IPC
INTEGRAL PROCESS CONTROLS

FLAMEPROOF & WEATHERPROOF LIMIT SWITCH BOX

Perfect Monitoring, Control and Protection for Valve

IPC manufactures a complete range of Flameproof and Weatherproof Limit Switch boxes with all required certifications. Ideal for use in various types of industries and compatible with almost all types of pneumatic actuators, IPC make Limit Switch boxes give superior performance even in the hostile environments.

IPC also introduced A.S. Interface Limit Switch box as the latest technology which communicates intelligently with other devices in network.

www.ipcvalves.com

FLAMEPROOF LIMIT SWITCH BOX (FPB)

ATEX CE PESO IECEx IP66 & IP67

FEATURES

- Epoxy coated aluminium body and stainless steel shaft makes this unit ideal for use in hostile environment.
- Easily adjustable serrated cams allow a very quick and fine, tool free switch adjustment.
- FPB Series Box has a large two color position indicator which makes it easy to see actual valve position from the top as well as all sides.
- Complies to NAMUR Mounting standards.
- Various options cable entries are available (eg. 1/2" NPT, M20 x 1.5P, 3/4" NPT etc.)
- FPB can be provided with optional extra terminal strip for external solenoid valve connection.
- FPB can be provided with different types of switches: SPDT, DPDT, Hermetically sealed electromechanical, inductive proximity etc.
- FPB can be provided with position transmitter arrangement having output signal of 4 to 20mA.
- Range of Mounting Accessories having the compatibility with the various Actuator manufacturers available.
- A stainless steel bracket is available as an option.
- Temperature range -20 °C to +60 °C.
- IP 66 & IP 67: Water, Rain and Dust Proof.
- Ex db IIC T6 Gb & Ex tb IIIC T85°C Db IP 66/ IP 67: Suitable for Zone 1, 2, 21 & 22 hazardous areas for gas and dust.

ORDERING OPTION

SERIES	SWITCH TYPE	SWITCH QUANTITY	CONDUIT ENTRY	MATERIAL	CERTIFICATION	SWITCH TYPE	DOME COLOR

SERIES
FPB-F

SWITCH QUANTITY
1
2
3
4

CONDUIT ENTRY	
H	½" NPT - 2 NOS
Q	¾" NPT - 2 NOS
M	M20X1.5 - 2 NOS

MATERIAL	
1	ALUMINIUM
2	CF8
3	CF8M

DOME COLOUR	
0	RED + GREEN
1	RED + YELLOW

SWITCH TYPE	
1	MICRO SWITCHES - SPDT/SPST/DPDT
2	PROXIMITY SENSORS - CYLINDRICAL / SLOTTED
3	ROTARY POSITION SENSORS - TRANSMITTER*

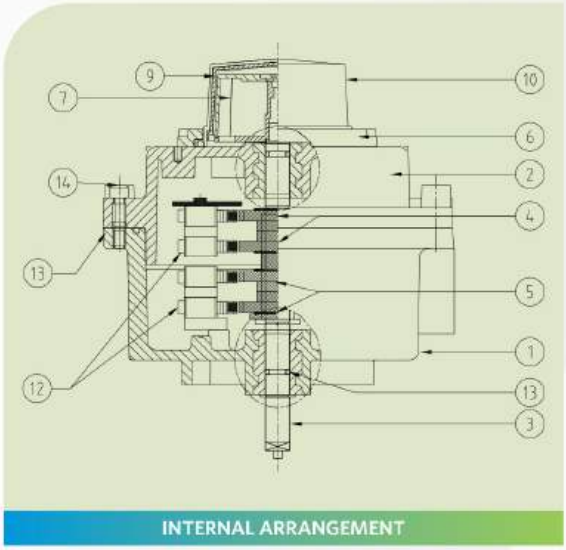
CERTIFICATION	
3	IP 67 / IP 66 WEATHERPROOF
4	FLAMEPROOF IIC+PESO, IP 66/67
6	FLAMEPROOF IIC & IIIC+ATEX, IP 66/67
7	FLAMEPROOF IIC & IIIC+IECEX, IP 66/67

CODE	SWITCH TYPE	RATING	MAX QTY.
01	SPDT ELECTROMECH	5A - 125/250 VAC; 0.1A - 48 VDC	4
02	SPDT ELECTROMECH (GOLD PLATED)	1A - 125 VAC	4
03	SPDT HERMETICALLY SEALED GOLD PLATED	4A - 115 VAC - 400Hz, 4A - 28 VDC	4
04	INDUCTIVE SENSOR NCB2-V3-N0	1mA - 8.2 VDC	4
05	PROXIMITY SJ3.5-N	1mA - 8.2 VDC	4
06	PROXIMITY NJ2-V3N	1mA - 8.2 VDC	4
07	PROXIMITY SJ3.5-SN	1mA - 8.2 VDC	4
08	INDUCTIVE SENSOR NBB3-V3-Z4	4 to 100 mA; 5 to 60 VDC	4
09	PROXIMITYNJ5-18GM-N	1mA - 8.2 VDC	4
10	DPDT ELECTROMECH	10A - 250 VAC; 0.5A - 250 VDC	2
11	ROTARY POSITION SENSOR (TRANSMITTER)*	≤ 16mA; 15 - 30V (Output : 4-20 mA)	1

ORDERING EXAMPLE

- FPB-F-1-2-H-1-4-01-0
- LIMIT SWITCH BOX-(FPB-F), FLAMEPROOF IIC+PESO, IP 66/67, SWITCH & QTY-SPDT ELECTROMECH -2 NOS, CABLE ENTRY-½" NPT, MTRL.-ALUMINUM, DOME-RED+GREEN, PAINTING-IPC STD, WITHOUT MOUNTING KIT

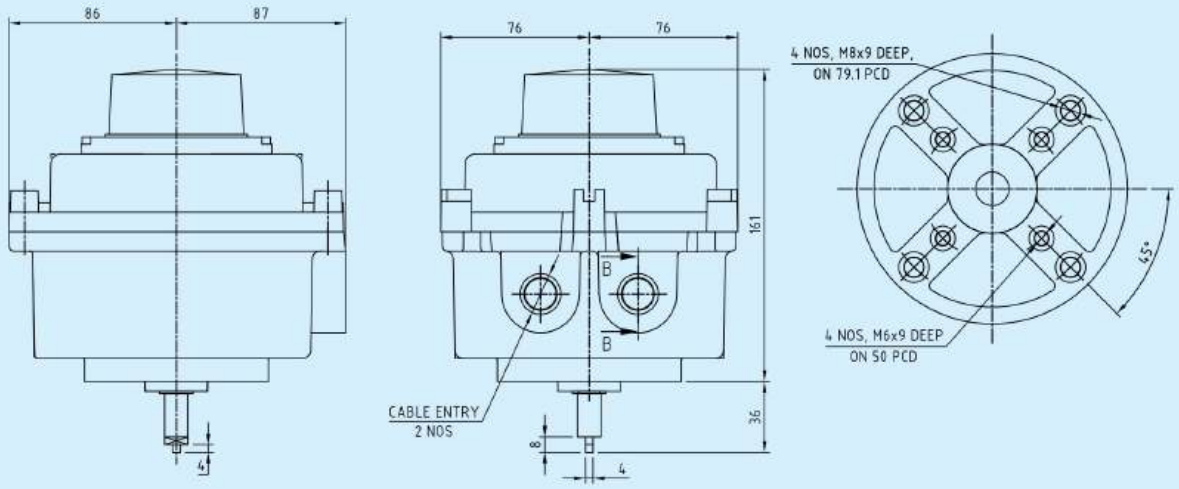
FLAMEPROOF LIMIT SWITCH BOX (FPB)



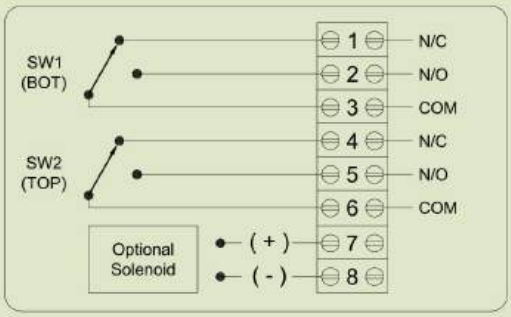
INTERNAL ARRANGEMENT

MATERIAL OF CONSTRUCTION

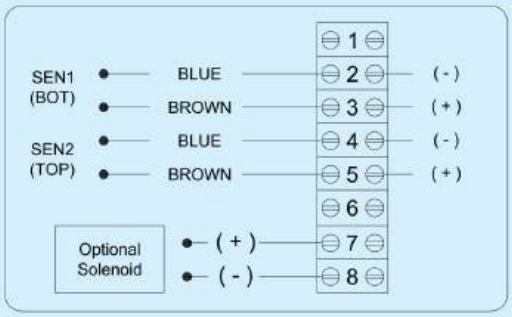
ITEM NO.	PART NAME	MOC	QTY.
1	HOUSING	LM-6/LM-24/ADC-12/SS304 (CF8)/SS 316 (CF8M)	1
2	COVER		1
3	OPERATING ROD	STAINLESS STEEL - SS304/SS316	1
4	INNER CAM	ABS	1
5	OUTER CAM	ABS	1
6	CLAMPING RING	30% GLASS FILLED NYLON	2
7	INNER DOME	ABS	2
9	INNER CAP	NYLON 6 UNFILLED	1
10	OUTER DOME	POLYCABRONATE	1
11	PCB ASSEMBLY (NOT SHOWN)	GLASS EPOXY PCB	1
12	SWITCHS/SENSORS	MICRO-SWITCH/PROXIMITY SENSORS, CYL/RECTANGULAR/SLATTED	-
13	O-RING	VITON RUBBER	4
14	SHC SCREW, M6X1PX22L-g	STAINLESS STEEL SS304	6



DIMENSION DETAILS



WIRING DIAGRAM (2 SPDT SWITCHES)



WIRING DIAGRAM (2 SENSORS)

WEATHERPROOF LIMIT SWITCH BOX (WPB-W)

IP66, IP67 & IP68

FEATURES

- In case of nylon construction, glass filed nylon body avoids corrosion.
- In case of aluminium construction, provides good mechanical strength.
- Easily adjustable and tool free serrated cams allow a very quick and fine switch adjustment.
- WPB series limit switch boxes have a standard large two color position indicator which is easily visible both from side and top of the valve.
- Complies to NAMUR Mounting standard – VDI / VDE 3845.
- Various options of Cable entries are available like 1/2" NPT, M20x1.5P, etc.
- WPB can be provided on request with an extra terminal strip for external solenoid valve connection.
- Various switch options are available like micro-switches, inductive proximity sensors, etc.
- Available with mounting accessories which are compatible with various actuator makes.
- Optional stainless steel bracket can be provided. Temperature range -20 °C to +80 °C.
- Ingress Protection levels as per IP66, IP67 and IP68 are available.

Nylon Construction

Aluminium Construction

ORDERING OPTION

SERIES	SWITCH TYPE	SWITCH QUANTITY	CONDUIT ENTRY	MATERIAL	CERTIFICATION	SWITCH TYPE	DOME COLOR

SERIES
WPB-W

SWITCH QUANTITY
1
2

CONDUIT ENTRY	
H	½" NPT - 2 NOS
Q	¾" NPT - 2 NOS (BY-ADAPTER)
M	M20X1.5 - 2 Nos (By-Adapter)
X	ANY OTHER POSSIBLE COMBINATION (BY-ADAPTER)

MATERIAL	
0	NYLON
1	ALUMINIUM

DOME COLOUR	
0	RED + GREEN
1	RED + YELLOW

SWITCH TYPE	
1	MICRO SWITCHES - SPDT/SPST/DPDT
2	PROXIMITY SENSORS - CYLINDRICAL / SLOTTED

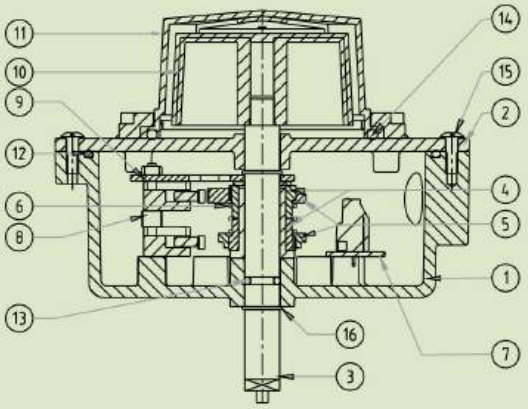
CERTIFICATION	
1	WEATHERPROOF IP 67
2	WEATHERPROOF IP 68
3	WEATHERPROOF IP 66

CODE	SWITCH TYPE	RATING	MAX QTY.
01	SPDT ELECTROMECH	5A - 125/250 VAC; 0.1A - 48 VDC	2
02	SPDT ELECTROMECH (GOLD PLATED)	1A - 125 VAC	2
03	SPDT HERMETICALLY SEALED GOLD PLATED	4A - 115 VAC - 400Hz, 4A - 28 VDC	2
04	INDUCTIVE SENSOR NCB2-V3-N0	1mA - 8.2 VDC	2
05	PROXIMITY SJ3.5-N	1mA - 8.2 VDC	2
06	PROXIMITY NJ2-V3N	1mA - 8.2 VDC	2
07	PROXIMITY SJ3.5-SN	1mA - 8.2 VDC	2
08	INDUCTIVE SENSOR NBB3-V3-Z4	4 to 100 mA; 5 to 60 VDC	2

ORDERING EXAMPLE

- WPB-W-1-2-H-0-1-01-0
- LIMIT SWITCH BOX-(WPB-W), WEATHERPROOF IP 67, SWITCH & QTY-SPDT ELECTROMECH -2 NOS, CABLE ENTRY-½" NPT, MTRL.-NYLON, DOME-RED+GREEN, PAINTING-IPC STD, WITHOUT MOUNTING KIT

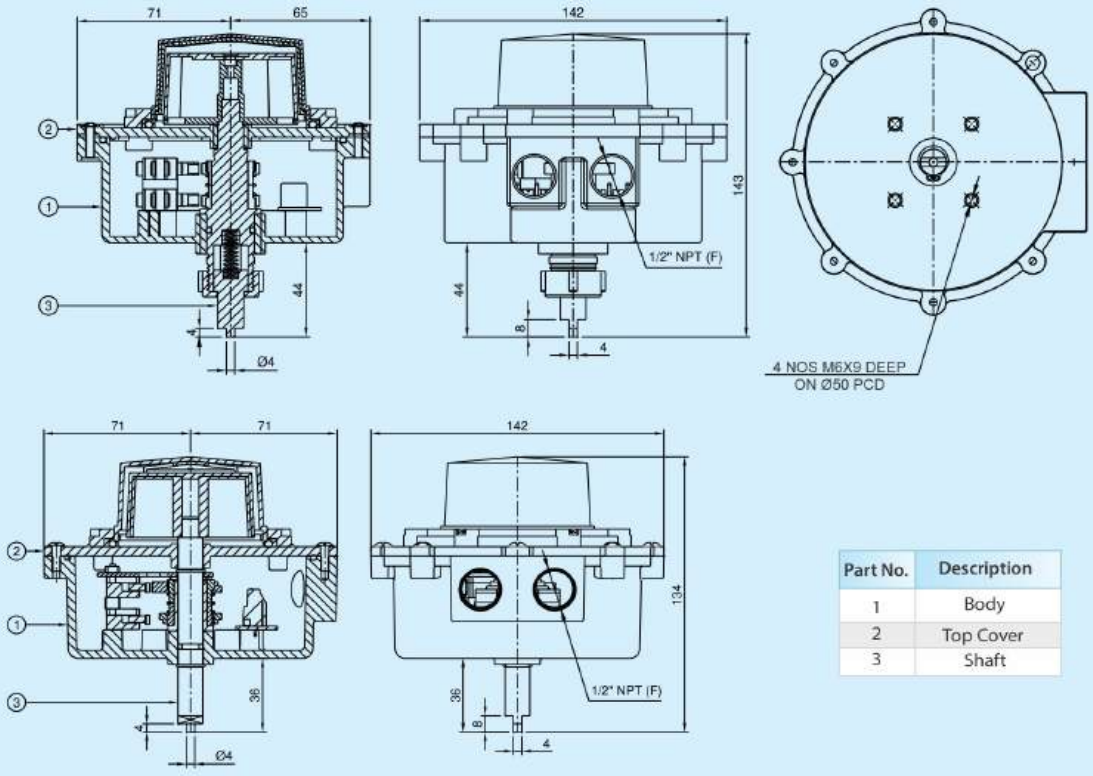
WEATHERPROOF LIMIT SWITCH BOX (WPB-W)



INTERNAL ARRANGEMENT

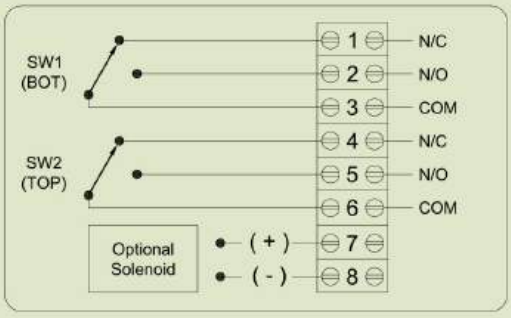
MATERIAL OF CONSTRUCTION

ITEM NO.	PART NAME	MOC	QTY.
1	WEATHERPROOF HOUSING	ALUMINUM/ GLASS FILLED NYLON	1
2	COVER FOR HOUSING		1
3	SHAFT	STAINESS STEEL	1
4	INNER CAM	NYLON 6 UNFILLED	2
5	OUTER CAM	NYLON 6 UNFILLED	2
6	SPRING -1	STEEL	1
7	PCB ASSEMBLY	GLASS EPOXY PCB	1
8	SPACER	ABS	2
9	SWITCH COVER	NYLON 6 UNFILLED	1
10	INNER DOME	ABS	1
11	OUTER DOME	POLYCARBONATE	1
12	O-RING FOR HOUSING	NITRILE	1
13	O-RING FOR SHAFT	NITRILE	1
14	O-RING FOR CLAMP RING	NITRILE	1
15	COMB HEAD SCREW	STAINLESS STEEL	8
16	CIRCLIP	STAINLESS STEEL	2

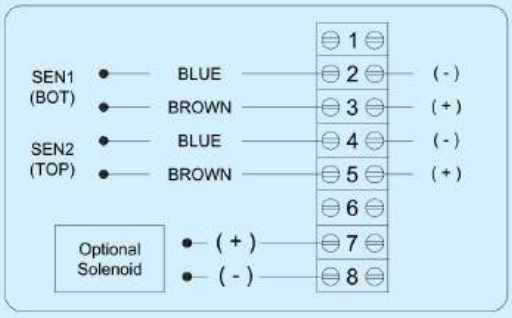


Part No.	Description
1	Body
2	Top Cover
3	Shaft

DIMENSION DETAILS



WIRING DIAGRAM (2 SPDT SWITCHES)



WIRING DIAGRAM (2 SENSORS)

WEATHERPROOF LIMIT SWITCH BOX (4 SWITCH / SENSOR) (WPB-L)

IP66 & IP68

FEATURES

- Aluminium body provides good mechanical strength.
- Easily adjustable and tool free serrated cams allow a very quick and fine switch adjustment.
- WPB series limit switch boxes have a standard large two color position indicator which is easily visible both from side and top of the valve.
- Complies to NAMUR Mounting standard – VDI / VDE 3845.
- Various options of Cable entries are available like 1/2" NPT, M20x1.5P, etc.
- WPB can be provided on request with an extra terminal strip for external solenoid valve connection.
- Various switch options are available like micro-switches, inductive proximity sensors, etc.
- Available with mounting accessories which are compatible with various actuator makes.
- Optional stainless steel bracket can be provided. Temperature range -20 °C to +80 °C.
- Ingress Protection levels as per IP66 and IP68 are available.

ORDERING OPTION

SERIES	SWITCH TYPE	SWITCH QUANTITY	CONDUIT ENTRY	MATERIAL	CERTIFICATION	SWITCH TYPE	DOME COLOR

SERIES
WPB-L

SWITCH QUANTITY
1
2
3
4

CONDUIT ENTRY	
H	½" NPT – 2 NOS
Q	¾" NPT – 2 NOS (BY-ADAPTER)
M	M20X1.5 – 2 Nos (By-Adapter)
X	ANY OTHER POSSIBLE COMBINATION (BY-ADAPTER)

MATERIAL	
1	ALUMINIUM

DOME COLOUR	
0	RED + GREEN
1	RED + YELLOW

SWITCH TYPE	
1	MICRO SWITCHES - SPDT/SPST/DPDT
2	PROXIMITY SENSORS - CYLINDRICAL / SLOTTED

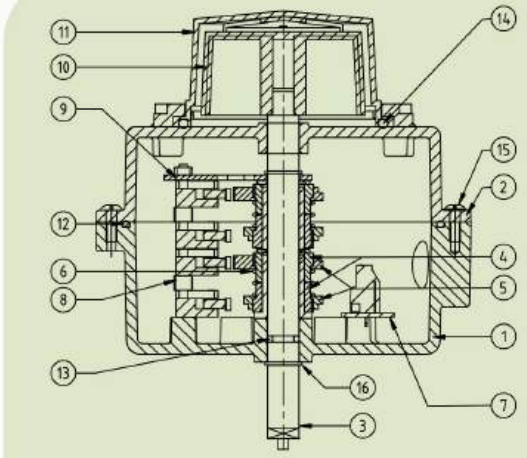
CERTIFICATION	
1	WEATHERPROOF IP 67
2	WEATHERPROOF IP 68
3	WEATHERPROOF IP 66

CODE	SWITCH TYPE	RATING	MAX QTY.
01	SPDT ELECTROMECH	5A - 125/250 VAC; 0.1A - 48 VDC	4
02	SPDT ELECTROMECH (GOLD PLATED)	1A - 125 VAC	4
03	SPDT HERMETICALLY SEALED GOLD PLATED	4A - 115 VAC - 400Hz, 4A - 28 VDC	2
04	INDUCTIVE SENSOR NCB2-V3-N0	1mA - 8.2 VDC	4
05	PROXIMITY SJ3.5-N	1mA - 8.2 VDC	2
06	PROXIMITY NJ2-V3N	1mA - 8.2 VDC	4
07	PROXIMITY SJ3.5-SN	1mA - 8.2 VDC	2
08	INDUCTIVE SENSOR NBB3-V3-Z4	4 to 100 mA; 5 to 60 VDC	4

ORDERING EXAMPLE

- WPB-L-1-4-H-1-1-01-0
- LIMIT SWITCH BOX-(WPB-L), WEATHERPROOF IP 67, SWITCH & QTY-SPDT ELECTROMECH -4 NOS, CABLE ENTRY-½" NPT, MTRL.-ALUMINUM, DOME-RED+GREEN, PAINTING-IPC STD, WITHOUT MOUNTING KIT

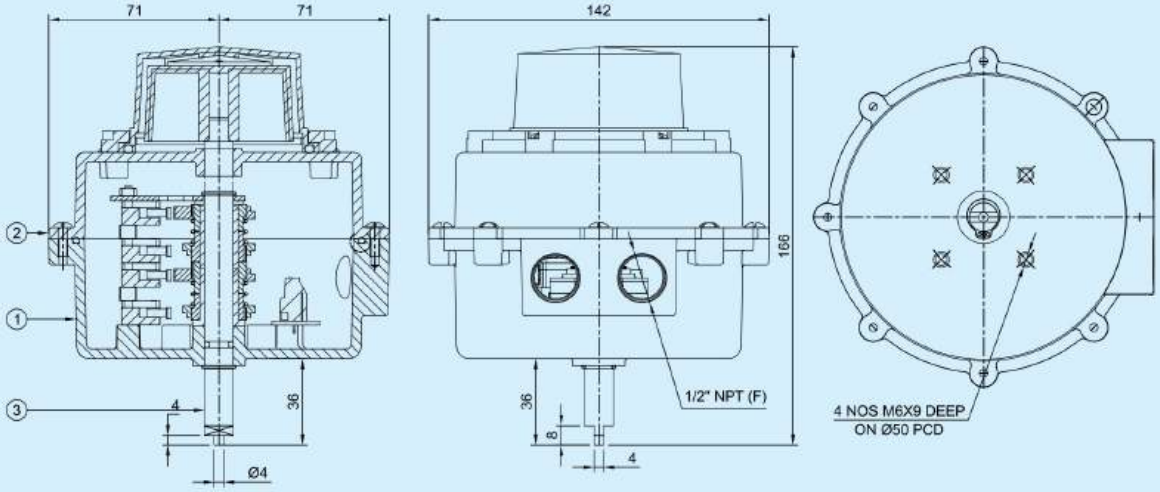
WEATHERPROOF LIMIT SWITCH BOX (WPB-L)



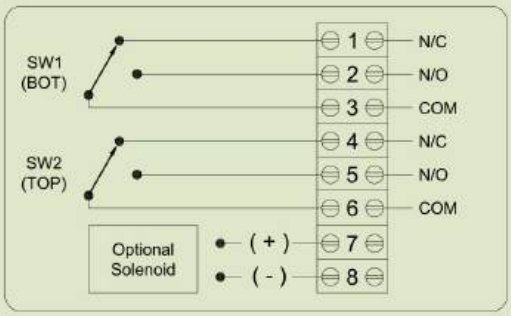
INTERNAL ARRANGEMENT

MATERIAL OF CONSTRUCTION

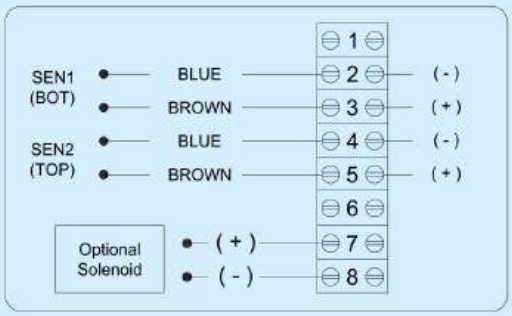
ITEM NO.	PART NAME	MOC	QTY.
1	WEATHERPROOF HOUSING	ALUMINUM	1
2	COVER FOR HOUSING		1
3	SHAFT	STAINESS STEEL	1
4	INNER CAM	NYLON 6 UNFILLED	4
5	OUTER CAM	NYLON 6 UNFILLED	4
6	SPRING -1	STEEL	2
7	PCB ASSEMBLY	GLASS EPOXY PCB	2
8	SPACER	ABS	4
9	SWITCH COVER	NYLON 6 UNFILLED	1
10	INNER DOME	ABS	1
11	OUTER DOME	POLYCARBONATE	1
12	O-RING FOR HOUSING	NITRILE	1
13	O-RING FOR SHAFT	NITRILE	1
14	O-RING FOR CLAMP RING	NITRILE	1
15	COMB HEAD SCREW	STAINLESS STEEL	8
16	CIRCLIP	STAINLESS STEEL	2



DIMENSION DETAILS



WIRING DIAGRAM (2 SPDT SWITCHES)



WIRING DIAGRAM (2 SENSORS)

FLAMEPROOF LIMIT SWITCH BOX WITH AS-Interface® Ver. 3.0

The Actuator Sensor Interface® (AS-Interface or AS-i) protocol originally developed by a consortium of major European companies is an industrial networking solution that can be used in PLC, DCS and PC-based automation systems.

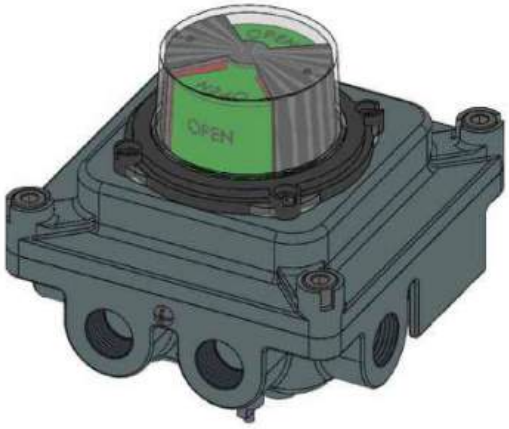
It is designed for connecting simple field I/O devices (e.g. binary ON/OFF devices such as actuators, sensors, rotary encoders, analog inputs and outputs, push buttons, and valve position sensors) in discrete manufacturing and process applications using a single two-conductor cable.

AS-i has gained acceptance in process industries due to its high power capability, simplicity of installation and operation, and low cost adder for devices.

AS-i can communicate via a Gateway to most higher-level bus systems such as DeviceNet™, Modbus® and PROFIBUS as well.

For AS-i bus network; both signal and power are carried on two wires.

Up to 8 amps @ 30VDC of power is available for field devices such as solenoid valves.



Limit Switch Box with AS-Interface

AS-Interface® Ver. 3.0 HIGHLIGHTS:

Physical Media:

- 2-wire cable (flat or round)
- both signal for communication and power on 2-wire cable

Network Topology:

- Bus, Ring, Tree, Star
- Trunk-drop, Zero-drop

Maximum Devices:

- for v3.0 : 62 nodes (or 434 I/O points) per system

Maximum Distance:

- Maximum Distance 100 meters
- Maximum Distance with repeaters 300 meters (max. of 2 repeaters can be used)

Current consumption per network:

- (2 in/2 out) 11 mA (power) - 59 mA (1 in/1 out)

IPC AS-I card version 3.0

AS-Interface® Ver. 3.0 HIGHLIGHTS:

Communication Methods:

- Master/Slave with cyclic polling
- Manchester Bit Encoding implemented via Alternating Pulse Modulation (APM)

Interface capability:

- All PLC's and DCS with ModBus®
- DeviceNet™
- PROFIBUS port

Error checking:

- Control sum, parity

Transmission speed:

- Baud Rate is 167 Kbits/second

Scanning speed:

- 5 mSec latency max. on fully loaded segment

Wiring Types:

- **Round:** Normal 2 wire cable #16AWG (1.5mm)
- **Flat:** 2 wire flat AS-I cable (1.5mm conductors)
- Yellow for communications
- Black for additional power

Grounding aspects:

- Ungrounded communications bus

Shielding:

- Unshielded wire

Terminators:

- No terminators required

Hazardous Area Installations:

- Explosion Proof wiring required

Device Addressing:

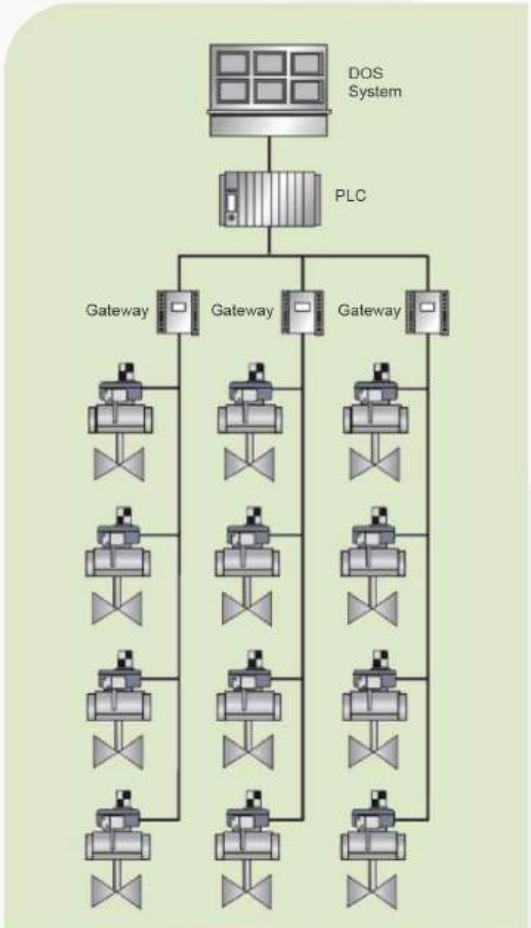
- Automatic when connected one at a time to the segment or with Handheld Addressing Unit

Redundancy:

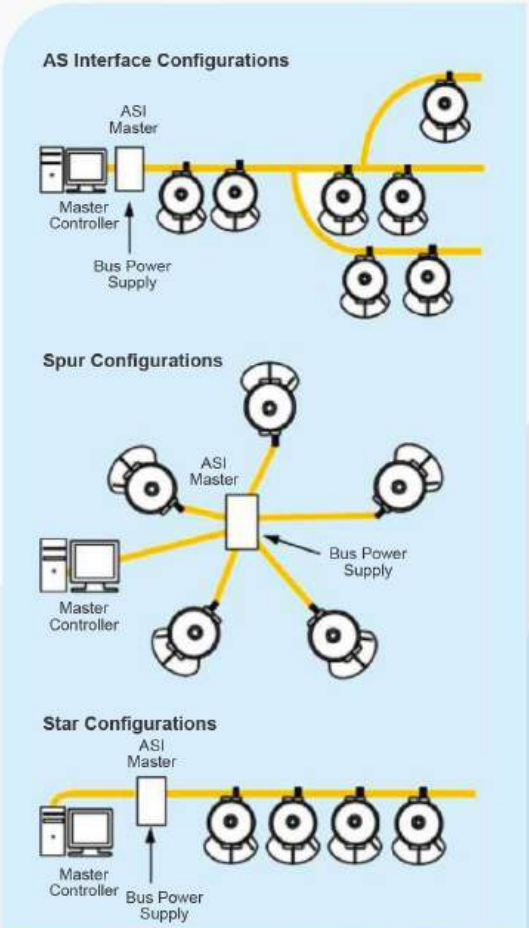
- No

Valves specific diagnostics:

- No



DOS SYSTEM



AS INTERFACE CONFIGURATIONS

IPC AS-I ON/OFF VALVE CONTROLLER ADDRESSING:

IPC's AS-I On/Off Valve Controller is a slave device to allow 62 devices (usually 61 slaves plus an AS-i master device) to be powered and controlled via a 2-wire bus cable, with full capability to energize one (1)x solenoid on every unit all at the same time.

This is the standard configuration for On/Off Valve Control.

There is options of two (2)x solenoids on the device for special applications like Dribble Control

It is user responsibility to check device configuration while connecting number of devices on segment; so that the bus limit would not be exceeded.

IPC can offer below options for AS-I On/Off Valve devices:

OPTION 1
(STANDARD OPTION FOR MANUAL ON/OFF VALVES):

IPC AS-i device with limit switch sensors only.

For this device, the wiring circuit has inputs enabled and outputs disabled, to read limit switch sensors only.

If a solenoid is connected later it will not function.

OPTION 2
(STANDARD OPTION FOR AUTOMATED ON/OFF VALVES):

IPC AS-i device with both inputs and outputs enabled (one solenoid per interface card)

The user's control system has to be designed to include a pre-programmed limit on the maximum number of solenoids to be energised.

If the system instructs too many units to switch on solenoids, they will obey, but the bus capacitance limit will be exceeded – thus this responsibility is with the user with regard to this issue.

OPTION 3
(STANDARD OPTION FOR DRIBBLE CONTROL ON/OFF VALVES):

IPC AS-i device can also offer Special configuration of both inputs and two outputs enabled (two solenoid per interface card) for Dribble Control Two-stage Valve applications.

The user's control system has to be designed to include a pre-programmed limit on the maximum number of solenoids to be energised.

If the system instructs too many units to switch on solenoids, they will obey, but the bus capacitance limit will be exceeded – thus this responsibility is with the user with regard to this issue.

DATA SHEET

HOUSING

- **Materials:** Base: Aluminium - Powder Coated
  Shaft: Stainless Steel
  O-rings: Viton
  Seal: Viton
- **Electrical Entries:** 1x M20 or 1/2" NPT with 1 x AS-I wire connector
- **Mounting:** VDI/VDE3845 (NAMUR)
- **Enclosure:** Flameproof Ex-d & IP66 & IP68 or Weatherproof IP66 & IP68

SENSORS

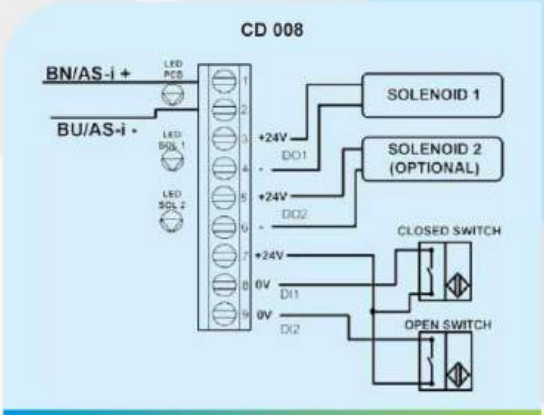
- **Type:** Dry Proximity Reed type or MechSPDT type switches
- **Nominal Voltage:** 5-60 VDC
- **Current Rating:** 200 mA
- **Off State Current:** M 1 mA

AS-I FIELDBUS CARD:

- **I/O Input:** 2 Digital Inputs
  Output: 2 Digital Outputs
- **Number of Stations:** 62 (AS-I Bus Standard)
- **Distance:** 100m std (300m with repeaters)
- **AS- Interface Voltage:** 26.5 - 31.6 VDC

Address preset 0 changeable via bus master or programming devices

- **IO Code** B
- **ID Code** A
- **Id2 Code** E



WIRING DIAGRAM

PROGRAMMING (BIT-SETTING):

DATA BIT (INPUT VIA AS-I)		PARAMETER BIT	
BIT	FUNCTION	BIT	FUNCTION
D0	Output A1	P0	Not Used
D1	Output A2	P1	Not Used
D2	Input E1	P2	Not Used
D3	Input E2	P3	Not Used

3/2 - 5/2 SOLENOID VALVE:

- **Materials:** Housing - Anodized Aluminum
  or St. Steel Seals - Polyurethane& Nitrile
- **Connections:** In/Out - 1/4" BSP or NPT
  Exhaust - 1/8" BSP or NPT
- **Flow Rate:** 900 l/min @ 6 Bar
- **Operating Pressure:** 150 to 800 Kpa
- **Temperature Range:** -5 to 60 °C
- **Voltage:** 24 VDC

QUICK RESPONSE, EFFICIENT DELIVERY AND QUALITY PRODUCTS!

Integral Process Controls was founded in 2001 with an objective to solve two key pain points for the customers. First, was to reduce the valve delivery time significantly to meet the aggressive demand timelines of the clients. Secondly, we sensed a need to meet the huge and largely unmet need for assured supply of quality valve and valve automation solutions of the customers. We set out to serve this very gap.

Solving the customer's challenges is the very reason we came into existence. Over the last ten years, we have been just scaling up this vision – solving new, bigger challenges for our customers while trying to set new benchmarks in quality. In last 21 years, IPC has worked with some of the reputed companies in India as well as overseas.

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