# PENN COMMERCIAL REFRIGERATION 2021

The power behind **your mission**

Johnson Controls

# PENN COMMERCIAL REFRIGERATION



## TEMPERATURE CONTROLS

### MECHANICAL THERMOSTATS



## FLOAT AND FLOW CONTROLS

### MECHANICAL LIQUID FLOW SWITCH



### MECHANICAL LIQUID LEVEL SWITCH

# PRESSURE CONTROLS

## ADJUSTABLE DIFFERENTIAL PRESSURE SWITCH



## ADJUSTABLE PRESSURE SWITCH



## FIXED SETTING PRESSURE SWITCH



## PRESSURE SWITCHES ACCESSORIES



## ADJUSTABLE OIL PROTECTION SWITCH



## ADJUSTABLE STEAM PRESSURE SWITCH

# MODULATINGWATER VALVES

## PRESSURE ACTUATED WATER VALVES



## TEMPERATURE ACTUATED WATER VALVES



# HUMIDITY CONTROLS

## MECHANICAL HUMIDITY STAT



# CONDENSER FAN SPEED CONTROLLERS

## 1-PHASE CONDENSER FAN SPEED CONTROL



## 3-PHASE CONDENSER FAN SPEED CONTROL

# FIELD AND COLD ROOM CONTROLLERS

## MODULAR ELECTRONIC CONTROL SYSTEM



## ELECTRONIC CONTROL DEVICES



## MULTI-STAGES CONTROL DEVICES



# TRANSDUCERS AND SENSORS

## PRESSURE TRANSDUCER



## LEAK DETECTION

# PENN CONNECTED REFRIGERATION

## HARDWARE



## SOFTWARE



# PENN CONNECTED FOOD SAFETY

## HARDWARE



## SOFTWARE

# REFRIGERANTS AND PRODUCT MATERIAL COMPATIBILITY

Requirements such as material compatibility (with refrigerants, refrigerant oils and other medias), system operating pressures and temperatures, and operating environment must be considered when selecting pressure controls, fan speed controls, water regulating valves and/or pressure transducers for HVACR applications.

The table below provides a listing of the PENN products that are materially compatible with the most common commercially available refrigerants.

As a standard practice, please review the applicable PENN product technical bulletin to confirm that the respective control's maximum working pressure is suitable for the refrigerant being used. In addition, you should confirm that the product's operating temperatures and enclosure are suitable for the intended application.

## NOTE

Controls used with flammable refrigerants typically require special construction and safety agency approvals including, ATEX compliance. Selective PENN P77, P78, P100 and P599 series controls are ATEX compliant. The requirement for ATEX compliance and other safety agency approvals depends on the refrigerant and the application's explosion hazard zone. ATEX compliant controls are not always required when flammable refrigerants are involved. However, you should always check with the proper authorities to confirm the requirements.

| REFRIGERANT SAFETY CLASS | REFRIGERANT | P20 | P28 | P74 | P735/P736 | P77/P78 | P100 | P215 | P216 (P499 TRANSDUCER) | P266 (P266SNR-1C, -2C) | P315 | P499 | P599 | V46/V48 | V246/V248 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | R22 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R124 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R134a | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R404A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R407A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R407C | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R407F | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R407H | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R410A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R422D | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R438A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R448A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R449A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R449B | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R450A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R452A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R507A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R513A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R744 ($CO_2$) | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

...Continued...

| REFRIGERANT SAFETY CLASS | REFRIGERANT | P20 | P28 | P74 | P735/P736 | P77/P78 | P100 | P215 | P216 (P499 TRANSDUCER) | P266 (P266SNR-1C, -2C) | P315 | P499 | P599 | V46/V48 | V246/V248 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A2L | R32 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R447A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R454A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R454B | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R454C | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R455A | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R1234yf | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R1234ze | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| B2L | R717 (NH3) | – | ■ [1] | ■ [1] | – | ■ [1] | – | – | ■ [1] | ■ [1] | – | ■ [1] | ■ [1] | – | – |
| A3 | R290 (Propane) | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R600a (Isobutane) | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | R1270 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

**Note**

**1** Selected models only

■ Material compatible with refrigerant and refrigerant oils

– Material not compatible with refrigerant and/or refrigerant oils

Always check if the maximum operating and test pressures do not exceed maximum allowable product pressure.
Also check for other refrigerant and/or application specific conditions.

Product portfolio changes may have occurred since this table was published.
Please check with your Johnson Controls representative to confirm product availability.

# PENN COMMERCIAL REFRIGERATION

## TEMPERATURE CONTROLS

## MECHANICAL THERMOSTATS


# 270XT

FREEZE PROTECTION, IP30

Sensing element is 3 or 6 meters long to permit attaching across the surface of a coil to guard against freezing at any point. When any 30 cm or more of this element senses a temperature as low as the control setpoint, it will "switch off".

A special version is available with bulb and 2 m capillary, range 24 to 18°C for clamp on or immersion purposes.

SPDT change over contacts permit the use of an alarm signal.

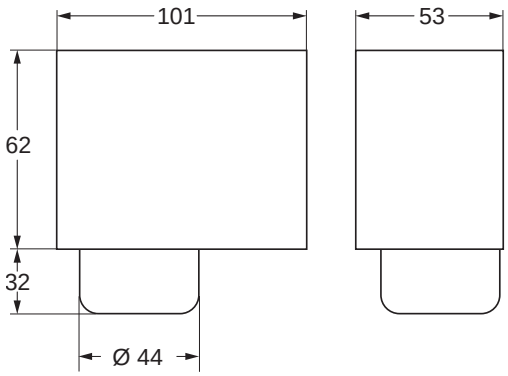
## FEATURES

- Dust tight PENN switch
- SPDT contacts
- 270XTAN provided with trip-free manual reset
- Controls have adjustable range

## APPLICATION

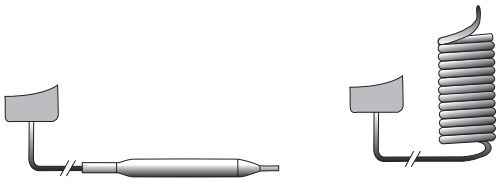
These controls are designed for protection against freeze up of hydronic heating coils, cooling coils and similar application.

## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

| CODES | RANGE (°C) | DIFF. (K) FIXED | STYLE | CAP. LENGTH (m) | BULB SIZE (mm) | SWITCH 8A | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|---|
| 270XT-95008 | -10 to 12 | 3 | 9 | --- | 3.2 x 6000 | SPDT open low | Automatic recycle |
| 270XT-95078 | | | | | 3.2 x 3000 | | |
| 270XT-95068 | -24 to 18 | 4 | 1b | 2 | 9.5 x 80 | | |
| 270XTAN-95008 | -10 to 12 | --- | 9 | --- | 3.2 x 6000 | | Manual reset |
| 270XTAN-95088 | | | | | 3.2 x 3000 | | |
| 270XTAN-95048 | -24 to 18 | | 1b | 2 | 9.5 x 80 | | |



**Style 1b** **Style 9**

# PENN COMMERCIAL REFRIGERATION

## TEMPERATURE CONTROLS

## MECHANICAL THERMOSTATS

# A19

### CAPILLARY AND SPACE THERMOSTATS, IP30

These thermostats are available with fixed or adjustable differential.
The various control ranges cover a broad range of temperature applications with a minimum number of models.

On request a built-in high or low limit stop is possible and can be adjusted quickly and easily in the field.
All models have a universal way of adjustment. For this purpose a knob and sealing cap are enclosed.

All are equiped with IP30 enclosure.

## FEATURES

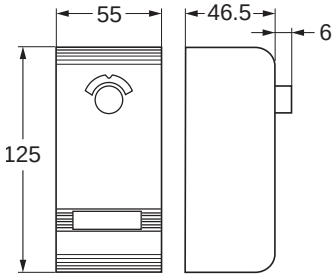
- Liquid filled sensing element
- Dust tight Penn switch
- Trip free manual reset
- Front adjustment

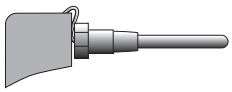
## APPLICATION

These thermostats are designed for refrigeration, cooling, heating, ventilation and air-conditioning applications.
Standard models are provided for remote sensing or room sensing. Models with manual reset are available for low or high limit functions.

# ORDERING INFORMATION

## DIMENSIONS *(in mm)*



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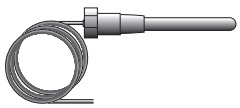
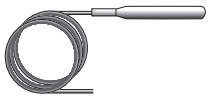
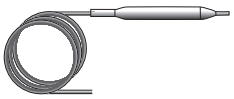


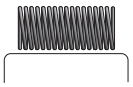
Style 4H



Style 1a



Style 1b

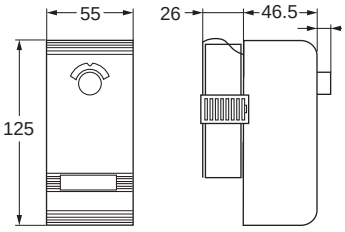


Style 3

| CODES | RANGE *(°C)* | DIFF. *(K)* FIXED | STYLE | CAP. LENGTH *(m)* | BULB SIZE *(mm)* | SWITCH 8A AUTO RECYCLE | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|---|
| A19AAC-9005 | -5 to 28 | 2 | 1b | 2 | 135 | SPDT open low | --- |
| A19AAC-9009 | 40 to 120 | 3.5 | | | 100 | SPDT open high | |
| A19AAC-9102 | -35 to 10 | 2.5 | | | 110 | | |
| A19AAC-9107 | 35 to 150 | 4 | 1a | | 265 | | Ø 5 mm bulb |
| A19AAC-9108 | 90 to 290 | 5.5 | | | 155 | | --- |
| A19AAC-9123 | 0 to 10 | 2.5 | | | 80 | SPDT open low | Bulb Ø 9.3 mm |
| A19AAC-9127 | 1 to 60 | 1.5 | 1b | 3 | 115 | | Maximum bulb temperature 85°C |
| A19AAC-9130 | -10 to 14 | 2.5 | | 2 | 110 | | Case compensation, low limit stop at 2°C |
| A19AAF-9102 | 0 to 10 | 1.5 | 1a | | 80 | SPDT open low | Ø 9.3 mm bulb, case compensation |
| A19AAF-9103 | 5 to 32 | 0.8 | 1b | | 155 | SPDT open high | --- |

# ORDERING INFORMATION

## DIMENSIONS *(in mm)*




| CODES | RANGE *(°C)* | DIFF. *(K)* FIXED | STYLE | CAP. LENGTH *(m)* | BULB SIZE *(mm)* | SWITCH 8A AUTO RECYCLE | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|---|
| A19A capillary thermostats | | | | | | | |
| A19ABC-9011 | 40 to 120 | 3 to 13 | 2 | --- | --- | SPDT open high | 1/2-14NPT connector |
| A19ABC-9012 | | | 4H | 2 | --- | | |
| A19ABC-9036 | -35 to 40 | 2.8 to 8 | 1b | 6.5 | 110 | 5 A switch, SPDT open low | Universal replacement |
| A19ABC-9037 | -35 to 40 | | | 3.5 | | --- | |
| A19ABC-9103 | -35 to 10 | 2.8 to 11 | | 2 | | SPDT open low | --- |
| A19ABC-9104 | -5 to 28 | 2 to 8 | | 2 | 135 | | |
| A19ABC-9106 | 10 to 95 | 3.5 to 14 | 1a | 3.5 | 75 | SPDT open high | Ø 7.4 mm bulb |
| A19ABC-9116 | 1 to 60 | 2 to 8.5 | 1b | 3 | 115 | SPDT open low | Max. bulb temp. 85°C |
| A19ABC-9117 | | | | 5 | | | |
| A19AGF-9101 [1] | 0 to 13 | 1.5 fixed | 1a | 2 | 80 | | 3 A switch (see bull. 3545), no enclosure, cal. pointer with dial, screwdriver slot, case compensation, bulb Ø 9.3 mm, bulk pack |
| A19ACC capillary thermostat, lock-out low with manual reset | | | | | | | |
| A19ACC-9100 | -35 to 10 | 6 | 1b | 2 | 110 | SPDT open low | --- |
| A19ACC-9101 | -5 to 28 | 4 | | | 135 | | |
| A19ACC-9103 | | | | 5 | | | |
| A19ACC-9105 | -35 to 10 | 6 | | 3.5 | 110 | | Low limit stop set at 2°C |
| A19ACC-9107 | -5 to 28 | 4 | | 3 | 135 | | --- |
| A19ACC-9116 | -35 to 10 | 6 | | 6.5 | 110 | | Low limit stop set at 3°C, universal replacement |

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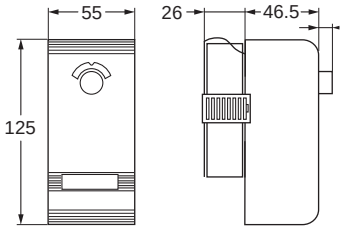
A19 IP30 MECHANICAL THERMOSTATS

# ORDERING INFORMATION

## DIMENSIONS *(in mm)*




| CODES | RANGE *(°C)* | DIFF. *(K)* FIXED | STYLE | CAP. LENGTH *(m)* | BULB SIZE *(mm)* | SWITCH 8A AUTO RECYCLE | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|---|
| A19ADC capillary thermostat, lock-out high with manual reset | | | | | | | |
| A19ADC-9200 | 40 to 120 | 7 | 2 | --- | --- | SPDT open high | 1/2-14 NPT connector |
| A19B space thermostats | | | | | | | |
| A19BAC-9001 | 0 to 43 | 2 | 3 | --- | --- | SPDT open high | Vinyl coated element |
| A19BAC-9250 | -35 to 10 | 2.5 | | | | | |
| A19BAC-9251 | -5 to 28 | 2 | | | | SPDT open low | |
| A19BBC-9275 | -35 to 40 | 2.8 to 8 | | | | SPDT open low, 5A | |
| A19D strap-on thermostats | | | | | | | |
| A19DAC-9001 | 40 to 120 | 4.5 | 20 | --- | --- | SPDT open high | 8 A switch, NEMA 1 enclosure, universal adjustment, including mounting strap |
| A19DAF-9001 | 92 to 116 | 2 | 20 | | | | 3 A switch, universal adjustment, including mounting strap |

**Note**

**1** Quantity orders only

# PENN COMMERCIAL REFRIGERATION

## TEMPERATURE CONTROLS

## MECHANICAL THERMOSTATS


# A19

CAPILLARY AND SPACE THERMOSTAT, IP65

These thermostats are available with fixed or adjustable differential.
The various control ranges cover a broad range of temperature applications with a minimum number of models.

SPDT contacts are standard on all models.

## FEATURES

- Liquid filled sensing element
- Dust tight PENN switch
- IP65 protection class
- Front adjustment

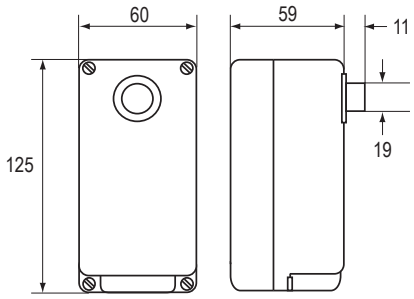
## APPLICATION

These thermostats are designed for applications where a splash-proof and/or dust-tight enclosure is required.

Four types are available:

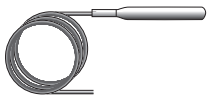
- Types A19ARC are general purpose capillary thermostats.
- Types A19BRC and A19BQC are space thermostats with coiled element to be used as farm control, outdoor thermostats or in cold storage rooms.
- Types A19AQF is specially designed for milkcool-tank applications.
- Type A19AQC-9101 is specially designed for ice-bank application.

## DIMENSIONS *(in mm)*

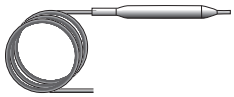


A19 IP65 MECHANICAL THERMOSTATS

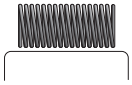
## ORDERING INFORMATION



Style 1a



Style 1b



Style 3

| CODES | RANGE *(°C)* | DIFF. *(K)* ADJUST. | STYLE | CAP. LENGTH *(m)* | BULB SIZE *(mm)* | SWITCH 8A AUTO RECYCLE | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|---|
| A19ARC-9100 | -35 to 10 | 2.8 to 11 | 1b | 2 | 110 | SPDT open low | --- |
| A19ARC-9101 | -5 to +28 | 2 to 8 | 1b | 2 | 135 | | |
| A19ARC-9104 | -20 to 65 | 3.5 to 13 | 1a | 3.5 | 75 | | Ø 7.4 mm bulb |
| A19ARC-9105 | 5 to 50 | 2.5 to 11 | 1b | 2 | 110 | | Concealed scale, screwdriver adjustment, bulb and cap. rubber coated |
| A19ARC-9107 | 40 to 120 | 3.5 to 13.5 | 1b | 2 | 100 | | --- |
| A19ARC-9109 | 1 to 60 | 2 to 8.5 | 1b | 3 | 115 | | Maximum bulb temperature 85°C |
| A19ARC-9113 | -35 to 40 | 2.8 to 11 | 1b | 2 | 110 | | --- |


A19 IP65 MECHANICAL THERMOSTATS

## ORDERING INFORMATION

| CODES | RANGE (°C) | DIFF. (K) ADJUST. | STYLE | CAP. LENGTH (m) | BULB SIZE (mm) | SWITCH 8A AUTO RECYCLE | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|---|
| A19A capillary thermostats | | | | | | | |
| A19AQC-9101 | -5 to 5 | 2 fixed | 1a | 2 | 80 | SPDT open low | 5 A switch, Ice bank control, bulb Ø 9.3 mm, case compensation, concealed scale, screwdriver adjustment, scale calibrated at increasing temperature |
| A19AQC-9102 | -5 to 28 | 2 fixed | 1b | 2 | 135 | | 8 A switch, calibrated and set at 2°C, case compensation, pointer adjust, PG16 connect., 1/2 - 14 NPT WELL connector |
| A19AQC-9200 | -5 to 55 | 2.5 fixed | 2 | --- | --- | | --- |
| A19AQF-9100 | 0 to 13 | 1.5 fixed | 1a | 2 | 80 | | 3 A switch, bulb Ø 9.3 mm, case compensation, concealed scale, screwdriver adjustment |
| A19AQF-9102 | 0 to 13 | 1.5 fixed | 1a | 3 | 80 | | 3 A switch, cap. thermostat, bulb Ø 9.3 mm, case compensation, concealed scale, screwdriver adjustment |
| A19B space thermostats | | | | | | | |
| A19BRC-9250 | -5 to 28 | 2 to 8 | 3 | --- | --- | SPDT open low | Vinyl coated element |
| A19BRC-9251 | 0 to 43 | 2 to 8 | | | | | |
| A19BRC-9253 | -35 to 40 | 2.8 to 11 | | | | | |
| A19BQC-9252 | -5 to 25 | 2 fixed | | | | | Concealed scale, screwdriver adjustment |

# PENN COMMERCIAL REFRIGERATION

## TEMPERATURE CONTROLS

## MECHANICAL THERMOSTATS


# A28

### 2-STAGE CAPILLARY AND SPACE THERMOSTAT, IP30 / IP65

Controls are compact with fixed differential per stage and (on most models) adjustable differential between stages. Liquid filled element provides wide range, constant differential over whole range and no influence from barometric pressure.
Since the bulb contains the major portion of the total fill the thermostat may by considered as cross-ambient, capillary and cup temperature variations affect the operating point only slightly due to the small amount of fill they contain.

For quantity orders it is possible to have the below stated optional constructions:

- Without case and cover for panel mounting
- Close differential per stage
- Different capillary lengths

All standard IP30 enclosure models have a universal way of adjustment. For this purpose a knob and sealing cap are enclosed.

## FEATURES

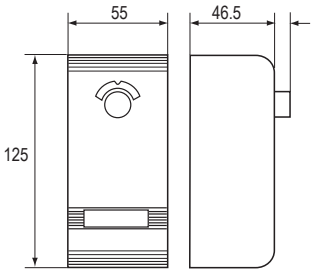
- Liquid filled sensing element
- Dust tight Penn switch
- IP65 protection class models available
- Front adjustment

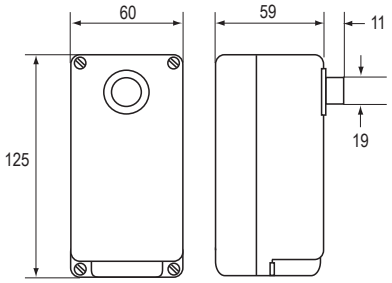
## APPLICATION

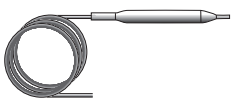
These thermostats are designed for various types of heating, cooling, ventilation, or air-conditioning applications. All models have two SPDT switches providing the following control possibilities:

- 2 stage heating
- 2 stage cooling
- Heating/cooling with automatic changeover

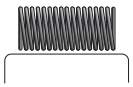
## DIMENSIONS *(in mm)*



Style 1b



Style 3

## ORDERING INFORMATION

| CODES | RANGE *(°C)* | DIFF. *(K)* | | STYLE | CAP. LENGTH *(m)* | BULB SIZE *(mm)* | SWITCH 5A AUTO RECYCLE | ADDITIONAL FEATURES NEMA 1 ENCLOSURE |
|---|---|---|---|---|---|---|---|---|
| | | Stage | Betw | | | | | |
| IP30 | | | | | | | | |
| A28AA-9006 | -35 to 10 | 2 | 1 to 4 | 1b | 2 | 110 | SPDT Open Low | General purpose |
| A28AA-9007 | -5 to 28 | 1.5 | | | | 135 | | |
| A28AA-9106 | | | | | 5 | | | |
| A28AA-9113 | 0 to 43 | | | 3 | --- | --- | SPDT Open High | Bulb stainless steel, general purpose |
| A28AA-9118 | 1 to 60 | 2 | | 1b | 3 | 115 | | Max. bulb temp. 85°C, general purpose |
| IP65 | | | | | | | | |
| A28QA-9101 | 5 to 50 | 2 | 4 | 1b | 2 | 110 | SPDT Open Low | Concealed scale, screwdriver adjustment |
| A28QA-9111 | -5 to 28 | 1.5 | 1 to 4 | | 2 | 135 | | --- |
| A28QA-9113 | 0 to 43 | 1.5 | | 3 | --- | --- | SPDT Open High | Bulb stainless steel |
| A28QA-9115 | 1 to 60 | 2 | | 1b | 3 | 115 | | --- |
| A28QA-9117 | 20 to 40 | 1.5 | | 3 | --- | --- | | Bulb stainless steel |

# PENN COMMERCIAL REFRIGERATION

## TEMPERATURE CONTROLS

## MECHANICAL THERMOSTATS

# A25

ROD AND TUBE SENSING ELEMENT

A rod and tube type sensing element actuate the switch contacts.
Main contacts (1 - 2) are normally closed, and open when the temperature at the element rises to the dial setpoint.
Contacts are re-closed only by operation of the reset lever. The reset lever is "trip-free" and cannot be used to block contacts in a closed position.

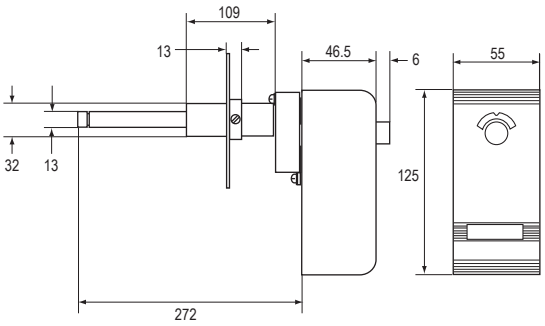
## FEATURES

- Rod and tube type of element
- Adjustable duct mounting flange
- Trip-free manual reset
- Dust-tight Penn switch

## APPLICATION

These warm air limit controls "lock out" on a temperature increase to the control setpoint. Manual reset is required to re-close the electrical contacts. A typical application is to stop air-conditioning or ventilating fans in the event of excessive return air temperature, as from a fire.

## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

| CODES | RANGE (°C) | SWITCH 8A MANUAL RESET | ADDITIONAL FEATURES |
|---|---|---|---|
| A25CN-9001 | 0 to 100 | SPDT open high | Visible scale, Knob adjustment, NEMA 1 enclosure,with flange for duct mounting |

# ACCESSORIES

## ORDERING INFORMATION

| CODES | DESCRIPTION | PRIMARY USAGE | INNER Ø X TUBE LENGTH BULB WELL *(mm)* | INSIDE AND OUTSIDE CONNECTOR *(NPT)* | MATERIAL CONNECTOR POCKET |
|---|---|---|---|---|---|
| FTG13A-600R | Closed tank connector Style 1b elements, Max. 10 bar, 120°C, Min. -40°C | A19/28/36 | --- | --- | --- |
| KIT012N600 | Capillary brackets (6 pieces) | 270XT | | | |
| WEL003N602R | Bulb well, Max. pressure 70 bar, Temp. 370°C | --- | 9.8 x 125 | 1/2 - 14 | Stainless steel |
| WEL11A601R | Bulb well, Max. pressure 20 bar, Temp. 120°C, USA item | A19 | 7.3 x 60 | 1/2 - 14 | Brass/Copper |
| WEL14A602R | Bulb well, Max. pressure 20 bar, Temp. 120°C, USA item | A19/28/36 | 9.8 x 125 | 1/2 - 14 | Brass/Copper |
| WEL14A603R | Bulb well, Max. pressure 20 bar, Temp. 120°C, USA item | A19/28/36 | 9.8 x 147 | 1/2 - 14 | Brass/Copper |
| WEL16A-601R | Bulb well, Max. pressure 20 bar, Temp. 120°C, USA item | A19/28/36 | 9.5 x 71 | 1/2 - 14 | Brass/Copper |

# PENN COMMERCIAL REFRIGERATION

## FLOAT AND FLOW CONTROLS

## MECHANICAL LIQUID FLOW SWITCH

# F61

FLOW SWITCH FOR LIQUID

The F61 liquid flow switches can be used in liquid lines carrying water, sea water, swimming pool water, ethylene glycol or other liquids not harmful to the specified materials.

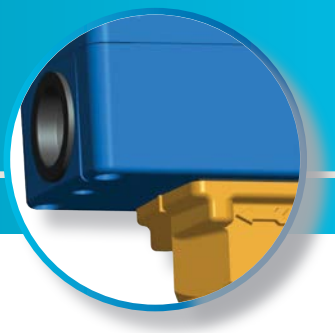
The switches have SPDT contacts and can be wired to energise one device and de-energise another when liquid flow either exceeds or drops below the set flow rate. Pipe insert models and the T-body types for low-flow applications are available.

The IP43 versions can be used for liquid temperatures above dewpoint *(for use in other environments see the Product Data Sheet)*. Typical applications are to shut down the compressor on liquid chiller systems, to prove flow on electric immersion heaters and to give a signal or alarm when the pump on condenser cooling system shuts down.

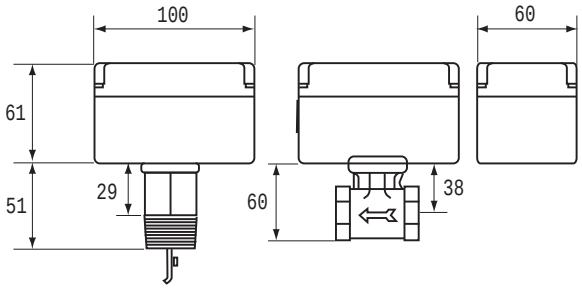
## FEATURES

- T-body and pipe-insert types available
- Polycarbonate IP43 enclosure
- Vapour tight IP67 enclosure
- Stainless steel pipe-insert type
- Large wiring space
- Range screw easy accessible.

F61 MECHANICAL LIQUID FLOW SWITCH



## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

IP43

| CODES | RANGE | CONNECTION | | SWITCH ACTION | ADDITIONAL FEATURES |
|---|---|---|---|---|---|
| F61SB-9100 | 0,15 dm³/s - 46 dm³/s | R1" DIN2999 | (ISO R7) | SPDT contacts, 15(8) Amp 230 V~ | 4 paddles 1", 2", 3", 6" St.St. AISI 301 |
| F61SD-9150 | 0,04 dm³/s - 0,07 dm³/s | 1/2 -14 NPTF | T-body | | --- |
| F61SD-9175 | | 3/4 -14 NPTF | | | |

IP67

| CODES | RANGE | CONNECTION | | SWITCH ACTION | ADDITIONAL FEATURES |
|---|---|---|---|---|---|
| F61TB-9100 | 0,15 dm³/s - 46 dm³/s | R1" DIN2999 | (ISO R7) | SPDT contacts, 15(8) amp 220 V~ | 4 paddles, 1", 2", 3" and 6" St.St. AISI 301 |
| F61TB-9104 | | | | SPDT contacts, 0,4 Amp 15 V~ | Lowenergy gold flashcontacts<br>4 paddles, 1", 2", 3" and 6" St.St. AISI 301 |
| F61TB-9200 | | | | SPDT contacts, 15(8) Amp 220 V~ | Stainless steel body assembly<br>3 paddles 1",2",3" St.St. AISI 316L |

## ACCESSORIES FOR FLOW SWITCHES

| CODES | DESCRIPTION |
|---|---|
| PLT69-11R | F61 - 6" stainless steel AISI 301 paddle |
| KIT21A-602 | F61 - 4 paddles 1", 2", 3" and 6" St.St. AISI 301 |

# PENN COMMERCIAL REFRIGERATION

## FLOAT AND FLOW CONTROLS

### MECHANICAL LIQUID FLOW SWITCH


# F261

FLOW SWITCH FOR LIQUID

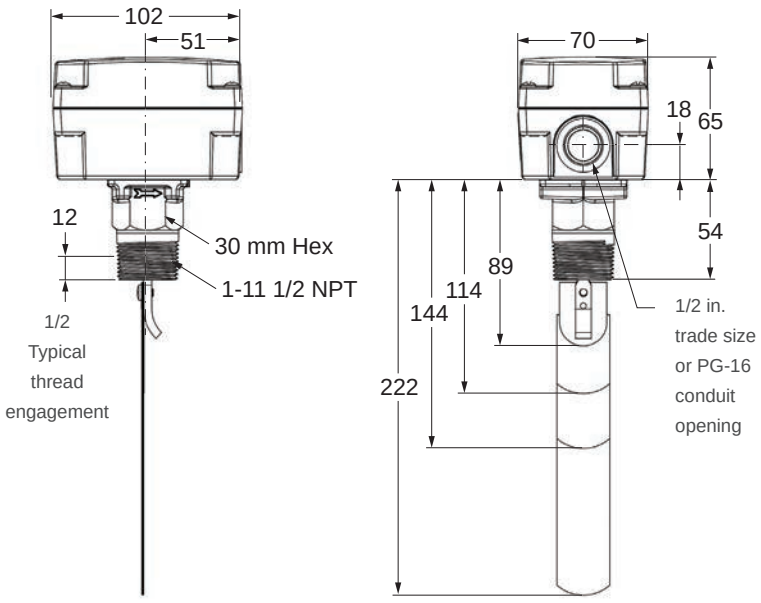
The F261 series flow switches respond to fluid flow in lines carrying water, ethylene glycol, or other nonhazardous fluids. These models also work in applications with swimming pool water and lubricating oils.

F261 series standard flow switches use a variety of paddle sizes to respond to fluid flow rates in applications with 1 inch trade size (or greater) pipe.

## FEATURES

- Type 3R (NEMA) or type 4 (NEMA) polycarbonate enclosure
- Viton® diaphragm
- Gold-plated contacts on selected models
- Maximum fluid pressure of 290 psig (20 bar)

## DIMENSIONS *(in mm)*




F261 MECHANICAL LIQUID FLOW SWITCH

# ORDERING INFORMATION

## STANDARD MODEL FLOW SWITCHES

| CODES | DESCRIPTION |
|---|---|
| F261KAH-V01C | Standard model flow switch with type 3R (NEMA) enclosure; 1 in., 2 in., 3 in., and 6 in. stainless steel paddles, lock-tooth washer, and stainless steel paddle screw supplied uninstalled |
| F261MAH-V01C | Standard model flow switch with type 4 (NEMA) enclosure; 1 in., 2 in., 3 in., and 6 in. stainless steel paddles, lock-tooth washer, and stainless steel paddle screw supplied uninstalled |

## REPLACEMENT PADDLE PARTS

| CODES | DESCRIPTION |
|---|---|
| KIT21A-602 | Stainless Steel paddles 1", 2", 3" and 6" |
| PLT69-11R | Stainless steel 6 in. paddle |

# TECHNICAL SPECIFICATIONS

## F261xxH SERIES STANDARD CONTROLS ELECTRICAL RATINGS

| Volts, 50/60 Hz | UL60730/UL1059 | | | | EN60730 | |
|---|---|---|---|---|---|---|
| | **24** | **120** | **208** | **240** | **24** | **230** |
| *Horsepower* | --- | 1 | 1 | 1 | --- | --- |
| *Full load Amperes* | --- | 16 | 10 | 10 | --- | 8 |
| *Locked rotor Amperes* | --- | 96 | 60 | 60 | --- | 48 |
| *Resistive Amperes* | 16 | 16 | 10 | 10 | 16 | 16 |
| *Pilot duty VA* | 125 | 720 | 720 | 720 | 77 | 720 |


F261 MECHANICAL LIQUID FLOW SWITCH

# TECHNICAL SPECIFICATIONS

## UL CONFORMITY DECLARATION INFORMATION

| | |
|---|---|
| Purpose of control | **F261 fluid flow switch** |
| Construction of control | Electronic independently mounted control |
| Number of cycles | 100,000 cycles |
| Method of mounting control | Mounting to sensed media vessel/orientation |
| Type 1 or type 2 action | Type 1.C (Microinterruption) |
| External pollution situation | Pollution degree 4 |
| Internal pollution situation | Pollution degree 2 |
| Rated impulse voltage | 4,000 VAC |
| Ball pressure temperature | |
| *Enclosure* | 130°C |
| *Switch component* | 122°C |
| Control adjustment instruction | --- |
| Field wiring rating | **Wire/cord temperature ratings:**<br>60°C only permitted when ambient air and media are less than 45°C<br>75°C only permitted when ambient air and media are less than 60°C<br>90°C only permitted when ambient air is less than 60°C and media is less than 75°C<br>150°C permitted when ambient air is less than 60°C and media is less than 121°C |
| Vessel pressure | F261 fluid flow switch: 290 psi (20 Bar) |

## FLUID FLOW SWITCHES

| | |
|---|---|
| Switch | SPDT |
| Enclosure | |
| *UL* | Type 3R or Type 4 |
| *CE* | IP43 (IP23 with drain hole plug removed) or IP67 |
| Wiring connections | Three color-coded screw terminals and one ground terminal |
| Conduit connection | One 22 mm hole for 1/2 in. trade size (or PG16) conduit |
| Pipe connector | Standard: 1 in. 11-1/2 NPT Threads |
| Maximum fluid pressure | 290 psi (20 bar) |
| Minimum fluid temperature [1] | -29°C |
| Maximum fluid temperature [2] | 121°C |
| Ambient conditions | -40 to 60°C |
| CE Compliance | Johnson Controls declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive. |

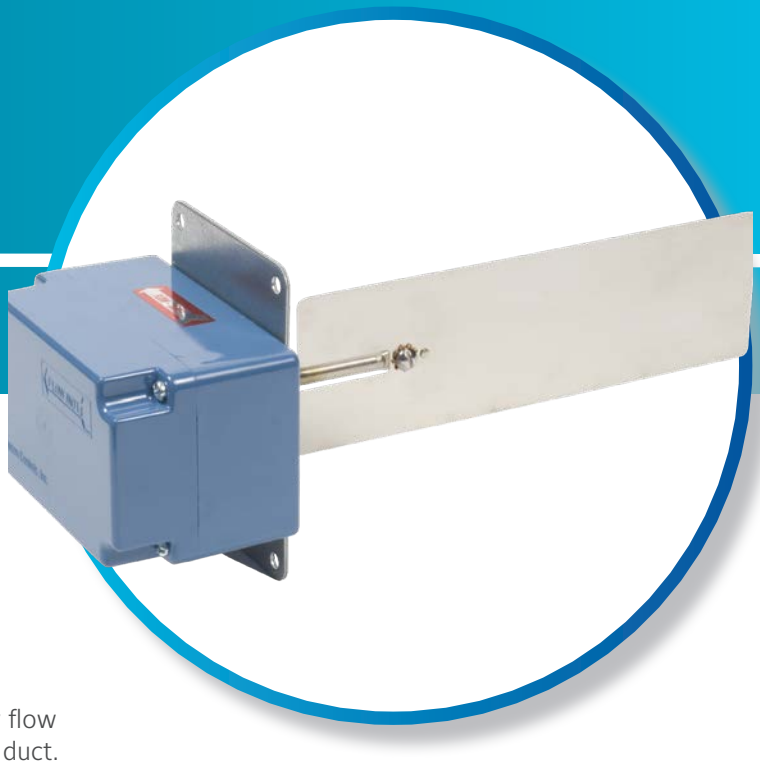
**Notes**

**1** Ensure that the low liquid temperature combined with the low ambient temperature does not lead to the freezing the liquid inside the body (or bellows, where appropriate). Please observe the liquid freezing point.

**2** At higher ambient temperatures, the maximum allowed liquid temperature becomes lower. The temperature of the electrical switch inside should not exceed 70°C.

# FLOAT AND FLOW CONTROLS

## MECHANICAL AIR FLOW SWITCH



# F62

AIR FLOW SWITCH

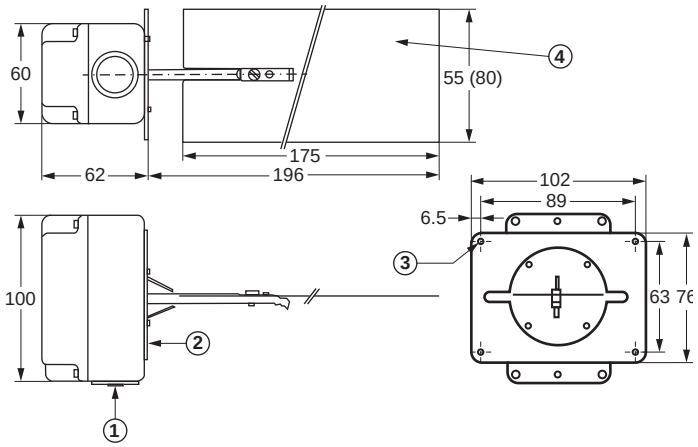
The F62 airflow switch detects air flow or the absence of air flow by responding only to the velocity of air movement within a duct.
The control can be wired to open one circuit and close a second circuit (SPDT) for either signaling or interlock purposes.
Failure of air flow during normal operation of air handling systems may cause over-heating, coil icing and other conditions that may be detrimental to the equipment.

Typical applications include make-up air systems, air cooling or heating processes and exhaust systems.

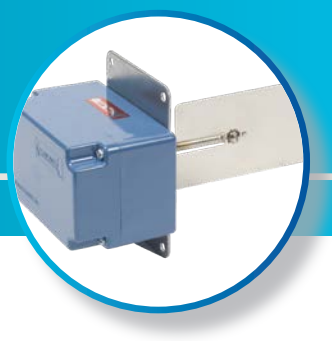
## FEATURES

- Polycarbonate IP43 enclosure
- Large wiring space
- Range screw easily accessible

## DIMENSIONS *(in mm)*




| | |
|---|---|
| 1 | Cable inlet hole Ø 22.7 mm; Dust cup is installed |
| 2 | Mounting plate gasket 0.2 mm thick neoprene cell rubber |
| 3 | Four mounting holes Ø 5 mm. |
| 4 | One paddle 55 mm wide (mounted)<br>One paddle 80 mm wide (packed with the control) |



F62 MECHANICAL AIR FLOW SWITCH

## ORDERING INFORMATION

IP43

| CODES | MAX. AIR VELOCITY | SWITCH ACTION | ENCLOSURE | ADDITIONAL FEATURES |
|---|---|---|---|---|
| F62SA –9100 | 10 m/sec | SPDT Contacts 15(8) A, 230 V~ | Plastic enclosure IP43 | With 55 mm paddle mounted, 80 mm separate |

## FLOAT AND FLOW CONTROLS

## MECHANICAL LIQUID FLOW SWITCH


# F262

AIR FLOW SWITCH

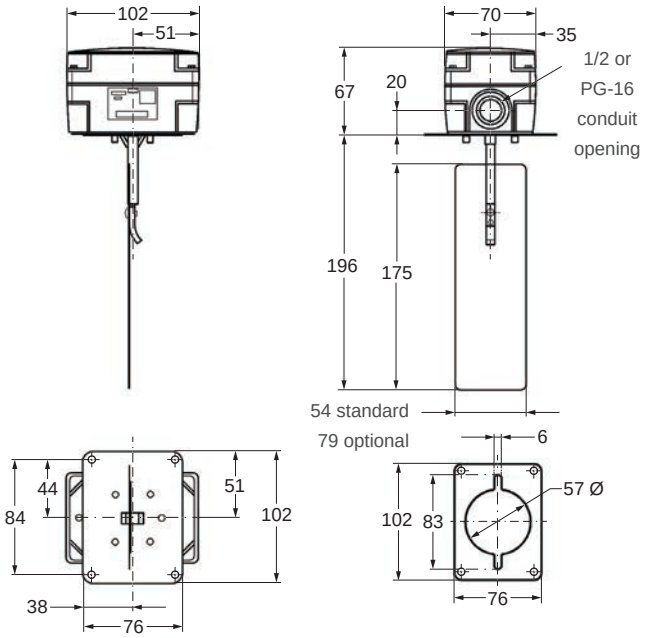
The F262 series airflow switches detect airflow or the absence of airflow by responding only to the velocity of air movement within a duct.
The single-pole, doublethrow (SPDT) switch can be wired to open one circuit and close a second circuit for either signaling or interlock purposes.

Airflow failure during the normal operation of air handling systems may cause overheating, coil icing, or other conditions that may be detrimental to the equipment.

## FEATURES

- Type 3R (NEMA) polycarbonate enclosure
- Dependable dust-protected SPDT snap-acting PENN switch
- Large wiring space
- Easily accessible range adjustment screw

## DIMENSIONS *(in mm)*



F262 MECHANICAL LIQUID FLOW SWITCH

## ORDERING INFORMATION

| CODE | DESCRIPTION |
|---|---|
| F262KDH-01C | Airflow switch with a 54 mm wide x 175 mm long paddle installed and a 79 mm wide x 175 mm long paddle supplied with the control |

## TECHNICAL SPECIFICATIONS

### ELECTRICAL RATINGS

| Volts 50/60 Hz | UL60730 | | | | EN60730 | |
|---|---|---|---|---|---|---|
| | **24** | **120** | **208** | **240** | **24** | **230** |
| Horsepower | --- | 1 | 1 | 1 | --- | --- |
| Full load Amperes | --- | 16 | 10 | 10 | --- | 8 |
| Locked rotor Amperes | --- | 96 | 60 | 60 | --- | 48 |
| Resistive Amperes | 16 | 16 | 10 | 10 | 16 | 16 |
| Plot duty VA | 125 | 720 | 720 | 720 | 125 | 720 |

| | |
|---|---|
| Switch | SPDT |
| Enclosure | |
| *UL* | Type 3R |
| *CE* | IP43 |
| Wiring connections | Three color-coded screw terminals and one ground terminal |
| Conduit connection | One 22 mm hole for 1/2 in. trade size (or PG16) conduit |
| Paddle material | 0.15 mm stainless spring steel |
| Maximum air velocity | 2,000 FPM (10.16 m/sec) |
| Maximum duct air temperature | 80°C |
| Ambient conditions | 0 to 40°C |
| CE Compliance | Johnson Controls declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive. |

F262 MECHANICAL LIQUID FLOW SWITCH

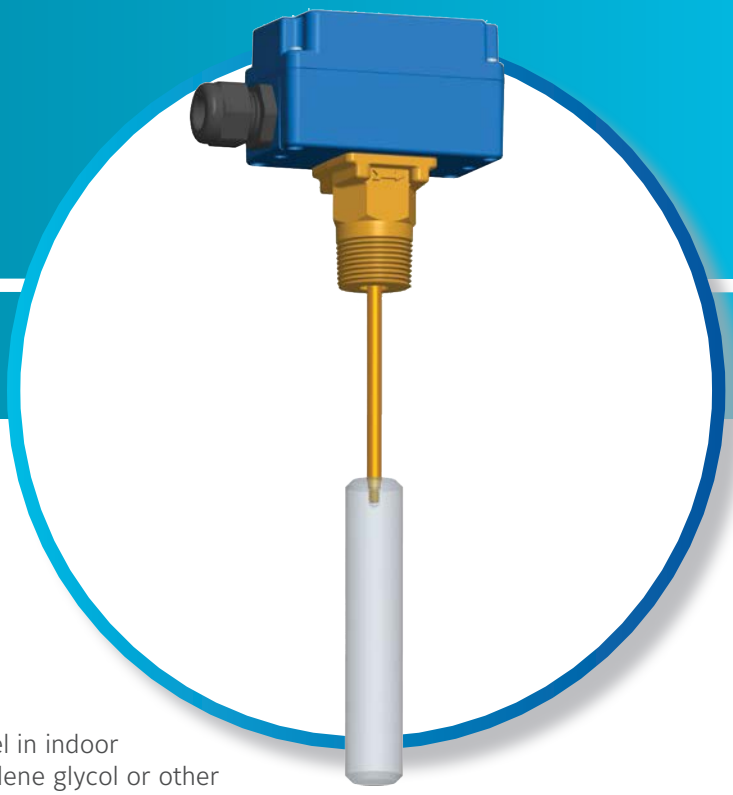
# TECHNICAL SPECIFICATIONS

## UL CONFORMITY DECLARATION INFORMATION

| | |
|---|---|
| Purpose of control | **F262 Series Airflow Switch** |
| Construction of control | Electronic independently mounted control |
| Number of cycles | 100,000 cycles |
| Method of mounting control | Mounting to sensed media vessel/orientation |
| Type 1 or type 2 action | Type 1.C (Microinterruption) |
| External pollution situation | Pollution degree 4 |
| Internal pollution situation | Pollution degree 2 |
| Rated impulse voltage | 4,000 VAC |
| Ball pressure temperature | |
| *Enclosure* | 130°C |
| *Switch component* | 122°C |
| Control adjustment instruction | --- |
| Field wiring rating | **Wire/Cord temperature ratings:**<br>60°C only permitted when ambient air and media are less than 45°C<br>75°C only permitted when ambient air and media are less than 60°C<br>90°C only permitted when ambient air is less than 60°C and media is less than 75°C<br>150°C permitted when ambient air is less than 60°C and media is less than 121°C |

## FLOAT AND FLOW CONTROLS

## MECHANICAL LIQUID LEVEL SWITCH



# F63

LIQUID LEVEL FLOAT SWITCH

The F63 liquid level switch is designed to maintain a liquid level in indoor or outdoor closed tanks holding water, chlorinated water, ethylene glycol or other non-corrosive liquids.

The switch has SPDT contacts and can be wired to close one circuit and open a second circuit when the liquid level rises above or falls below the required level.

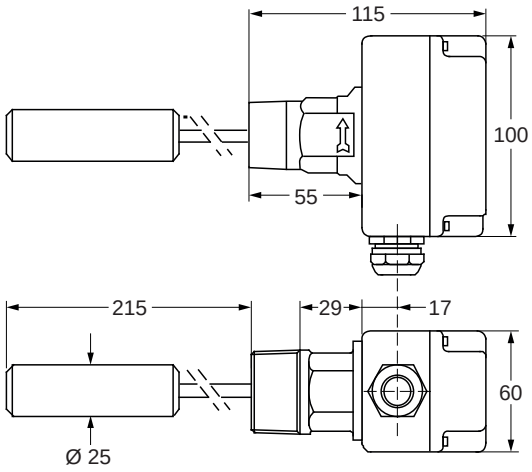
The switch maintains the liquid level within (approx.) 13 mm.

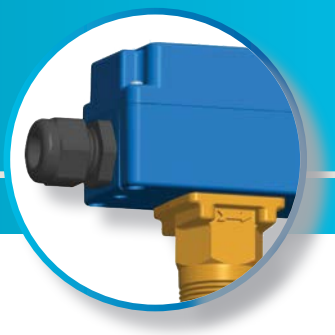
The float switch should not be used for liquids lighter than water (density less than 0.95 kg/dm$^3$).

## FEATURES

- Solid polycarbonate float
- Vapour tight IP67 enclosure
- Convenient wiring terminals

## DIMENSIONS *(in mm)*





F63 MECHANICAL LIQUID LEVEL SWITCH

## ORDERING INFORMATION

| CODE | CONNECTION | SWITCH ACTION | ENCLOSURE | ADDITIONAL FEATURES |
|---|---|---|---|---|
| F63BT-9102 | 1-11 1/2 NPT | SPDT Contacts 15(8) A, 230 V~ | Plastic enclosure IP67 | Plastic float, VITON diaphragm |

## ACCESSORY

| CODE | DESCRIPTION |
|---|---|
| FLT001N001R | F63 - Float |

# PENN COMMERCIAL REFRIGERATION

## FLOAT AND FLOW CONTROLS

## MECHANICAL LIQUID LEVEL SWITCH


# F263

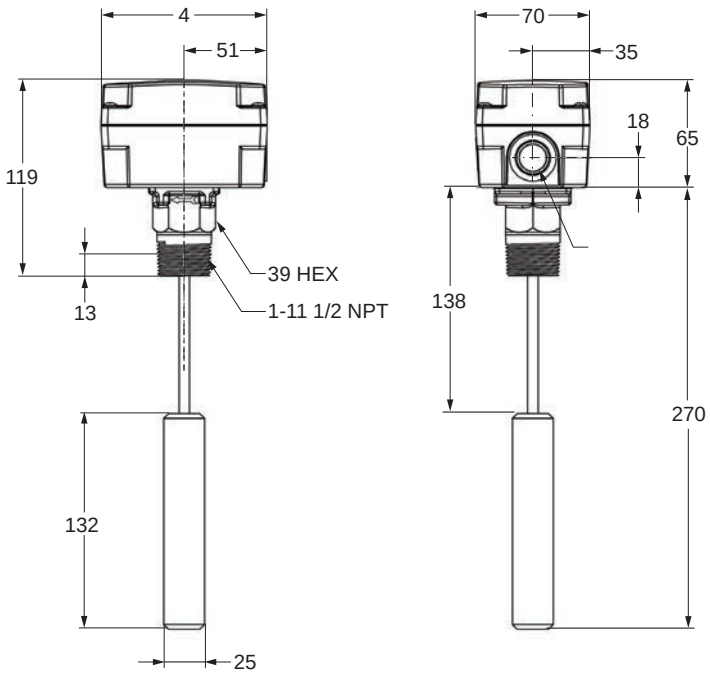
LIQUID LEVEL FLOAT SWITCH

The F263 series liquid level float switches are designed to maintain a liquid level in indoor or outdoor closed tanks that hold water or other nonhazardous liquids. When the liquid level in the tank rises above or falls below the required level, the single-pole, double-throw (SPDT) switch closes one circuit and opens a second circuit.

## FEATURES

- Viton® diaphragms
- Single-pole, double-throw switch
- Sturdy type 4 (NEMA) enclosure
- Solid polycarbonate float

## DIMENSIONS *(in mm)*



F263 - MECHANICAL LIQUID LEVEL SWITCH

## ORDERING INFORMATION

| CODE | DESCRIPTION |
|---|---|
| F263MAP-V01C | SPDT float switch with Type 4 (NEMA) enclosure and polycarbonate float for liquid temperatures -29 to 100°C); maximum liquid pressure 150 psig (1,035 kPa) |

## TECHNICAL SPECIFICATIONS

### ELECTRICAL RATINGS

| Volts 50/60 Hz | UL60730 | | | | EN60730 | |
|---|---|---|---|---|---|---|
| | **24** | **120** | **208** | **240** | **24** | **230** |
| Horsepower | --- | 1 | 1 | 1 | --- | --- |
| Full load Amperes | --- | 16 | 10 | 10 | --- | 8 |
| Locked rotor Amperes | --- | 96 | 60 | 60 | --- | 48 |
| Resistive Amperes | 16 | 16 | 10 | 10 | 16 | 16 |
| Plot duty VA | 125 | 720 | 720 | 720 | 125 | 720 |

| | |
|---|---|
| Switch | Single-Pole, Double-Throw (SPDT) |
| Enclosure | |
| *UL* | Type 4 (NEMA) |
| *CE* | IP67 |
| Wiring connections | Three color-coded screw terminals and one ground terminal |
| Conduit connection | One 22 mm hole for 1/2 in. trade size (or PG16) conduit |
| Pipe connector | 1 in. 11-1/2 NPT threads |
| Minimum tank diameter | 229 mm |
| Maximum liquid pressure | 150 psig (1,035 kPa) |
| Liquid temperature range | |
| *Minimum* | -29°C or liquid freezing point |
| *Maximum* | 100°C |
| Ambient conditions | |
| *Minimum* | -40°C |
| *Maximum* | 60°C |
| CE Compliance | Johnson Controls declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive. |

# PENN COMMERCIAL REFRIGERATION

## PRESSURE CONTROLS

## ADJUSTABLE DIFFERENTIAL PRESSURE SWITCH


# P232

SENSITIVE DIFFERENTIAL

This switch senses a change in the differential pressure (either velocity pressure or pressure drop across a restriction) as the air flow changes.
The pressure, as sensed by two sensing ports, is applied to the two sides of a diaphragm in the control. The spring loaded diaphragm moves and actuates the switch.

The series P232 can also be used to detect small positive gauge pressure by using only the high pressure connection and leaving the low pressure connector open, or to detect a vacuum by using only the low pressure connection and leaving the high pressure connector open to ambient pressure.

## FEATURES

- Easy to read setpoint scale
- Large wiring space
- Versatile mounting options

## APPLICATION

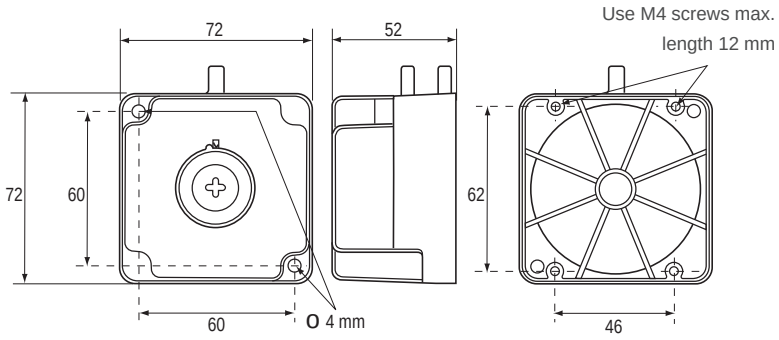
- This (differential) pressure switch is used to sense flow of air, single or differential air pressure

Typical applications include:

- Clogged filter detection
- Detection of frost on air conditioning coils and initiation of defrost cycle
- Air proving in heating or ventilation ducts
- Maximum air flow controller for variable air volume system

P232 - ADJUSTABLE DIFFERENTIAL PRESSURE SWITCH

## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

| CODE | SWITCH POINT RANGE *(in Wc)* | SWITCHING DIFFERENTIAL *(in Wc)* | PACK |
|---|---|---|---|
| P232A-B-AAC | 0,2 to 1,6 | < 0.1 | ind. |

**Note**

Other models on request, range up to 20 inWC

# PENN COMMERCIAL REFRIGERATION

## PRESSURE CONTROLS

## ADJUSTABLE DIFFERENTIAL PRESSURE SWITCH


# P233

SENSITIVE DIFFERENTIAL

This switch senses a change in the (differential) pressure as the airflow changes. The (differential) pressure is applied to the two sides of a diaphragm in the control.

The spring-loaded diaphragm moves and actuates the switch.
The series P233A/F can also be used to detect small positive gauge pressure or to detect a vacuum.

## FEATURES

- One switch to measure relative pressure, vacuum or differential pressure
- Various accessories available
- Compact and durable construction
- Easy mounting and wiring, various mounting possibilities
- Standard PG 11 nipple and optional DIN 43650 connector
- Accurate and stable switch point
- SPDT contact standard

## APPLICATION

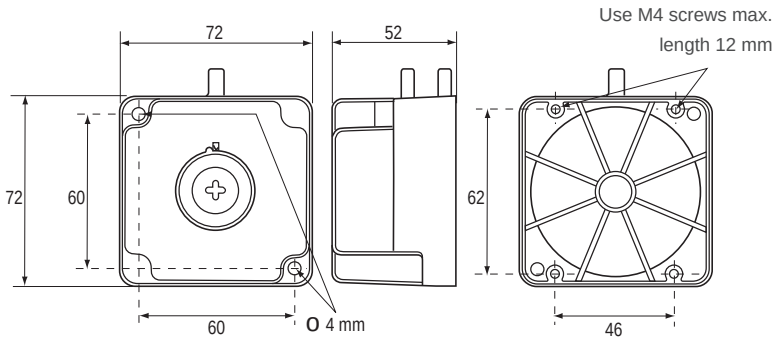
- This (differential) pressure switch is used to sense flow of air, single or differential air pressure

Typical applications include:

- Detect clogged filter
- Detect frost or ice build-up on air conditioning coils
- Air proving in heating or ventilation ducts
- Maximum airflow controller for variable air volume system
- Detect blocked flue or vent
- Monitor fan operation

# P233 ADJUSTABLE DIFFERENTIAL PRESSURE SWITCH

## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

| CODES | SWITCH POINT RANGE (mbar) | SWITCHING DIFFERENTIAL (mbar) [2] | CONTACTS | PACK | ADDITIONAL FEATURES |
|---|---|---|---|---|---|
| P233F-P3-AAC | 0,3 fixed | < 0.3 | SPDT contacts, Contact rating 5(2) A 250 VAC | Ind. | --- |
| P233A-4-AAC | 0,5 to 4 | | | | --- |
| P233A-4-AAD [1] | | | | Bulk | --- |
| P233A-4-AHC | | | | Ind. | GMT008N600R + BKT024N002R |
| P233A-4-PAD [1] | 50 to 400 Pa | | | Bulk | Scale in Pa |
| P233A-4-PAC | | | | Ind. | --- |
| P233A-4-PHC | | | | | Scale in Pa, GMT008N600R + BKT024N002R |
| P233A-4-PKC | | | | | Scale in Pa, FTG015N602R (2x) + 2 m tube 4/7 mm |
| P233A-4-AKC | 0,5 to 4 | | | | FTG015N602R (2x) + 2 m tube 4/7 mm |
| P233A-6-AAC | 0,5 to 6 | | | Ind. | --- |
| P233A-6-AAD [1] | | | | Bulk | |
| P233A-10-AAC | 1,4 to 10 | < 0.5 | | Ind. | --- |
| P233A-10-AHC | | | | | GMT008N600R + BKT024N002R |
| P233A-10-PAC | 140 to 1000 Pa | | | | --- |
| P233A-10-PKC | | | | | Scale in Pa, FTG015N602R (2x) + 2 m tube 4/7 mm |
| P233A-10-AAD [1] | 1,4 to 10 | | | Bulk | --- |
| P233A-10-AKC | | | | Ind. | FTG015N602R (2x) + 2 m tube 4/7 mm |
| P233A-50-AAC | 6 to 50 | < 1 | | | |
| P233A-10-PHC | 140 to 1000 Pa | < 0,5 | | | Scale in Pa, GMT008N600R + BKT024N002R |

**Notes**

**1** Quantity orders only

**2** Switching differential is maximum value mid-range

# PENN COMMERCIAL REFRIGERATION

## PRESSURE CONTROLS

## ADJUSTABLE DIFFERENTIAL PRESSURE SWITCH


# P74

DIFFERENTIAL PRESSURE

The P74 series of differential pressure switches incorporate two opposing pressure elements and an adjustable range setpoint spring with a calibrated scale.

The control switches at the indicated setpoint on an increase in differential pressure and switches back to the normal position when the different pressure decreases to the setpoint less the mechanical switching differential.

## FEATURES

- Heavy duty pressure elements.
- These controls may be used in combination with series P28 lube oil protection control on two compressor, single motor units.

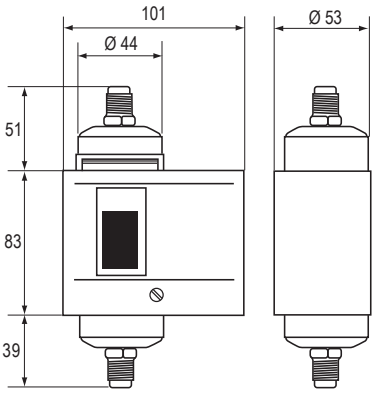
## APPLICATION

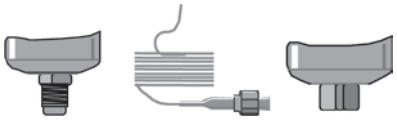
These controls are designed to sense pressure differences between two points and may be used as operating or limit controls.

Typical applications are to detect flow across a chiller or water cooled condenser, to detect flow in a heating system and sensing lube oil pressure differential on refrigeration compressors.

P74 ADJUSTABLE DIFFERENTIAL PRESSURE SWITCH

## DIMENSIONS *(in mm)*



**Style 5** **Style 13** **Style 15**

## ORDERING INFORMATION

| CODES | RANGE *(bar)* | MECH. DIFFERENTIAL *(bar)* | STYLE | SWITCH ACTION | ADDITIONAL FEATURES |
|---|---|---|---|---|---|
| P74DA-9300 | 0.6 to 4.8 | 0.7 to 2 adj. | 5 | DPST, 10A, contacts open low | --- |
| P74DA-9600 | | | 13 | | |
| P74EA-9300 | | 0.3 fix. | 5 | SPDT, 5 A, contact open high | |
| P74EA-9700 | | | 15 | SPDT, 8 A, contact open high | For NH3 |
| P74EA-9701 | | | | | Set 1 bar, concealed adjustment, for NH3 |
| P74FA-9700 | 0 to 1 | 0.1 fix. | | SPDT, 3 A, contact open high | For water |
| P74FA-9701 | 2 to 8 | 0.7 fix. | | | For NH3 |

# PENN COMMERCIAL REFRIGERATION

## PRESSURE CONTROLS

## ADJUSTABLE PRESSURE SWITCH


# P735

SINGLE PRESSURE

The P735 series pressure controls may be used for control functions or limit functions, depending on model number. All models are provided with alarm contacts. All standard models have phosphor bronze bellows and brass pressure connections. Models for use with ammonia are provided with stainless steel bellows and connectors.

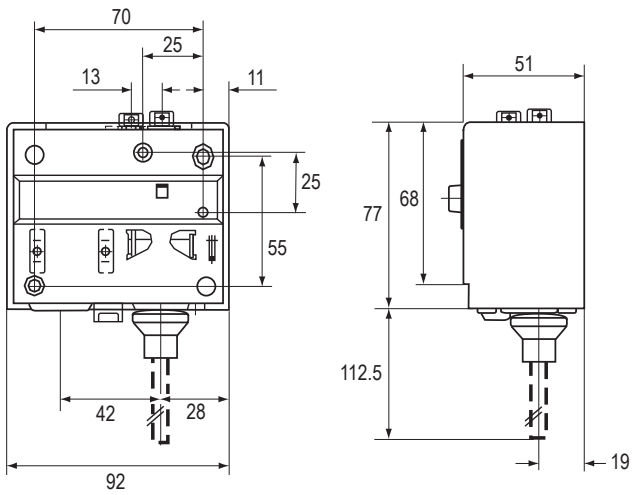
## FEATURES

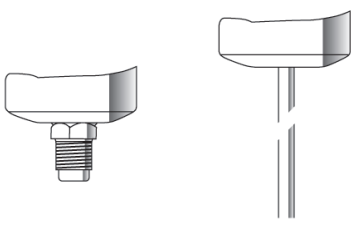
- Generous wiring space
- SPDT contacts are provided as standard on single pressure controls
- Trip-free manual reset
- Wetted materials approved for use with standard non-corrosive and (mild) flammable A2L / A3 refrigerants

## APPLICATION

These pressure controls are designed for use in a variety of applications involving refrigeration high or low pressure. Models supplied have a "whole range" design, enabling them to be used with all non-corrosive refrigerants which are within the operating range of the control. They may also be used for other high or low pressure applications such as air, water etc. Models which can be used with ammonia are included in the program.

## DIMENSIONS *(in mm)*



Style 5 Style 28


P735 ADJUSTABLE PRESSURE SWITCH

## ORDERING INFORMATION

### FOR WATER

| CODE | RANGE *(bar)* | DIFFERENTIAL *(bar)* | SWITCH ACTION (WIRE DIAG.) | MAX. BELLOWS PRESSURE | SPECIAL PRESSUE CONNECTION G¼" FEMALE |
|---|---|---|---|---|---|
| | | | | | Ind. pack. |
| P735AAA | -0,2 to 10 | 1 to 4,5 | 1 | 15 | -9200 |
| | -0,5 to 7 | 0,6 to 3 | 1 | 22 | -9201 |

### FOR NON-CORROSIVE REFRIGERANTS

| CODES | RANGE *(bar)* | DIFFERENTIAL *(bar)* | SWITCH ACTION (WIRE DIAG.) | MAX. BELLOWS PRESSURE | STYLE 5 | |
|---|---|---|---|---|---|---|
| | | | | | Ind. pack. | Bulkpack |
| P735AAA | -0.5 to 7 | 0.6 to 3 | 1 | 22 | -9300 | -9320 |
| | 3 to 30 | 3 to 12 | 2 | 33 | -9350 | -9370 |
| | 3.5 to 21 | 2.1 to 5.5 | 2 | 30 | -9351 | --- |

### FOR NON-CORROSIVE REFRIGERANTS TYPE APPROVED PRESSURE LIMITER/PRESSURE CUT OUT

| CODES | RANGE *(bar)* | DIFFERENTIAL *(bar)* | SWITCH ACTION (WIRE DIAG.) | MAX. BELLOWS PRESSURE | STYLE 5 | | STYLE 28 | PED APPROVAL |
|---|---|---|---|---|---|---|---|---|
| | | | | | Ind. pack. | Bulkpack | Ind. pack. | |
| P735AAW | -0.5 to 7 | 0.6 to 3 | 1 | 22 | -9300 | -9320 | -9800 | --- |
| | 3 to 30 | 3.5 to 12 | 2 | 33 | -9350 | -9370 | -9850 | ■ |
| P735BEB | 3 to 30 | Man. res. [1] | 3 | 33 | --- | -9370 | --- | |

**Notes**

**1** Resetable at 3.5 bar below cut-out point

# PENN COMMERCIAL REFRIGERATION

## PRESSURE CONTROLS

## ADJUSTABLE PRESSURE SWITCH


# P736

DUAL PRESSURE

The P736 series pressure controls may be used for control functions or limit functions, depending on model number. All models are provided with alarm contacts (except P736ALA). All standard models have phosphor bronze bellows and brass pressure connections. Models for use with ammonia are provided with stainless steel bellows and connectors.

## FEATURES

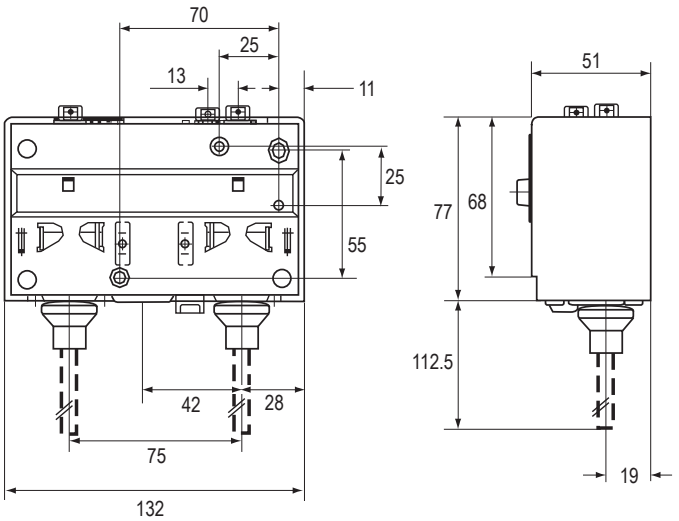
- Generous wiring space
- Trip-free manual reset
- Separate alarm contacts for both low pressure and high pressure cut-out (except P736ALA)
- Wetted materials approved for use with standard non-corrosive and (mild) flammable A2L / A3 refrigerants

## APPLICATION

These dual pressure controls are designed for use in a variety of applications involving refrigeration high or low pressure.

Models supplied have a "whole range" design, enabling them to be used all non-corrosive refrigerants which are within the operating range of the control. They may also be used for other high or low pressure applications such as air, water etc. Models which can be used with ammonia are included in the program.

## DIMENSIONS *(in mm)*




Style 5



Style 28


P736 ADJUSTABLE PRESSURE SWITCH

## ORDERING INFORMATION

### FOR NON-CORROSIVE REFRIGERANTS

| CODES | LEFT SIDE | | RIGHT SIDE | | CONTRUCTION LP/HP (MAX. PRESS.) | STYLE 5 | |
|---|---|---|---|---|---|---|---|
| | Range (bar) | Diff. (bar) | Range (bar) | Diff. (bar) | | Ind. pack. | Bulkpack |
| P736LCA | -0.5 to 7 | 0.6 to 3 | 3 to 30 | 3 (fixed) | LP: 22 bar HP: 33 bar | -9300 | -9320 |
| P736MCA | | | | Man. Res. [2] | | --- | |

### FOR NON-CORROSIVE REFRIGERANTS TYPE APPROVED PRESSURE LIMITER/PRESSURE CUT OUT

| CODES | LEFT SIDE | | RIGHT SIDE | | CONTRUCTION LP/HP (MAX. PRESS.) | STYLE 5 | | STYLE 28 | PED APPROVAL |
|---|---|---|---|---|---|---|---|---|---|
| | Range (bar) | Diff. (bar) | Range (bar) | Diff. (bar) | | Ind. pack. | Bulkpack | Ind. pack. | |
| P736LCW | -0.5 to 7 | 0.6 to 3 | 3 to 30 | 3 (fixed) | LP: 22 bar HP: 33 bar | -9300 | -9320 | -9800 | ■ |
| P736MCB | -0.5 to 7 | 0.6 to 3 | 3 to 30 | Man. Res. [1] | | -9300 | **** | --- | |

**Notes**

**1** Resetable at 0.5 bar above cut-out point

**2** Resetable at 3 bar below cut-out point

100 kPa = 1 bar ≈ 14.5 psi

# PENN COMMERCIAL REFRIGERATION

## PRESSURE CONTROLS

## ADJUSTABLE PRESSURE SWITCH


# P77

SINGLE PRESSURE, IP54

The P77 series pressure controls may be used for control functions or limit functions, depending on model number. All models are provided with alarm contacts. All standard models have phosphor bronze bellows and brass pressure connections.
Models for use with ammonia are provided with stainless steel bellows and connectors. Devices conforming to PED 2014/68/EU Cat. IV (HP models) have the fail-safe function with double bellows.

Their IP54 classification means that these pressure controls are suitable for almost all applications.

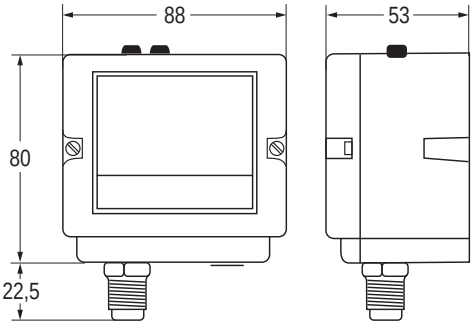
## FEATURES

- Generous wiring space
- Splash-proof enclosure (IP54)
- SPDT contacts are provided as standard on single pressure controls.
- Trip-free manual reset
- High refrigerant pressure. Suitable for R410A and CO2 subcritical applications.
- Wetted materials approved for use with standard and (mild) flammable A2L / A3 refrigerants

## APPLICATION

These pressure controls are designed for use in a variety of applications involving refrigeration high or low pressure. Models supplied have a "whole range" design, enabling them to be used with refrigerants R22, R134A, R404A, R410A, R290 and $CO_2$ sub-critical and all other non-corrosive refrigerants which are within the operating range of the control. They may also be used for other high or low pressure applications such as air, water etc. Models which can be used with ammonia are included in the program. Also models tested and approved to PED 2014/68/EU Cat. IV (supersedes DIN and TUV approval) are included in the program.

## DIMENSIONS *(in mm)*





P77 ADJUSTABLE PRESSURE SWITCH

## ORDERING INFORMATION

### FOR NON-CORROSIVE REFRIGERANTS

| FAMILY CODES | STYLE 5 | | STYLE 28 | STYLE 30 | STYLE 35 | RANGE *(bar)* | DIFF. *(bar)* | MAX BELLOWS PRESSURE |
|---|---|---|---|---|---|---|---|---|
| | Ind. pack. | Bulkpack | Bulkpack | Ind. pack. | Ind. pack. | | | |
| P77AAA | -9300 | -9320 | -9800 | -9400 | -9500 | -0.5 to 7 | 0.6 to 3 | 22 |
| | -9301 | --- | --- | --- | --- | -0.2 to 10 | 1 to 4.5 | 15 |
| | -9302 | --- | --- | --- | --- | -0.3 to 2 | 0.4 to 1.5 | 4 |
| | -9350 | -9370 | -9850 | -9450 | -9550 | 3 to 30 | 3 to 12 | 33 |
| | -9351 | -9371 | --- | -9451 | --- | 3.5 to 21 | 2.1 to 5.5 | 30 |
| P77BCA | -9300 | --- | --- | --- | --- | -0.5 to 7 | Man. res. [1] | 22 |
| P77BEA | -9350 | --- | --- | -9450 | --- | 3 to 30 | Man. res. [2] | 33 |

### FOR AMMONIA AND NON-CORROSIVE REFRIGERANTS

| FAMILY CODES | STYLE 15 | | RANGE *(bar)* | DIFF. *(bar)* | MAX BELLOWS PRESSURE |
|---|---|---|---|---|---|
| | Ind. pack. | Bulkpack | | | |
| P77AAA | -9700 | --- | -0.5 to 7 | 0.6 to 3 | 14 |
| | -9750 | --- | 3 to 30 | 3.5 to 12 | 33 |
| P77BCA | -9700 | --- | -0.5 to 7 | Man res. [1] | 14 |
| P77BEA | -9750 | --- | 3 to 30 | Man. res. [2] | 33 |

### FOR NON-CORROSIVE REFRIGERANTS (PRESSURE LIMITER, PRESSURE CUT-OUT, SAFETY PRESSURE CUT-OUT, INCLUDING LOCKPLATE ASSY)

| FAMILY CODES | STYLE 5 | | STYLE 28 | RANGE *(bar)* | DIFF. *(bar)* | MAX BELLOWS PRESSURE | APPROVED ACCORDING TO PED 2014/68/EU CAT. IV |
|---|---|---|---|---|---|---|---|
| | Ind. pack. | Bulkpack | Ind. pack. | | | | |
| P77AAW | -9300 | -9320 | -9800 | -0.5 to 7 | 0.6 to 3 | 22 | --- |
| | -9350 | -9370 | -9850 | 3 to 30 | 3.5 to 12 | 33 | ■ |
| | -9355 | --- | -9855 | 3 to 42 | 5 to 15 | 47.6 | |
| P77BCB | -9300 | --- | -9800 | -0.5 to 7 | Man. res. [1] | 22 | --- |
| P77BEB | -9350 | -9370 | -9850 | 3 to 30 | Man. res. [3] | 33 | ■ |
| | -9355 | --- | -9855 | 3 to 42 | Man. res. [4] | 47.6 | |
| P77BES | -9350 | -9370 | -9850 | 3 to 30 | Man. res. [3] | 33 | |

**Notes**

**1** Resetable at 0.5 bar above cut-out point
**2** Resetable at 3 bar below cut-out point
**3** Resetable at 3.5 bar below cut-out point
**4** Resetable at 5 bar below cut-out point
100 kPa = 1 bar ≈ 14.5 psi


## ORDERING INFORMATION

### FOR AMMONIA AND NON-CORROSIVE REFRIGERANTS (PRESSURE LIMITER, PRESSURE CUT-OUT, SAFETY PRESSURE CUT-OUT, INCLUDING LOCKPLATE ASSY)

| FAMILY CODES | STYLE 15 | | RANGE *(bar)* | DIFF. *(bar)* | MAX BELLOWS PRESSURE | APPROVED ACCORDING TO PED 2014/68/EU CAT. IV |
|---|---|---|---|---|---|---|
| | Ind. pack. | Bulkpack | | | | |
| P77AAW | -9700 | --- | -0.5 to 7 | 0.6 to 3 | 14 | --- |
| | -9750 | --- | 3 to 30 | 3.5 to 12 | 33 | |
| P77BEB | -9750 | --- | 3 to 30 | Man. res. [3] | 33 | ■ |
| P77BES | -9750 | --- | 3 to 30 | Man. res. [3] | 33 | |

### FOR HAZARDOUS LOCATION APPLICATION AND NON-CORROSIVE REFRIGERANTS (PRESSURE LIMITER, INCLUDING LOCKPLATE ASSY) – ATEX CERTIFIED

| FAMILY CODES | STYLE 28 | | RANGE *(bar)* | DIFF. *(bar)* | PRESSURE CONNECTION | MAX BELLOWS PRESSURE | APPROVED ACCORDING TO PED 2014/68/EU CAT. IV |
|---|---|---|---|---|---|---|---|
| | Ind. pack. | Bulkpack | | | | | |
| P77XAAW | -18000C | -18000D | -0.5 to 7 | 0.6 to 3 | 6 mm Ø copper tube | 22 | --- |
| | -18500C | -18500D | 3 to 30 | 3.5 to 12 | | 33 | ■ |

**Notes**

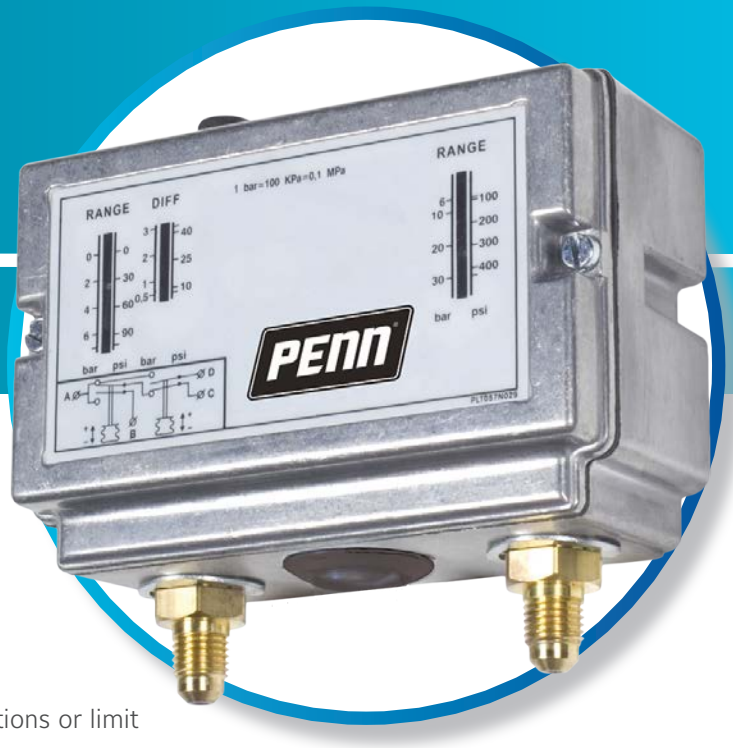
**1** Resetable at 0.5 bar above cut-out point
**2** Resetable at 3 bar below cut-out point
**3** Resetable at 3.5 bar below cut-out point
**4** Resetable at 5 bar below cut-out point

100 kPa = 1 bar ≈ 14.5 psi

# PENN COMMERCIAL REFRIGERATION

## PRESSURE CONTROLS

## ADJUSTABLE PRESSURE SWITCH




# P78

DUAL PRESSURE, IP54

The P78 series pressure controls may be used for control functions or limit functions, depending on model number.
All models are provided with alarm contacts (except P78ALA). All standard models have phosphor bronze bellows and brass pressure connections. Models for use with ammonia are provided with stainless steel bellows and connectors. Devices conforming to PED 2014/68/EU Cat. IV have a double bellows on the high pressure versions.
Their IP54 classification means that these pressure controls are suitable for almost all applications.

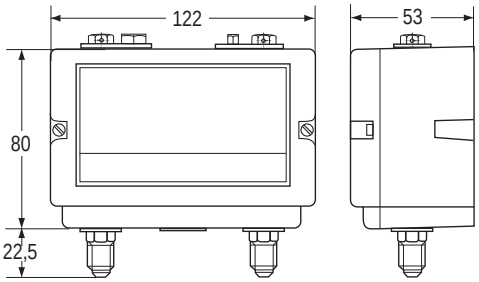
## FEATURES

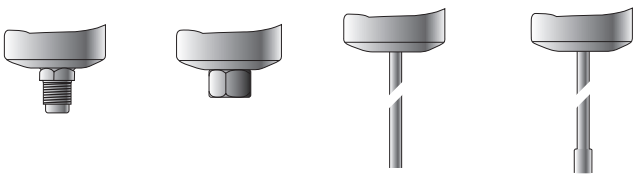
- High refrigerant pressure. Suitable for R410A and $CO_2$ subcritical applications.
- Models with gold plated contacts available
- Generous wiring space
- Splash-proof enclosure (IP54)
- Trip-free manual reset
- Patented separate alarm contacts for both low pressure and high pressure cut-out (except P78ALA)
- Wetted materials approved for use with standard and (mild) flammable A2L / A3 refrigerants

## APPLICATION

These pressure controls are designed for use in a variety of applications involving refrigeration high or low pressure. Models supplied have a "whole range" design, enabling them to be used with refrigerants R22, R134A, R404A, R410A, $CO_2$ sub-critical and all other non-corrosive refrigerants which are within the operating range of the control. They may also be used for other high or low pressure applications such as air, water etc. Models which can be used with ammonia are included in the program. Also models tested and approved to PED 2014/68/EU Cat. IV (supersedes DIN and TUV approval) are included in the program.

## DIMENSIONS *(in mm)*



Style 5 Style 15 Style 28 Style 30


P78 - ADJUSTABLE PRESSURE SWITCH

# ORDERING INFORMATION

## DUAL PRESSURE CONTROLS FOR NON-CORROSIVE REFRIGERANTS

| FAMILY CODES | PRESSURE CONNECTION | | | LEFT SIDE | | RIGHT SIDE | | CONSTRUCTION LP/HP (MAX. PRESS.) |
|---|---|---|---|---|---|---|---|---|
| | Style 5 | | Style 30 | Range (bar) | Diff. (bar) | Range (bar) | Diff. (bar) | |
| | Ind. Pack. | Bulkpack | Ind. Pack. | | | | | |
| P78LCA | -9300 | -9320 | -9400 | -0.5 to 7 | 0.6 to 3 | 3 to 30 | 3 (fixed) | LP: 22 bar<br>HP: 33 bar |
| P78MCA | -9300 | --- | -9400 | -0.5 to 7 | 0.6 to 3 | 3 to 30 | Man. Res. [3] | |
| P78PGA | -9300 | [1] | -9400 | -0.5 to 7 | Man. Res [2] | 3 to 30 | Man. Res. [3] | |

## FOR AMMONIA AND NON-CORROSIVE REFRIGERANTS

| FAMILY CODES | PRESSURE CONNECTION | | LEFT SIDE | | RIGHT SIDE | | CONSTRUCTION LP/HP (MAX. PRESS.) | APPROVED ACCORDING TO PED 2014/68/EU CAT. IV |
|---|---|---|---|---|---|---|---|---|
| | Style 15 | | Range (bar) | Diff. (bar) | Range (bar) | Diff. (bar) | | |
| | Ind. pack. | Bulkpack | | | | | | |
| P78LCA | -9700 | [1] | -0.5 to 7 | 0.6 to 3 | 3 to 30 | 3 (fixed) | LP: 14 bar<br>HP: 33 bar | --- |
| P78MCA | -9700 | [1] | -0.5 to 7 | 0.6 to 3 | 3 to 30 | Man. res. [3] | | |
| P78PGA | -9700 | [1] | -0.5 to 7 | Man. res [2] | 3 to 30 | Man. res. [3] | | |
| P78PLM | -9750 | [1] | 3 to 30 | Man. res [4] | 3 to 30 | Man. res. [4] | | ■ |

## FAN CYCLING CONTROLS FOR AIR-COOLED CONDENSERS (NON-CORROSIVE REFRIGERANTS)

| FAMILY CODES | PRESSURE CONNECTION | | | LEFT SIDE | | RIGHT SIDE | | CONSTRUCTION HP (MAX. PRESS.) |
|---|---|---|---|---|---|---|---|---|
| | Style 5 | | Style 30 | Range (bar) | Diff. (bar) | Range (bar) | Diff. (bar) | |
| | Ind. pack. | Bulkpack | Ind. pack. | | | | | |
| P78ALA | -9351 | [1] | -9451 | 3.5 to 21 | 1.8 (fixed) | 3.5 to 21 | 1.8 (fixed) | HP: 30 bar |

**Notes**

**1** Can be set-up for quantity orders
**2** Resetable at 0.5 bar above cut-out point
**3** Resetable at 3 bar below cut-out point
**4** Resetable at 3.5 bar below cut-out point


## ORDERING INFORMATION

### FOR NON-CORROSIVE REFRIGERANTS, TYPE APPROVED PRESSURE LIMITER/PRESSURE CUT OUT/ SAFETY PRESSURE CUT OUT

| FAMILY CODES | PRESSURE CONNECTION | | | LEFT SIDE | | RIGHT SIDE | | CONSTRUCTION LP/HP (MAX. PRESS.) | APPROVED ACCORDING TO PED 2014/68/EU CAT. IV |
|---|---|---|---|---|---|---|---|---|---|
| | Style 5 | | Style 28 | | | | | | |
| | Ind. pack. | Bulkpack | Ind. pack. | Range *(bar)* | Diff. *(bar)* | Range *(bar)* | Diff. *(bar)* | | |
| P78LCW | -9300 | -9320 | -9800 | -0.5 to 7 | 0.6 to 3 | 3 to 30 | 3 (fixed) | LP: 22 bar HP: 33 bar | ■ |
| P78MCB | -9300 | -9320 | -9800 | -0.5 to 7 | 0.6 to 3 | 3 to 30 | Man. res. [4] | | |
| P78MCS | -9300 | --- | --- | -0.5 to 7 | 0.6 to 3 | 3 to 30 | Man. res. [4] | | |
| P78PGB | -9300 | [1] | -9800 | -0.5 to 7 | Man. res. [2] | 3 to 30 | Man. res. [4] | | |
| P78PLM | -9350 | [1] | -9850 | 3 to 30 | Man. res. [4] | 3 to 30 | Man. res. [4] | | |

### DUAL PRESSURE CONTROLS FOR NON-CORROSIVE REFRIGERANTS, TYPE APPROVED PRESSURE LIMITER/PRESSURE CUT OUT/SAFETY PRESSURE CUT OUT

| FAMILY CODES | PRESSURE CONNECTION | LEFT SIDE | | RIGHT SIDE | | CONSTRUCTION LP/HP (MAX. PRESS.) | APPROVED ACCORDING TO PED 2014/68/EU CAT. IV |
|---|---|---|---|---|---|---|---|
| | Style 5 | | | | | | |
| | Ind. pack. | Range *(bar)* | Diff. *(bar)* | Range *(bar)* | Diff. *(bar)* | | |
| P78LCW | -9355 | -0.2 to 10 | 1 to 4.5 | 3 to 42 | 4 (fixed) | LP: 15 bar HP: 47.6 bar | ■ |
| P78MCB | -9355 | -0.2 to 10 | 1 to 4.5 | 3 to 42 | Man. res. [5] | | |
| P78PLM | -9355 | 3 to 42 | Man. res. [5] | 3 to 42 | Man. res. [5] | | |

### DUAL PRESSURE CONTROL FOR HAZARDOUS LOCATION APPLICATION AND NON-CORROSIVE REFRIGERANTS – ATEX CERTIFIED

| FAMILY CODE | PRESSURE CONNECTION | | LEFT SIDE | | RIGHT SIDE | | APPROVED ACCORDING TO PED 2014/68/EU CAT. IV |
|---|---|---|---|---|---|---|---|
| | Style 28 | | | | | | |
| | Ind. pack. | Bulkpack | Range (bar) | Diff. (bar) | Range (bar) | Diff. (bar) | |
| P78XLCW | -18000C | -18000D | -0.5 to 7 | 0.6 to 3 | 3 to 30 | 3 (fixed) | ■ |

**Notes**

**1** Can be set-up for quantity orders
**2** Resetable at 0.5 bar above cut-out point
**3** Resetable at 3 bar below cut-out point
**4** Resetable at 3.5 bar below cut-out point
**5** Resetable at 5 bar below cut-out point

# PENN COMMERCIAL REFRIGERATION

## PRESSURE CONTROLS

## FIXED SETTING PRESSURE SWITCH


# P100

DIRECT MOUNT PRESSURE SWITCH

The P100 series are encapsulated, non-adjustable, direct mount pressure controls typically used for low and high-pressure cut-outs for OEM applications.
The P100 series are produced according to switchpoint requirements of customers. The small dimensions, weight and protection class makes the P100 series applicable for use without the need of additional mounting brackets.

The P100 series can be used for all non-corrosive refrigerants like R134a; R32; R404, R410A, R290 (Propane), R600, R1234, R744 ($CO_2$) and many others.

## FEATURES

- Compact size and light weight
- Encapsulated, dust tight switch IP67
- Broad variety of electrical and pressure connections
- Manual reset models have a trip-free design
- Models with gold-plated contacts available upon request
- Approved according to PED 2014/68/EU Cat. IV
- ATEX Certified models available

## APPLICATION

- Computer room air conditioning
- Refrigeration/Air conditioning condensers
- Commercial refrigeration
- Ice machines
- Food service equipment

P100 FIXED SETTING PRESSURE SWITCH

# ORDERING CODES

## LOW PRESSURE AUTOMATIC RESET MODELS

More models are available. This is only a selection. For quantity orders customized models can be set up.
Tolerances apply. For details and inquiries contact your Johnson Controls representative.

| CODES | FUNCTION | SETPOINTS *(bar g)* | | PRESSURE PORT | CABLE *(cm)* | SWITCH |
|---|---|---|---|---|---|---|
| | | Open | Close | | | |
| P100AP-315D | Contact opens on pressure drop | 0,3 | 0,7 | 1/4" SAE Fem. Flare | 200 | SPST Standard Duty |
| P100AP-85D | | | 1,4 | | 122 | |
| P100AP-50D | | | 2,2 | | 76 | |
| P100AP-57D | | 0,5 | 2,0 | | 200 | |
| P100AP-305D | | | 3,0 | 6 mm Brazing Tube | | |
| P100AP-310D | | 0,7 | 2,2 | 1/4" SAE Fem. Flare | 300 | |
| P100AP-322D | | 1,5 | 2,5 | | 200 | |
| P100AP-25D | | | 3,0 | 6 mm Brazing Tube | 183 | |
| P100AP-318D | | 2,0 | 3,3 | 1/4" SAE Fem. Flare | 200 | |
| P100AP-300D | | 2,5 | 4,0 | | | |
| P100AP-302D | | 4,0 | 6,0 | | | |
| P100AP-100D | | 7,0 | 10,0 | | 46 | |
| P100AP-101D | | | | 6 mm Brazing Tube | 122 | |
| P100AP-311D | | 10,3 | 15,5 | 1/4" SAE Fem. Flare | 300 | |
| P100AP-323D | | 14,0 | 19,0 | | 200 | |

## HIGH PRESSURE AUTOMATIC RESET MODELS

More models are available. This is only a selection. For quantity orders customized models can be set up.
Tolerances apply. For details and inquiries contact your Johnson Controls representative.

| CODES | FUNCTION | SETPOINTS *(bar g)* | | PRESSURE PORT | CABLE *(cm)* | SWITCH |
|---|---|---|---|---|---|---|
| | | Open | Close | | | |
| P100CP-102D | Contact opens on pressure rise | 16,0 | 11,0 | 1/4" SAE Fem. Flare | 200 | SPST Standard Duty |
| P100CP-77D | | 18,0 | 12,0 | | 122 | |
| P100CP-114D | | 24,0 | 18,0 | 6 mm Brazing Tube | 100 | |
| P100CP-104D | | | | 1/4" SAE Fem. Flare | 200 | |
| P100CP-111D | | 26,0 | 20,0 | | | |
| P100CP-112D | | | | 6 mm Brazing Tube | | |
| P100CP-53D | | 26,9 | | 1/4" SAE Fem. Flare | 122 | |
| P100CP-73D | | 27,0 | 19,0 | 6 mm Brazing Tube | | |
| P100CP-107D | | 28,0 | 23,0 | | 200 | |
| P100CP-106D | | | | 1/4" SAE Fem. Flare | | |
| P100CP-108D | | 38,0 | 28,0 | | | |
| P100CP-133D | | 40,7 | 32,4 | | 122 | |
| P100CP-142D | | 42,0 | 35,0 | | 300 | |
| P100CP-170D | | 140,0 | 100,0 | 6 mm Brazing Tube | 120 | |

P100 FIXED SETTING PRESSURE SWITCH

# ORDERING CODES

## HIGH PRESSURE MANUAL RESET MODELS

More models are available. This is only a selection. For quantity orders customized models can be set up.
Tolerances apply. For details and inquiries contact your Johnson Controls representative.

| CODES | FUNCTION | SETPOINTS *(bar g)* | | PRESSURE PORT | CABLE *(cm)* | SWITCH |
|---|---|---|---|---|---|---|
| | | Open | Close | | | |
| P100DA-11D | Contact opens on pressure rise | 20,0 | Manual Reset | 1/4" SAE Fem. Flare | 122 | SPST Standard Duty |
| P100DA-68D | | 26,0 | | | 300 | |
| P100DA-82D | | 28,0 | | | 200 | |
| P100DA-34D | | 31,0 | | | 122 | |
| P100DA-72D | | 38,0 | | | 200 | |
| P100DA-90D | | 40,5 | | | 300 | |
| P100DA-75D | | 42,0 | | | 200 | |
| P100DA-76D | | | | 6 mm Brazing Tube | | |
| P100DA-96D | | 43,5 | | 1/4" SAE Fem. Flare | | |
| P100DA-91D | | 45,0 | | | 300 | |

## HIGH PRESSURE AUTOMATIC RESET MODELS - HEAVY DUTY

More models are available. This is only a selection. For quantity orders customized models can be set up.
Tolerances apply. For details and inquiries contact your Johnson Controls representative.

| CODES | FUNCTION | SETPOINTS *(bar g)* | | PRESSURE PORT | CABLE *(cm)* | SWITCH |
|---|---|---|---|---|---|---|
| | | Open | Close | | | |
| P100EE-22D | Change over contact | 20,7 | 27,6 | 1/4" SAE Fem. Flare | 200 | SPDT Heavy Duty |
| P100EE-20D | | 27,6 | 20,7 | 6 mm Brazing Tube | 122 | |
| P100EE-61D | | 28,0 | 21,0 | | 200 | |
| P100EE-19D | | 29,7 | 38,6 | 1/4" SAE Fem. Flare | 61 | |
| P100EE-82D | | 40,7 | 32,4 | | 183 | |

## HIGH PRESSURE AUTOMATIC RESET MODEL ATEX CERTIFIED

Below model is currently available, but more models will be set up with ATEX certification.
Tolerances apply. For details and inquiries contact your Johnson Controls representative.

| CODES | FUNCTION | SETPOINTS *(bar g)* | | PRESSURE PORT | CABLE *(cm)* | SWITCH |
|---|---|---|---|---|---|---|
| | | Open | Close | | | |
| P100CP-900D | Contact opens on pressure rise | 18,5 | 13,0 | 6 mm Brazing Tube | 129 | SPST Standard Duty |

# PRESSURE SWITCHES ACCESSORIES

## ORDERING INFORMATION

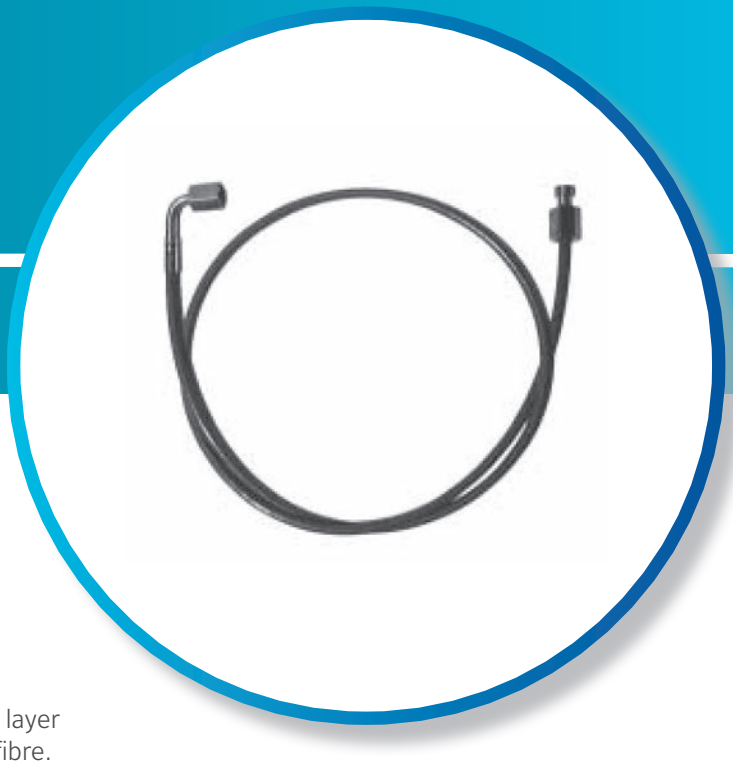
| CODES | DESCRIPTION | MINIMUM ORDER QUANTITY |
|---|---|---|
| BKT024N002R | Mounting bracket for P233 | 1 |
| FTG015N602R | Duct mounting kit “staight” | |
| FTG015N603R | Duct mounting kit “bent” | |
| GMT008N600R | Duct kit for P233, self locking grommet and tubing | |
| CNR003N001R | Connector 6 mm for P77/P78, P735/P736 | |
| CNR003N002R | Connector 8 mm for P77/P78, P735/P736 | |
| CNR012N001R | Adapter R3/8 female to 1/4-18 NPT male for P48 | |
| CNR013N001R | Adapter R 3/8 female to 1/4-18 NPT female for P48 | |
| KIT023N600 | Locking kit for P48, P77/P78, P735/P736 - for field installation | |
| KIT031N601 | Valve depressors for conversion style 51 - style 50 | 100 (1 box) |
| 271-51L | Mounting bracket for P28, P45, P48, P74, P77/P78, P735/P736 | 50 |

PRESSURE SWITCHES ACCESSORIES

## ORDERING INFORMATION

CAPILLARY KIT

| CODES | LENGTH *(cm)* | STYLE | MINIMUM ORDER QUANTITY |
|---|---|---|---|
| SEC002N600 | 90 | 2x style 13 | 100 |
| SEC002N602 | | Style 13 - style 45a | |
| SEC002N606 | 200 | Style 13 - style 45a | 75 |
| SEC002N607 | | 2x style 13 | |
| SEC002N621 | 90 | Style 34 - style 34 | 100 |
| SEC002N622 | | Style 50 - style 50 | |
| SEC002N624 | 200 | Style 50 - style 50 | 75 |
| SEC002N626 | 90 | Style 50 - style 51 | 100 |
| SEC002N627 | 200 | Style 50 - style 51 | |



# H735

SYNTETIC FLEXIBLE HOSE

The synthetic hoses consist of a seamless PA compound inner layer reinforced with a braided layer of high performance synthetic fibre.

This reinforcement is protected by an oil, weather and abrasion resistant Polyester Elastomer Compound.

The standard assembly length is 0,9 meter with one straight and one elbow 90 degree hose fitting.

The fitting connection is 1/4" metal tube with 7/16"-20 UNF swivel nut connection suitable for 1/4" SAE male flare. Other lengths and/or fitting connections configurations (Style 50, 51 straight or elbow) are available on request (quantity orders only).

## FEATURES

- Very flexible
- Low minimum bend radius (30 mm)
- One straight and one 90° elbow pressure connection
- Polyester Elastomer Compound construction
- High pressure safety ratio
- Low effusion

## APPLICATION

These synthetic hoses are designed for pressure measuring connections. They provide, for example, a very flexible connection between a refrigerant compressor and pressure controls. The hoses can be used for all non-corrosive refrigerants including R134a, R22, R404a, R407c and R410A with pressures within the maximum pressure range of the hose. Hoses are tested with common compressor oils in combination with above mentioned refrigerants.

## ORDERING INFORMATION

| CODES | PRESSURE CONNECTION | FITTING CONNECTION | LENGTH *(cm)* | ADDITIONAL FEATURES |
|---|---|---|---|---|
| H735AA-30C | Straight x 90° elbow | 1/4" metal tube with 7/16"-20 UNF swivel nut connection suitable for 1/4" SAE male flare | 30 | All models bulk packed |
| H735AA-40C | | | 40 | |
| H735AA-50C | | | 50 | |
| H735AA-70C | | | 70 | |
| H735AA-100C | | | 100 | |
| H735AA-150C | | | 150 | |

**Note**

Minimum shipping quantity 100 pieces

# PENN COMMERCIAL REFRIGERATION

## PRESSURE CONTROLS

### ADJUSTABLE OIL PROTECTION SWITCH


# P28

OIL PROTECTION

These controls measure the pressure differential between the pressure generated by the oil pump and the refrigerant pressure at the crankcase.

A built-in time delay switch allows for pressure-pick up on start and avoids nuisance shutdowns on pressure drops of short duration during the running cycle. When the compressor is started, the time delay switch is energised. If the net oil pressure does not build up within the required time limit, the time delay switch trips to stop the compressor. If the net oil pressure rises within the required time after the compressor starts, the time delay switch is automatically de-energised and the compressor continues to operate normally. If the net oil pressure should drop below setting (scale pointer) during the running cycle, the time delay switch is energised and, unless the net oil pressure returns to cut-in point within the time delay period, the compressor will be shut down, and have to be manual reset.

The compressor can never run longer than the predetermined time on low oil pressure.

Controls are available only for manual reset after cut-out.

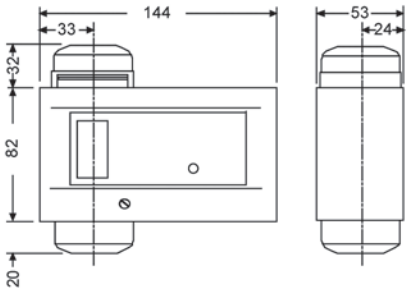
## FEATURES

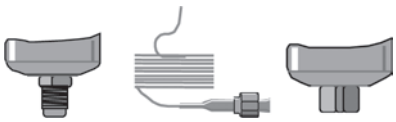
- Heavy duty pressure elements
- Safety lock-out with trip-free manual reset
- Ambient compensated timing
- Dust-tight Penn switch
- Wetted materials approved for use with standard and (mild) flammable A2L / A3 refrigerants

## APPLICATION

These oil protection controls are designed to give protection against low net lube oil pressure on pressure lubricated refrigeration compressors.

## DIMENSIONS *(in mm)*



Style 5 Style 13 Style 15

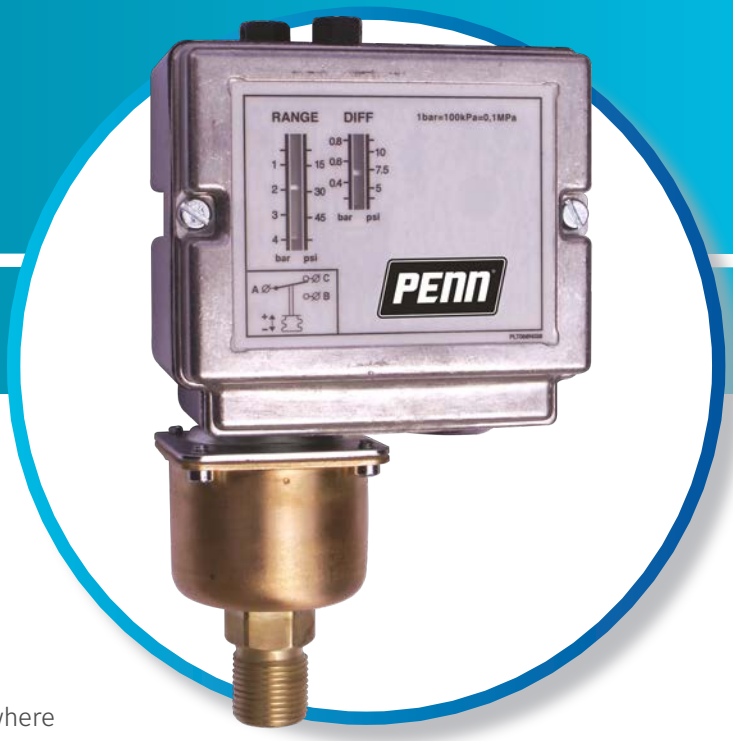

P28 ADJUSTABLE OIL PROTECTION SWITCH

## ORDERING INFORMATION

| CODES | RANGE *(bar)* | STYLE | TIME DELAY *(s)* | VOLTAGE | SWITCH ACTION | REFRIGERANT | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|---|
| P28DA-9660 | 0.6 to 4.8 | 13 | 90 | 115/230 | 15(8) A, 230 VAC, open low, alarm and safe light contacts | non-corr. | --- |
| P28DJ-9360 | | 5 | 90 | 230 | | | IP66 enclosure |
| P28DJ-9861 | | 15 | 90 | | | NH3 | IP66 enclosure, Incl. 2 connectors CNR003N001 |
| P28DP-9340 | | 5 | 50 | | | non-corr. | --- |
| P28DP-9660 | | 13 | 90 | | | | --- |
| P28DP-9680 | | | 120 | | | | --- |

# PRESSURE CONTROLS

## ADJUSTABLE STEAM PRESSURE SWITCH




# P48

STEAM PRESSURE

The P48 series have been developed for special applications where pressure must be controlled.
All models have an adjustable differential depending on the range *(see type number selection table)*.
The P48AAA-9110 and P48AAA-9120 has the power element outside the case.

All the models have phosphor bronze bellows and brass pressure connections except the P48AAA-9150. This model has a stainless steel bellows and pressure connection and is provided with a brass adapter 1/4"-18 NPT female to R3/8 male.

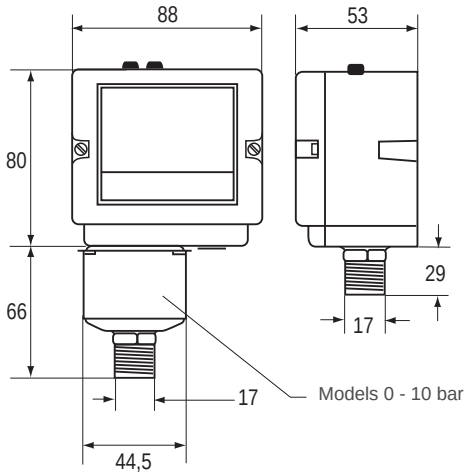
## FEATURES

- Generous wiring space provided
- Splash-proof enclosure (IP54)
- SPDT contacts are provided as standard on single pressure control
- Trip-free manual reset

## APPLICATION

The series P48 pressure controls are designed as operating or high/low cut-out control on steam, air or (hot) water applications. Also for non-combustible gases which are not harmful to the materials in contact with these mediums.
On steam applications a steam trap is recommended.

## DIMENSIONS *(in mm)*



P48 ADJUSTABLE STEAM PRESSURE SWITCH


## ORDERING INFORMATION

| CODES | RANGE *(bar)* | DIFFERENTIAL *(bar)* | PRESSURE CONNECTION | STYLE | SWITCH ACTION | ADITIONAL FEATURES |
|---|---|---|---|---|---|---|
| P48AAA-9110 | 0 to 1 | 0.16 to 0.55 | G 3/8" male | 29a | ~16(10)A<br>400 V... 220 V DC,<br>12 W<br>(pilot duty only)<br>SPDT, Open High | Automatic reset |
| P48AAA-9120 | 0.2 to 4 | 0.25 to 0.8 | | | | |
| P48AAA-9130 | -0.2 to 10 | 1 to 4.5 | | | | |
| P48AAA-9140 | 1 to 16 | 1.3 to 2.5 | | | | |
| P48AAA-9150 | 3 to 30 | 3 to 12 | | | | Automatic reset,<br>stainless steel bellows |
| P48BEA-9140 | 4 to 16 | --- | | | | Manual reset |

# PENN COMMERCIAL REFRIGERATION

## MODULATING WATER VALVES

## PRESSURE ACTUATED WATER VALVES


# V46

### 2-WAY PRESSURE ACTUATED WATER VALVES - COMMERCIAL APPLICATIONS

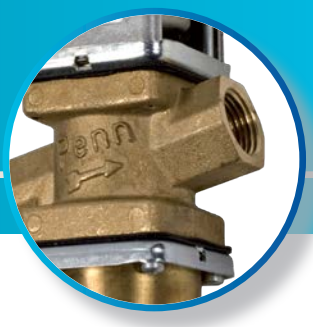
These pressure actuated modulating valves control the quantity of water to a condenser by directly sensing pressure changes in a refrigerant circuit.

The valves can be used in non-corrosive refrigerant systems. Ammonia power elements and valves designed for salt-water applications are available.

The valves have a quick opening characteristic and open on pressure increase (direct acting). Reverse acting (close on pressure increase) is possible.

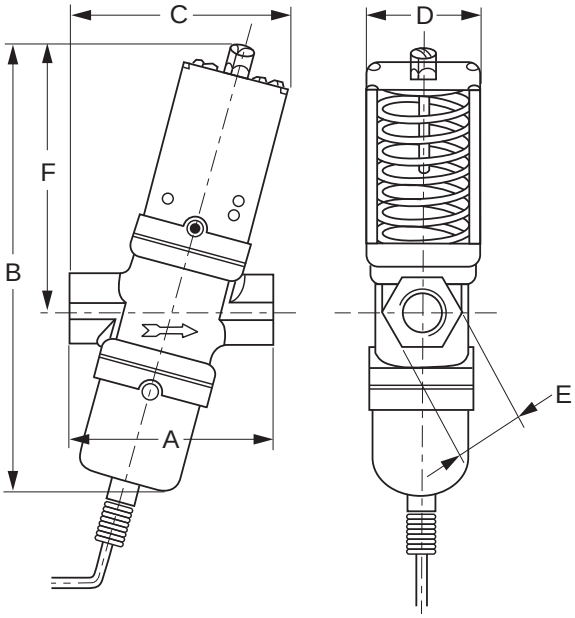
## FEATURES

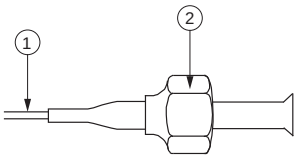
- Pressure balanced valve design
- Pressure actuated
- 3/8, 1/2, 3/4" are angled body type valves with high $K_V$ value
- 3/8" up to 2" pressure valves "all range" types
- Quick opening valve characteristics
- No close fitting or sliding parts in water passages
- Easy to disassemble. All parts can be replaced
- Special bronze bodies and monel parts
- Power elements with stainless steel bellows available
- Wide range of pressure connection styles
- Nickel plated seats available for 3/8, 1/2, and 3/4" valves
- Direct/reverse action
- Wetted materials approved for use with standard non-corrosive and (mild) flammable A2L / A3 refrigerants



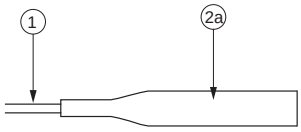
## V46AA / VA46AB / VA46AC DIMENSIONS *(in mm)*

| VALVE SIZE | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 3/8" | 70 | 150 | 75 | 41 | 24 | 92 |
| 1/2" | 80 | 166 | 86 | 51 | 27 | 98 |
| 3/4" | 90 | 181 | 97 | 55 | 36 | 110 |

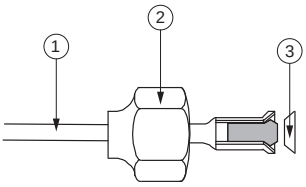


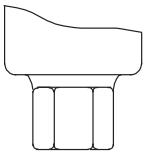

**Style 13**
(excl. valve depressor)
1: 75 cm capillary
2: 7/16-20 UNF flare nut



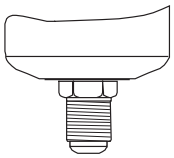

**Style 34**
1: 75 cm capillary
2: 1/4" tube for braze connection



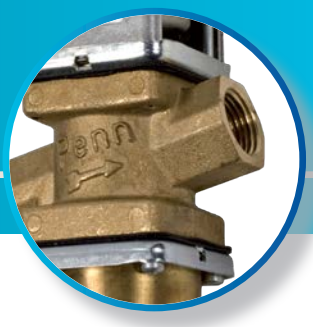

**Style 50**
(incl. valve depressor mounted into machined flare)
1: 75 cm capillary
2: 7/16-20 UNF flare nut
3: copper sealring



**Style 15**
1/4-18NPT (female)

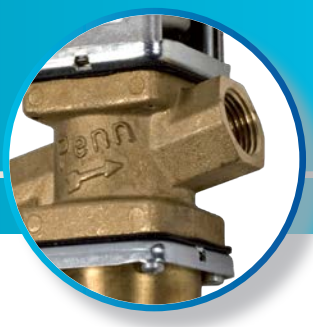


**Style 5**
7/16-20 UNF



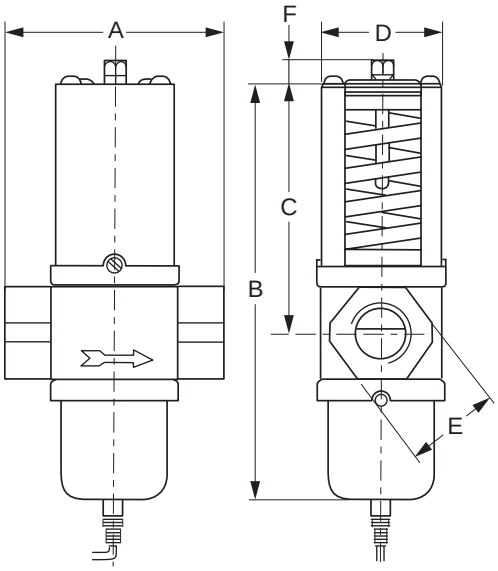
## V46AA / VA46AB / VA46AC ORDERING INFORMATION

| CODES | RANGE *(bar)* | BODY STYLE | SIZE THREAD ACCORDING TO ISO 228 | STYLE | CAPILLARY LENGTH *(cm)* | ADDITIONAL FEATURES (IT IS POSSIBLE TO CHANGE STYLE 13 INTO STYLE 45A BY ORDERING KIT031N600) |
|---|---|---|---|---|---|---|
| V46AA-9600 | 5...18 | Angled | 3/8“ | 13 | 75 | --- |
| V46AA-9608 | | | | | | With special washer to prevent waterhammer at low flow capacity |
| V46AA-9602 | | | | | 100 | Nickel plated seat/longer capillary |
| V46AA-9950 | | | | 34 | 75 | Nickel plated seat/solder connection |
| V46AB-9600 | | | 1/2“ | 13 | | --- |
| V46AB-9950 | | | | 34 | | Solder connection/“062” id.cap |
| V46AC-9600 | | | 3/4“ | 13 | | --- |
| V46AA-9300 | 5...23 | Angled | 3/8“ | 5 | --- | --- |
| V46AA-9301 | | | | | | Nickel plated seat, high range. With washer to prevent waterhammer at low flow capacity |
| V46AA-9606 | | | | 13 | 75 | Nickel plated seat, high range |
| V46AA-9609 | | | | | | Nickel plated seat, high range. With washer to prevent waterhammer at low flow capacity |
| V46AA-9510 | | | | 50 | | High range |
| V46AB-9300 | | | 1/2“ | 5 | --- | --- |
| V46AB-9605 | | | | 13 | 75 | Nickel plated seat, high range |
| V46AB-9951 | | | | 34 | | Solder connection, high range |
| V46AB-9510 | | | | 50 | | High range |
| V46AC-9300 | | | 3/4“ | 5 | | --- |
| V46AC-9605 | | | | 13 | | Nickel plated seat, high range |
| V46AC-9510 | | | | 50 | | High range |



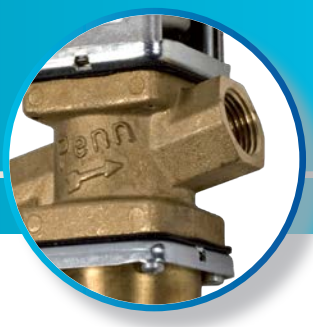
## V46AD / VA46AE DIMENSIONS *(in mm)*

| VALVE SIZE | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1“ | 124 | 233 | 138 | 71 | 48 | 13 |
| 1-1/4“ | 126 | 242 | 144 | | 57 | |



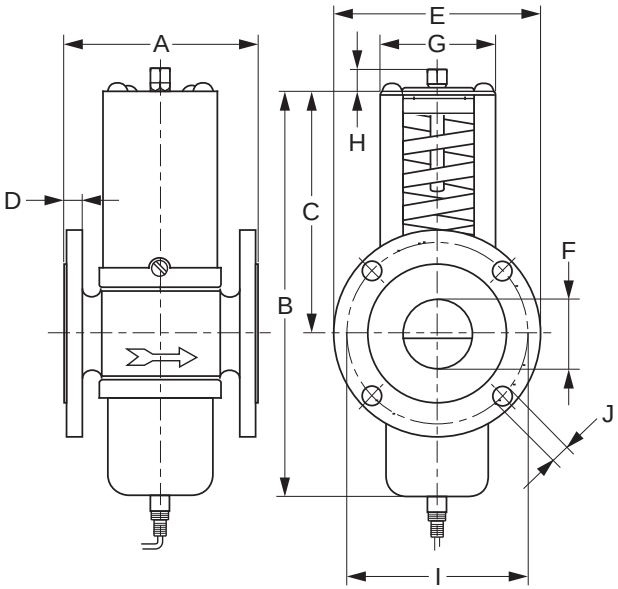

## V46AD / VA46AE ORDERING INFORMATION

| CODES | RANGE *(bar)* | BODY STYLE | SIZE THREAD ACCORDING TO ISO 7-RC | STYLE | CAPILLARY LENGTH *(cm)* | ADDITIONAL FEATURES (IT IS POSSIBLE TO CHANGE STYLE 13 INTO STYLE 45A BY ORDERING KIT031N600) |
|---|---|---|---|---|---|---|
| V46AD-9300 | 5...18 | Straight | 1“ | 5 | --- | --- |
| V46AD-9510 | | | | 50 | 75 | |
| V46AD-9600 | | | | 13 | | |
| V46AE-9300 | | | 1-1/4“ | 5 | --- | |
| V46AE-9510 | | | | 50 | 75 | |
| V46AE-9600 | | | | 13 | 75 | |
| V46AD-9511 | 10...23 | | 1“ | 50 | 75 | High range |
| V46AE-9512 | | | 1-1/4“ | | | |



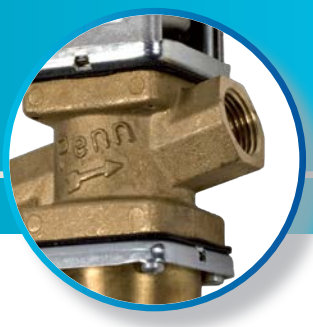
## V46AR / VA46AS / VA46AT DIMENSIONS *(in mm)*

| VALVE SIZE | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1/2" | 137 | 242 | 144 | 18 | 150 | 47 | 67 | 13 | 110 | 18 |
| 2" | 168 | 299 | 164 | 20 | 165 | 57 | 89 | 16 | 125 | |
| 2-1/2" | 172 | | | | 185 | 70 | | | 145 | |



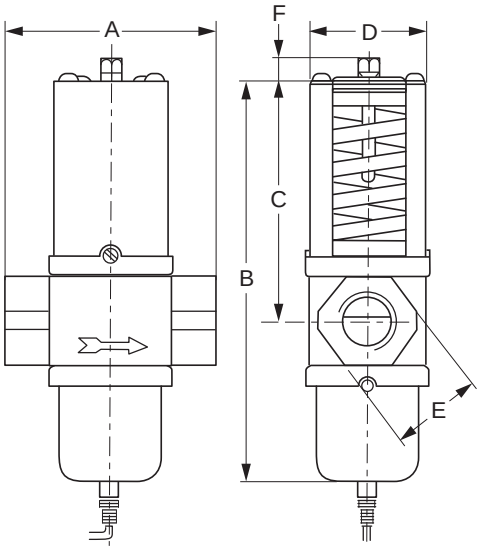

## V46AR / VA46AS / VA46AT ORDERING INFORMATION

| CODES | RANGE *(bar)* | BODY STYLE | SIZE DIN2533 FLANG CONNECTIONS | STYLE | CAPILLARY LENGTH *(cm)* | ADDITIONAL FEATURES (IT IS POSSIBLE TO CHANGE STYLE 13 INTO STYLE 45A BY ORDERING KIT031N600) |
|---|---|---|---|---|---|---|
| V46AR-9300 | 5...18 | Straight | 1-1/2" | 5 | --- | --- |
| V46AR-9600 | | | | 13 | 75 | |
| V46AS-9300 | 5...11.5 | | 2" | 5 | --- | --- |
| V46AS-9301 | 11...18 | | | | | |
| V46AT-9300 | 5...11.5 | | 2-1/2" | | | |
| V46AT-9301 | 11...18 | | | | | |



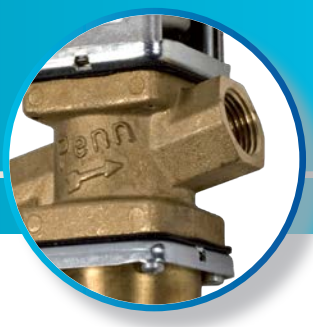
## V46BA / V46BB / V46BC / V46BD / V46BE DIMENSIONS *(in mm)*

| VALVE SIZE | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 3/8" | 67 | 136 | 79 | 41 | 24 | 10 |
| 1/2" | 80 | 153 | 86 | 51 | 29 | |
| 3/4" | 86 | 163 | 96 | 55 | 35 | |
| 1" | 124 | 233 | 138 | 71 | 52 | 13 |
| 1-1/4" | | 242 | 144 | | 62 | |




## V46BA / V46BB / V46BC / V46BD / V46BE ORDERING INFORMATION

| CODES | RANGE *(bar)* | BODY STYLE | SIZE THREAD ACCORDING TO ISO 228 | STYLE | CAPILLARY LENGTH *(cm)* | ADDITIONAL FEATURES (IT IS POSSIBLE TO CHANGE STYLE 13 INTO STYLE 45A BY ORDERING KIT031N600) |
|---|---|---|---|---|---|---|
| V46BA-9600 | 5...18 | Straight | 3/8" | 13 | 75 | --- |
| V46BB-9600 | | | 1/2" | | | |
| V46BC-9600 | | | 3/4" | | | |
| V46BD-9600 | | | 1" | | | |
| V46BE-9510 | | | 1-1/4" | 50 | | |
| V46BE-9600 | | | | 13 | | |
| V46BA-9510 | 5 ...23 | | 3/8" | 50 | | |
| V46BB-9510 | | | 1/2" | | | |
| V46BC-9510 | | | 3/4" | | | |
| V46BC-9511 | | | | | 140 | Longer capillary |
| V46BD-9510 | 10...23 | | 1" | | 75 | --- |
| V46BE-9511 | | | 1-1/4" | | 150 | Longer capillary |

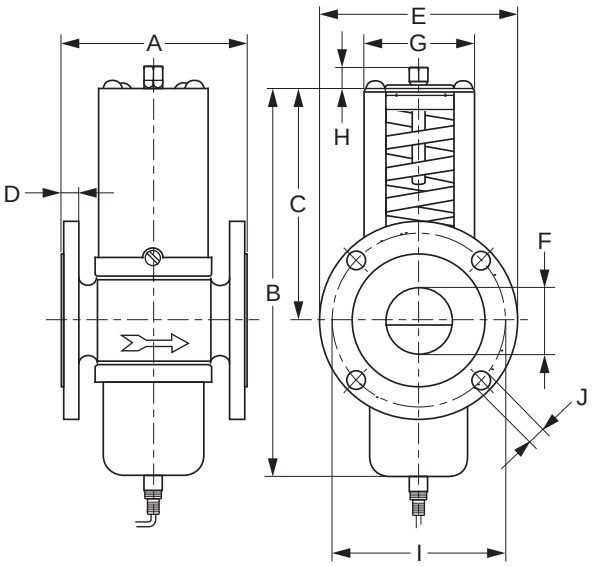


## MODULATING WATER VALVES

### V46 PRESSURE ACTUATED WATER VALVES

## V46BR / V46BS / V46BT DIMENSIONS *(in mm)*

| VALVE SIZE | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1/2" | 135 | 242 | 144 | 14 | 150 | 47 | 67 | 13 | 110 | 18 |
| 2" | 162 | 299 | 164 | 16 | 165 | 57 | 89 | 16 | 125 | |
| 2-1/2" | 172 | | | | 185 | 70 | | | 145 | |




## V46BR / V46BS / V46BT ORDERING INFORMATION

| CODES | RANGE *(bar)* | BODY STYLE | SIZE DIN 86021 FLANGE CONNECTIONS | STYLE | CAPILLARY LENGTH *(cm)* |
|---|---|---|---|---|---|
| V46BR-9510 | 5...18 | Straight | 1-1/2" | 50 | 75 |
| V46BR-9600 | | | | 13 | |
| V46BS-9300 | 5...11.5 | | 2" | 5 | --- |
| V46BS-9301 | 11...18 | | | | |
| V46BT-9300 | 5...11.5 | | 2-1/2" | | |
| V46BT-9301 | 11...18 | | | | |

MODULATING
WATER VALVES

PRESSURE ACTUATED
WATER VALVES

# V46SA

PRESSURE ACTUATED WATER VALVES, LOW FLOW

The V46SA is a direct acting, "all range", pressure actuated modulating valve, used to control the waterflow to a condenser by directly sensing pressure changes in a non-corrosive refrigerant circuit.

The V46SA is specially designed for use on equipment requiring a low condenser waterflow such as icemakers, small heatpumps and watercoolers. The springhousing and power element are rolled to the valve body. Rubber diaphragms seal the water away from the range spring and bellows part so these are not submerged in water where they would be subject to sedimentation and corrosion.

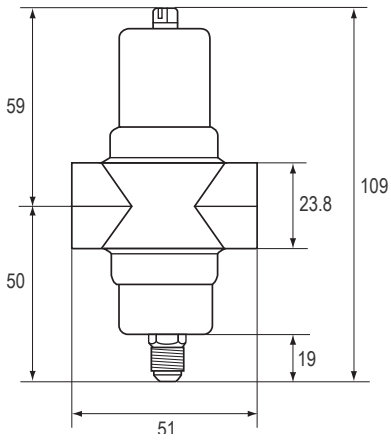
The valve can be ordered style 5 (without capillary), style 34 and style 50 (incl. 75 cm capillary).

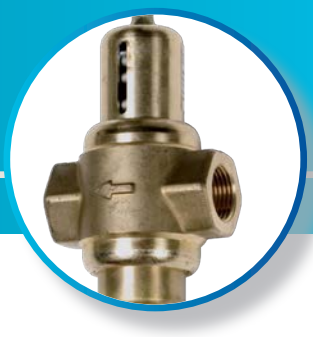
The capillary part will be delivered separated from the valve.

## FEATURES

- Valve designed for low flow
- "All range" power element and spring housing
- Small dimensions
- Pressure actuated
- Various pressure connection style
- High refrigerant pressure resistant bellows
- Wetted materials approved for use with standard non-corrosive and (mild) flammable A2L / A3 refrigerants

## DIMENSIONS *(in mm)*





V46SA PRESSURE ACTUATED WATER VALVES

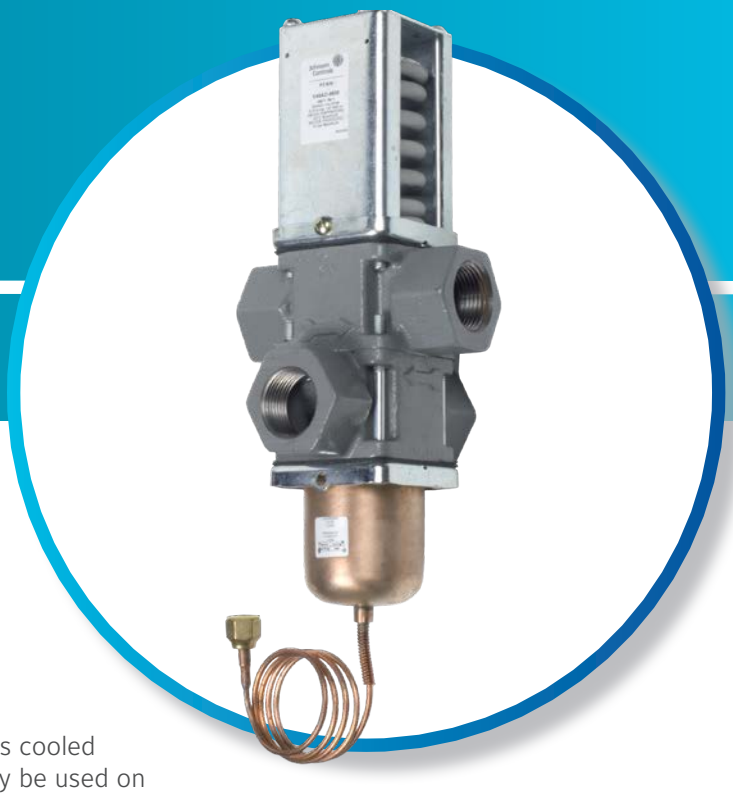
## ORDERING INFORMATION

| CODES | RANGE *(bar)* | BODY STYLE | SIZE THREAD ACCORDING TO ISO 228 | STYLE | CAPILLARY LENGTH *(cm)* | ADDITIONAL FEATURES (IT IS POSSIBLE TO CHANGE STYLE 13 INTO STYLE 45A BY ORDERING KIT031N600) |
|---|---|---|---|---|---|---|
| V46SA-9101 | 5...23 | Straight | 3/8" | 45A | 75 | Capillary soldered to power element |
| V46SA-9110 | | | | 50 | | Capillary separate |
| V46SA-9300 | | | | 5 | --- | --- |
| V46SA-9951 | | | | 34 | 75 | Capillary soldered to power element |

# PENN COMMERCIAL REFRIGERATION

## MODULATING WATER VALVES

## PRESSURE ACTUATED WATER VALVES



# V48

### 3-WAY PRESSURE ACTUATED WATER VALVES

These watervalves are especially designed for condensing units cooled either by atmospheric or forced draft cooling towers. They may be used on single, or multiple condenser hook-ups to the tower.

The type V48 valve senses the compressor head pressure and allows cooling water to flow to the condenser, to by-pass the condenser, or to allow waterflow to both condenser and by-pass line in order to maintain correct refrigerant head pressure.

A further advantage of this system is that the 3-way valve permits a continuous water flow to the tower so the tower can operate efficiently with a minimum of maintenance on nozzles and wetting surfaces.

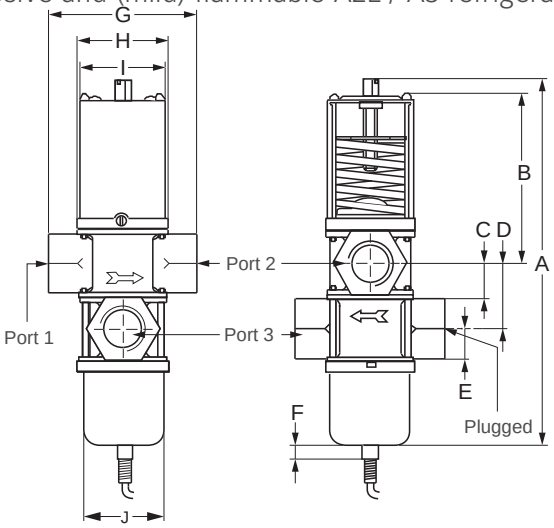
The valves can be used in non-corrosive refrigerant systems. Ammonia power elements and valves designed for salt-water applications are available. The valves have a quick opening characteristic.

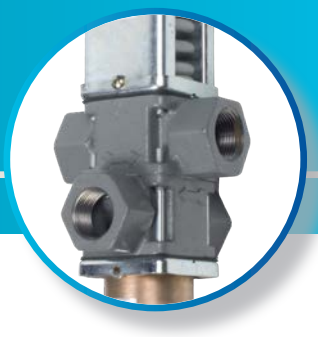
## FEATURES

- Pressure balanced design
- Free movement of all parts
- Easy manual flushing
- High $K_V$ values
- Pressure actuated
- Can be used as mixing or diverting valve
- Wetted materials approved for use with standard non-corrosive and (mild) flammable A2L / A3 refrigerants

## DIMENSIONS *(in mm)*

| VALVE SIZE | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| Commercial type | | | | | | | | | | |
| 1/2" | 201 | 86 | 24 | 38 | 29 | 8 | 81 | 51 | 47 | 45 |
| 3/4" | 218 | 96 | 27 | 45 | 35 | | 86 | 55 | 52 | 48 |
| 1" | 296 | 138 | 29 | 51 | 48 | | 124 | 71 | 67 | 59 |
| 1-1/4" | 315 | 144 | 32 | 60 | 57 | | 126 | | | 59 |
| Maritime type | | | | | | | | | | |
| 3/4" | 218 | 96 | 27 | 45 | 35 | 8 | 86 | 55 | 52 | 48 |





MODULATING WATER VALVES

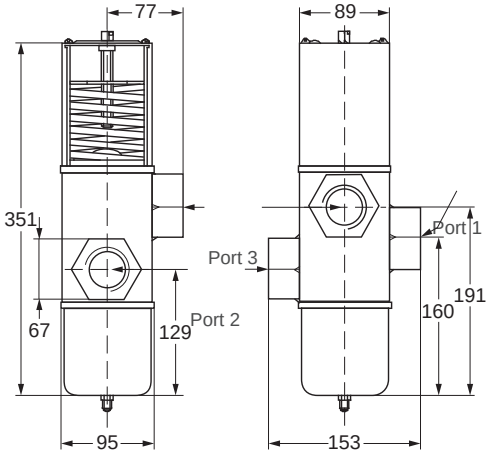
V48 PRESSURE ACTUATED WATER VALVES

## ORDERING INFORMATION

| CODES | RANGE *(bar)* | BODY STYLE | SIZE THREAD | STYLE | CAPILLARY LENGTH *(cm)* | ADDITIONAL FEATURES (IT IS POSSIBLE TO CHANGE STYLE 13 INTO STYLE 45A BY ORDERING KIT031N600) |
|---|---|---|---|---|---|---|
| Commercial type | | | | | | |
| V48AB-9510 | 4...20 | Straight | 1/2" according to ISO 7-Rc | 50 | 75 | --- |
| V48AB-9600 | 4...16 | | | 13 | | |
| V48AC-9510 | 4...20 | | 3/4" according to ISO 7-Rc | 50 | | |
| V48AD-9510 | 6...20 | | 1" according to ISO 7-Rc | 50 | | |
| V48AD-9600 | 4...16 | | | 13 | | |
| V48AE-9510 | 6...20 | | 1-1/4 " according to ISO 7-Rc | 50 | | --- |
| V48AE-9600 | 4...16 | | | 13 | | |
| Maritime types | | | | | | |
| V48BC-9600 | 4...16 | Straight | 3/4" according to ISO 228 | 13 | 75 | Seawater resistant |

## V48AF COMMERCIAL TYPE

### DIMENSIONS *(in mm)*



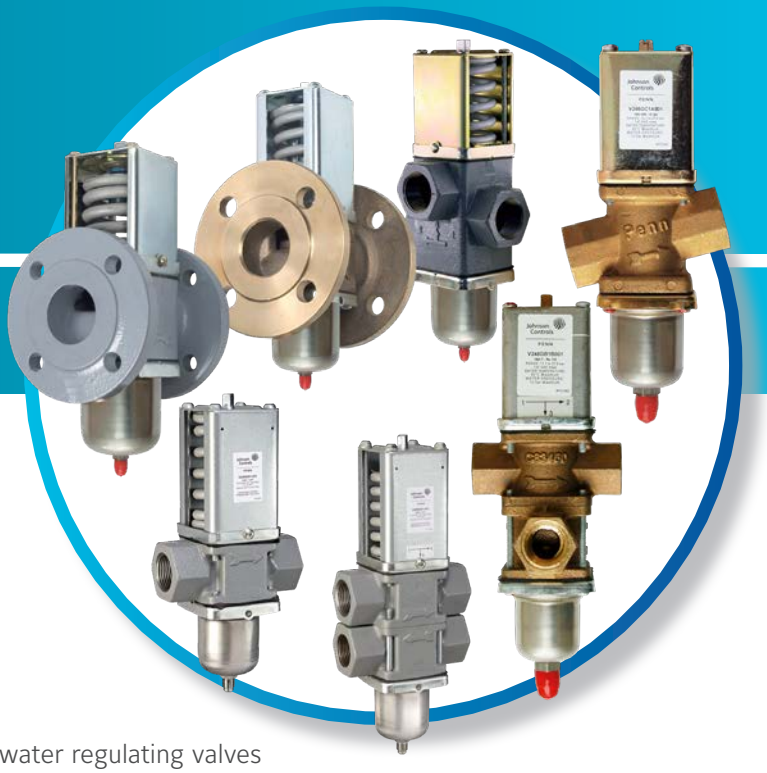

## ORDERING INFORMATION

| CODE | RANGE *(bar)* | BODY STYLE | SIZE THREAD ACCORDING TO ISO 7-RC | STYLE | ADDITIONAL FEATURES (IT IS POSSIBLE TO CHANGE STYLE 13 INTO STYLE 45A BY ORDERING KIT031N600) |
|---|---|---|---|---|---|
| V48AF-9300 | 6...14 | Straight | 1-1/2" | 5 | --- |

# PENN COMMERCIAL REFRIGERATION

## MODULATING WATER VALVES

## PRESSURE ACTUATED WATER VALVES



# V246 / V248

WATER REGULATING VALVES FOR HIGH PRESSURE REFRIGERANTS

The V246 / V248 series 2-way and 3-way pressure actuated water regulating valves for high-pressure refrigerants regulate water flow and control refrigerant head pressure in systems with single or multiple watercooled condensers. These valves have an adjustable opening point in a refrigerant pressure range of 200 to 400 psig (13.8 to 27.6 bar).

These series valves are designed specifically for condensing units cooled either by atmospheric or forced draft cooling towers. They are used on single or multiple condenser hook-ups to the tower to provide the most economical and efficient use of the tower. V246 / V248 valves may be used with standard non-corrosive refrigerants.

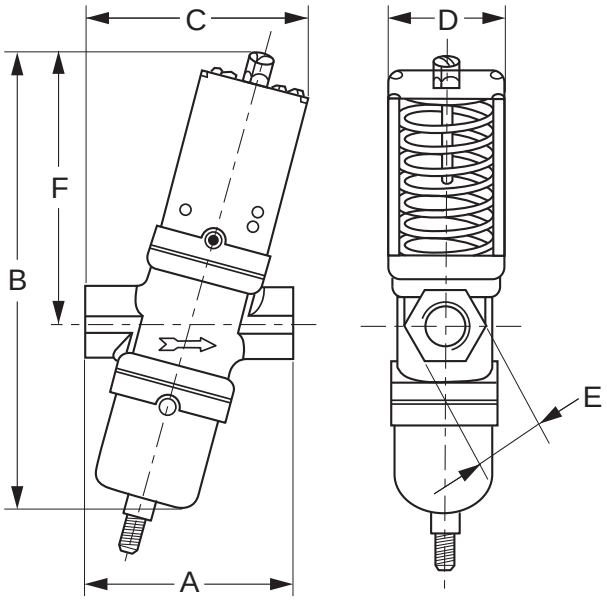
For applications where the coolant may be corrosive to the internal parts, maritime models are available, which have nickel copper (Monel®) internal parts.

## FEATURES

- No close fitting or sliding parts in water passages
- Accessible range spring
- Take-apart construction
- Pressure-balanced design
- Corrosion-resistant material for internal parts
- Wetted materials approved for use with standard non-corrosive and (mild) flammable A2L / A3 refrigerants

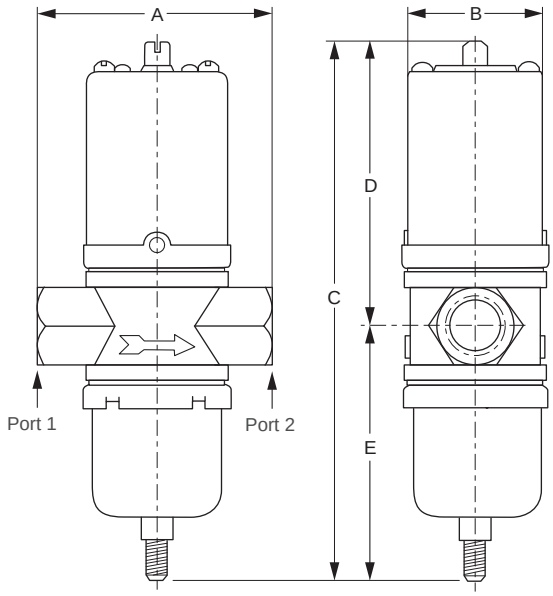
## DIMENSIONS *(in mm)*

### STANDARD PRODUCTION MODELS RANGE 13.8 TO 27.6 bar
### V246 SCREW CONNECTION VALVES




COMMERCIAL SERVICE

| VALVE SIZE | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 3/8" | 70 | 176 | 75 | 41 | 24 | 92 |
| 1/2" | 80 | 191 | 86 | 51 | 27 | 98 |
| 3/4" | 90 | 217 | 97 | 55 | 36 | 110 |




COMMERCIAL SERVICE

| VALVE SIZE | A | B | C | D | E |
|---|---|---|---|---|---|
| 1" | 124 | 71 | 267 | 151 | 116 |
| 1-1/4" | 126 | | 276 | 156 | 121 |

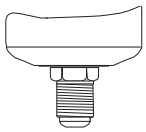
MARITIME SERVICE

| VALVE SIZE | A | B | C | D | E |
|---|---|---|---|---|---|
| 3/8" | 67 | 41 | 166 | 89 | 77 |
| 1/2" | 78 | 51 | 182 | 96 | 86 |
| 3/4" | 86 | 55 | 203 | 106 | 98 |
| 1" | 124 | 71 | 267 | 151 | 116 |
| 1-1/4" | 126 | | 276 | 156 | 121 |

# ORDERING INFORMATION

## STANDARD PRODUCTION MODELS RANGE 13.8 TO 27.6 bar
## V246 SCREW CONNECTION VALVES

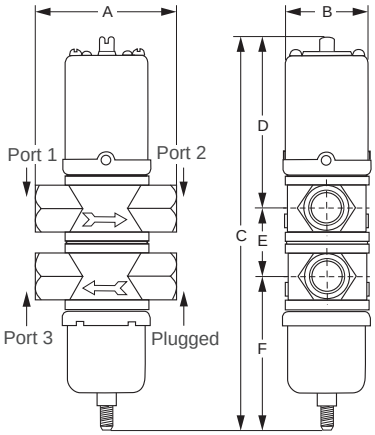
| CODES | CONSTRUCTION | VALVE SIZE AND CONNECTION | ELEMENT STYLE | SHIPPING WEIGHT *(kg)* |
|---|---|---|---|---|
| V246GA1A001C | Direct acting, Commercial | 3/8 in. BSPP Screw, ISO 228 | Style 5 | 1.86 |
| V246GB1A001C | | 1/2 in. BSPP Screw, ISO 228 | | 1.4 |
| V246GC1A001C | | 3/4 in. BSPP Screw, ISO 228 | | 1.7 |
| V246GD1B001C | | 1 in. BSPT Screw, ISO 7 | | 4.2 |
| V246GE1B001C | | 1-1/4 in. BSPT Screw, ISO 7 | | 4.5 |
| V246GR1B001C | | 1-1/2 in. Flange, DIN2533 | | 6.2 |
| V246HA1B001C | Direct acting, Maritime | 3/8 in. BSPP Screw, ISO 228 | | 1.86 |
| V246HB1B001C | | 1/2 in. BSPP Screw, ISO 228 | | 1.4 |
| V246HC1B001C | | 3/4 in. BSPP Screw, ISO 228 | | 2.0 |
| V246HD1B001C | | 1 in. BSPT Screw, ISO 228 | | 4.3 |
| V246HE1B001C | | 1-1/4 in. BSPT Screw, ISO 228 | | 4.7 |
| V246HR1B001C | | 1-1/2 in. Flange, DIN86021 | | 6.2 |
| V246HS1B001C | | 2 in. Flange, DIN86021 | | 12.3 |



**Style 5**
**7/16-20 UNF**

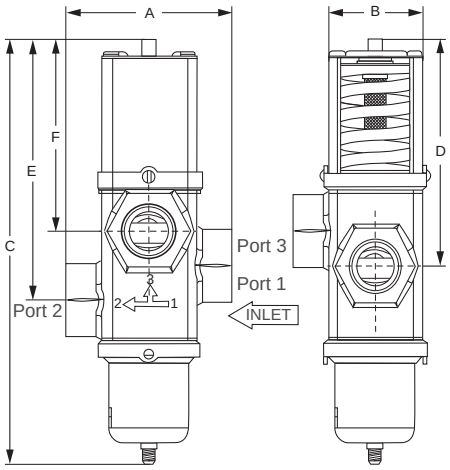
## DIMENSIONS *(in mm)*

### STANDARD PRODUCTION MODELS RANGE 13.8 TO 27.8 bar




3/4 in. THROUGH 1-1/4 in.

| VALVE SIZE | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 3/4 in. | 86 | 55 | 248 | 106 | 45 | 98 |
| 1-1/4 in. | 126 | 71 | 336 | 156 | 60 | 121 |

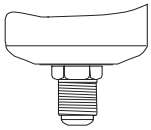



1-1/2 in.

| VALVE SIZE | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1-1/2 in. | 152 | 89 | 387 | 206 | 237 | 175 |

## ORDERING INFORMATION

| CODES | CONSTRUCTION | VALVE SIZE AND CONNECTION | ELEMENT STYLE | SHIPPING WEIGHT *(kg)* |
|---|---|---|---|---|
| V248GE1B001C | Direct acting, Commercial | 1-1/4 in. BSPT Screw, ISO 7 | Style 5 | 5.0 |
| V248GF1B001C | | 1-1/2 in. BSPT Screw, ISO 7 | | 11.3 |
| V248HC1B001C | Direct acting, Maritime | 3/4 in. BSPP Screw, ISO 228 | | 3.0 |



**Style 5**
**7/16-20 UNF**

# PENN COMMERCIAL REFRIGERATION

## MODULATING WATER VALVES

### TEMPERATURE ACTUATED WATER VALVES

# V47

TEMPERATURE ACTUATED MODULATING VALVES

These modulating water valves can be used for heating applications.
It does have an heating element which means that the bulb temperature always must be higher than the valve body (power element).

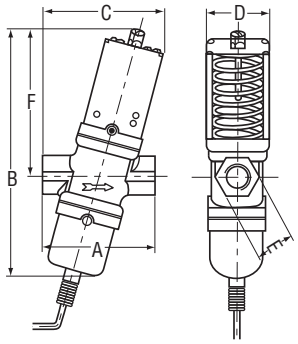
The valve opens at increasing bulb temperature.

The bulb must be mounted pointing downwards up to horizontal.

## FEATURES

- Pressure balanced valve design
- 3/4" are angled body type valves with high $K_V$ value
- Quick opening valve characteristics
- No close fitting or sliding parts in water passages
- Easy to disassemble. All parts can be replaced

## DIMENSION *(in mm)*




| VALVE SIZE | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 3/4" | 90 | 181 | 97 | 55 | 36 | 110 |

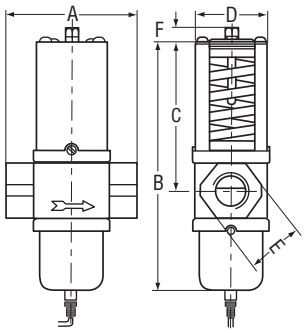
## ORDERING INFORMATION

| CODES | RANGE *(°C)* | BODY STYLE | SIZE THREAD ACCORDING TO ISO 228 | CAPILLARY LENGTH | BULB STYLE 4 LENGTH *(mm)* |
|---|---|---|---|---|---|
| V47AC -9160 | 24...57 | Angled | 3/4" | 1.8 m plain | 82 |

## MODULATING WATER VALVES

### V47 TEMPERATURE ACTUATED WATER VALVES

## DIMENSION *(in mm)*

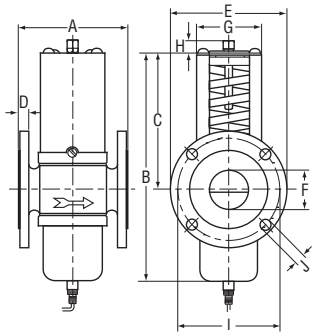



| VALVE SIZE | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1“ | 124 | 233 | 138 | 72 | 48 | 13 |
| 1-1/4“ | 125 | 243 | 144 | | 57 | |

## ORDERING INFORMATION

| CODES | RANGE *(°C)* | BODY STYLE | SIZE THREAD ACCORDING TO ISO 7-RC | CAPILLARY LENGTH | BULB STYLE 4 LENGTH *(mm)* |
|---|---|---|---|---|---|
| V47AD -9160 | 24...57 | Straight | 1“ | 1.8 m arm. | 152 |
| V47AD -9161 | 46...82 | | | | |
| V47AE -9160 | 24...57 | | 1-1/4“ | | |
| V47AE -9161 | 46...82 | | | | |

## DIMENSION *(in mm)*




| VALVE SIZE | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1/2“ | 137 | 244 | 144 | 18 | 150 | 47 | 67 | 13 | 110 | 18 |

## ORDERING INFORMATION

| CODES | RANGE *(°C)* | BODY STYLE | SIZE DIN 2533 FLANGE CONNECTIONS | CAPILLARY LENGTH | BULB STYLE 4 LENGTH *(mm)* |
|---|---|---|---|---|---|
| V47AR -9161 | 46...82 | Straight | 1-1/2“ | 1.8 m arm. | 152 |

# PENN COMMERCIAL REFRIGERATION

## HUMIDITY CONTROLS

### MECHANICAL HUMIDITY STAT

# W43

ROOM HUMIDISTATS

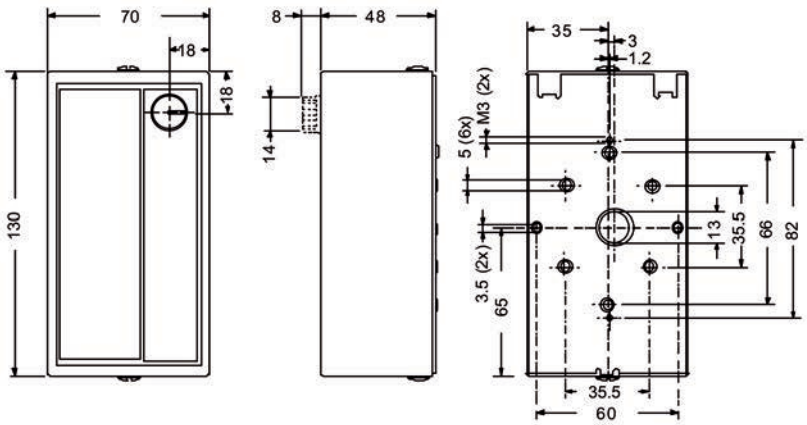

These room humidistats are designed to control humidification or dehumidification equipment. It provides SPDT control.

The sensing element consists of carefully selected and processed human hair, proven to be the most sensitive and stable material known for this application. Under normal conditions these controls retain their sensitivity and accuracy for many years.

## FEATURES

- Wide range 0 to 90% R.H.
- Dust tight Penn switch
- SPDT Contacts
- Field adjustable high and low limit stops
- Separate mounting plate

## DIMENSIONS *(in mm)*



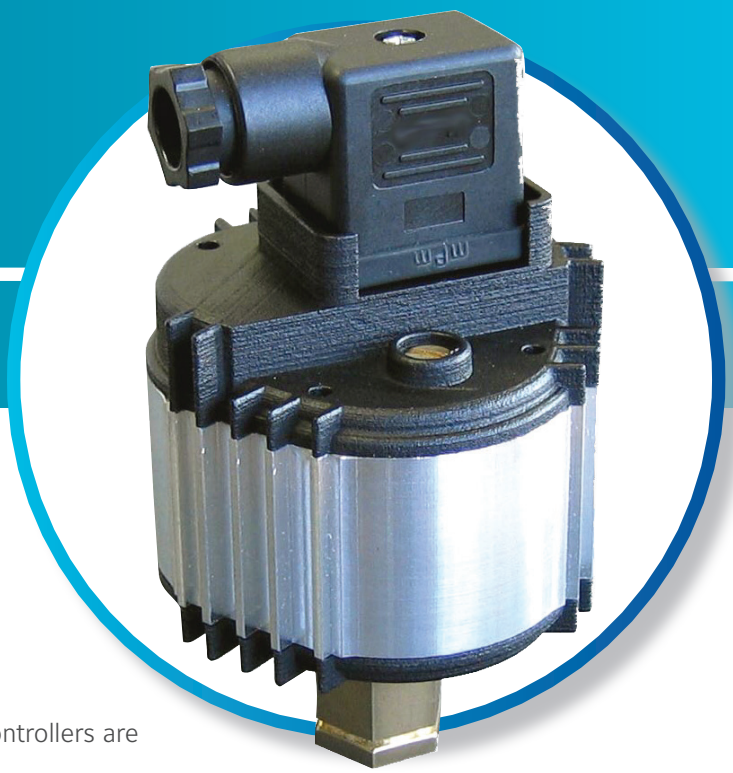

## ORDERING INFORMATION

| CODE | DESCRIPTION |
|---|---|
| W43C-9100 | Room humidistat |

# PENN COMMERCIAL REFRIGERATION

## CONDENSER FAN SPEED CONTROLLERS

### 1-PHASE CONDENSER FAN SPEED CONTROL



# P215PR

DIRECT-MOUNT SINGLE PHASE CONTROLLER

These direct mount pressure actuated condenser fan speed controllers are designed for speed variation of single-phase motors.

Head pressure control of a refrigeration system, through speed variation of the fan on an air-cooled condenser, results in optimum performance throughout the year.

A pressure actuated device, gives the most direct and fastest response to pressure variations in the refrigerant system. The controller varies the supply voltage to the motor from 30% to at least 95% over the proportional band using the phase cutting principle.

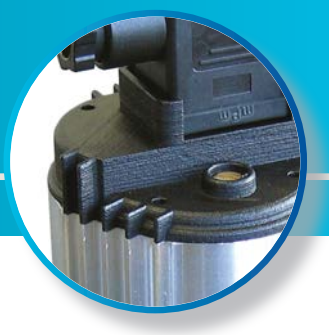
This provides speed variation of permanent split capacitor or shaded pole motors that do not draw more than 4 A (rms) full load current.

Cut-off models (fan stops at low pressure) as well as minimum speed models (fan keeps running at 30%) are available.

The controllers can be used in non-corrosive refrigerant systems.

## FEATURES

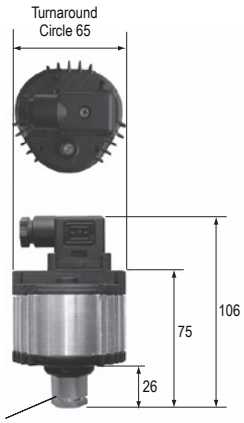
- Condenser pressure control by fan speed variation
- Pressure input
- Direct mount
- Setpoint screw on top
- Built-in suppression filter
- IP65
- Compact design
- Attractive styling
- Quick connector plug included
- CE
- Tested for safe operation with all A2L and A3 refrigerants



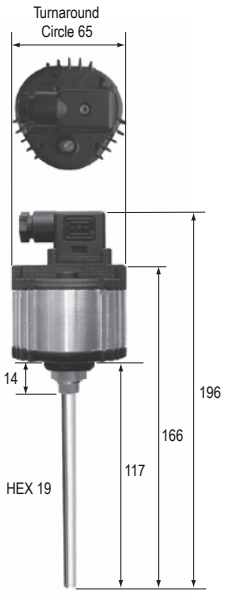
## CONDENSER FAN SPEED CONTROLLERS

P215PR 1-PHASE CONDENSER FAN SPEED CONTROL

## DIMENSIONS *(in mm)*




**Style 47**
**Direct mount**
**7/16 –20 UNF female**
**(incl. valve depressor)**




**Style 28**
**Braze connection**
**6 mm ODM**

## ORDERING INFORMATION

| CODES | RANGE *(bar)* | ELEMENT STYLE | SETPOINT *(bar)* | PROP. BAND *(bar)* | SUPPLY VOLTAGE 50/60 Hz | RATING | CONTROLLER MODE | EXTRA FEATURES |
|---|---|---|---|---|---|---|---|---|
| P215PR-9200 | 10 to 25 | 47 | 19 | 4.5 | 230 VAC | 4 Amp | Cut-off | --- |
| P215PR-9202 | 22 to 42 | | 26 | 5.5 | | | | |
| P215PR-9203 | 5 to 15 | | 9 | 2.5 | | | | |
| P215PR-9800 | 10 to 25 | 28 | 19 | 4.5 | | | | |
| P215PR-9230 | | 47 | | | | | | Bulk Pack |
| P215PR-9232 | 22 to 42 | | 26 | 5.5 | | | | |
| P215PR-9250 | 10 to 25 | | 19 | 4.5 | | | | Bulk Pack, 2 m cable connector incl. |

**Note**

For a 4 Amp rating and UL approval please contact your sales representative.

# CONDENSER FAN SPEED CONTROLLERS

## 1-PHASE CONDENSER FAN SPEED CONTROL

# P215RM

REMOTE-MOUNT SINGLE PHASE CONTROLLER

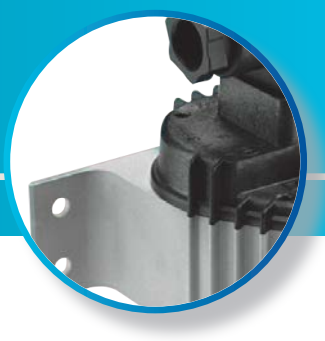
The new P215RM (Remote Mount) is an addition model to our very successful P215PR  Direct Mount FSC which is in program since 2004.

We have designed the P215RM for situations where mounting space is limited or if the refrigeration line is to thin so it cannot carry the weight off the P215PR. Also new on this product is the all-in bracket design which is part of the complete Aluminium housing.

The P215RM can be screwed to a side panel and connected to the refrigeration line by using a flexible hose or a copper capillary.

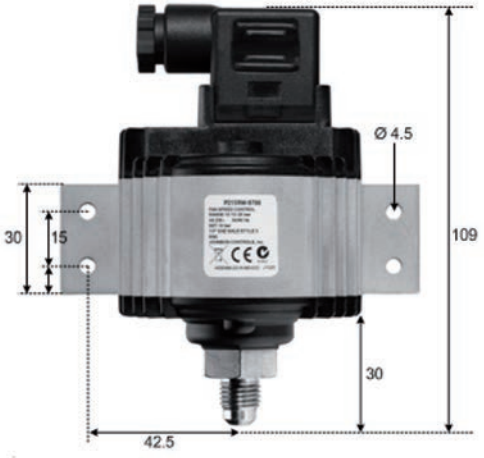
## FEATURES

- Quick and easy to install due to integral mounting bracket
- Easy mounting with style 5 pressure connection
- No need to use a male / male adaptor between P215RM and flex hose
- Three ranges available 5 - 15 bar, 10 - 25 bar, 22 - 42 bar
- Output current maximum 4A at 55°C operating ambient temperature
- Global design CE approval
- Wetted materials approved for use with standard non-corrosive and (mild) flammable A2L / A3 refrigerants



# 1-PHASE CONDENSER FAN SPEED CONTROL

## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

| CODES | RANGE *(bar)* | ELEMENT STYLE | SETPOINT *(bar)* | PROP. BAND *(bar)* | SUPPLY VOLTAGE 50/60 Hz | RATING | CONTROLLER MODE | EXTRA FEATURES |
|---|---|---|---|---|---|---|---|---|
| P215RM-9700 | 10 to 25 | 5 | 19 | 4.5 | 230 VAC | 4 Amp | Cut-off | --- |
| P215RM-9702 | 22 to 42 | | 26 | 5.5 | | | | |
| P215RM-9703 | 5 to 15 | | 9 | 2.5 | | | | |

# PENN COMMERCIAL REFRIGERATION

## CONDENSER FAN SPEED CONTROLLERS

### 1-PHASE CONDENSER FAN SPEED CONTROL


# P216

CONDENSER FAN SPEED CONTROLLER

These controllers are designed for speed variation of single phase motors, especially for fan speed control on air cooled condensers. Head pressure control of a refrigeration system, through speed variation of the fan on an air-cooled condenser, results in optimum performance throughout the year.

Using a pressure transducer as the input device to the fan speed controller, gives the most direct and fastest response to pressure variations in the refrigerant system. The controller varies the supply voltage to the motor from 45% to at least 95% over the proportional band using the phase cutting principle. If the pressure drops below the adjusted setpoint minus the proportional band, the output to the motor is zero volt or the adjusted min. speed setting. This provides speed variation of permanent split capacitor or shaded pole motors which do not draw more than 12 A (rms) full load current.

The controller used for dual pressure input varies the fan speed by directly sensing the pressure changes of two separate refrigerant circuits. The setpoint of each pressure transducer can be separately adjusted.
The controller selects the input with the greatest cooling demand to control the fan speed.

The transducers can be used in non-corrosive refrigerant systems.
The motor manufacturer should have approved his product for this speed control principle. It is recommended to confirm with the electric motor manufacturer, that the motor can be used with a controller, using the phase cutting principle for speed variation. You can also provide a copy of this P216 product data sheet to the motor manufacturer/supplier for review.

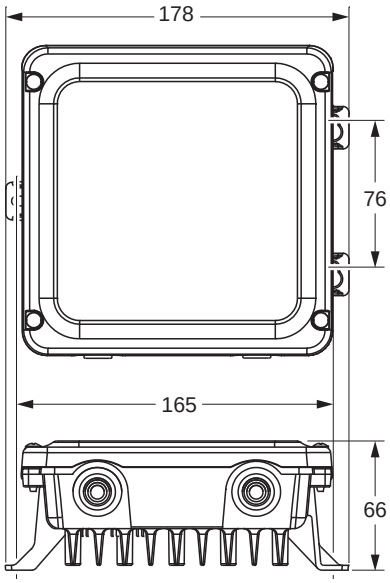
## FEATURES

- The new benchmark in standard FSC
- Easy to Install and Easy to operate
- Output Range: 0,5 to 12 Amp (1 phase)
- Input 0-10 Vdc
- Including 0-50 bar pressure transducer P499VCS-405C
- Heatpump mode
- Reverse operation mode
- Master / Slave mode
- Fixed pressure ranges for direct replacement (P215)
- Setpoint and Min speed potmeters
- Operate with High Efficiency AC-fan motors who comply to ERP 2015 directive.
- Wetted materials approved for use with standard non-corrosive and (mild) flammable A2L / A3 refrigerants



P216 1-PHASE CONDENSER FAN SPEED CONTROL

## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

| CODES | DESCRIPTION |
|---|---|
| P216EEA-2K | Wallmount P216EEA-101C + P499VCS-405C pressure transducer |
| P216EEA-101C | Wall mounted FSC |
| P499VCS-405C | Pressure transmitter with range 0-50 bar, Output 0-10V. 2 meter fixed cable. Pressure connection 7/16-20UNF female thread |

# PENN COMMERCIAL REFRIGERATION

## CONDENSER FAN SPEED CONTROLLERS

### 1-PHASE CONDENSER FAN SPEED CONTROL


# P266

PRESSURE ACTUATED SINGLE PHASE DIGITAL CONTROLLER

The P266 pressure actuated single phase digital controller is a cost-effective, weather-resistant, durable motor speed control.
The P266 control is designed for approved single-phase, Permanent Split-Capacitor (PSC) motors commonly used in a wide variety of refrigeration and air conditioning condenser fan applications.

The P266 series controls are designed to replace the Johnson Controls® P66 series and P215 series fan speed controls, providing additional features and flexibility, greater energy efficiency, and longer motor life in a compact, rugged, weather-resistant package.

P266 models are available for 208 to 240 VAC and 440 to 575 VAC range applications. P266 controls have current ratings from 4 to 12 A depending on the voltage and model.

Some P266 models provide optional control of up to three auxiliary (fixed-speed) fans or fan stages. Also, some models provide two additional high-voltage triacs, which allow you to split the source power to the main and auxiliary windings, and connect a low-speed capacitor to increase efficiency at low speed operation.

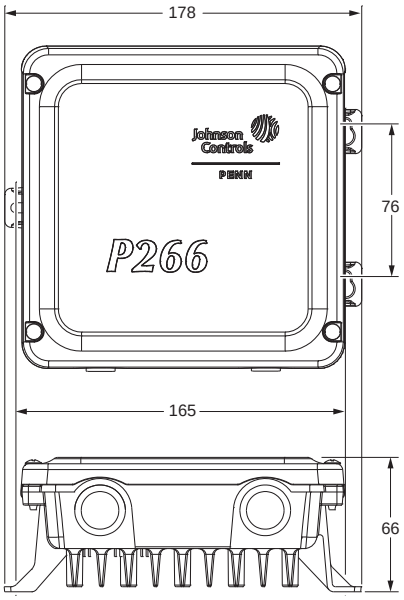
## FEATURES

- Global design CE / UL / CSA / C-tick
- Microprocessor based
- Field programmable, digital setting
- One or two electronic pressure transducers (P266SNR)
- Pressure range 0 - 35 bar or 0 - 52 bar
- Patented design
- Output 8 or 12 Amp at 60°C ambient temperature
- Robust aluminium IP54 enclosure with integral heatsink
- Multi triac control providing energy savings up to 25%
- Optional auxiliary (vernier) control
- Auto selection 50 / 60 Hz
- Wetted materials approved for use with standard non-corrosive and (mild) flammable A2L / A3 refrigerants


## CONDENSER FAN SPEED CONTROLLERS

### P266 1-PHASE CONDENSER FAN SPEED CONTROL

## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

| CODES | DESCRIPTION | TRANSDUCER MODEL INCLUDED IN KIT | VOLTAGE RANGE *(VAC)* | MAXIMUM OUTPUT *(Ampères)* | HIGH VAC TRIACS | AVAILABLE AUXILIARY FAN CONTROL CIRCUITS |
|---|---|---|---|---|---|---|
| P266EBA-1K [1] | P266 fan speed control with Internal transformer and **one** P266 pressure transducer and one 2 m cable | P266SNR-1C 0-35 bar (0-508 psi) | 208 to 240 | 8 | 3 | 3 |
| P266EBA-3K [1] | | P266SNR-2C 0-52 bar (0-754 psi) | | | | |
| P266ECA-1K [1] | | P266SNR-1C 0-35 bar (0-508 psi) | | | 1 | --- |
| P266ECA-3K | | P266SNR-2C 0-52 bar (0-754 psi) | | | | |
| P266EDA-1K [1] | | P266SNR-1C 0-35 bar (0-508 psi) | | | | 3 |
| P266EEA-1K [1] | | P266SNR-1C 0-35 bar (0-508 psi) | | 12 | | --- |
| P266EFA-1K [1] | | P266SNR-1C 0-35 bar (0-508 psi) | | | | 3 |

**Note**

**1** Factory default settings: Start Voltage is set to 40% of the supply line-voltage. End Voltage is set to 95% of the supply line-voltage. Start Pressure is set to 44% of the P266 transducer's total pressure range. End Pressure is set to 51% of the P266 transducer's total pressure range.


P266 1-PHASE CONDENSER FAN SPEED CONTROL

## ORDERING INFORMATION

### P266SNR ELECTRONIC PRESSURE TRANSDUCERS

| CODES | DESCRIPTION |
|---|---|
| P266SNR-1C | Electronic pressure transducer: 0 to 35 bar total range with a 1/4 in. SAE female flare connection and a 2 meter cable. |
| P266SNR-2C | Electronic pressure transducer: 0 to 52 bar total range with a 1/4 in. SAE female flare connection and a 2 meter cable. |
| P266PRM-1K | P266 Utility Com. Tool Kit. Communication Software Package to program and monitor P266 Control parameters. |

# PENN COMMERCIAL REFRIGERATION

## CONDENSER FAN SPEED CONTROLLERS

### 1-PHASE CONDENSER FAN SPEED CONTROL

# P315PR

DIRECT-MOUNT PRESSURE ACTUATED FOR EC MOTORS

The direct mount pressure actuated condenser fan speed controllers are designed for speed variation of electronically commutated (EC) motors. Head pressure control of a refrigeration system, through speed variation of the fan on an air-cooled condenser, results in optimum performance throughout the year.
The controllers can be used in non-corrosive refrigerant systems.

A pressure actuated device provides the most direct and fastest response to pressure variations in the refrigerant system. The controller varies the supply voltage to the motor from 5% to at least 95% over the proportional band.

## FEATURES

- Fan speed variation cndenser pressure control
- Pressure input
- Direct mount option
- Setpoint screw location on top of device
- IP65 enclosure
- Compact design
- Attractive styling
- Quick connector plug included
- Suitable to control 1 or 3 phase EC motor
- Tested for safe operation with all A2L and A3 refrigerants
- Wetted materials approved for use with standard non-corrosive and (mild) flammable A2L / A3 refrigerants

## CONDENSER FAN SPEED CONTROLLERS

### P315PR 1-PHASE CONDENSER FAN SPEED CONTROL

## DIMENSIONS *(in mm)*


## ORDERING INFORMATION

| CODES | RANGE *(bar)* [1] | ELEMENT STYLE | SETTING *(bar)* | PROP. BAND *(bar)* | CONTROLLER MODE [2] | MINIMUM SHIPPING QUANTITY | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|---|
| P315PR-9200C | 8 to 25 | 47 | 16 | 4 | N/A | 1 | --- |
| P315PR-9200D | | | | | | 25 | Bulk Pack |
| P315PR-9202C | 22 to 42 | | 26 | 5 | | 1 | --- |
| P315PR-9203C | 5 to 15 | | 6 | 4 | | | |
| P315PR-9203D | | | | | | 25 | Bulk Pack |

**Notes**

**1** 1 bar = 100 kPa ≈ 14.5 psi

**2** Minimum speed.

# PENN COMMERCIAL REFRIGERATION

## CONDENSER FAN SPEED CONTROLLERS

### 3-PHASE CONDENSER FAN SPEED CONTROL


# VFD68

VARIABLE FREQUENCY DRIVES

The VFD68 Variable Frequency Drive provides three-phase motor speed control in a variety of HVAC/R applications. The VFD68 drive is designed primarily for condenser fan speed control on HVAC and refrigeration condensing units, but can also be set up to control a variety of pumps, blowers and fans.

The VFD68 drive accepts an input signal from P499 electronic pressure transducer, or other devices that provide a 0 to 5 VDC, 0 to 10 VDC, or 4 to 20 mA signal. The application-specific design of the VFD68 drive provides a simple interface, which makes the drive easy to understand and operate. You can quickly and easily reconfigure the VFD68 drive to control variable speed pumps in cooling and heating applications, or to control variable speed supply fans in VAV applications.

The VFD68 drive is an RS485, RTU-compliant ModBus® slave device and can be integrated into a ModBus network.

## FEATURES

- Selectable input types allows use with 0 to 5 VDC (ratiometric), 0 to 10 VDC, or 4 to 20 mA input signals from transducers, sensors, and controllers.
- High input signal selection of two similar inputs provides fan speed control of dual circuit condensing units, based on the highest pressure circuit.
- Compact design provides for easy and flexible installation.
- Three-phase 400V 50Hz models can control a wide variety of three-phase motors ranging up to 3hp.
- Simple and advanced end-user settings provide quick and simple application setup and operation, as well as advanced setup parameters for custom applications.

## APPLICATIONS

The VFD68 drive accepts input signals from a variety of pressure transducers, temperature sensors, and low-voltage controllers to provide continuous response to changing condenser load conditions.

The VFD68 drive allows the system to:

- Maintain optimum condenser head pressure
- Operate in low ambient temperature conditions down to -40 °C
- Reduce short-cycling, which occurs when using
- Use on/off fan controls
- Maintain a more stable evaporator temperature
- Operate more efficiently, reducing electricity cost.

The VFD68 drive can also:

- Help optimize compressor operation, reduce wear, and extend compressor life by stabilizing the condenser head pressures
- Reduce motor repair and replacement costs by eliminating the condenser fan short-cycling
- Extend refrigerated product life and provide more consistent comfort cooling by stabilizing evaporator temperatures

VFD68 3-PHASE CONDENSER FAN SPEED CONTROL

## ORDERING INFORMATION

### 400V 50Hz (460V 60Hz) PRODUCTION MODELS

| CODES | DESCRIPTION |
|---|---|
| VFD68CFF-2C | VFD68 Drive; 0.75 kw (1 hp); 128 x 108 x 130 mm |
| VFD68CGG-2C | VFD68 Drive; 1.5 kw (2 hp); 128 x 108 x 136 mm |
| VFD68CHH-2C | VFD68 Drive; 2.2 kw (3 hp); 128 x 108 x 156 mm |

**Note**

The Variable Frequency Drives are delivered without EMC-filter. This has to be ordered separately (not available from Johnson Controls)

# PENN COMMERCIAL REFRIGERATION

## FIELD AND COLD ROOM CONTROLLERS

## MODULAR ELECTRONIC CONTROL SYSTEM


# SYSTEM 450™

MODULAR ELECTRONIC CONTROLS

System 450™ is a family of modular, digital electronic controls that is easily assembled and set up to provide reliable temperature, pressure, and humidity control for a wide variety of Heating, Ventilating, Air Conditioning and Refrigeration (HVACR) and commercial/industrial process applications.

The System 450 control system is designed to replace System 350™ control system and System 27, and provide many additional features and benefits with less than a dozen model variations.

All System 450 control modules are multipurpose and field configurable out-of-the-box; each module is designed for use in temperature, pressure, and humidity systems. A System 450 control system can be easily assembled and configured to monitor and control temperature, pressure, and humidity simultaneously.

A single C450 control module can be set up as a stand-alone control or connected to expansion modules to control up to ten outputs based on any of the three available inputs.

A control system may consist of relay outputs (Single-Pole, Double-Throw [SPDT]), analog outputs (0–10 VDC or 4–20 mA), or any combination of relay and analog outputs.

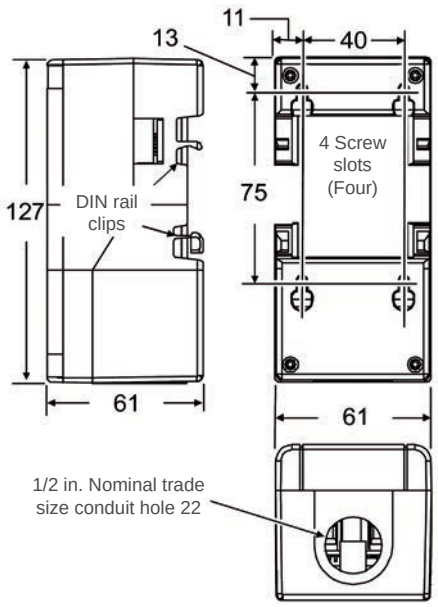
## FEATURES

- Durable, compact modular design with plug-together connectors and DIN rail or direct wall mount capability
- Multipurpose, field-configurable modules designed for global use
- Backlit Liquid Crystal Display (LCD) and four-button touchpad user interface
- Up to three inputs and up to ten outputs (relay or analog)
- Versatile, all-in-one, stand-alone control modules
- An extensive suite of compatible temperature and humidity sensors as well as pressure transducers
- High input signal selection
- Differential control
- Adjustable user-defined reset setpoint (C450R Only)
- Adjustable minimum and maximum setpoint temperature (C450R only)
- Selectable warm weather shutdown temperature (C450R only)
- Adjustable setback temperature (C450R only)


# FIELD AND COLD ROOM CONTROLLERS

## SYSTEM 450™ MODULAR ELECTRONIC CONTROL SYSTEM

## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

System 450 control modules are capable of monitoring up to three input sensors and controlling up to ten outputs that can be any combinationof relay and analogue outputs (provided by expansion modules).

| CODES | DESCRIPTION |
|---|---|
| | C450 control module types |
| C450CBN-4C | Control module 1 stage |
| C450CCN-4C | Control module 2 stage |
| C450CEN-1C | Control module with Ethernet communications, LCD, and four-button touchpad UI. (No onboard outputs available on control modules with network communications capabilities.) |
| C450CRN-1C | Control module with RS485 Modbus communications, LCD, and four-button touchpad UI. (No onboard outputs available on control modules with network communications capabilities.) |
| C450CPN-4C | Control module - 1 analog output (PI) |
| C450CQN-4C | Control module - 2 analog Output (PI) |
| C450RBN-3C | Reset control module with LCD, four-button touchpad UI, and SPDT relay output; provides one SPDT output relay. One A99BC-25C temperature sensor with 0.25 m silicon leads and one A99BC-300C temperature sensor with 3 m silicon leads are included in the box with the reset control module. |
| C450RCN-3C | Reset control module with LCD, four-button touchpad UI, and SPDT relay output; provides two SPDT output relays. One A99BC-25C temperature sensor with 0.25 m silicon leads and one A99BC-300C temperature sensor with 3 m silicon leads are included in the box with the reset control module. |

...Continued...


# FIELD AND COLD ROOM CONTROLLERS

## SYSTEM 450™ MODULAR ELECTRONIC CONTROL SYSTEM

## ORDERING INFORMATION

| CODES | DESCRIPTION |
|---|---|
| | C450 expansion module types |
| C450SBN-3C | Expansion module 1 relay stage |
| C450SCN-3C | Expansion module 2 relay stage |
| C450SPN-1C | Expansion module - 1 analog output (PI) |
| C450SQN-1C | Expansion module - 2 analog output (PI) |
| | C450 power module |
| C450YNN-1C | Power module 230/24 VAC - 50/60 Hz |
| | C450 sensor types |
| A99 | Temperature sensors, all models, Range -40 / 120 °C |
| P499RCP-401C | Pressure transmitter - Range -1 / 8 bar |
| P499RCP-402C | Pressure transmitter - Range -1 / 15 bar |
| P499RCP-404C | Pressure transmitter - Range 0 / 30 bar |
| P499RCP-405C | Pressure transmitter - Range 0 / 50 bar |

## SPECIFICATIONS SPDT RELAY OUTPUT CONTACTS

- AC motor ratings at 208/240 VAC
- Full-load Amperes: 4,9 Amp
- Locked-rotor Amperes: 29,4 Amp
- Non-inductive load at 24/240 VAC: 10 Amp
- Pilot duty at 24/240 VAC: 125 VA

| A99 | All A99 models can be used on the C450 | |
|---|---|---|
| P499 | P499RCP-401C | Range -1 to 8 bar |
| | P499RCP-402C | Range -1 to 15 bar |
| | P499RCP-404C | Range 0 to 30 bar |
| | P499RCP-405C | Range 0 to 50 bar |

# PENN COMMERCIAL REFRIGERATION

## FIELD AND COLD ROOM CONTROLLERS

## ELECTRONIC CONTROL DEVICES

# ER LINE

ELECTRONIC REFRIGERATION LINE

Devices are designed to be incorporated in refrigerated display cases and cold storage rooms.

ER Line proposes progressive offer from basic controls to advanced controls including real time clock, energy saving and network communication to be integrated with monitoring system.
It also introduces specific products for supermarkets (e.g. compressor rack).

## HARDWARE FEATURES

- Robust front panel for durability and long term usage
- Direct 230 V supply, no external transformer required
- Up to 5 relays in a single package
- NTC or PTC (A99) sensors
- Removable plug connectors for quick mounting and wiring
- Embedded real time clock, no additional clock card required
- Embedded RS485 port, no additional communication card required

## APPLICATION FEATURES

- Positive or negative temperature units with a single product
- Minimum and maximum temperature monitoring
- Comprehensive controls
- Light and standby switching
- Energy saving (2nd setpoint)

# FIELD AND COLD ROOM CONTROLLERS

ER LINE ELECTRONIC CONTROL DEVICES

## ORDERING INFORMATION

| PRODUCTS | TYPE | MOUNTING | WIRING | COMPRESSOR RELAYS | FAN RELAYS | DEFROST RELAYS | AUXILIARY RELAYS | REAL TIME CLOCK | RS485 |
|---|---|---|---|---|---|---|---|---|---|
| ER54 | Evaporator control | Panel | Removable plug connectors | ■ | ■ | ■ | ■ | ■ | ■ |
| ER55-DR | Cold room control | Din rail | Removable plug connectors | ■ | ■ | ■ | ■ (2 relays) | ■ | ■ |
| ER55-SM | Cold room control | Split | Fixed screw connectors | ■ | ■ | ■ | ■ (2 relays) | ■ | ■ |
| ER65 | Rack control | Din rail | Removable plug connectors | ■ (4 relays) | --- | --- | ■ | --- | ■ |

**Note**

Please refer to product bulletins for complete information

## ACCESSORIES

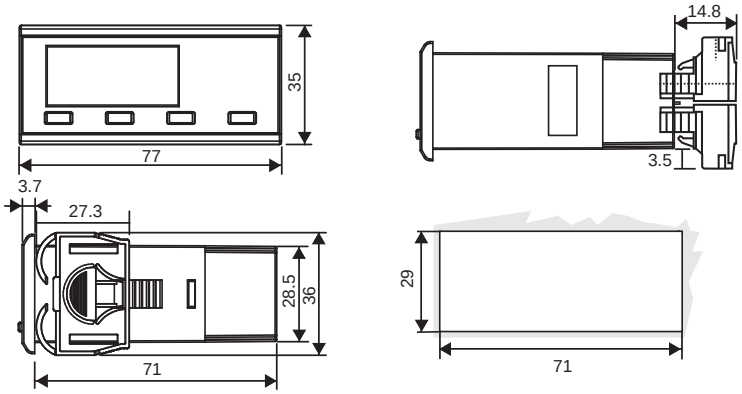
| CODES | DESCRIPTION | APPLIED PRODUCTS |
|---|---|---|
| ER-NTC-0C | NTC sensor, cable 2 m, universal replacement | All ER products |
| ER-COM-1C | RS485 cable, 1.5 m, plug connector | ER54, ER55-SM |
| ER-COM-2C | RS485 cable, 1.5 m, RJ connector | ER55-DR |
| P499Axx-xxx | Pressure transducer, 4-20 mA<br>*(See also P499 catalogue section)* | ER65 |

# ER54 EVAPORATOR CONTROLLERS

## FEATURES

- Panel mount controller
- cool thermostat
- comprehensive controls
- RS485
- real time clock
- plug connectors
- Delivered with one NTC sensor

## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

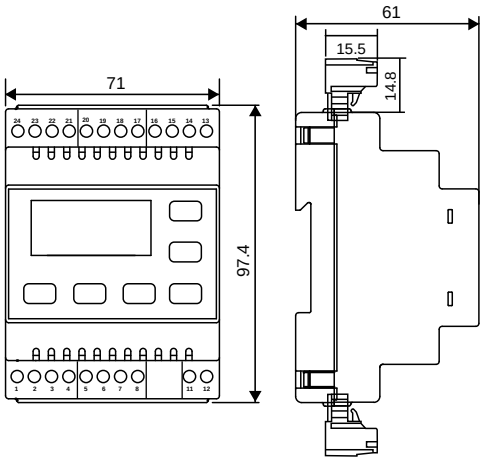
| CODES | RS485 | POWER SUPPLY | PROTECTION CLASS | TEMPERATURE RANGE | DISPLAY | INPUTS | OUTPUTS |
|---|---|---|---|---|---|---|---|
| ER54-PMW-501C | MODBUS | 230 VAC, ±10%<br>Consumption 3W | IP55 (front)<br>IP20 (back) | -40 to 70°C<br>Accuracy:<br>±0.3 °C | LED 3 digits<br>Decimal<br>displaying | · 3 temperatures<br>· 2 voltage free contacts | · Compressor: SPST 12(5)A<br>· Fan: SPST 7(2)A<br>· Defrost: SPST 7(2)A<br>· Auxiliary: SPST 7(2)A |
| ER54-PMW-001C | N2 Open | | | | | | |

# ER55 COLD ROOM CONTROLLERS

## FEATURES

- DIN rail mounting controller
- cool thermostat
- comprehensive controls
- RS485
- real time clock
- plug connectors
- Delivered with one NTC sensor

## DIMENSIONS *(in mm)*



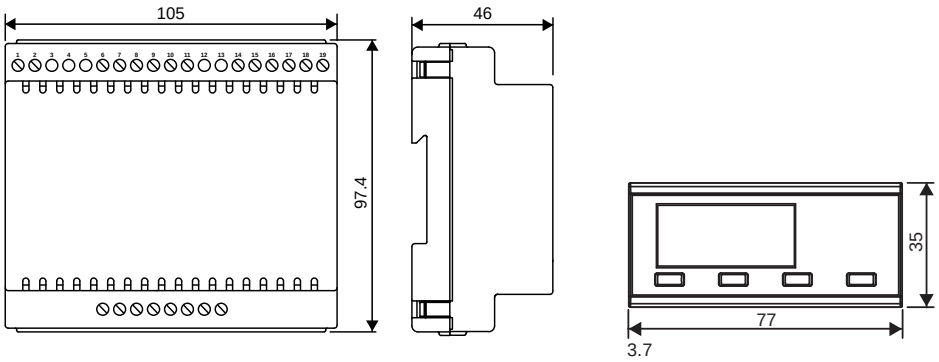

| CODES | RS485 | POWER SUPPLY | PROTECTION CLASS | TEMPERATURE RANGE | DISPLAY | INPUTS | OUTPUTS |
|---|---|---|---|---|---|---|---|
| ER55-DR230-501C | MODBUS | 230 VAC, ±10%<br>Consumption 3W | IP20 | -40 to 70°C<br>Accuracy:<br>±0.3°C | LED 3 digits<br>Decimal<br>displaying | • 3 temperatures<br>• 2 voltage free contacts | • Compressor: SPST 7(2)A<br>• Fan: SPST 7(2)A<br>• Defrost: SPST 16(4)A<br>• Auxiliary 1: SPDT 7(2)A<br>• Auxiliary 2: SPST 7(2)A |
| ER55-DR230-001C | N2 Open | | | | | | |

# ER55 COLD ROOM CONTROLLERS

## FEATURES

- Split mounting controller
- cool thermostat
- comprehensive controls
- RS485
- real time clock
- plug connectors
- Delivered with two NTC sensors

## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

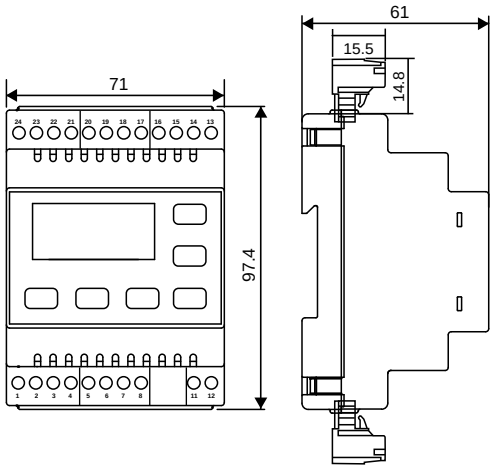
| CODES | RS485 | POWER SUPPLY | PROTECTION CLASS | TEMPERATURE RANGE | DISPLAY | INPUTS | OUTPUTS |
|---|---|---|---|---|---|---|---|
| ER55-SM230-501C | MODBUS | 230 VAC, ±10%<br>Consumption 3W | IP20 | -40 to 70°C<br>Accuracy:<br>±0.3°C | Remote<br>LED 3 digits<br>Decimal<br>displaying | • 3 temperatures<br>• 2 voltage free contacts | • Compressor: SPST 16(8)A<br>• Fan: SPST 8(3)A<br>• Defrost: SPST 16(4)A<br>• Auxiliary 1: SPST 7(2)A<br>• Auxiliary 2: SPST 7(2)A |
| ER55-SM230-001C | N2 Open | | | | | | |

# ER65 RACK CONTROLLERS

## FEATURES

- DIN rail mounting controller
- pressure or temperature control
- 4 compressors or fans sequencer
- RS485
- plug connectors
- Sensor to be ordered separately (see also P499 pressure transducer section).

## DIMENSIONS *(in mm)*




## ORDERING INFORMATION

| CODES | RS485 | POWER SUPPLY | PROTECTION CLASS | TEMPERATURE RANGE | DISPLAY | INPUTS | OUTPUTS |
|---|---|---|---|---|---|---|---|
| ER65-RK230-001C | N2 Open | 230 VAC, +/-10%<br>Consumption 3W | IP20 | -40 to 70°C<br>Accuracy:<br>+/-0.3°C | LED 3 digits<br>Decimal displaying | · 1 temperature<br>· 1 pressure<br>· 2 voltage free contacts<br>· 3 supplied contacts (230 V) | · Stages (x4): SPST 5(1)A<br>· Alarm: SPDT 7(2)A |

# PENN COMMERCIAL REFRIGERATION

## FIELD AND COLD ROOM CONTROLLERS

## MULTI-STAGES CONTROL DEVICES

# MS LINE

GENERAL PURPOSE AND MULTI-STAGES

This range of versatile controls is intended for single or multistage (2 or 4 stages) applications such as heating, cooling but also humidity or pressure depending on the input type.

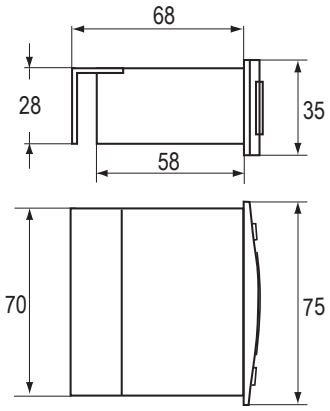
This range incorporates all control functions as required by modern applications and it exists in both panel mount and DIN rail enclosures. Particular attention has been given to its style in order to better suit your machine design.

This complete range of microprocessor based controls offers innovative features and "state of the art" technology.

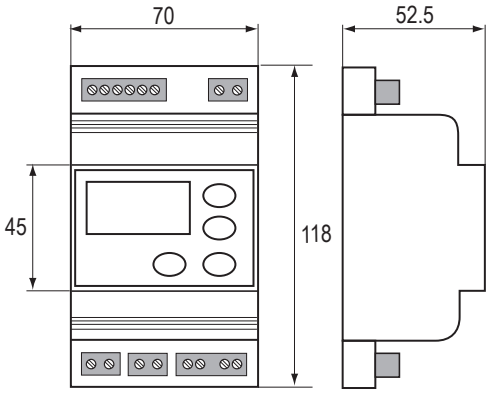
## FEATURES

- Attractive panel mount and DIN rail mount enclosure
- Up to 4 relays in panel mount enclosure
- 230 Volt power supply models available
- Accept temperature (A99) and 0-10 Volts sensor signal depending on models
- Power supply to sensors on 0-10 Volts models available from controller
- Accurate and interchangeable IP68 sensor
- Wide range of enclosures for sensors available
- Keyboard lock
- SMD technology

## DIMENSIONS *(in mm)*




Panel model




DIN rail model

## ORDERING INFORMATION

### MS DISPLAY

| CODES | RANGE | POWER SUPPLY | ENCLOSURE | INPUT | PROTECTION CLASS | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|
| DIS230T-1C | -40 to 70°C | 230 VAC | Panel | A99 sensor (incl.) | Overall IP20<br>Front IP54 | Accuracy: ±1 Unit<br>Power Consumption:<br>1.5 VA 50/60 Hz |
| DIS230V-1C | 0 to +100% (Rh) | | | 0-10 V from humidity sensor (not Incl.) | | |

### MS1 ONE-STAGE CONTROL

| CODES | RANGE | POWER SUPPLY | ENCLOSURE | INPUT | OUTPUT RATING 250 VAC | ALARM OUTPUT | PROTECTION CLASS | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|---|---|
| MS1PM12RT-1C | -40 to 70°C | 12 VAC/DC | Panel | A99 sensor (incl.) | SPST 8(3)A | Open Collector 40 VDC/100 mA | Overall IP20<br>Front IP54 | • Accuracy: ±1 Unit<br>• Power Consumption: 2 VA 50/60 Hz |
| MS1PM230T-1C | | 230 VAC | | | SPDT 8(3)A | | | |
| MS1DR230T-1C | | 230 VAC | DIN rail | | SPST 8(3)A | | IP20 | |
| MS1PM12RV-1C | -40 to 100 | 12 VAC | Panel | 0-10 V | SPST 8(3)A | | Overall IP20<br>Front IP54 | |
| MS1PM230V-1C | | 230 VAC | | | SPDT 8(3)A | | | |
| MS1DR230V-1C | | 230 VAC | DIN rail | | SPST 8(3)A | | IP20 | |

## OREDERING INFORMATION

### MS2 TWO-STAGE CONTROL

| CODES | RANGE | POWER SUPPLY | ENCLOSURE | INPUT | OUTPUT RATING 250 VAC<br>Each stage (1-2) | PROTECTION CLASS | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|---|
| MS2PM12RT-1C | -40 to 70 °C | 12 VAC/DC | Panel | A99 sensor (incl.) | SPST 8(3)A | Overall IP20 Front IP54 | · Accuracy: ±1 °C<br>· Power Consumption: 2 VA 50/60 Hz |
| MS2DR230T-1C | | 230 VAC | DIN rail | | SPST 8(3)A | IP20 | |
| MS2DR48DT-1C | | 12-24 VAC/DC 48 VDC | | | SPDT 8(3)A | | |
| MS2PM12RV-1C | -40 to 100 | 12 VAC | Panel | 0-10 V | SPST 8(3)A | Overall IP20 Front IP54 | |
| MS2DR230V-1C | | 230 VAC | DIN rail | | SPST 8(3)A | IP20 | |

### MS4 FOUR-STAGE CONTROL

| CODES | RANGE | POWER SUPPLY | ENCLOSURE | INPUT | OUTPUT RATING 250 VAC<br>Each stage (1 to 4) | PROTECTION CLASS | ADDITIONAL FEATURES |
|---|---|---|---|---|---|---|---|
| MS4PM12RT-1C | -40 to 70°C | 12 VAC/DC | Panel | A99 sensor (incl.) | SPST 8(3)A | Overall IP20 Front IP54 | · Accuracy: ±1 Unit<br>· Power Consumption: 2 VA 50/60 Hz |
| MS4DR230T-1C | | 230 VAC | DIN rail | | SPST 8(3)A | | |
| MS4DR48DT-1C | | 12-24 VAC/DC 48 VDC | | | SPDT 8(3)A | IP20 | |

# PENN COMMERCIAL REFRIGERATION

## TRANSDUCERS AND SENSORS

## PRESSURE TRANSDUCER


# P499

ELECTRONIC PRESSURE TRANSDUCER

The P499 series is a global pressure transducer with an excellent price performance ratio.
The P499 exceeds the latest industrial CE/UL requirements including surge protection, and is over voltage protected in both positive and reverse polarity.

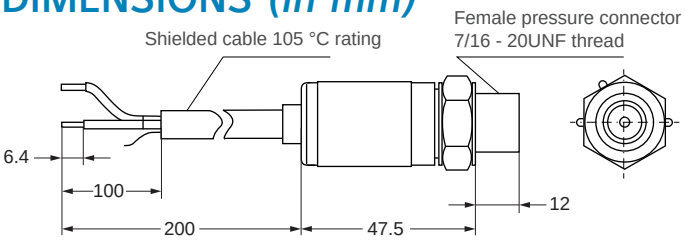
The P499 is designed to produce a linear analogue signal based on the sensed pressure.

The pressure port is machined from a solid piece of 17-4PH stainless steel. There are no O-rings or welds that are exposed to the pressure media. This results in a leak proof ,all metal sealed pressure system which withstand more than 10 million pressure cycles without failure.

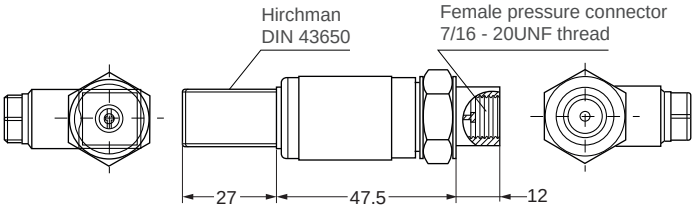
## FEATURES

- Single-piece machined steel pressure port
- Environmentally sealed electronics
- Reliable, repeatable performance and long operating life
- Slender body design
- Available in several pressure ranges up to 50 bar.
- Wetted materials approved for use with standard and (mild) flammable A2L / A3 refrigerants

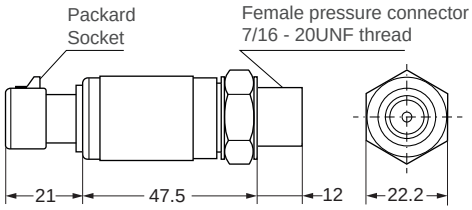
## DIMENSIONS *(in mm)*




**Shielded cable female**




**Hirchman female**




**Packard female**


P499 PRESSURE TRANSDUCER

## ORDERING INFORMATION

### 2 METER CABLE CONNECTIONS MODELS

| CODES | PRESSURE RANGE | | PRESSURE PORT | OUTPUT |
|---|---|---|---|---|
| | Minimum Pressure (Pmin) | Maximum Pressure (Pmax) | | |
| P499ABS-401C | -1 bar | 8 bar | 1/4" SAE Male | 4 to 20 mA |
| P499ABS-404C | 0 bar | 30 bar | | |
| P499ACS-401C | -1 bar | 8 bar | 1/4" SAE Female | |
| P499ACS-404C | 0 bar | 30 bar | | |
| P499ACS-405C | | 50 bar | | |
| P499VBS-401C | -1 bar | 8 bar | 1/4" SAE Male | 0 - 10 V |
| P499VBS-402C | -1 bar | 15 bar | | |
| P499VBS-404C | 0 bar | 30 bar | | |
| P499VCS-401C | -1 bar | 8 bar | 1/4" SAE Female | |
| P499VCS-404C | 0 bar | 30 bar | | |
| P499VCS-405C | | 50 bar | | |

### HIRSCHMANN DIN CONNECTOR

| CODES | PRESSURE RANGE | | PRESSURE PORT | OUTPUT |
|---|---|---|---|---|
| | Minimum Pressure (Pmin) | Maximum Pressure (Pmax) | | |
| P499ABH-401C | -1 bar | 8 bar | 1/4" SAE Male | 4 to 20 mA |
| P499ABH-402C | | 15 bar | | |
| P499ABH-404C | 0 bar | 30 bar | | |
| P499ACH-401C | -1 bar | 8 bar | 1/4" SAE Female | |
| P499ACH-402C | | 15 bar | | |
| P499ACH-404C | 0 bar | 30 bar | | |
| P499ACH-405C | | 50 bar | | |
| P499RCH-401C | -1 bar | 8 bar | | 0,5 - 4,5 V Ratiometric |
| P499RCH-404C | 0 bar | 30 bar | | |
| P499VBH-401C | -1 bar | 8 bar | 1/4" SAE Male | 0 - 10 V |
| P499VBH-404C | 0 bar | 30 bar | | |
| P499VCH-401C | -1 bar | 8 bar | 1/4" SAE Female | |
| P499VCH-402C | | 15 bar | | |
| P499VCH-404C | 0 bar | 30 bar | | |
| P499VCH-405C | | 50 bar | | |


P499 PRESSURE TRANSDUCER

## ORDERING INFORMATION

### PACKARD CONNECTOR

| CODES | PRESSURE RANGE | | PRESSURE PORT | OUTPUT |
|---|---|---|---|---|
| | Minimum Pressure (Pmin) | Maximum Pressure (Pmax) | | |
| P499ACP-401C | -1 bar | 8 bar | 1/4" SAE Female | 4 to 20 mA |
| P499ACP-402C | | 15 bar | | |
| P499ACP-403C | 0 bar | | | |
| P499ACP-404C | | 30 bar | | |
| P499ACP-405C | | 50 bar | | |
| P499RCP-401C | -1 bar | 8 bar | | 0,5 - 4,5 V Ratiometric |
| P499RCP-402C | | 15 bar | | |
| P499RCP-404C | 0 bar | 30 bar | | |
| P499RCP-405C | | 50 bar | | |
| P499VCP-401C | -1 bar | 8 bar | | 0 - 10 V |
| P499VCP-404C | 0 bar | 30 bar | | |

# PENN COMMERCIAL REFRIGERATION

## TRANSDUCERS AND SENSORS

## PRESSURE TRANSDUCER

# P599

ELECTRONIC PRESSURE TRANSDUCER

The P599 series electronic pressure transducers are compact, economical, rugged, direct-mount pressure transducers designed for use in commercial and industrial refrigeration and air conditioning applications.
These transducers provide a proportional analog signal based on the sensed pressure.

The P599 series transducers feature environmentally protected electronics with stainless steel construction. The digitally compensated P599 transducers are highly accurate over a broad temperature range, resisting the effects of wide ambient temperature swings, high humidity, condensation and icing.

The pressure port is machined from 304L stainless steel. No o-rings or organic materials are exposed to the pressure media, allowing for a leak-proof, all-metal, sealed pressure system. The P599 series transducers operate with any corrosive or non-corrosive refrigerants that are compatible with stainless steel (304L SS), including water condensate, carbon dioxide, glycol, most refrigerants (including ammonia) and many other compatible fluids and gases. The P599 transducers also can be used with the following natural refrigerants: NH3 (ammonia) and $CO_2$ (carbon dioxide) in accordance with hazardous location requirements.

The P599 series provides transducers in a variety of pressure ranges, covering most common refrigeration and air conditioning applications.

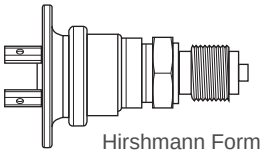
## FEATURES

- **Industrial Duty Design –** Offers a sealed design that includes a snubber to dampen pressure pulsations and has no o-rings for reliable performance in the most harsh environments.
- **10 Million Plus Full Scale Pressure Cycle Rated Life Span –** Provides life use with no degradation of accuracy or performance over the life of the transducer.
- **Approved for Today's Refrigerants –** Use with an extensive number of refrigerants, including HCFC, HFC, HFO and natural refrigerants, like Propane, CO2 and Ammonia.
- **Environmentally Protected Electronics –** Provide high vibration tolerance and prevent ingress and egress that can occur through suction line icing and thawing.
- **Wetted materials approved** - for use with standard and (mild) flammable A2L / A3 refrigerants.
- **ATEX certified**

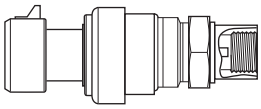
P599 PRESSURE TRANSDUCER

# ORDERING INFORMATION

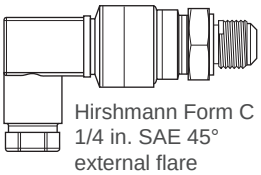
## STANDARD MODELS



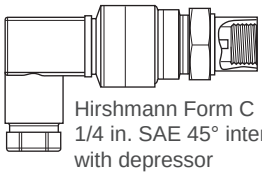
Hirshmann Form A
G3/8 A external



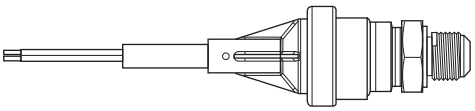
Packard connector
1/4 in. SAE 45°
internal flare with depressor



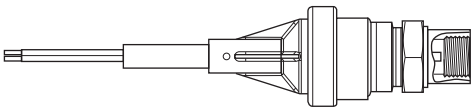
Hirshmann Form C
1/4 in. SAE 45°
external flare



Hirshmann Form C
1/4 in. SAE 45° internal flare
with depressor



2 m Shielded cable
1/4 in. SAE 45° external flare



2 m Shielded cable
1/4 in. SAE 45° internal flare with depressor

### 0.5 TO 4.5 VDC RATIOMETRIC FOR bar APPLICATIONS

| CODES | PRESSURE RANGE | | PRESSURE PORT | ELECTRICAL CONNECTOR |
|---|---|---|---|---|
| | Minimum pressure (Pmin) | Maximum pressure (Pmax) | | |
| P599RCHS401C | -1 bar | 8 bar | 1/4 in. - SAE 45° internal flare with depressor | Hirschmann® Form C |
| P599RCPS401C | | | 1/4 in. - SAE 45° internal flare with depressor | Packard |
| P599RCPS402C | | 15 bar | 1/4 in. - SAE 45° internal flare with depressor | |
| P599RCHS404C | 0 bar | 30 bar | 1/4 in. - SAE 45° internal flare with depressor | Hirschmann Form C |
| P599RCPS404C | | | 1/4 in. - SAE 45° internal flare with depressor | Packard |
| P599RCPS405C | 0 bar | 50 bar | 1/4 in. - SAE 45° internal flare with depressor | Packard |
| P599RJJS412C | -1 bar | 59 bar | G3/8 A external | Hirschmann Form A |
| P599RJJS413C | | 159 bar | G3/8 A external | |

P599 PRESSURE TRANSDUCER

## ORDERING INFORMATION

0 TO 10 VDC FOR bar APPLICATIONS

| CODES | PRESSURE RANGE | | PRESSURE PORT | ELECTRICAL CONNECTOR |
|---|---|---|---|---|
| | Minimum pressure (Pmin) | Maximum pressure (Pmax) | | |
| P599VBHS401C | -1 bar | 8 bar | 1/4 in. - SAE 45° external flare | Hirschmann Form C |
| P599VCHS401C | | | 1/4 in. - SAE 45° internal flare with depressor | |
| P599VCPS401C | | | 1/4 in. - SAE 45° internal flare with depressor | Packard |
| P599VBSS401C | | | 1/4 in. - SAE 45° external flare | Shielded cable |
| P599VCSS401C | | | 1/4 in. - SAE 45° internal flare with depressor | |
| P599VBSS402C | -1 bar | 15 bar | 1/4 in. - SAE 45° external flare | Shielded cable |
| P599VCHS402C | | | 1/4 in. - SAE 45° internal flare with depressor | Hirschmann Form C |
| P599VBHS404C | 0 bar | 30 bar | 1/4 in. - SAE 45° external flare | Hirschmann Form C |
| P599VCHS404C | | | 1/4 in. - SAE 45° internal flare with depressor | |
| P599VBSS404C | | | 1/4 in. - SAE 45° external flare | Shielded cable |
| P599VCSS404C | | | 1/4 in. - SAE 45° internal flare with depressor | |
| P599VCHS405C | 0 bar | 50 bar | 1/4 in. - SAE 45° internal flare with depressor | Hirschmann Form C |
| P599VCSS405C | | | 1/4 in. - SAE 45° internal flare with depressor | Shielded cable |

## TRANSDUCERS AND SENSORS

# P599 PRESSURE TRANSDUCER

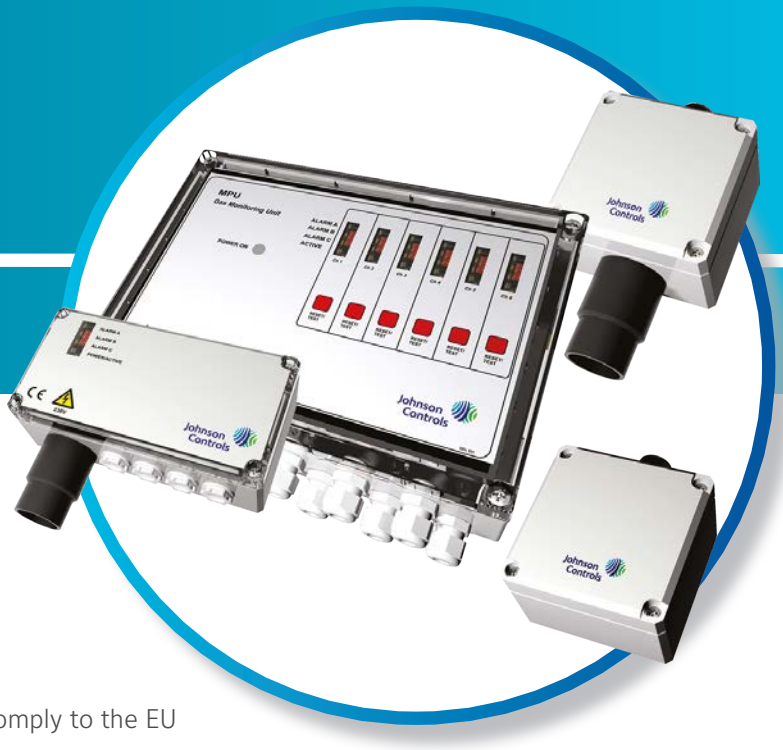
### 4 TO 20 MA FOR bar APPLICATIONS

| CODES | PRESSURE RANGE | | PRESSURE PORT | ELECTRICAL CONNECTOR |
|---|---|---|---|---|
| | Minimum pressure (Pmin) | Maximum pressure (Pmax) | | |
| P599ABHS401C | -1 bar | 8 bar | 1/4 in. - SAE 45° external flare | Hirschmann Form C |
| P599ACHS401C | | | 1/4 in. - SAE 45° internal flare with depressor | |
| P599ACPS401C | | | 1/4 in. - SAE 45° internal flare with depressor | Packard |
| P599ABSS401C | | | 1/4 in. - SAE 45° external flare | Shielded cable |
| P599ACSS401C | | | 1/4 in. - SAE 45° internal flare with depressor | |
| P599ABHS402C | -1 bar | 15 bar | 1/4 in. - SAE 45° external flare | Hirschmann Form C |
| P599ACHS402C | | | 1/4 in. - SAE 45° internal flare with depressor | |
| P599ACPS402C | | | 1/4 in. - SAE 45° internal flare with depressor | Packard |
| P599ACPS403C | 0 bar | 15 bar | 1/4 in. - SAE 45° internal flare with depressor | Packard |
| P599ABHS404C | 0 bar | 30 bar | 1/4 in. - SAE 45° external flare | Hirschmann Form C |
| P599ACHS404C | | | 1/4 in. - SAE 45° internal flare with depressor | |
| P599ACPS404C | | | 1/4 in. - SAE 45° internal flare with depressor | Packard |
| P599ABSS404C | | | 1/4 in. - SAE 45° external flare | Shielded cable |
| P599ACSS404C | | | 1/4 in. - SAE 45° internal flare with depressor | |
| P599ACHS405C | 0 bar | 50 bar | 1/4 in. - SAE 45° internal flare with depressor | Hirschmann Form C |
| P599ACPS405C | | | 1/4 in. - SAE 45° internal flare with depressor | Packard |
| P599ACSS405C | | | 1/4 in. - SAE 45° internal flare with depressor | Shielded cable |

## ACCESSORIES

### WIRE HARNESSES FOR USE WITH PACKARD CONNECTORS

| CODES | LENGTH *(m)* |
|---|---|
| WHA-PKD3-200C | 2.0 |




# LEAK DETECTORS

## LEAK DETECTORS

The JCI product range offers Leak detectors (in order to comply to the EU F-gas Directive) for the following gases:

- Ammonia (NH3)
- Synthetic refrigerants HFC (R134a, R410a etc) as shown in this catalogue
- Carbon dioxide ($CO_2$)
- Hydro Carbons (R290, R600)

The MPU multi point units need to be used in combination with the MP series of detectors.
The GD/GS series of detectors are standalone detectors and have 3 alarm relays that are factory calibrated depending on the gas type.

## ORDERING INFORMATION

### FACTORY-SET ALARM LEVELS (BY EXPERIENCE APPROPRIATE ALARM LEVELS AND RANGES)

| DETECTOR TYPE | RANGE | ALARM LEVELS |
|---|---|---|
| NH3-4000 | 0-4000 ppm | 150 / 500 / 3000 ppm |
| NH3-10000 | 0-10000 ppm | 500 / 3000 / 8000 ppm |
| HFC | 0-4000 ppm | 100 / 1000 / 2000 ppm |
| $CO_2$ | 0-10000 ppm | 2000 / 5000 / 8000 ppm |
| Flammable / explosive gas | 0-40% LEL | 5 / 10 / 20% LEL |

The HFC detector alarm levels are set for R134a. But they also indicate for HCFC and CFC although at slightly different levels. Detectors can be adjusted for other gases and customized alarm levels. In this case contact your Johnson Controls representative for information.

### NOTE

Sensors are a consumable part.
Expected sensor lifetime ≈ 5 years.
Sensors can be easily replaced and are available as a spare part.
Maintenance: at least once a year (normal operation/environment).
For details or questions contact your Johnson Controls representative.

## ORDERING INFORMATION (PART 1/2)

| CODES | MODEL | DETAILS | |
|---|---|---|---|
| | GD | · Room mounting<br>· Ambient temperature: -40°C to 50°C<br>· Humidity: 0...95% Rh (non condensing)<br>· IP21 |  |
| GD24-HFC-4000 | | 0-4000 ppm, 12..24 VAC/DC, max 2 W | |
| GD230-HFC-4000 | | 0-4000 ppm, 230 VAC, max 2 W | |
| | GS | · Splash proof, room mounting<br>· Ambient temperature: -40°C to 50°C<br>· Humidity: 0...95% Rh (non condensing)<br>· IP54 |  |
| GS24-HFC-4000 | | 0-4000 ppm, 12..24V AC/DC, max 2 W | |
| GS230-HFC-4000 | | 0-4000 ppm, 230V AC, max 2 W | |
| GSH230CO2-10000 | | · Splash proof, room mounted detector with build in heater<br>· Ambient temperature: -40°C to 50°C<br>· Humidity: 0...95% Rh<br>· IP67<br>· 0-10000 ppm , 230 VAC | |
| GSH24-CO2-10000 | | · Splash proof, room mounted detector with build in heater<br>· Ambient temperature: -40°C to 50°C<br>· Humidity: 0...95% Rh<br>· IP67<br>· 0-10000 ppm , 24 VAC | |
| | MP-D | · Room mounting<br>· Ambient temperature: -40°C to 50°C<br>· Humidity: 0..95% Rh (non condensing)<br>· IP21 |  |
| MP-D-HFC-4000 | | 0-4000 ppm | **38-220** |
| | MP-DS | · Splash proof, room mounting<br>· Ambient temperature: -40°C to 50°C<br>· Humidity: 0...95% Rh (non condensing)<br>· IP54 |  |
| MP-DS-HFC-4000 | | 0-4000 ppm | **38-420** |

## ORDERING INFORMATION (PART 2/2)

| CODES | MODEL | DETAILS | |
|---|---|---|---|
| | **MPS** | · Splash proof, room mounted detector with build in heater<br>· Ambient temperature: -40°C to 50°C<br>· Humidity: 0...95% Rh<br>· IP67<br>· 0-10000 ppm |  |
| MPS-CO2-10000 | | | **34-410** |
| | **MPU** | · Ambient temperature: 0°C to 50°C<br>· Humidity: 10...95% Rh (non condensing)<br>· IP66 |  |
| MPU2C | | 2 channels, 230V AC / 24V DC, max 10 W | **20-310** |
| MPU4C | | 4 channels, 230V AC / 24V DC, max 10 W | **20-300** |
| MPU6C | | 6 channels, 230V AC / 24V DC, max 10 W | **20-305** |
| --- | | Custom preset alarm levels. Price per channel/detector | **60-300** |
| | **TR-IR** | · Splash proof, room mounted detector with build in heater<br>· Ambient temperature: -40°C to 50°C<br>· Humidity: 0...95% Rh<br>· IP67 |  |
| TR-IR-CO2-10000 | | | **39-4312** |

PENN CONNECTED
REFRIGERATION
HARDWARE

# E10

TEMPERATURE SENSOR

The E10 Temperature Sensor is a wireless, battery-operated, single-probe internal temperature sensor. Use the E10 to monitor the internal temperature of a single unit of refrigeration equipment.

The E10 is accurate to ± 0.5°C and records temperatures from -35°C to 50°C. You can configure the E10 to measure temperatures at preferred intervals. If temperatures exceed the alarm thresholds, the E10 sends an alert by email and short service message (SMS). The E10 is part of the PENN Connected PC10 remote wireless monitoring system.

## FEATURES

- Single-probe internal temperature sensor
- Cost-effective temperature monitoring solution
- Easy to install and use
- Convenient replacement for data loggers
- Sends alerts by email and SMS through the PC10 system
- Conforms to the European standard EN12830 for hazard analysis critical control point (HACCP) regulations

## APPLICATIONS

Use the E10 with refrigeration equipment in the food storage, food production, and logistics and transport sectors.

## ORDERING INFORMATION

| CODE | DESCRIPTION |
|---|---|
| RMZ-1214-E10 | Single-probe temperature sensor for internal use |

## ACCESSORIES

| CODE | DESCRIPTION |
|---|---|
| RMZ1214R10-EU | Repeater to extend the wireless network range for Europe |
| RMZ1214R10-UK | Repeater to extend the wireless network range for UK and Ireland |
| RMZ1218C40-EU | LTE 4G gateway for ZigBee wireless sensors for Europe |
| RMZ1218C40-UK | LTE 4G gateway for ZigBee wireless sensors for UK and Ireland |
| PC10 | PENN Connected PC10 remote wireless monitoring system |

# TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Code | |
| *RMZ-1214-E10* | Temperature Sensor |
| Battery | Includes 3.6 V lithium thionyl chloride (LiTCL), type AA |
| *Battery Life* | 3 years with a measuring rate of 5 minutes at 25°C<br>5 years with a measuring rate of 10 minutes at 25°C |
| Ambient Conditions | |
| *Operating* | -35°C to 50°C |
| *Storage* | -40°C to 55°C |
| Accuracy | ±0.5°C within the range -20°C to 40°C |
| Resolution | 0.1°C |
| Measuring Range | -35°C to 50°C |
| Measuring Rate | |
| *Standard* | 5 minutes |
| *Range* | 1 minute to 6 hours |
| Radio Frequency | Industrial, Scientific, Medical (ISM) 2.4 GHz to 2.5 GHz |
| Transmission Network | ZigBee® wireless radio frequency |
| Transmission Power | 6.3 mW (8 dBm) |
| Transmission Distance | Maximum indoor range of 60 m |
| Housing | |
| *Enclosure Material* | White acrylonitril butadieen styreen (ABS) plastic |
| *Protection Class* | IP65 |
| Dimensions<br>(Height x Width x Depth) | 77 mm x 50 mm x 34 mm |
| Weight | 0.92 kg |
| CE Compliance | Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive, Low Voltage Directive, and RoHS Directive. |

# E11

TEMPERATURE SENSOR

The E11 Temperature Sensor is a wireless, battery-operated, dual-probe internal and external temperature sensor. Use the E11 to monitor two different locations in a single unit of refrigeration equipment. You can configure the E11 to measure temperatures at preferred intervals. If temperatures exceed the alarm thresholds, the E11 sends an alert by email and short service message (SMS). The E11 is part of the PENN Connected PC10 remote wireless monitoring system.

## FEATURES

- Dual-probe internal and external temperature sensor
- Cost-effective temperature monitoring solution
- Easy to install and use
- Convenient replacement for data loggers
- Sends an alert by email and SMS through the PC10 system
- Conforms to the European standard EN12830 for hazard analysis critical control point (HACCP) regulations

## APPLICATIONS

Use the E11 with refrigeration equipment in the food storage, food production, and logistics and transport sectors.

## ORDERING INFORMATION

| CODES | DESCRIPTION |
|---|---|
| RMZ1214E11-NT1 | Dual-probe internal and external termperature sensor. Cable length: 0.9 m NTC |
| RMZ1214E11-NT3 | Dual-probe internal and external termperature sensor. Cable length: 2.8 m NTC |

## ACCESSORIES

| CODE | DESCRIPTION |
|---|---|
| RMZ1214R10-EU | Repeater to extend the wireless network range for Europe |
| RMZ1214R10-UK | Repeater to extend the wireless network range for UK and Ireland |
| RMZ1218C40-EU | LTE 4G gateway for ZigBee wireless sensors for Europe |
| RMZ1218C40-UK | LTE 4G gateway for ZigBee wireless sensors for UK and Ireland |
| PC10 | PENN Connected PC10 remote wireless monitoring system |

# TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Code | |
| *RMZ1214E11* | Temperature Sensor |
| Battery | Includes 3.6 V lithium thionyl chloride (LiTCL), type AA |
| *Battery Life* | 3 years with a measuring rate of 5 minutes at 25°C<br>5 years with a measuring rate of 10 minutes at 25°C |
| Ambient Conditions | |
| *Operating* | -35°C to 50°C |
| *Storage* | -40°C to 55°C |
| Accuracy | |
| *Internal Probe* | ±0.5°C within the range -20°C to 40°C |
| *External Probe* | ±0.3°C within the range -20°C to 40°C |
| Resolution | 0.1°C |
| Measuring Range | |
| *Internal Probe* | -35°C to 50°C |
| *External probe* | -50°C to 100°C |
| Measuring Rate | |
| *Standard* | 5 minutes |
| *Range* | 1 minute to 6 hours |
| Radio Frequency | Industrial, Scientific, Medical (ISM) 2.4 GHz to 2.5 GHz |
| Transmission Network | Network ZigBee® Wireless Radio Frequency |
| *Power* | 6.3 mW (8 dBm) |
| *Distance* | Maximum indoor range of 60 m |
| Housing | |
| *Enclosure Material* | White acrylonitril butadieen styreen (ABS) plastic |
| *Protection Class* | IP65 |
| Dimensions (Height x Width x Depth) | 77 mm x 50 mm x 34 mm |
| Weight | 0.92 Kg |
| CE Compliance | Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive, Low Voltage Directive, and RoHS Directive. |

PENN CONNECTED
REFRIGERATION
HARDWARE

# E20

HUMIDITY AND INTERNAL TEMPERATURE SENSOR

The E20 Humidity and Internal Temperature Sensor is a wireless, battery-operated, dual-probe humidity and internal temperature sensor.
Use the E20 to monitor both the temperature and humidity in a single location or unit of refrigeration equipment.

Configure the E20 to measure humidity and temperatures at target intervals. If the humidity or temperature exceeds the alarm thresholds, the E20 sends an alert by email and short message service (SMS).

The E20 is part of the PENN Connected PC10 remote wireless monitoring system.

## FEATURES

- Dual-probe humidity and internal temperature sensor
- Cost-effective monitoring solution
- Easy to install and use
- Convenient replacement for data loggers
- Sends an alert by email and SMS through the cloudbased PC10 system
- Conforms to the European standard EN12830 for hazard analysis critical control point (HACCP) regulations

## APPLICATIONS

Use the E20 with refrigeration equipment in the food storage, food production, and logistics and transport sectors.

## ORDERING INFORMATION

| CODE | DESCRIPTION |
|---|---|
| RMZ1214E20 | Dual-probe humidity and internal temperature sensor |

## ACCESSORIES

| CODE | DESCRIPTION |
|---|---|
| RMZ1214R10-EU | Repeater to extend the wireless network range for Europe |
| RMZ1214R10-UK | Repeater to extend the wireless network range for UK and Ireland |
| RMZ1218C40-EU | LTE 4G gateway for ZigBee wireless sensors for Europe |
| RMZ1218C40-UK | LTE 4G gateway for ZigBee wireless sensors for UK and Ireland |
| PC10 | PENN Connected PC10 remote wireless monitoring system |

# TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Product | |
| *RMZ1214E20* | Humidity and Internal Temperature Sensor |
| Battery | Includes 3.6 V lithium thionyl chloride (LiTCL), type AA |
| Battery Life | 3 years with a measuring rate of 5 minutes at 25°C<br>5 years with a measuring rate of 10 minutes at 25°C |
| Ambient Conditions | |
| *Operating* | -35°C to 50°C |
| *Storage* | -40°C to 55°C |
| Accuracy | |
| *Internal Probe* | ±0.3°C |
| *Humidity Probe* | ±2% RH |
| Resolution | |
| *Internal Probe* | 0.1°C |
| *Humidity Probe* | 0.1% RH |
| Measuring Range | |
| *Internal Probe* | -35°C to 50°C |
| *Humidity Probe* | 0% to 100% RH |
| Measuring Rate | |
| *Standard* | 5 minutes; |
| *Range* | 1 minute to 6 hours |
| Radio Frequency | Industrial, Scientific, Medical (ISM) 2.4 GHz to 2.5 GHz |
| Transmission Network | ZigBee® wireless radio frequency |
| *Power* | 6.3 mW (8 dBm) |
| *Distance* | Maximum indoor range of 60 m |
| Housing | |
| *Enclosure Material* | White acrylonitril butadieen styreen (ABS) plastic |
| *Protection Class* | IP65 |
| Dimensions (Height x Width x Depth) | 77 mm x 50 mm x 34 mm |
| Weight | 0.92 Kg |
| CE Compliance | Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive, Low Voltage Directive, and RoHS Directive. |

PENN CONNECTED
REFRIGERATION
HARDWARE

# E61

DOOR SENSOR

The E61 Door Sensor is a wireless, battery-operated, external door sensor with a magnetic contact switch. Use the E61 to monitor the open and closed status of chiller and freezer room doors.

You can configure the E61 to monitor the status of the doors at preferred intervals. If the door open times exceed the alarm thresholds, the E61 sends an alert by email and short service message (SMS). The E61 is part of the PENN Connected PC10 remote wireless monitoring system.

## FEATURES

- External door sensor and magnetic reed contact switch
- Cost-effective door monitoring solution
- Easy to install and use
- Sends alerts by email and SMS through the PC10 system
- Conforms to the European standard EN12830 for hazard analysis critical control point (HACCP) regulations

## APPLICATIONS

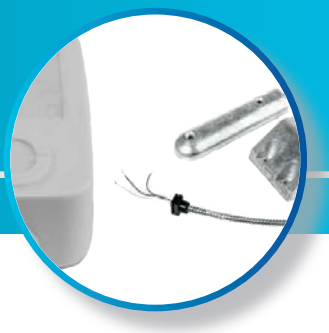
Use the E61 with chiller and freezer room doors in the food production, food storage, and logistics and transport sectors.

## ORDERING INFORMATION

| CODE | DESCRIPTION |
|---|---|
| RMZ1214E61-DS1 | Magnetic, external door sensor with reed contact switch |

## ACCESSORIES

| CODE | DESCRIPTION |
|---|---|
| RMZ1214R10-EU | Repeater to extend the wireless network range for Europe |
| RMZ1214R10-UK | Repeater to extend the wireless network range for UK and Ireland |
| RMZ1218C40-EU | LTE 4G gateway for ZigBee wireless sensors for Europe |
| RMZ1218C40-UK | LTE 4G gateway for ZigBee wireless sensors for UK and Ireland |
| PC10 | PENN Connected PC10 remote wireless monitoring system |



# TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Code | |
| *RMZ1214E61-DS1* | Door Sensor |
| Battery | Includes 3.6 V lithium thionyl chloride (LiTCL), type AA |
| *Battery Life* | 3 years with a measuring rate of 5 minutes at 25°C<br>5 years with a measuring rate of 10 minutes at 25°C |
| Ambient Conditions | |
| *Operating* | -35°C to 50°C |
| *Storage* | -40°C to 55°C |
| Measuring Rate | |
| *Standard* | 5 minutes |
| *Range* | 1 minute to 6 hours |
| Measuring Mode | Online through wireless ZigBee |
| Radio Frequency | Industrial, Scientific, Medical (ISM) 2.4 GHz to 2.5 GHz |
| Transmission Power | 6.3 mW (8 dBm) |
| Transmission Distance | Maximum indoor range of 60 m |
| Housing | |
| *Enclosure Material* | White acrylonitril butadieen styreen (ABS) plastic with gray polyamide M12 gland |
| *Protection Class* | IP65 |
| Dimensions (Height x Width x Depth) | 77 mm x 50 mm x 34 mm |
| Weight | 0.92 kg |
| CE Compliance | Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive, Low Voltage Directive, and RoHS Directive. |

## CONTACT SWITCH

| | |
|---|---|
| Activation | Magnetic reed contact switch |
| Mounting | Surface mount |
| Switch Configuration | N.O. door contact |
| Operating Gap | 50 mm |
| Ambient Conditions | |
| *Operating* | -10°C to 40°C |
| *Storage* | -20°C to 60°C |
| Material | Aluminium armoured sleeving; 45.72 cm |
| Contact Material | Rhodium |
| Magnet | Ferrite or Alnico V |
| Cable | Type: polyvinyl chloride (PVC); Length: 1 m |
| Dimensions (Height x Width x Depth) | |
| *Switch* | 150 mm x 40 mm x 15 mm |
| *Magnet* | 60 mm x 75 mm x 32 mm |

PENN CONNECTED
REFRIGERATION
HARDWARE

# R10

REPEATER

The R10 Repeater is a plug-in device that extends the range of a wireless network. Use the R10 with a ZigBee® router to support up to 15 endpoint nodes and an unlimited number of routers from the mesh network.

The R10 is part of the PENN Connected PC10 remote wireless monitoring system.

## FEATURES

- Cost-effective, wireless network range extender
- Easy to install and use
- Plug-in device that does not require network cabling
- Conforms to the European standard EN12830 for hazard analysis critical control point (HACCP) regulations

## APPLICATIONS

Use the R10 with refrigeration equipment in the food storage, food production, and logistics and transport sectors.

## ORDERING INFORMATION

| CODE | DESCRIPTION |
|---|---|
| RMZ1214R10-EU | Repeater to extend the wireless network range for Europe |
| RMZ1214R10-UK | Repeater to extend the wireless network range for UK and Ireland |

## ACCESSORIES

| CODE | DESCRIPTION |
|---|---|
| RMZ-1214-E10 | Single-probe, internal temperature sensor |
| RMZ1214E11-NT1 | Dual-probe, internal and external temperature sensor. Cable length: 0.9 m (NTC) |
| RMZ1214E11-NT3 | Dual-probe, internal and external temperature sensor. Cable length: 2.8 m (NTC) |
| RMZ1214E61-DS1 | Magnetic, external door sensor with reed contact switch |
| RMZ1218C40-EU | LTE 4G gateway for ZigBee wireless sensors for Europe |
| RMZ1218C40-UK | LTE 4G gateway for ZigBee wireless sensors for UK and Ireland |
| PC10 | PENN Connected PC10 remote wireless monitoring system |

## TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Code | |
| *RMZ1214R10* | Repeater |
| Power Supply | 12 V external adapter; 2.1 mm central and pin EU and international power plug versions available |
| Ambient Conditions | |
| *Operating* | -35°C to 50°C |
| *Storage* | -40°C to 55°C |
| Nodes Supported | The ZigBee® router supports 20 endpoint nodes and an unlimited number of routers from the mesh network. |
| Radio Frequency | Industrial, Scientific, Medical (ISM) 2.4 GHz to 2.5 GHz |
| Transmission Power | 6.3 mW (8 dBm) |
| Transmission Distance | Maximum indoor range of 60 m |
| Housing | |
| *Enclosure Material* | White acrylonitril butadieen styreen (ABS) plastic |
| *Protection Class* | IP40 |
| Dimensions (Height x Width x Depth) | 77 mm x 50 mm x 34 mm |
| Weight | 0.92 kg |
| CE Compliance | Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive, Low Voltage Directive, and RoHS Directive. |

PENN CONNECTED
REFRIGERATION
HARDWARE

# C10

GATEWAY

The C10 Gateway is a plug-in Ethernet gateway for ZigBee® wireless sensors. Use the C10 to receive data from PENN Connected temperature sensors and transmit it to the PENN Connected cloud-based platform.

The C10 is part of the PENN Connected remote wireless monitoring system.

## FEATURES

- Cost-effective Ethernet gateway for ZigBee wireless sensors
- Compatible with RJ45 network cabling
- Supports Dynamic Host Configuration Protocol (DHCP)
- Connects to the server TCP port 80
- Easy to install and use
- Buffers data if the device loses its network connection
- Conforms to the European standard EN12830 for hazard analysis critical control point (HACCP) regulations

## APPLICATIONS

Use the C10 with refrigeration equipment in the food production, food storage, and logistics and transport sectors.

## ORDERING INFORMATION

| CODE | DESCRIPTION |
|---|---|
| RMZ1218C10-EU | Plug-in Ethernet gateway for ZigBee wireless sensors for Europe |
| RMZ1218C10-UK | Plug-in Ethernet gateway for ZigBee wireless sensors for UK and Ireland |

## ACCESSORIES

| CODE | DESCRIPTION |
|---|---|
| RMZ-1214-E10 | Single-probe internal temperature sensor |
| RMZ1214E11-NT1 | Dual-probe internal and external temperature sensor. Cable length: 0.9 m NTC |
| RMZ1214E11-NT3 | Dual-probe internal and external temperature sensor. Cable length: 2.8 m NTC |
| RMZ1214E61-DS1 | Magnetic external door sensor with reed contact switch |
| RMZ1214E20 | Humidity and internal temperature sensor |
| RMZ1214R10-EU | Repeater to extend the wireless network range for Europe |
| RMZ1214R10-UK | Repeater to extend the wireless network range for UK and Ireland |
| PC10 | PENN Connected PC10 remote wireless monitoring system |

# TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Code | |
| *RMZ1218C10* | Gateway for ZigBee® wireless sensors |
| Power | 12 V external adapter; 2.1mm central + pin<br>EU and international power plug versions available |
| Ambient Conditions | |
| *Operating Temperature* | -35°C to 50°C |
| *Storage Temperature* | -40°C to 55°C |
| Antenna | Internal wire antenna |
| Connection Mode | Connects online through radio frequency wireless.<br>ZigBee Connects to the cloud through TCP over Ethernet |
| Endpoints Supported | The gateway features a ZigBee coordinator function. It supports up to 15 sensors.<br>To extend the number of supported sensors, add a repeater (RMZ1214R10) to the network.<br>Each additonal repeater supports a further 15 sensors. |
| Radio Frequency | ZigBee 2.4 GHz |
| Transmission Power | 6.3 mW (8 dBm) |
| Transmission Distance | Maximum indoor range of 60 m |
| Energy Consumption | 150 mA |
| Housing | Flame retardant acrylonitril butadieen styreen (ABS) UL94-V0 |
| Dimensions<br>(Height x Width x Depth) | 58 mm x 111 mm x 39 mm |
| Weight | 0,100 Kg |
| Protection Class | IP40 |
| CE Compliance | Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive, Low Voltage Directive, and RoHS Directive. |

PENN CONNECTED
REFRIGERATION
HARDWARE

# C40

GATEWAY

The C40 Gateway is a 4G gateway with 2G fallback for ZigBee® wireless sensors. Use the C40 to receive data from PENN Connected temperature sensors and transmit it to the PENN Connected cloud-based platform.

The C40 can support 15 sensors through wireless technology.

The C40 is part of the PENN Connected remote wireless monitoring system.

## FEATURES

- Cost-effective gateway
- Uses long-term evolution (LTE) technology
- Easy to install and use
- Plug-in device
- Buffers data if the gateway loses its network connection
- Conforms to the European standard EN12830 for hazard analysis critical control point (HACCP) regulations

## APPLICATIONS

Use the C40 with refrigeration equipment in the food production, food storage, and logistics and transport sectors.

## ORDERING INFORMATION

| CODE | DESCRIPTION |
|---|---|
| RMZ1218C40-EU | Long-term evolution (LTE) 4G gateway for ZigBee wireless sensors for Europe |
| RMZ1218C40-UK | Long-term evolution (LTE) 4G gateway for ZigBee wireless sensors for UK and Ireland |

## ACCESSORIES

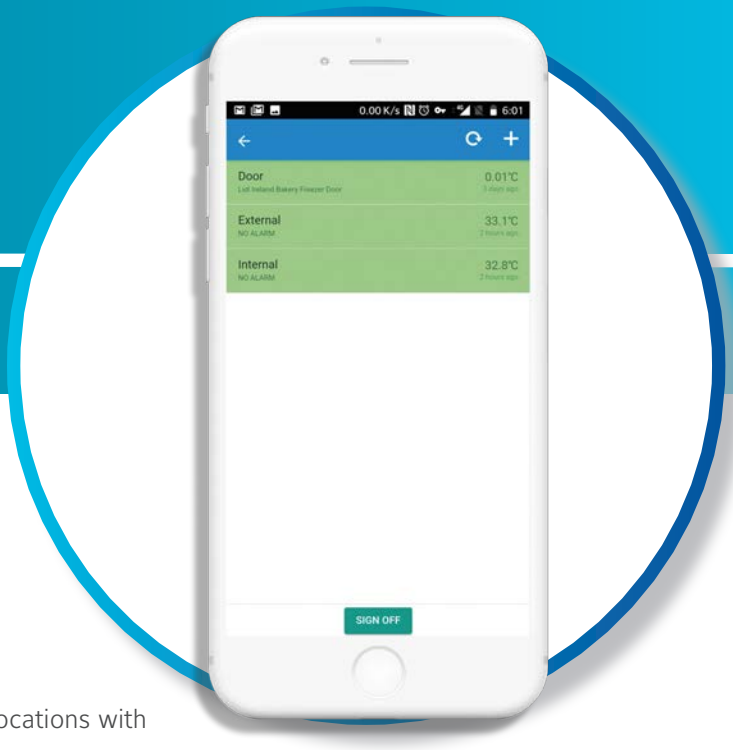
| CODE | DESCRIPTION |
|---|---|
| RMZ-1214-E10 | Single-probe internal temperature sensor |
| RMZ1214E11-NT1 | Dual-probe internal and external temperature sensor, cable length: 0.9 m NTC |
| RMZ1214E11-NT3 | Dual-probe internal and external temperature sensor, cable length: 2.8 m NTC |
| RMZ-1214-E61 | Magnetic external door sensor with reed contact switch |
| RMZ1214R10-EU | Repeater to extend wireless network range for Europe |
| RMZ1214R10-UK | Repeater to extend wireless network range for UK and Ireland |
| PC10 | PENN Connected PC10 remote wireless monitoring system |

# TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Code | |
| *Product* | RMZ1218C40 Gateway |
| Type | RMZ1218C40-yy; yy is the power adapter for the UK, EU, and US |
| Power | 12 V external adapter; 2.1 mm central positive pin<br>EU, UK, and US power plug versions available |
| Ambient Conditions | |
| *Operating* | -10°C to 40°C |
| *Storage* | -40°C to 55°C |
| WAN Interface | 2G and 4G gateway for ZigBee® wireless sensors. LTE user equipment (UE) Category m1/NB1 compliant to the latest Third Generation Partnership Project (3GPP) Release 13 |
| SIM Card | Includes micro SIM |
| Antenna | External Global System for Mobile Communications (GSM) antenna;<br>SubMiniature version A (SMA), mulitposition, 1.5 dBi gain, 195 mm x 18 mm<br>External ZigBee dipole antenna |
| Buffer Memory | ~6,500 samples |
| Endpoints Supported | The gateway supports up to 15 sensors. To extend the number of supported sensors, add a repeater (RMZ1214R10) to the network.<br>Each additional repeater supports a further 15 sensors. |
| Radio Frequency | ZigBee 2.4 GHz |
| Transmission | |
| *Power* | 6.3 mW (8 dBm) |
| *Distance* | Maximum indoor range of 60 m |
| Energy consumption | 62 mA average, 208 mA Imax |
| Housing | |
| *Enclosure Material* | Flame retardant acrylonitril butadieen styreen (ABS) ULV94-V0 |
| *Protection Class* | IP40 |
| Dimensions<br>(Height x Width x Depth) | 92 mm x 58 mm x 39 mm |
| Weight | 0.165 Kg including adapter |
| CE Compliance | Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive, Low Voltage Directive, and RoHS Directive. |

# PENN COMMERCIAL REFRIGERATION

## PENN CONNECTED REFRIGERATION SOFTWARE




# PCR

CLOUD-BASED SOFTWARE

Monitor and optimise all your refrigeration equipment across locations with PENN® cloud-based temperature and alarm management.

The platform can connect with various IoT sensors.

The platform provides insights that assists your business in driving efficiencies. The platform allows you to meet local food safety regulations and increases efficiency for retail, ealthcare, OEM refrigeration, food and beverage industry and others.

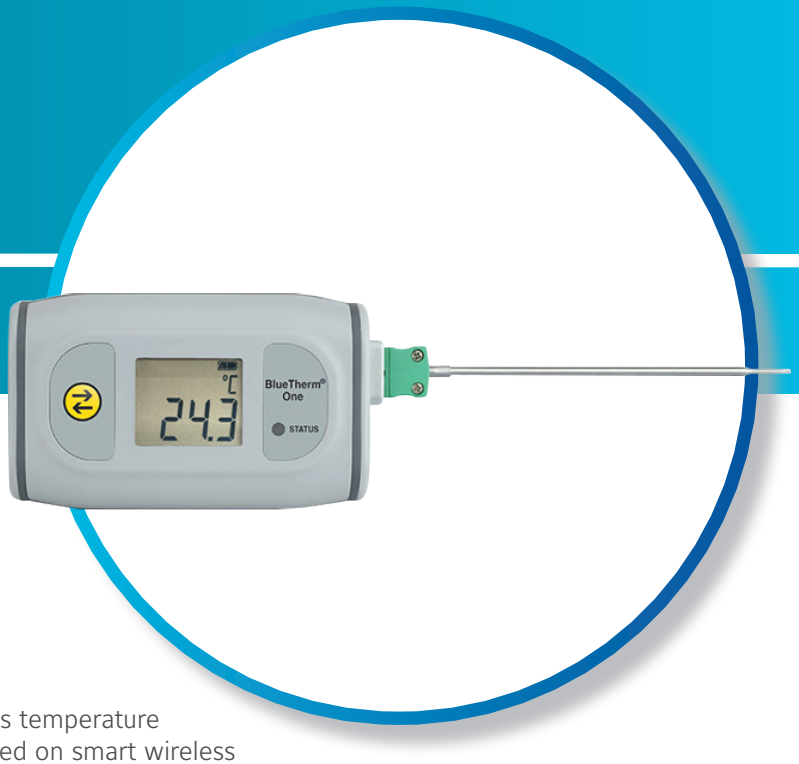
## FEATURES

- **Enterprise view -** View all your information in a way that has been customized according to the structure of your enterprise on a regional, national or international level.
- **Alarm management -** View, access, and manage all the alarms in your system. A smart alarm configuration is available with time delays. A mobile application is also offered.
- **Remote access view -** View the system remotely with your mobile device or laptop from anywhere. Access view can be restricted to unit or site depending on permissions.
- **Food Safety reporting -** Download data from the system ensuring you are compliant with local legislation. Data can be downloaded by site or unit and for defined dates.
- **Alarm notifications -** You will receive notification via SMS, email or automated phone call in the event of an alarm. There is an escalation workflow available to meet your process.
- **Data trending view -** For example, alarming temperature readings pointing to a potentially faulty refrigeration device or door openings versus temperature for trends on merchandising alarms.

## SOFTWARE SUBSCRIPTIONS

For storing monitoring data in the cloud and making use of the cloud-based temperature and alarm management functions it is necessary for each site to order a software subscription based on the number of sensors installed in that site.
Please contact your sales representative for more information.

PENN CONNECTED
FOOD SAFETY
HARDWARE




# BT1

BLUETOOTH THERMOMETER

The PENN Connected BT1 Bluetooth Thermometer transmits temperature data to the PENN Connected Food Safety mobile app installed on smart wireless devices through a secure connection of up to 50 m.

The BT1 includes the following interchangeable thermocouple probes:

- The fast response penetration probe delivers a versatile solution for liquid or semi-solids. This stainless steel probe features a reduced tip and provides a response time of less than 2 seconds. The probe temperature ranges from -75°C to 250°C.
- The surface probe uses flat ribbon technology to deliver a fast, accurate response with minimal heat loss. This stainless steel probe provides a response time of less than 1 second. The probe temperature ranges from -75°C to 250°C.

Use the BT1 with the PENN Connected Food Safety app to read temperatures and comply with food safety regulations. The BT1 is part of the PENN Connected PC10 Remote Wireless Monitoring System.

**Note:** The maximum range of the BT1 depends on the make and model of your smart device. Environmental conditions may also affect the signal strength.

## FEATURES

- Interchangeable thermocouple probes
- Fast and accurate hazard analysis critical control point (HACCP) checks Biomaster antimicrobial technology that reduces bacterial growth
- Water resistant to IP65
- Large LCD screen and a single LED that indicates
- Bluetooth connection status

## APPLICATIONS

Use the BT1 in the food storage, food production, and logistics and transport sectors.

## ORDERING INFORMATION

| CODE | DESCRIPTION |
|---|---|
| PCFS-BT1 BT1 | Bluetooth thermometer |
| PCFS-BT1-133-SR | Stainless steel surface probe. Uses flat ribbon technology for fast and accurate responses with minimal heat loss. |
| PCFS-BT1-133-L | Stainless steel penetration probe with a reduced tip of Ø1.8 x 25 mm for fast responses. Suitable for liquids or semi-solids. Length: 120 mm |
| PCFS-BT1-133-S | Stainless steel penetration probe with a reduced tip of Ø1.8 x 25 mm for fast responses. Suitable for liquids or semi-solids. Length: 80 mm |


# TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Code | |
| *PCFS-BT1* | Bluetooth Thermometer |
| Accuracy | ±0.4°C ±0.1% of reading |
| Resolution | 0.1°C to 999.9 thereafter 1°C |
| Range | -199.9°C to 1.372°C |
| Bluetooth Module | Bluetooth LE |
| Sensor Type | K thermocouple |
| Display | 12 mm LCD |
| Dimensions (Height x Width x Depth) | |
| *Thermometer* | 34 mm x 66 mm x 109 mm |
| *Surface Probe* | Ø8 mm x 120 mm |
| *Penetration Probe* | Ø3.3 x 80mm or 120 mm<br>Reduced Tip: Ø1.8 mm x 25 mm |
| Weight | 0.165 Kg |
| Protection Class | IP65 |
| CE Compliance | Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive, Radio Equipment Directive, and RoHS2 Directive. |

# PENN COMMERCIAL REFRIGERATION

## PENN CONNECTED FOOD SAFETY SOFTWARE

# PCFS

CLOUD-BASED PLATFORM

A cloud-based platform that manages all aspects of food safety that is configurable, innovative and easy to use.

The platform easily digitalises your current food safety records and notifies you when action is required.
It captures non compliances and provides an easy to access portal to retrieve data in the event of an audit.

PENN Connected Food Safety leverages technologies such as the Cloud, Internet of Things (IoT) and mobile applications to help our customers meet the latest in Food safety regulations.

## FEATURES

- **Workflow Builder -** The system can be configured to customer needs with an easy to use workflow builder. Just drag and drop elements to create a workflow and start ensuring compliance with food safety regulation in minutes.
- **Enterprise View -** View all your information in a way that has been customised according to the structure of your enterprise on a regional, national or international level.
- **Remote Access -** View the system remotely with your mobile device or laptop from anywhere. Access view can be restricted to unit or site depending on permissions.
- **Food Safety Reporting -** Download data from the system ensuring you are compliant with local legislation. Data can be downloaded by site or unit and for defined dates.
- **Alarm Notification -** You will receive notification via push notification, SMS, email or automated phone call in the event of an alarm. There is an escalation workflow available to meet your process.
- **Scheduler -** Schedule reminders for staff to complete tasks on site; temperature checks, cleaning, etc.
- **Ensuring you are compliant -** The PENN Connected Food Safety platform allows you to define and enforce food safety standards based on local regulation. Scheduled tasks can be setup to remind staff to complete actions and therefore, ensure compliance.
- **Drives efficiences -** The platform results in a reduction in time spent recording data. Data is available remotely, so audit times are greatly reduced. Reduce stock loss with refrigeration monitoring alarms.
- **Protect your brand -** The PENN Connected Food Safety platform protects your brand by validating standards and improving compliance.
- **Easy to install and use -** The platform consists of an easy to use mobile application and an easy to install refrigeration monitoring system. Customers require minimal training to use the PENN Connected solution due to the intuitive design of the platform.

## ORDERING INFORMATION

| CODE | DESCRIPTION |
|---|---|
| PCFS-SW-1 | 1 year Food Safety Software site license |