 Btu 0.0011619 Watt-hr
1 Btu/h	0.293 Watt 4.2 cal/min
1 Watt	3.413 Btu/h
1 Watt-h	3.413 Btu
1 kW (1000 Watts)	3413 Btu/h
1 kW-hr	3413 Btu
1hp	0.746 kW 2544.65 Btu/h 33,000 ft-lb./min
1 Bohp[a]	9.809kW 33,479 Btu/h 34.5 lb of steam per hour

a Boiler output Horsepower is the equivalent of the heat required to evaporate 34.5 lb of water per hour in to dry, saturated steam at 212 F.

COMMONLY USED THERMAL UNITS		
1 BTU	=	0.252 kcal
1 BTU	=	107.7 kgm
1BTU/sec	=	1.055 kW
1 BTU/lb	=	0.5556 kcal/kg
1 BTU/ft³	=	8.9 kcal/m³
1 BTU/ft²-hr	=	2.71 kcal/m²h
1 BTU/ft²-hr-°F	=	4.886 kcal/m²-hr-°C
1 BTU/ft-hr-°F	=	1.49 kcal/m-hr-°C
1 BTU in/ ft²-hr-°F	=	0.124 kcal/m-hr-°C
1 BTU/lb-°F	=	1 kcal/kg-°C
1 BTU/ft³-°F	=	16.2 kcal/m³-°C
1 kcal	=	3.968 BTU
1 kgm	=	0.0093 BTU
1 kW	=	0.948 BTU/sec
1 kcal/kg	=	1.80 BTU/lb
1 kcal/m³	=	112 BTU/ft³
1 kcal/m²-hr	=	0.369 BTU/ft²-hr
1 kcal/m²-hr °C	=	0.205 BTU/ft²-hr-°F
1 kcal/m-hr-°C	=	0.67 BTU/ft-hr-°F
1 kcal/m³-°C	=	0.0624 BTU/ft³-°F
1 kcal	=	4.187 kJ

PROPERTIES OF COMMONLY USED INDUSTRIAL FUELS			
	Specific Gravity	**Calorific Value**	
Furnace Oil	0.89-0.95	10200	kcal/kg
Low Sulphur Heavy Stock (LSHS)	0.88-0.98	10300	kcal/kg
Heavy Petroleum stock (HPS)	0.85-0.98	9500	kcal/kg
Light Diesel Oil (LDO)	0.85-0.87	10300	kcal/kg
Husk	--	3360	kcal/kg
Wood	--	4700	kcal/kg
Bagasse	--	3850	kcal/kg
Blast Furnace Gas	1.0	850	kcal/Nm³
Coke Oven Gas(Mixed)	0.38	4200	kcal/Nm³
Coal Gas	0.42	5000-6000	kcal/Nm³
LD Gas	--	1600	kcal/Nm³
LPG (50% Propane+50% Butane)	2.1	24500	kcal/Nm³
Natural Gas	0.570	8900	kcal/Nm³
Producer Gas	0.87	1500	kcal/Nm³

Notes :

Kaustubha Udyog

S. No. 36/1/1, Sinhgad Road, Vadgaon Khurd, Near Lokmat Press, Pune 411 068. INDIA
Tel.: +91-(0) 20-24391592 / 24393577 Telefax : +91-(0) 20-25460486 / 24393577
Email : ku.pressure@gmail.com Website : http://www.orion-instruments.io

ORDER/ENQUIRY FORM FOR PRESSURE SWITCHES | DEALER\AGENT CODE :

Please fill up the following parameters :

Technical:

1. Maximum working pressure = _____ bar / mm wg (including surges)
2. Set point 1

For single pressure switch	**For adj. diff. Models**	**For pressure diff. Models**
Increasing ____ bar/mm wg	(lower) cut-in pressure _____ bar	Pmax (HP side) _____
Decreasing ____ bar/mm wg	(upper) cut-out pressure _____ bar	Pmax (LP side) _____
		Δp desired = _____ bar/mm wg rising / falling

3. Set point 2 (for 2SPDT switches)

For single pressure switch	**For adj. diff. Models**	**For pressure diff. Models**
Increasing ____ bar/mm wg	(lower) cut-in pressure _____ bar	Pmax (HP side) _____
Decreasing ____ bar/mm wg	(upper) cut-out pressure _____ bar	Pmax (LP side) _____
		Δp desired = _____ bar/mm wg rising / falling

4. Working medium _____

   Compatible with

   Pressure housing
   - ☐ Aluminium
   - ☐ Brass
   - ☐ S. S.

   Diaphragm
   - ☐ Neoprene / Nitrile
   - ☐ Teflon

5. Max. temperature of working medium _____ °C
6. Electrical rating : 5 A / 250 VAC 0.2 A / 250 VDC or Other
7. Enclosure : IP 40 / IP 54 / IP 65 / Flameproof I, II A, II B / Flameproof II C
8. Please specify any other details in text: - _____
9. Model suggested _____

Commercial :

Annual Consumption _____ nos. _____

Expected target price Rs. / USD _____ Ex works / FOB _____

Expected date of first sample _____

Customer details : Name _____

Address _____

Contact Person _____ Designation _____

Tel. No. (O) _____ (R) _____

Fax No. _____ Email _____

Weekly off

Pressure switches presently used :

Make	Model	Quantity

Salesman's Signature :

Customer's Signature :

Affix
Stamp
Here

To,

KAUSTUBHA UDYOG
S. No. 36/1/1, Sinhgad Road, Vadgaon Khurd,
Near Lokmat Press, Pune 411 068. INDIA
Tel.: +91-(0) 20-24391592 / 24393577
Telefax : +91-(0) 20-24393577 / 25460486
Email : ku.pressure@gmail.com
Website : http://www.orion-instruments.io

INGRESS PROTECTION (IP) CODES

First Number Protection against solid bodies	Second Number Protection against liquid
0. No protection	0. No protection
1. Object greater than 50 mm	1. Vertically dripping water
2. Object greater than 12 mm	2. 75° to 90° dripping water
3. Object greater than 2.5 mm	3. Sprayed water
4. Object greater than 1 mm	4. Splashed water
5. Dust-protected	5. Water jets
6. Dust-tight	6. Heavy seas
7. -	7. Effects of immersion
8. -	8. Indefinite immersion

Approximate US Enclosure Type Equivalent to IPXX

Type →	IP	Type →	IP	Type →	IP
1	10	3S	54	6 & 6P	67
2	11	4 & 4X	55	12 & 12K	52
3	54	5	52	13	54
3R	14				

Source : Factory Mutual Research

Pressure Conversion Table

	Kg/cm^2	mmHg	Bar	mbar	mmWc	psi(lb/in^2)	KPa
Kg/cm^2	1	735.56	0.9807	980.7	10000	14.2233	98.066
mmHg	0.001359	1	0.00133	1.3332	13.5951	0.01934	0.13332
Bar	1.01972	750.062	1	1000	10197.16	14.5038	102
mbar	1.01972 x10^{-3}	0.7501	0.001	1	10.197	0.0145	0.1
mmWc	0.0001	0.07355	0.000098	0.098	1	0.00142	9.8067 x10^{-3}
psi(lb/in^2)	0.07031	51.715	0.06895	68.950	703.07	1	6.8947
KPa	0.0101972	7.50062	10^{-2}	10	101.9716	0.145038	1

While every effort has been made to ensure the accuracy of this catalogue at the time of publication, we reserve the right to supply equipment in line with current design specifications. So, we recommend that critical parameters be checked at the order stage.

WARRANTY :

Our products are warranted against defect in specified material and workmanship under specified normal service conditions for 12 months after being placed in service but not more than 18 months from the date of shipment, provided such items are returned free to our works at PUNE.

Company's liability in respect of defective parts is limited to making good by replacement, or repair defects, to be determined by the company. This is, provided the purchaser has given immediate written notice upon discovery of such defects, but within the time specified above. The replaced / repaired parts will be supplied exworks.

The company will be relieved of it's obligation if any arbitrary attempt to rectify has been undertaken by purchaser/user. This warranty does not cover normal wear and tear and damage due to corrosion or erosion.

The company's liability is limited to making good the part or parts which are defective and excludes any and every other obligation for loss or damage, direct or consequential.

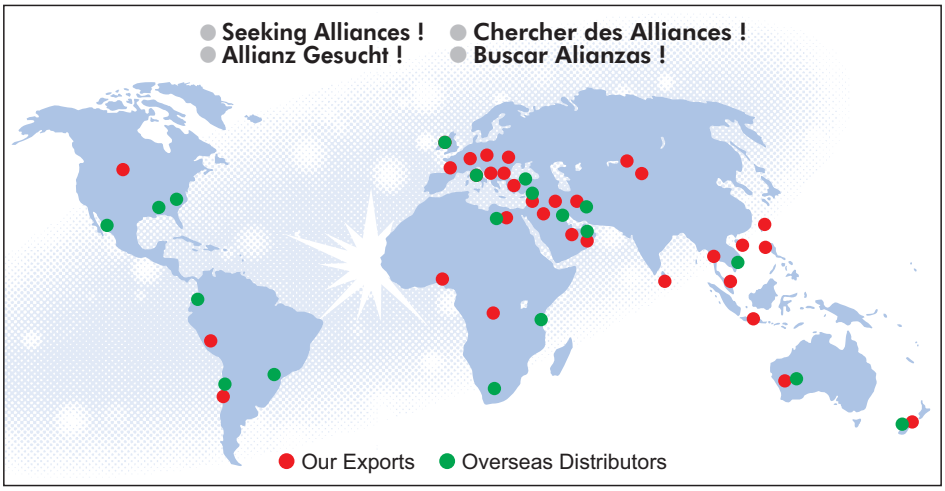
The foregoing is in lieu of all other expressed and implied warranties(except of title), including those of merchantability and fitness for a particular purpose.

Although we provide application assistance, either through our literature or personally, it is the responsibilty of the customer to determine the suitability of the product in the application. Customer's interpretation and implementation of application suggestions and recommendation by Kaustubha Udyog, general or specific, transmitted verbally or in writing, published or unpublished, is strictly at the buyer's own risk.

Your Local Representative

REPRESENTATIVES





Note : *As efforts are made constantly to improve both design and method of manufacture, the apparatus supplied may differ in detail from illustration and data printed. Please check the specifications while ordering*

Kaustubha Udyog (Orion Instruments)

Registered Office :
7, Parichaya Society, 1000/6D, Navi Peth, Pune 411 030 INDIA
Tel.: +91-(0) 20-24393877 / 24393577 / 24391592
Telefax : +91-(0) 20-25460486 / 24532124

Marketing Office :
S. No. 36/1/1, Sinhgad Road, Vadgaon Khurd, Pune 411 068. INDIA
Tel.: +91-(0) 20-24393877 / 64700835 / 64700836
Telefax : +91-(0) 20-24393577 / 25460486

ISO 9001:2015
Certificate No.: **FM 72815**

Email : ku.pressure@gmail.com / info@orion-instruments.io **Website :** www.orion-instruments.io

Copyright © 2023 Kaustubha Udyog