

# **POWERS®** Pneumatic Controls

Thermostats

- **Controllers and Transmitters**
- **Mechanical Line Voltage Controls**
- **Relays and Three-way Valve**
- **Damper Actuators**
- **Control Cabinets**















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## **Pneumatic Thermostats**









The 192 S Thermostats are proportional single output, single setpoint, 1-pipe (low air capacity) or

2-pipe (high air capacity) sensor controllers. Each thermostat includes a wall mounting plate for installation in a variety of rough-in terminal boxes. A sensitive bimetal responds to temperature change to modulate control air through a flapper nozzle. One setpoint dial is provided. Air connections are made with 5/32" (4 mm) O.D. plastic tubing, directly to the thermostat chassis for retrofit applications or with plug-in adapter accessory that slide into the wall mounting plate. Part Numbers: 192-200, 192-201, 192-202, 192-203, 192-220, 192-221, 192-222, 192-223

#### **Technical Instructions**

Installation Instructions

#### Powerstar® Heating/Cooling Pneumatic Room Thermostat 192 HC

The TH 192 HC thermostats are proportional single output, dual setpoint, 2-pipe (high air capacity) sensor controllers. Sensitive bimetals respond to temperature change to modulate control air through a flapper nozzle. When the supply air pressure changes from 18 to 25 psi (124 to 172 kPa), the thermostat automatically switches from the cooling to the heating setpoint respectively. Air connections are made with 5/32" (4 mm) O.D. plastic tubing, directly to the thermostat chassis for retrofit applications or with plug-in adapters which slide into the wall mounting plate.

Part Numbers: 192-207, 192-208, 192-209, 192-210, 192-227, 192-228, 192-229, 192-230

#### **Technical Instructions**

Installation Instructions

#### Powerstar® Day/Night/Vent Pneumatic Room Thermostat 192 DN/DNV

The TH 192 DN and DNV thermostats are proportional single output, dual setpoint, 2-pipe or 3-pipe (high air capacity) sensor controllers. Sensitive bimetals respond to temperature change to modulate control air through a flapper nozzle. When the supply air pressure changes from 18 to 25 psi (124 to 172 kPa), the thermostat automatically switches from the day to the night setpoint respectively. Air connections are made with 5/32" (4 mm) O.D. plastic tubing, directly to the thermostat chassis for retrofit applications or with plug-in adapters which slide into the wall mounting plate.

Part Numbers: 192-204, 192-205, 192-206, 192-224, 192-225, 192-226

**Technical Instructions** 

Installation Instructions

## Powerstar® Free Energy Band Heating/Cooling Pneumatic Room Thermostat 193 HC

The TH 193 HC thermostats are proportional dual output, dual setpoint, two-pipe (dual onepipe, low air capacity) or three-pipe (dual two-pipe, high air capacity) sensor controllers. Sensitive bimetals respond to temperature changes to modulate control air through a flapper nozzle. As the heating load decreases due to internal heat gains, a dead band of control minimizes energy consumption while the setpoint changes from 72°F (22°C) heating mode to 78°F (26°C) cooling mode. Two setpoint dials allow adjustment of the dead band 4°F (2°C) minimum. Air connections are made with 5/32-inch (4 mm) O.D. plastic tubing, directly to the thermostat chassis for retrofit applications or with plug-in adapters which slide into the wall mounting plate.

Part Numbers: 193-211, 193-212, 193-213, 193-214, 193-215, 193-216, 193-217, 193-218, 193-235

**Technical Instructions** 

Installation Instructions

#### RETROLINE® Powerstar® Retrostat Pneumatic Room Thermostats "192-194 Retrostats"

The Powerstar<sup>™</sup> RETROLINE<sup>™</sup> Retrostat Pneumatic Room Thermostat converts most existing pneumatic room thermostats to a Powerstar 192/194 direct or reverse acting, 2-pipe, single or dual setpoint unit. Day/Night or Heat/Cool Retrostat is factory calibrated to match the appropriate changeover pressure of the competitive thermostat.

Part Numbers: 192-840, 192-841, 195-850, 192-851

Installation Instructions













#### Powerstar® 832 D Room Thermostat

Powers D Room Thermostat is a gradual-acting, pneumatic instrument recommended for room temperature control in heating and air conditioning applications. Among the outstanding features of the D thermostat are its rapid response to temperature change and its unique design which prevents a constant waste of air. Other features include a wide range of adjustment, noncorrosive parts, ease of calibration and quiet operation. These factors ensure long, dependable life and maintenance-free operation.

Part Numbers: 832-0120, 832-0490, 832-0500, 832-1260

**Technical Instructions** 

Installation Instructions

#### Limitem® 356 and 357 Thermostats

The 356 LIMITEM<sup>™</sup> Rigid Bulb Thermostat is a pneumatically operated, duct-mounted thermostat, which is available in either direct or reverse acting in a variety of ranges. The TH 357 LIMITEM<sup>™</sup> is a gradual-direct acting thermostat for air temperature control. This pneumatically operated instrument senses a temperature and passes on a pneumatic signal whose pressure is proportional to the temperature sensed. The sensing element is liquid-filled, and is available in remote and averaging bulb styles.

Part Numbers: 356-0012, 356-0013, 356-0750, 356-1005, 356-1006, 357-0001, 357-0003, 357-0004

<b>Technical</b>		Technical	
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#### **Pneumatic Thermostat Accessories**

Proven to provide fast response and highly accurate temperature control, Pneumatic Thermostats are supported by a wide range of mounting, configuration and calibration accessories.

The document below provides a listing of available accessories.

#### Technical Instructions



#### Powerstar<sup>™</sup> Pneumatic Thermostat Covers

These covers are designed for new thermostat installation or for replacement of existing thermostat covers.

The document below specifies the various thermostat cover models available with concealed or exposed setpoint adjustment, room temperature indication and setpoint indications. Available in beige or white plastic and metal options.

Part Numbers: 192-250, 192-250W, 192-252, 192-252W, 192-254, 192-254W, 192-256, 192-256W, 192-257W, 192-258, 192-260, 192-260W, 192-262, 192-262W, 192-264, 192-265, 192-265W, 192-266, 192-266W, 192-267, 192-268, 192-269, 192-270, 192-271, 192-352, 192-354, 192-356, 192-357, 192-362, 192-364, 192-366, 856-036, 856-044, 856-046

**Technical Instructions** 

**Related Links** 

<u>Technical Bulletin: Powers Controls™ Tool Kit for Thermostat Calibration</u> <u>Technical Instructions: Powers Controls™ Restrictors</u>

## **Pneumatic Controllers and Transmitters**



## **Pneumatic Controllers and Transmitters Accessories**



#### **Related Links**

Installation Instructions: AF 908 Air Line Filter Assembly Item

Installation Instructions: Copper Tubing to Poly Tubing Adapter

Installation Instructions: Replacement Transmitters for Honeywell

Installation Instructions: Replacement Transmitters for Johnson Controls

Technical Instructions: Lockable Thermostat Guard

Technical Instructions: Powers Controls<sup>™</sup> Air Line Filter Assembly

Technical Instructions: Powers Controls™ RL 380 Check Valve

## **Powers® Mechanical Line Voltage Controls**



#### **Powers® Electric Line Voltage Mechanical Room Thermostats**

The ET 134 line voltage room thermostat is a wall mounted instrument available with exposed or concealed set point adjustment. Models are available with Single-Pole, Single-Throw (SPST) or Single-Pole, Double-Throw (SPDT) contact action and for standard-duty (nominal 1/4 hp; 10 amps, non-inductive) applications. Rugged and reliable, these "non-powered" On-Off thermostats provide a proven means of control in demanding heating and cooling applications.

Part Numbers: 134-1083, 134-1084, 134-1085, 134-1086

**Technical Instructions** 

#### Powers® Low Temperature Detect Line Voltage Mech. Thermostats

The Electric Low Temperature Detection Cut-out and Alarm Thermostat is a remote bulb instrument which opens an electrical circuit to stop the supply fan motor and/or closes an outside air damper when the temperature at the sensing element falls below the setting of the instrument. Simultaneously, it closes a circuit to indicate an alarm condition. The ET 141 remote bulb thermostat incorporates a temperature-sensitive liquid-filled sensing element that actuates precision snap-acting switches through a diaphragm and linkage mechanism. The switches are Single-Pole, Double-Throw (SPDT) snap-acting type, totally enclosed, and are suitable for low or line voltage power switching.

#### Part Numbers: 134-1504, 134-1510, 134-1511

Technical Instructions	Technical Instructions
<u>(134-1504)</u>	<u>(134-1510, 134-1511)</u>

#### Powers® Mid Range Temp Line Voltage Mechanical Thermostats

The ET 141 remote bulb thermostat incorporates a temperature-sensitive liquid-filled sensing element that actuates precision snap-acting switches through a diaphragm and linkage mechanism. The switches are Single-Pole, Double-Throw (SPDT) snap-acting type, totally enclosed, and are suitable for low or line voltage power switching. The electric surface mounted thermostat has a Single-Pole, Double-Throw (SPDT) contact mechanism and is designed especially for mounting on pipes.

#### Part Numbers: 141-0520, 141-0522

Technical Instructions	Technical Instructions
<u>(141-0520)</u>	<u>(141-0522)</u>





The ET 141 remote bulb thermostat incorporates a temperature-sensitive liquid-filling sensing element that actuates precision snap-acting switches through a diaphragm and linkage mechanism. The switches are Single-Pole, Double-Throw (SPDT) snap-acting type, totally enclosed, and are suitable for low or line voltage power switching.

The electric surface mounted thermostat has a Single-Pole, Double-Throw (SPDT) contact mechanism and is designed especially for mounting on pipes.

The ET 141 high limit control thermostat is duct mounted and has a rigid bulb, bi-metal rod and tube construction.

#### Part Numbers: 141-0521, 141-0522, 141-0530

Technical Instructions	Technical Instructions	Technical Instructions
<u>(141-0521)</u>	<u>(141-0522)</u>	<u>(141-0530)</u>





Part Number: 134-1861

Technical Instructions



## **Powers® Mechanical Line Voltage Controls Accessories**



## Powers® 243 Series Pneumatic Relays and Three-way Valve



#### Powers<sup>®</sup> 243 MP Multi-Purpose Relay

The Powers RL 243 MP Multi-Purpose Relay is a pneumatic auxiliary device designed to provide a variety of pneumatic control functions for the typical control system. Applications include direct and reverse acting amplifying, signal advancing, minimum pressure relay, and lower pressure transfer. The relay operates on a force balance principal and is provided with a Powers two-valve design to assure stability and prevent unnecessary air consumption. Internal relief assembly prevents signal lock-up and assures fail-safe operation. A single spring adjustment is provided to allow setting the relay for desired operation.

Part Number: 243-0009

**Technical Instructions** 

Installation Instructions

#### Powers® 243 BR Balance Retard Relav

The RL-243 Balanced Retard (BR) Relay is a pneumatic auxiliary device used to obtain special pneumatic signal outputs for use in a pneumatic control system. Standard applications include signal retarding, balancing action, and signal advancing. The relay can also be used to obtain several special control functions such as signal hesitation and pressure limiting. The relay operates on a force-balance principal and is provided with a Powers' two-valve design to assure stability and prevent unnecessary air consumption. Internal relief assembly prevents signal lock-up and assures fail-safe operation. The relay is also adaptable for flush panel mounting to facilitate manual readjustment if desired.

Part Number: 243-0010

#### **Technical Instructions**

Installation Instructions



engineer in obtaining specialized control action within a pneumatic control system. Applications include amplifying, summing, differential pressure, ratio control, higher pressure, and signal characterization control. The relay operates on a force balance principle and is provided with a Powers' two-valve design to assure stability and prevent unnecessary air consumption. Internal relief assembly prevents signal lock-up and assures fail-safe operation.

Part Number: 243-0011

**Technical Instructions** 

Installation Instructions



#### Powers<sup>®</sup> 243 SW Switching Relay

The Powers 243 SW Switching Relay is a two-position, pilot-operated auxiliary device used for switching a common part from one pneumatic circuit to another. A mounting bracket is provided for mounting on a vertical or horizontal surface.

Part Number: 243-0001

**Technical Instructions** 

Installation Instructions



#### Three-way Electro-Pneumatic (EP) Valve

These rugged and reliable general purpose air valves provide multiple voltage and style options to meet most any application need. Series 265 Electro-Pneumatic Valve is a general purpose, electrically operated, two position 3-way valve designed to control airflow. It can be used for interlock between an electrical system and a pneumatic control system.

Part Numbers: 265-1021, 265-1022, 265-1024, 265-1027, 265-1028

**Technical Instructions** 

Installation Instructions

The RL 243A Analog Relay is a pneumatic auxiliary device designed to assist the

## **Powers™ Controls Pneumatic Damper Actuators**



#### **Powers® Controls No. 3 Pneumatic Damper Actuators**

The Powers® Controls No. 3 Pneumatic Damper Actuator is a compact, totally enclosed, rolling diaphragm-type actuator designed for modulating or two-position actuation of dampers or air valves. This actuator has a stroke length of 2-3/8 inches (60mm) and is available in nominal spring ranges of 3 to 7 psi (21 to 50 kPa), 5 to 10 psi (35 to 69 kPa) and 8 to 13 psi (55 to 90 kPa).

Part Numbers: 331-4310, 331-4311, 331-4312, 331-4313, 331-4314, 331-4510, 331-4511, 331-4512, 331-4513, 331-4514, 331-4531, 331-4809, 331-4810, 331-4811, 331-4812, 331-4813, 331-4814, 331-4831, 332-4811, 332-4831

**Technical Instructions** 

Installation Instructions

#### **Powers® Controls No. 4 Pneumatic Damper Actuators**

The Powers<sup>™</sup> Controls No. 4 Pneumatic Damper Actuator is a totally enclosed pneumatic piston type actuator designed to operate dampers for ventilating systems, mixing box control, and other applications requiring a large effective diaphragm area and long stroke. This actuator has a stroke length of 4 inches (102mm) and is available in nominal spring ranges of 3 to 7 psi (21 to 48 kPa), 3 to 13 psi (21 to 90 kPa), 5 to 10 psi (35 to 69 kPa) and 8 to 13 psi (55 to 90 kPa).

The POWERS™ No. 4 Damper Actuator "Hesitation" model is frequently used to operate the outdoor air damper on unit ventilators. The hesitation feature enables the outdoor air damper to be synchronized with the unit valve to maintain a predetermined outdoor air requirement when the controlled zone is at the desired temperature.

Part Numbers: 331-2904, 331-2905, 331-2906, 331-2929, 331-2930, 331-2961, 331-2963, 331-2968, 331-2973, 331-2974, 331-3000, 331-3001, 331-3002, 331-3017, 331-3018, 332-2961, 332-2968, 332-2973

#### **Technical Instructions**

Installation Instructions



#### **Powers® Controls No. 6 Pneumatic Damper Actuators**

Powers® Controls No. 6 Pneumatic Damper Actuator is a heavy-duty, rolling diaphragm, spring return actuator designed to drive large dampers, centrifugal refrigeration inlet vanes, and other applications requiring a large, effective diaphragm area and long 4 inch (102mm) stroke length.

Part Numbers: 331-2793, 331-2794, 331-2856, 331-2857, 331-2858, 331-2988, 331-3011, 331-3012, 331-3013, 331-3060, 332-2856, 332-3011, 332-3060

**Technical Instructions** 

Installation Instructions

## **Powers® Controls Pneumatic Damper Actuators Accessories**



#### **Related Links**

Applications Bulletin: Damper Actuator Sizing and Selection

Installation Instructions: Damper Actuator Diaphragm Replacement

Technical Bulletin: Instrument Air Capacities

Technical Bulletin: Maximum Thrust Ratings of Pneumatic Damper Actuators

## Powers® Controls CP 567 Control Cabinets



#### 567 Series Control Cabinet Assemblies 3.5-inch Depth

These cabinets provide a convenient central location for equipment such as power metering, small electronic controls and accessories.

These 12" H x 14" W x 3.5" D cabinets provide a smaller profile for the mounting and protection of small electronic controls or power metering devices. A convenient "windowed door" model is available to allow external viewing of internal controls and displays without opening the door.

Part Numbers: 567-551, 567-556

#### **Technical Instructions**



#### 567 Series Control Cabinet Assemblies 6-inch Depth

These cabinets provide a convenient central location for equipment such as BAS electronic controls, metering devices and small pneumatic equipment.

The empty cabinet box can be installed at the job to permit early rough-in of conduit. Since the door and subpanel can be separated from the cabinet, controls may be mounted to the door subpanel either at the job site or at the field office and connected to the cabinet at your convenience.

Part Numbers: 567-351, 567-452, 567-453, 567-454

**Technical Instructions** 



#### 567 Series Control Cabinet Assemblies 9-inch Depth

These cabinets provide a convenient central location for equipment such as DDC and/or pneumatic systems using either copper or polyethylene tubing or with wired electric/electronic systems. The 9-inch nominal cabinet depth provides extra room for large items. The empty cabinet box may be installed at the job to permit early rough-in of conduit. Since the door and subpanel can be separated from the cabinet, controls may be mounted to the door subpanel either at the job site or at the field office and connected to the cabinet at your convenience.

Part Numbers: 567-352, 567-353

#### **Technical Instructions**

#### 567 Series Control Cabinet Components Cabinet Enclosure Only

These cabinets provide a convenient central location for equipment such as DDC and/or pneumatic systems using either copper or polyethylene tubing or with wired electric/electronic systems.

The empty panel can be installed at the job to permit early rough-in of conduit. Since the door and subpanel can be separated from the cabinet, controls may be mounted to the door subpanel either at the job site or at the field office and connected to the cabinet at your convenience.

Part Numbers: 567-371, 567-372

#### **Technical Instructions**



#### 567 Series Control Cabinet Components Cabinet Doors Only

These replacement doors provide the 567 control panel assembly a long operational life as doors can be replaced to support new door mounted equipment requirements or to replace previously punched doors.

The empty panel enclosure box can be installed at the job to permit early rough-in of conduit. Since these doors can be separated from the cabinet, controls may be mounted to the door subpanel either at the job site or at the field office and connected to the cabinet at your convenience.

Part Numbers: 567-361, 567-362, 567-363

**Technical Instructions** 





## **Quick Reference Guides Available**





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