

## Differential pressure transmitter PS-9101

### Introduction

The PS-9101 Differential pressure is designed to measure the difference between two sensed pressures to produce 0...10 V DC proportional output.

The differential pressure, as sensed by the sensing ports, is applied to both sides of a mass air flow sensor, directed across the surface of the sensing element.

The output voltage varies in proportion to the differential temperature of sensing elements, as a consequence of increasing/decreasing the mass air flow through the inlet and outlet ports caused by sensed differential pressure.



**PS-9101-800x  
Transmitter (IP20)**



**PS-9101-850x  
Transmitter (IP54)**

### Features and Benefits

- |   |   |
|---|---|
| <input type="checkbox"/> <b>Model available in 3 differential pressure ranges</b> | Covers most of HVAC applications                    |
| <input type="checkbox"/> <b>Models for Din Rail mounting</b>                      | Easier installation                                 |
| <input type="checkbox"/> <b>Models with splash proof dust tight case</b>          | Electronic base can be mounted in many environments |
| <input type="checkbox"/> <b>Fast response (&lt; 50 ms)</b>                        | Can be used in critical applications such as VAV    |
| <input type="checkbox"/> <b>MTBF of sensor 20 years</b>                           | Long lasting reliability                            |

## Ordering data

PS-9101-8	0	
<b>Operating range</b>		
1	0...750 Pa	
2	0...330 Pa	
3	0...130 Pa	
<b>Protection Class</b>		
0	IP 20	
5	IP54	

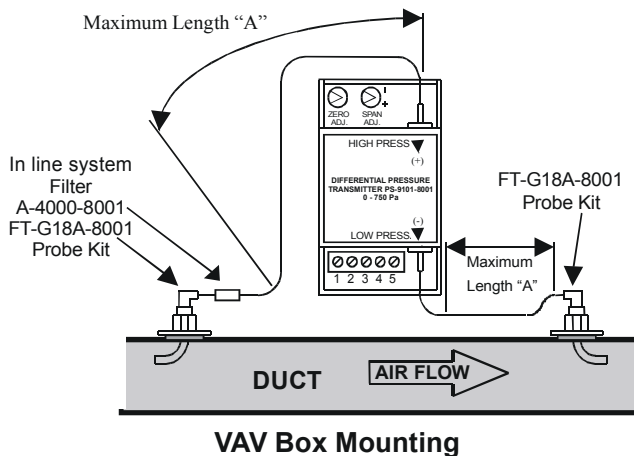
## Accessories

A-4000-8001	In line filter
PS-9101-8900	DIN rail mounting kit
FT-G18A-8001	Remote mounting probe kit

## Repairs and Replacements

Repairs should not be made in the field. Defective devices should be returned to the factory. For a replacements, contact the nearest Johnson Controls wholesaler or branch office. Replace the Inline Filter A-4000-8001 when dark red colour appears on outer.

## Mounting instructions



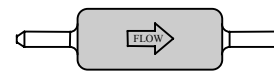
Make sure no compressed air is applied to either connector. Do not mount the control where ambient temperature falls below 0°C or exceeds +60°C. **If either the low or high pressure input ports are not used, protect the open port from other external air velocities or direct impingement which will produce erroneous signals.**

- 1) For mounting the PS-9101, use the 35 mm DIN Rail System. Kit PS-9101-8900 can be used for duct mounting.

## Operation

Typical applications of the PS-9101 include pressure sensing in ducts, and air flow velocity sensing for VAV terminal units. The PS-9101 can be used separately, or as a part of a digital VAV control system (DC-9100/DR-9100). By subtracting the measured static air pressure from the measured total air pressure, the PS-9101 senses air velocity pressure. This value is sent to the DC-9100/DR-9100 controller in form of 0 to 10 VDC signal. The DC/DR-9100 controller interprets the PS-9101 signal to determine the position of the VAV damper motor actuator for the required air flow

- 2) Use FT-G18A-8001 remote mounting probe kits for remote sensing locations. Run plastic tubing from the high and/or low pressure connectors to the sensing point. Use tubing with an inner diameter of at least 4.3 mm (0.170 inch) and an outer diameter of 6.3 mm (1/4 inch).
- 3) Use Inline Filter A-4000-8001 on the side of inlet high supply pressure. Replace In line filter when dark red color appears on outer surface.



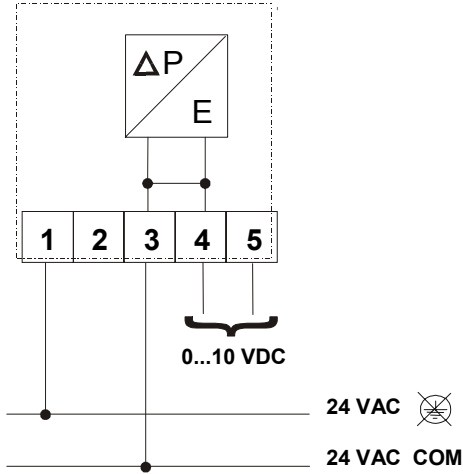
**Inline Filter A-4000-8001**

- 4) Factory calibration is with inline system filter and 2 m lengths of plastic tubing. With the maximum allowable sum of the two tube lengths shown in the table below, the nominal range decreases by 25%.

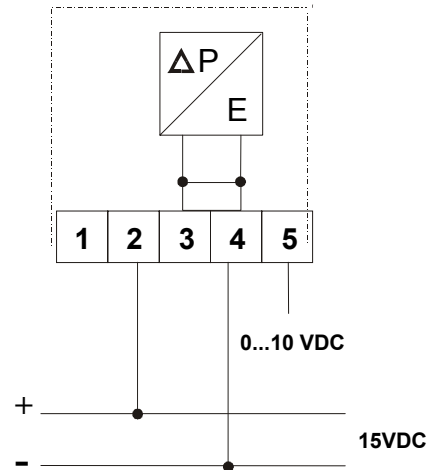
RANGE	Max Sum of Two Tube Lengths
0 – 130 Pa	10 meters
0 – 330 Pa	15 meters
0 – 750 Pa	20 meters

## Wiring diagram

Disconnect the power supply before wiring connections are made to prevent possible electrical shock or damage to the equipment. Make all wiring connections in accordance with the National Electrical Code and Local regulations. Make all wiring connection before applying power. Improper wiring may cause permanent damage. Refer to the installation wiring diagrams for correct hook-up.

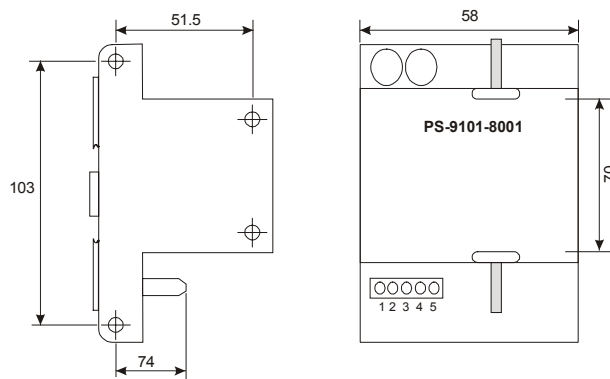


PS-9101 with 24 VAC supply voltage

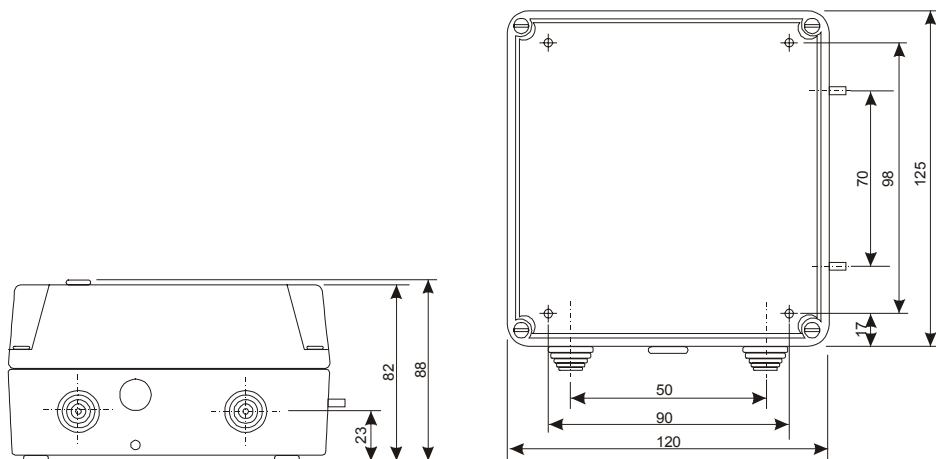


PS-9101 with 15 VDC supply voltage

## Dimensions



PS-9101-800x IP20



PS-9101-850x IP54

## Specifications

<b>Supply voltage</b>	15 VDC $\pm$ 10% (Available from controller) or 24 VAC +10%; -15%
<b>Output Signal</b>	0 to 10 VDC linear to differential pressure
<b>Ambient Op. Limits</b>	0 to 60° C, 10 to 90% RH (non condensing)
<b>Pressure</b>	34.5 kPa max
<b>Mounting</b>	DIN Rail / wall
<b>Air connection</b>	4 x 6 mm plastic tube
<b>Power consumption</b>	350 mW (24mA at 15VDC)
<b>Output load</b>	Min. 5 k Ohms / Max. 2 mA
<b><math>\Delta</math>P Ranges</b>	See Ordering data
<b>Repeatability &amp; Hyst.</b>	1%
<b>Linearity</b>	$\pm$ 2% from 0 to 500 Pa $\pm$ 5% from 500 to 750 Pa
<b>Adjustment</b>	1 potentiometer for 0 point, 0-25% of range 1 potentiometer for span adjustment, $\pm$ 50% of nominal range (max 750 Pa)
<b>Output Voltage shift</b>	0-25°C + 0.08% °C 25-55 °C - 0.08% °C
<b>Response Time</b>	50 ms max.
<b>Electrical connection</b>	Terminal block for 2.5 mm <sup>2</sup> (maximum) section wire
<b>Housing material</b>	Polypropylene
<b>Enclosure protection class</b>	IP 20, IP54, (IEC 60529)
<b>Weight</b>	0,1 kg
<b>Storage Temp. limits</b>	-40 to +70 °C
<b>CE Compliance</b>	EMC (89/336 EEC) according to the standard EN 50081-1 and EN 50082-1

*The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office.*

*Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.*

### GENERAL

The PS-9101 differential pressure transmitter is designed to measure the difference between two sensed pressures to produce a 0 to 10 V DC proportional output. The output voltage varies in proportion to the differential temperature of the sensing elements, consequently increasing/decreasing the mass air flow through the inlet and outlet ports caused by sensed differential pressure.

### PS-9101 MODEL RANGE

PS-9101-8001 : 0 to 3 in. W.G.; 0 to 750 Pa

PS-9101-8002 : 0 to 1.33 in. W.G.; 0 to 330 Pa

PS-9101-8003 : 0 to 0.5 in. W.G.; 0 to 130 Pa

### FEATURES

- Models available in 3 differential pressure ranges
- Small and compact
- Din Rail mounted
- Mass air flow measurement
- Fast response (< 50 ms)
- MTBF of sensor 20 years

### INSTALLATION

All Series PS-9101 differential pressure transmitter controls are designed for use only as operating controls. Where an operating control failure would result in personal injury and /or loss of property, it is responsibility of the installer to add devices (safety, limit controls) or systems (alarm, supervisory) that protect against, or warn of, control failure.

### LOCATION

Do not mount the control where ambient temperature falls below 0 °C (+32 °F) or exceeds +60 °C (+140 °F).

### IMPORTANT

This product is in conformance with the following European directives:  
**89 / 336 / EEC**  
If it is installed inside enclosure.



### SPECIFICATION & TECHNICAL DATA

<b>Supply Voltage</b>	15V DC (Available from Controller) 24V AC
<b>Output Signal</b>	0 to 10V DC linear
<b>Ambient Op. Limits</b>	0 to 55 °C ; 10 to 90% RH (non condensing)
<b>Overpressure</b>	5 psi max. (34.5 kPa)
<b>Mounting</b>	DIN RAIL / WALL
<b>Air Connection</b>	4 x 6 mm plastic tube
<b>Power Consumption</b>	350 mW
<b>Output Load</b>	Min. 5kOhms / Max. 2mA
<b>Dp Ranges</b>	See model range
<b>Adjustment</b>	(1) pot. for zero point 0-25% of range (1) pot. for span adjustment ± 50% of nominal range (except 3 in. range which is the max.)
<b>Repeatability &amp; Hyst.</b>	1%
<b>Linearity</b>	± 2% from 0 to 500 Pa ± 5% from 500 to 750 Pa
<b>Output Voltage Shift</b>	0-25 °C +0.08% °C 25-55 °C -0.08% °C
<b>Response Time</b>	50 ms max.
<b>Electrical Connection</b>	Terminal block for 2.5 mm <sup>2</sup> section wire max.
<b>Housing Material</b>	Polypropilene
<b>Protection</b>	IP 20
<b>Storage Temp. Limits</b>	-40 to +70 °C

**Accessories** Remote mounting Probe kit FT-G18A-8001  
 Din Rail PS-9101-8900  
 Filter A-4000-8001

**Weight** 100 g

## MOUNTING

Mount the PS-9101 securely. Make sure no air pressure is applied to either connector.

**CAUTION:** The PS-9101 is a highly sensitive device. If either the low or high pressure input ports are not used, take care to protect the open port from other external air velocities or direct impingement which will produce erroneous output signals.

## VAV BOX MOUNTING (See Figure 1)

- For mounting the PS-9101, use DIN Rail System 35 mm size. Kit PS-9101-8900 can be used for duct mounting.
- Use FT-G18A-8001 remote mounting probe kits for remote sensing locations. Run plastic tubing from the high and /or low pressure connectors to the sensing point. Use tubing at least 0.170" I.D. (0.25" O.D.).
- Use in-line system filter A-4000-8001 on the side of inlet high supply pressure. **WARNING:** Replace filter when dark red color appears on outer surface.
- Factory Calibration is with in-line system filter and 2 m length of plastic tubing with the length of tubing as shown in Table 1, the nominal range decreases by 25%.

## WIRING

**CAUTION:** Disconnect the power supply before wiring connections are made to prevent possible electrical shock or damage to the equipment. Make all wiring connections in accordance with the National Electrical Code and local regulations. Make all wiring connections before applying power. Improper wiring may cause permanent damage. Refer to the installation wiring diagrams for correct hookup.

## CHECK-OUT PROCEDURE

## INSTALLATION INSTRUCTIONS

- Verify the model range instrument if is correct for the control of  $\Delta P$  or flow volume of VAV units (see diagram characteristic of VAV units manufacturer).
- Verify zero Output V DC with zero  $\Delta p$  pressure (eventually adjust through the pot.).
- Measure the max. differential pressure:  $\Delta p$
- Adjust 10V DC Output with pot. span adjustment at the max. differential pressure.

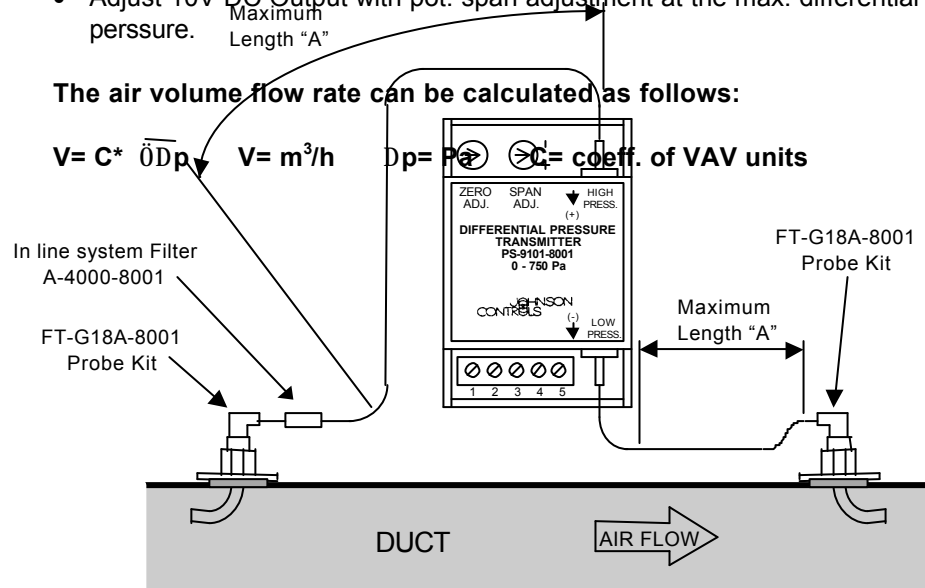


Figure 1

Table 1: Max Length "A" depending on

RANGE (Pa)	LENGHT max. "A"
0-130	10
0-330	15
0-750	20

A-4000-8001 In Line Filter

