

# 4WPS (1 & 2) Diaphragm Pressure Switch Installation and Maintenance Instructions



## Intended Applications

The pressure switches are specifically applied for monitoring and controlling of operations using maximum and minimum pressures. A micro switch triggers an electrical signal when minimum or maximum pressures are reached.

### **DANGER**

The switch may only be used in the specified fields of applications (see type label).

The temperature has to be within the specified ranges, the pressure values and the electrical rating must not exceed the value specified.

Observe the applicable national safety instructions for assembly, commissioning and operation of the switch.

## Safety Instructions

The safety instructions are intended to protect the user from dangerous situations and/or material damage. In the operating instructions the seriousness of the potential risk is designated by the following signal words:

### **DANGER**

Refers to imminent danger to personnel.  
Non-observance may result in fatal injury.

### **WARNING**

Refers to a recognizable danger.  
Non-observance may result in fatal injuries and destroy the equipment or plant parts.

### **CAUTION**

Refers to a danger.  
Non-observance may result in light injuries and material damage to the equipment and/or the plant.

### **IMPORTANT**

Refers to important information essential to the user.

### **DISPOSAL**

The equipment must be disposed of correctly in accordance with the local regulations for electric/electronic equipment.  
The equipment must not be disposed of with household garbage.

## Standards

The standards applied during development, manufacture and configuration are listed in the (UL & CSA) safety agency certification reports and the manufacturers CE declaration.

## Warranty/Guarantee

Our scope of delivery and services is governed by Winters' warranties and warranty periods.

### Terms of Guarantee

We guarantee the function and material of the pressure switch under normal operating and maintenance conditions in accordance with the statutory provisions.

### Loss of Guarantee

The agreed guarantee period will expire in case of:

- change or modifications to the switch/housing/fitting
- incorrect use
- incorrect installation
- incorrect handling or operation contrary to the provisions of these operating instructions.

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No liability is assumed for any damage resulting there from, or any consequential damage.

## Transportation/Storage

### **CAUTION**

Severe shock and vibrations should be avoided during transport. Storage should be dry and clean.

## Installation/Commissioning

### **DANGER**

Only install or uninstall the switch when de-energized (electrically and hydraulically/pneumatically).

Pressure connection and electrical connection must be carried out by trained or instructed personnel according to state-of-the-art standards.

The switch must only be installed in systems where the maximum pressure  $P_{max}$  is not exceeded (see type label).

### **CAUTION**

Alternating pressure - vacuum applications are not authorized in switch types which are suitable for both vacuum and pressure applications.

### **WARNING**

Pressure peaks and pressure shocks exceeding the maximum operating pressure are inadmissible.

The maximum operating pressure is the upper final value of the adjustable range or, if specified, the pressure indicated as maximum operating pressure. Exceeding the max. operating pressure affects the performance and the life span of the product and may damage it.

Pressure switches must be mounted to eliminate vibration.

### **WARNING**

Check the switch regularly for functioning.

If the switch does not work properly, stop operation immediately!

### **IMPORTANT**

All pressure switches are tested for proper functioning before they leave the factory. The factory proof pressures are stated on the type label.

## Contact Protection

The micro switches used are normally suitable for both direct and alternating current operation. Inductive, capacitive and lamp loads may, however, considerably reduce the life expectancy of a micro switch and, under extreme circumstances, even damage the contacts.

Depending on the application spark suppression and current limiting is recommended (see diagrams below).

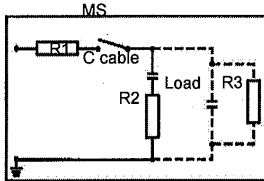


Fig. 1: Protection in case of capacitive loads  
R1: Protection against starting current rushes  
R2,R3: Protection against high discharge currents

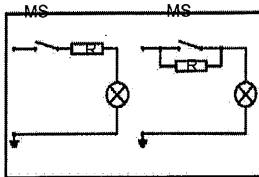


Fig. 2: Lamp load provided with resistance in parallel or series connection to switch of condensers

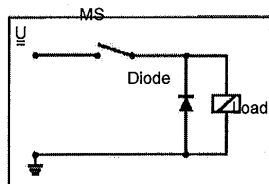


Fig. 3: Protection in case of continuous current and inductive load by recovery diode

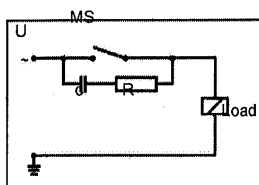


Fig. 4: Protection in case of alternating current and inductive load by RC-link

## Set Point Adjustment

In pressure switches, a displacement of the pressure sensing element occurs with a change in pressure. Following the displacement of the pressure sensing element, a micro switch is operated.

Upon delivery of the product, the set points are likely to be found in the middle of the adjustable range. On request, fix set point may be adjusted by our factory. In this event, the point will be indicated on the type plate or any separate plate, i=increasing, d=decreasing.

The set point is adjusted by turning the adjustment screw.

### IMPORTANT

To reach the adjustment screw for pressure switches with housing, remove the cover.

Allow pressure switch to reach the desired switch pressure. Turn adjustment screw clockwise or counter-clockwise to actuate the micro switch.

### IMPORTANT

In case of overpressure:	Counter-clockwise rotation:	set point increasing
	Clockwise rotation:	set point decreasing
In case of vacuum:	Counter-clockwise rotation:	setpoint decreasing
	Clockwise rotation:	set point increasing

### IMPORTANT

Please consult the wiring diagram for the contact status at atmospheric pressure (see wiring diagram).

### IMPORTANT

Particularly important for small pressures! Set point adjustment must be performed in the installed position.

### Precise adjustment of set point to actuate on increasing pressure:

- Lower the system pressure to 0 psi
- Increase pressure slowly and check if micro switch actuates at desired switch pressure
- If necessary, readjust by turning the adjustment screw
- Repeat preceding steps until micro switch operates at desired switch pressure

### Precise adjustment of set point to actuate on decreasing pressure:

- Increase pressure up to a point clearly above the desired switch pressure (at least, switch pressure plus max. hysteresis; not above max. operating pressure).
- Lower pressure slowly and check if micro switch actuates at desired switch pressure
- If necessary, readjust by turning the adjustment screw
- Repeat preceding steps until micro switch operates at desired switch set point
- Following the adjustment of all set points, each set point must be checked and, if necessary be readjusted.

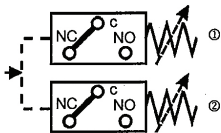
### IMPORTANT

The adjustment of set points occurs for each set point as specified above.

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## Wiring Code for all Types (Contact status at atm. pressure)



at vacuum NC/NO vice versa

Power circuit ①	Power circuit ②
C = purple	C = brown
NC = blue	NC = orange
NO = red	NO = black

## Maintenance/Cleaning

### Maintenance

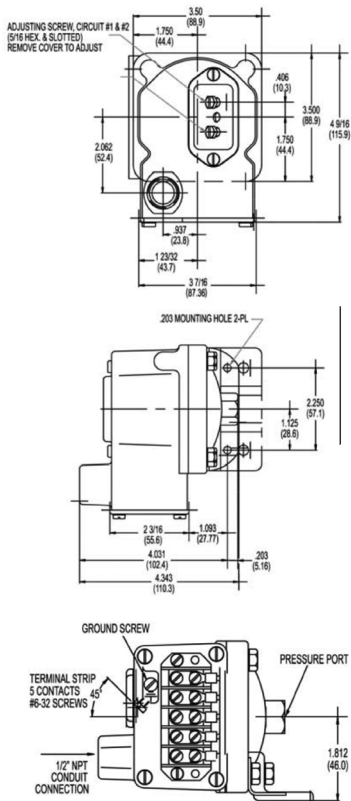
The pressure switch is maintenance free. Checking the set points lies within the discretion of the user. The usual preventive maintenance work in accordance with the PED and normal safe use guidelines must always be carried out.

Please note that small setpoint drifts may occur during the initial use of the switch (run-in period). To minimize the setpoint drift, Winters can perform a run-in (aging) process in our works on request.

Larger or continuing setpoint drifts during the normal use of the switch may indicate that the switch is not installed correctly, is not being used within the specified limits, exceeds the design criteria or is worn out. Inconsistent switching may also indicate diaphragm damage, caused by high cycle rates, overpressure, or media incompatibility. It should be replaced before the ultimate rupture of the diaphragm takes place. Please consult your supplier or Winters directly for guidelines.

### Cleaning

Wipe with clean damp cloth only. Nameplate legibility may be impaired by use of chemical solvents!



Pressure Switch 4WPS1 & 4WPS2 Series

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## Electrical Ratings

Micro Switch	Special Characteristics	Volt AC 50/60 Hz	Ind. Load A	Res. Load A	Volt DC	Ind. Load A	Res. Load A	Notes
A	Micro switch with silver contacts	125 250	10 10	10 10	6 to 28	0, 50	0, 5	Small hysteresis; high AC / low DC loads
GH	Micro switch with gold plated contacts for low voltage and low current	125	1	1	24	1, 00	1, 00	Low change-back values

### IMPORTANT

We recommend using a pre-fuse of the maximum current rating from the table above according to the load switched.

We recommend gold plated contacts for all low voltage/power applications.

## Adjustable Range 4WPS Pressure Switch

Adjustable Range "Hg (mbar)		Approximate Deadband (Actuation value) "Hg (mbar)	Proof Pressure "Hg (mbar)
Min	Max		
0.06 (2)	6 (203)	0.14-0.28 (4.7-9.5)	20 (677)
0.8 (2.7)	30 (1,016)	0.4-0.8 (14-27)	30 (1,016)

Adjustable Range psi (bar)		Approximate Deadband (Actuation value) psi (bar)	Proof Pressure psi (bar)
Min	Max		
0.03 (0)	3 (0.2)	0.07-0.15 (0-0.01)	10 (0.7)
0.4 (0.03)	18 (1.2)	0.12-0.26 (0.01-0.02)	60 (4.1)
0.5 (0.03)	80 (5.5)	1.6-3.4 (0.1-0.2)	160 (10.9)
1.5 (0.1)	150 (10.3)	2.3-6 (0.2-0.4)	300 (20.4)

## Approvals for 4WPS Pressure Switch

4WPS housed-terminal block model is UL Listed (File No. E42816, Guide No. NKPZ(2), Motor Controllers, Float and Pressure Operated. Hermetically sealed, Class I, Div. II, UL File E37043 for hazardous locations.

## Operating Life Time

Normal expected service life (expressed in the number of cycles over the full adjustment range) is approximately 1 million for the pressure switch. This may be extended to 2.5 million cycles max. if only a part of the adjustment range is used (about 20%).

Switch sensor life may also be effected negatively by:

- Media not compatible with the wetted materials
- Too high switch cycling speed or more than 20 cycles per minute
- System cycling pressure exceeding the top of the adjustable range

The proof pressure must never be exceeded to avoid permanent sensor damage. Matching the working range of the switch to the application is a also a key for optimal switch performance. For greatest accuracy the set point should fall in the upper 70% of the adjustable range. For most favourable life the set point should be in the lower 30% of the adjustable range. Therefore, the most favourable combination of accuracy and life factor lies between 30% and 70 % of the adjustable range.

Specifications are subject to change without notice!

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