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(Continued on next page)

Powerstar Room Thermostats

Proven to provide fast response and highly accurate temperature control, Powerstar Pneumatic Room Thermostats are designed to control heating and/or cooling by operating a variety of pneumatic devices such as valves or damper actuators.

Powerstar thermostats are factory calibrated to control pneumatic devices over a 3 to 15 psi (103 to 207 kPa) range.

Powerstar pneumatic room thermostats are available for the following applications:

- Single Temperature
- Day/Night
- Day/Night/Vent
- Heating/Cooling
- Free Energy Band
- Free Energy Band with Hesitation

Covers are available with concealed or exposed setpoint adjustment, room temperature indication, and setpoint indicator.

Selection Guide

Air Supply	Applications	Control Outputs	Control Setpoints	Control Actions	Air Output Capacity		Model
					Low (1-pipe)	High (2-pipe)	
15 to 30 psi (103 to 207 kPa)	• Heat or Cool	Single	Single	Direct/Reverse	•	•	**192 S**
Cool 18 psi (124 kPa) Heat 25 psi (172 kPa)	• Heat and Cool (auto changeover) • Factory calibrated (194 HC) for Honeywell or Johnson retrofit	Single	Dual	Direct/Direct		•	**192 HC**
				Reverse/Reverse		•	**194 HC**
				Direct/Reverse		•	
				Reverse/Direct		•	
Day 18 psi (124 kPa) Night 25 psi (172 kPa)	• Day and Night (auto changeover) • Factory calibrated (194 DN) for Honeywell or Johnson retrofit • R2 vent (“0”) day, full supply night (DNV only, 3-pipe) • Night override selector switch	Single	Dual (Day/Night)	Direct/Direct		•	**192 DN 194 DN**
				Reverse/Reverse		•	
Day 18 psi (124 kPa) Night 25 psi (172 kPa)	• Day and Night (auto changeover) • Factory calibrated (194 DN for Honeywell or Johnson retrofit) • R2 vent (“0”) day, full supply night (DNV only, 3-pipes) • Night override selector switch	Dual	Dual (Day/Night with Vent)	None	•	•	**192 DNV 194 DNV**
15 to 30 psi (103 to 207 kPa)	• Heat and Cool • Sequence-controlled devices with two control lines (same or different range)	Dual	Dual (Heat/Cool)	Direct/Direct	•	•	**193 HC Free Energy Band**
				Reverse/Reverse	•	•	
				Direct/Reverse	•	•	
				Reverse/Direct	•	•	
15 to 30 psi (103 to 207 kPa)	• Heat and Cool • Sequence-controlled devices with one control line (different spring ranges)	Single	Dual (Heat/Cool)	Direct/Direct		•	**193 HC Free Energy Band (Hesitation)**

We’re happy to assist you

Our customer support teams are accessible and happy to assist you with ordering, fulfillment, and shipping questions. Call a representative at 1-800-516-9964 from 7 am to 5:30 pm (CST) Monday through Friday.

Contact Customer Support or your Account Executive with any questions. We appreciate your business and look forward to helping you!

Powerstar Single Setpoint Pneumatic Room Thermostat

192 S Thermostat chassis.

Typical wall plate and screws.

Description

Providing proportional single output, single setpoint, 1-pipe for low air capacity or 2-pipe for high air capacity pneumatic room temperature control, the 192 S Powerstar Single Setpoint Pneumatic Room Thermostat is the most economical model. Refer to the Retroline® Retrostats on page F-15 to replace competitive models.

Features

- Single setpoint dial available in Fahrenheit or Celsius scales
- Available in direct or reverse acting models
- Sensitive bimetal responds to temperature changes
- Integral, field adjustable limit stops
- Wall mounting plate for connection to a variety of rough-in terminal boxes included
- Large volume air capacity relay in 2-pipe models only
- Test port for fast check of output pressure without removing the cover
- Field replaceable thermometer, setpoint dial, restrictor and filters for decreased maintenance cost

Options

- Quick-connect air connections for ease of installation and service
- Fixed limit stops to meet government specifications
- Large, 1/2" setpoint knob for convalescent homes

Applications

Designed for heating and cooling applications for control of pneumatic valves and damper actuators. The 192 S Powerstar Single Setpoint Pneumatic Room Thermostat is excellent for commercial and institutional facilities.

Recommendation

1-pipe: Use when limited output air capacity is required to operate a single valve and/or actuator; requires external restrictor, 20 scim (5.4 ml/s) air supply.

2-pipe: Use for high output capacity for control of multiple valves and actuators, used with or without high/low limiting controls.

Application Drawings

Dotted lines are alternative control schemes.

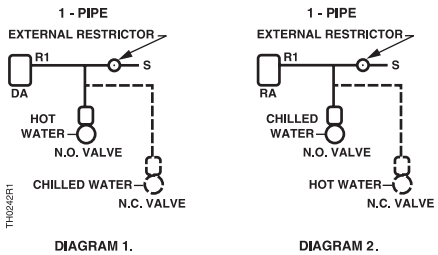


DIAGRAM 1.

DIAGRAM 2.

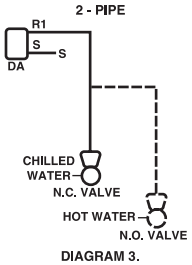


DIAGRAM 3.

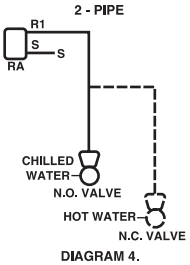


DIAGRAM 4.

192 S Thermostat Specifications

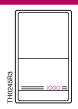
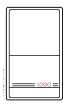
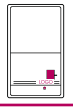
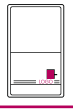
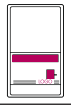
For complete conversion kits, refer to the Retroline® Retrostats starting on page F-15.

Scale; Range
Major (minor) Divisions ..... 45 to 85°F, 10(2)°F (7 to 30°C, 5(1)°C)
Factory Calibration ..... 72°F, 7.5 psi ±0.3 (22°C, 52 kPa @ 1.8)
Sensitivity Adjustment Range ..... 1 to 4 psi/°F (12 to 50 kPa/°C)
Factory Setting ..... 2.5 psi/°F (31 kPa/°C)
Limit Stop
Field Adjustment Range ..... 45/85°F (7/30°C)
Fixed Limit Stop Range ..... 55/75°F (13/24°C)
Temperature
Storage ..... -10 to +140°F (-23 to +60°C)
Ambient Operating ..... 40 to 140°F (4 to 60°C)
Accuracy at Factory
Calibration ..... ±2°F (±1.1°C)
Response ..... 0.1°F (0.06°C)
Supply Air Pressure
Recommended ..... 25 psi (172 kPa)
Maximum ..... 30 psi (207 kPa)

Nominal Air Consumption for Air Compressor Sizing
1-pipe ..... 25 scim (6.8 ml/s)
2-pipe ..... 20 scim (5.5 ml/s)
Nominal Air Capacity for Air Main Sizing
1-pipe ..... 25 scim (6.8 ml/s)
2-pipe ..... 20 scim (5.5 ml/s)
Nominal Chassis Air Capacity
1-pipe Supply ..... 25 scim (6.8 ml/s)
2-pipe Supply ..... 230 scim (63 ml/s)
1-pipe Exhaust ..... 30 scim (8 ml/s)
2-pipe Exhaust ..... 150 scim (41 ml/s)
Air Connections ..... 5/32" (4 mm) OD tubing
Dimensions (with cover) ..... 2.16" W x 3.34" H x 1.59" D (55 mm W x 85 mm H x 40 mm D)
Shipping Weights (with cover)
Thermostat Chassis and Wall Plate ..... 0.53 lb. (0.24 kg)
Plastic Cover/Metal Cover ..... 0.07 lb. (0.04 kg)/0.27 lb. (0.12 kg)

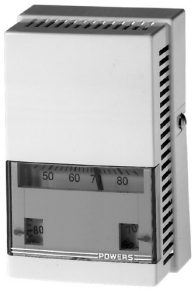
192 S Thermostat Product Ordering

Model #	Thermostat Chassis Type				Thermostat Chassis & Wall Plate	
					Control Action	
	Output	Setpoint	Air Output Capacity	Thermometer & Setpoint Scales	Direct	Reverse
192 S 1-pipe	Single	Single (Heat or Cool)	Low (No Relay)	°F	**192-200**	**192-201**
				°C	**192-220**	**192-221**
192 S 2-pipe	Single	Single (Heat or Cool)	High (Integral Relay)	°F	**192-202**	**192-203**
				°C	**192-222**	**192-223**

Thermostat Covers *(Sold Separately)*	Plastic Part No.		Metal Part No.
	Desert Beige	White	
 • Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer concealed • No logo	**192-257**	**192-257W**	**192-357**
 • Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer concealed • With logo	**192-256**	**192-256W**	**192-356**
 • Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer exposed	**192-254**	**192-254W**	**192-354**
 • Adjustment setpoint key • Indicator setpoint exposed • Chassis thermometer concealed • Use with 1/2" setpoint knob option	**192-265**	**192-265W**	**192-365**
 •Adjustment setpoint key •Indicator setpoint exposed •Chassis thermometer exposed •Use with 1/2" setpoint knob option	**192-266**	**192-266W**	**192-366**
 • Adjustment setpoint exposed • Indicator setpoint exposed • Chassis thermometer concealed	**192-250**	**192-250W**	**192-350**
 • Adjustment setpoint exposed • Indicator setpoint exposed • Chassis thermometer concealed	**192-252**	**192-252W**	**192-352**

Note: • "Exposed features" are indicated in **red** on corresponding illustration.
• Universal Cover sold on page **F-83.** For **194** refer to Powerstar Retroline section.

Powerstar Heating/Cooling Pneumatic Room Thermostats



192 HC Thermostat chassis.

Typical wall plate and screws.

192 HC Thermostat with plastic cover. Chassis wall plate with easy maintenance plug-in adapters shown (optional).

Description

Providing proportional single output, dual setpoint with 2-pipe for high air capacity pneumatic room temperature control, the 192 HC Powerstar Heating/Cooling Pneumatic Room Thermostat provides two thermostats under one cover; one side for heating and the other for cooling. Switchover is accomplished by changing the air pressure to the thermostat.

Features

- Dual setpoint dial available in Fahrenheit or Celsius scales
- Available in direct or reverse acting models
- Sensitive bimetal responds to temperature changes
- Integral, field adjustable limit stops
- Adjustable changeover pressure
- Large volume air capacity relay
- Wall mounting plates provides connection to a variety of rough-in terminal boxes
- Test port for fast check of output pressure without removing the cover
- Field replaceable thermometer, setpoint dials, restrictor and filters

Options

- Fixed limit stops to meet government specifications
- Quick-connect air connections for ease of installation and service
- Large, 1/2" setpoint knob for convalescent homes

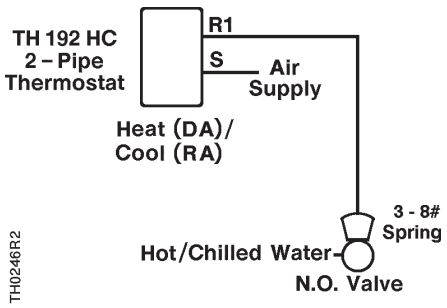
Applications

Designed for temperature control of heating and cooling applications, the 192 HC Powerstar Heating/Cooling Pneumatic Room Thermostat controls valves and damper actuators in cooling equipment. Providing energy management and occupant comfort, the thermostat automatically adjusts to seasonal changes from heating setpoint to cooling setpoint in commercial and institutional facilities.

Recommendation

For control of multiple valves and actuators, use with or without high/low limiting controls.

Application Drawing



192 HC Thermostat Specifications

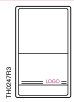
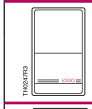
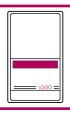
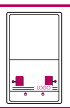
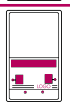
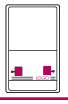
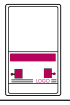
For complete conversion kits, refer to the Retroline® Retrostats starting on page F-15.

Scale; Range
Major (minor) Divisions.....45 to 85°F, 10(2)°F (7 to 30°C, 5(1)°C)
Factory Calibration .....72°F, 7.5 psi ± 0.3 (22°C, 52 kPa @ 1.8)
Sensitivity Adjustment Range .....1 to 4 psi/°F (12 to 50 kPa/°C)
Factory Setting .....2.5 psi/°F (31 kPa/°C)
Limit Stop
Field Adjustment Range .....45/85°F (7/30°C)
Fixed Limit Stop Range.....55/75°F (3/24°C)
Temperature
Storage.....-10 to +140°F (-23 to +60°C)
Ambient Operating .....40 to 140°F (4 to 60°C)
Accuracy at Factory
Calibration .....±2°F (±1.1°C)
Response .....0.1°F (0.06°C)
Supply Air Pressure
Two Pressure (Recommended) Cooling/Heating..... 18 psi (124kPa)/(124 kPa)/25 psi (172 kPa)
Supply Air Pressure
Two Pressure (Range)
Cooling ..... 15 to 19 psi (103 to 131 kPa)
Heating ..... 23 to 30 psi (159 to 207 kPa)
Two Pressure, Honeywell Competitive Model
Cooling/Heating..... 13 psi (90 kPa)/18 psi (124 kPa)
Two Pressure, Johnson Competitive Model[1]
Cooling/Heating..... 15 psi (103 kPa)/20 psi (138 kPa)
Nominal Air Consum. for Air Compressor Sizing .....25 scim (6.8 ml/s)
Nominal Air Capacity for Air Main Sizing .....40 scim (11 ml/s)
Nominal Air Capacity
Supply/Chassis Exhaust..... 150 scim (41 ml/s)/150 scim (41 ml/s)
Air Connections .....5/32" (4 mm) OD tube
Dimensions (with cover) .....2.16" W x 3.34" H x 1.59" D (55 mm W x 85 mm H x 40 mm D)
Shipping Weights
Thermostat Chassis and Wall Plate .....0.53 lb. (0.24 kg)
Plastic Cover .....0.07 lb. (0.04 kg)
Metal Cover (single/dual) .....0.27 lb. (0.12 kg)/0.7 lb. (0.3 kg)

1. Some Johnson Controls heat/cool thermostats have a cooling supply pressure of 20 psi (138 kPa) and a heating supply pressure of 15 psi (103 kPa). For this application, the heating and cooling actions must be reversed. If exposed setpoint is required, order special cover, **192-773**.

192 HC Thermostat Product Ordering

Model #	Thermostat Chassis Type				Thermostat Chassis & Wall Plate	
					Control Action	
	Output	Setpoint	Air Output Capacity	Thermometer & Setpoint Scales	Heat Direct	Heat Reverse
192 HC 2-pipe	Single	Dual (Heat and Cool)	High (Integral Relay)	°F °F °C °C	**192-207** Cool (DA)	**192-209** Cool (DA)
					192-208 Cool (RA)	**192-210** Cool (RA)
					192-227 Cool (DA)	**192-229** Cool (DA)
					192-228 Cool (RA)	**192-230** Cool (RA)

Thermostat Covers *(Sold Separately)*		Plastic Part No.		Metal Part No.
		Desert Beige	White	
	• Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer concealed • No logo	**192-257**	**192-257W**	**192-357**
	• Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer concealed • With logo	**192-256**	**192-256W**	**192-356**
	• Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer exposed	**192-254**	**192-254W**	**192-354**
	• Adjustment setpoint key • Indicator setpoint exposed • Chassis thermometer concealed	**192-267**	**192-267W**	**192-367**
	•Adjustment setpoint key •Indicator setpoint exposed •Chassis thermometer exposed •Use with 1/2" setpoint knob option	**192-268**	—	**192-368**
	• Adjustment setpoint exposed • Indicator setpoint exposed • Chassis thermometer concealed • Use with 1/2" setpoint knob option	**192-258**	—	—
	• Adjustment setpoint exposed • Indicator setpoint exposed • Chassis thermometer concealed	**192-260**	**192-260W**	**192-360**

Note: • "Exposed features" are indicated in **red** on corresponding illustration.
• Universal Cover sold on page **F-92.**

Powerstar Day/Night/Vent Pneumatic Room Thermostats

192 DN Thermostat chassis.

Typical wall plate and screws.

192 DN Thermostat with plastic cover. Chassis wall plate with easy maintenance plug-in adapters shown (optional).

Description

Providing proportional dual setpoint, 2-pipe or 3-pipe high air capacity pneumatic room temperature control, the 192 DN or DNV Powerstar Pneumatic Room Thermostat automatically resets the room temperature setpoint during unoccupied hours by changing the air pressure to the thermostat. A manual override feature allows occupants to switch to day mode. The override returns to night mode the following night.

Features

- Dual setpoint dial available in Fahrenheit or Celsius scales
- Available in direct or reverse acting models
- Sensitive bimetal responds to temperature changes
- Manual override selector for off-hour occupant comfort
- Adjustable changeover pressure
- Large volume air capacity relay
- Integral, field adjustable limit stops
- Wall mounting plate for connection to a variety of rough-in terminal boxes included
- Test port for fast check of output pressure without removing the cover
- Field replaceable thermometer, setpoint dial, restrictor and filters

Options

- Fixed limit stops to meet government specifications
- Quick-connect air connections for ease of installation and service
- Large, 1/2" setpoint knob for convalescent homes

Applications

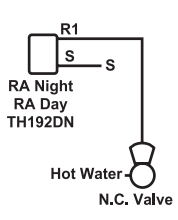
The 192 DN and DNV Powerstar Pneumatic Room Thermostat controls valves and damper actuators in cooling equipment, automatically performing setback changes from day to night. The 192 DNV also performs a purge sequence at night to bring in “vent” outside air to cool the building. A manual override selector switch allows individual room or zone “day” control locally during the night cycle.

During the night control cycle, the 192 DNV models provide a separate output signal (full air supply) allowing ventilation control. Periodic resetting to the “night” control mode during evening or weekend periods using time clocks ensures optimal energy management.

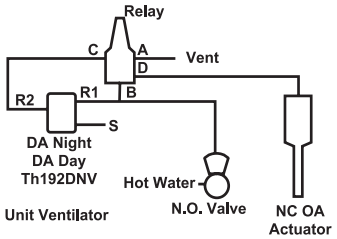
Recommendation

Use 192 DN or DNV for multiple valves and actuators, with or without high/low limiting controls.

Application Drawings



Day/Night.



Day/Night/Vent.

Chassis Port R2 Pressure	Operation Mode (Air Supply)	Switching Relay Connection
Full Air Supply	Night (S=25 psi)	A-D
0 psi	Night Occupied	B-D
0 psi	Day (S=18 psi)	B-D

192 DN/DNV Thermostat Specifications

For complete conversion kits, refer to the Retroline® Retrostats starting on page F-15.

Scale; Range
Major (minor) Divisions..... 45 to 85°F, 10(2)°F (7 to 30°C, 5(1)°C)

Factory Calibration .....72°F, 7.5 psi (22°C, 31 kPa)

Sensitivity Adjustment Range .....1 to 4 psi/°F (12 to 50 kPa/°C)

Factory Setting ..... 2.5 psi/°F (31 kPa/°C)

Limit Stop
Field Adjustment Range ..... 45/85°F (7/30°C)
Fixed Limit Stop Range..... 55/75°F (3/24°C)

Temperature
Storage.....-10 to +140°F (-23 to +60°C)
Ambient Operating ..... 40 to 140°F (4 to 60°C)

Accuracy at Factory
Calibration ..... ±2°F (±1.1°C)
Response ..... 0.1°F (0.06°C)

Supply Air Pressure
Two Pressure
Day (recommended)..... 18 psi (124 kPa)
Night (recommended)..... 25 psi (172 kPa)
Vent-Day/Night ..... 0 psi (0 kPa)/25 psi (172 kPa)
Two Pressure
Day (range)..... 15 to 19 psi (103 to 131 kPa)
Night (range)..... 23 to 30 psi (159 to 207 kPa)
Two Pressure (Honeywell Competitive Model)
Day/Night..... 13 psi (90 kPa)/18 psi (124 kPa)
Two Pressure (Johnson Controls Competitive Model)
Day/Night..... 15 psi (103 kPa)/20 psi (138 kPa)

Nominal Air Consumption for Air Compressor Sizing ..... 25 scim (6.8 ml/s)

Nominal Air Capacity for Air Main Sizing ..... 40 scim (11 ml/s)

Nominal Chassis Air Capacity
Supply ..... 230 scim (63 ml/s)
Exhaust ..... 150 scim (41 ml/s)

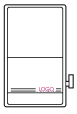
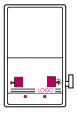
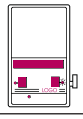
Air Connections ..... 5/32" (4 mm) OD tube

Dimensions (with cover)
192 DN ..... 2.16" W x 3.34" H x 1.59" D (55 mm W x 85 mm H x 40 mm D)
192 DNV..... 2.5" W x 3.34" H x 1.59" D (64 mm W x 85 mm H x 40 mm D)

Shipping Weights
Thermostat Chassis and Wall Plate .....0.53 lb. (0.24 kg)
Plastic Cover .....0.07 lb. (0.04 kg)
Metal Cover (dual).....0.27 lb. (0.12 kg)

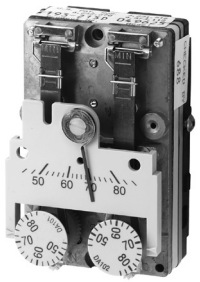
192 DN/DNV Thermostat Product Ordering

Model #	Thermostat Chassis Type: Output	Setpoint	Air Output Capacity	Thermometer & Setpoint Scales	Thermostat Chassis & Wall Plate: Control Action D (DA) / N (DA)	D (RA) / N (RA)	D (DA) / N (DA) (with Night Vent)
192 DN	Single	Dual (Day and Night)	High (Integral Relay)	°F	**192-204**	**192-205**	**192-206**
192 DNV 3-pipe				°C	**192-224**	**192-225**	**192-226**

Thermostat Covers *(Sold Separately)*	Plastic Part No. Desert Beige	White	Metal Part No.
 • Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer concealed	**192-262**	**192-262W**	**192-362**
 • Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer exposed	**192-264**	—	**192-364**
 • Adjustment setpoint key • Indicator setpoint exposed • Chassis thermometer concealed • Use with 1/2" setpoint knob option	**192-269**	—	—
 • Adjustment setpoint key • Indicator setpoint exposed • Chassis thermometer exposed • Use with 1/2" setpoint knob option	**192-270**	—	**192-370**
 • Adjustment setpoint key (night) exposed (day) • Indicator setpoint exposed • Chassis thermometer exposed	**192-271**	**192-271W**	**192-371**

Note:
- DNV 3-pipe model provides full air supply on R2 vent port during night control cycle.
- "Exposed features" are indicated in **red** on corresponding illustration.
- For **194** refer to Powerstar Retroline section.
- Universal Cover sold on page **F-92.**

Powerstar Free Energy Band Heating/Cooling Pneumatic Room Thermostats



193 HC Thermostat chassis.

Typical wall plate and screws.

193 HC Thermostat with plastic cover. Chassis wall plate with easy maintenance plug-in adapters shown (optional).

Description

Providing proportional, dual output, dual setpoint, 2-pipe (dual 1-pipe low air capacity) or 3-pipe (dual 2-pipe high air capacity) pneumatic room temperature control, the 193 HC Powerstar Free Energy Band Pneumatic Room Thermostat creates a deadband so that no heating or cooling occurs during the Free Energy Band.

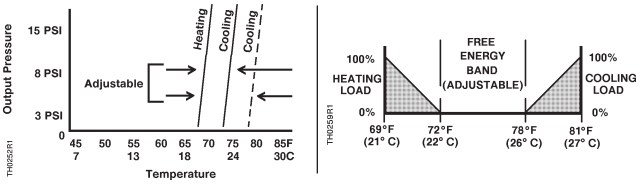
Features

- Dual setpoint dials available in Fahrenheit or Celsius scales
- Integral, field adjustable limit stops
- Sensitive bimetal responds to temperature changes
- Adjustable Free Energy Band
- Test port for fast check of output pressure without removing the cover
- Wall mounting plates for connection to a variety of rough-in terminal boxes included
- Field replaceable thermometer, setpoint dials, restrictors and filters
- Competitive adapter mounting kits available

Options

- Fixed limit stops to meet government specifications
- Quick-connect air connections for ease of installation and service
- Large, 1/2" setpoint knob for convalescent homes

Input/Output Characteristics



Applications

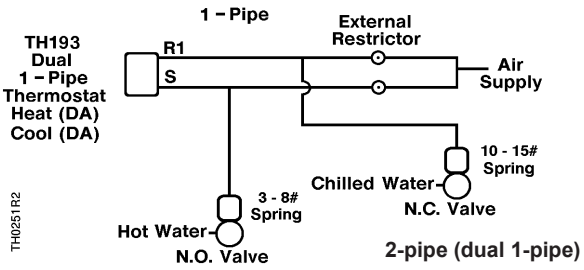
Designed for buildings with early morning heat requirements and mid-morning to afternoon cooling requirements, the Powerstar Free Energy Band Pneumatic Room Thermostat two temperature thermostat controls valves, damper actuators and mechanical heating and cooling equipment. Providing energy management and occupant comfort, the thermostat automatically reduces heating load and increases cooling load.

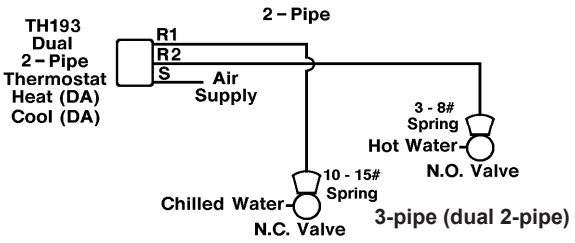
Recommendation

2-pipe (dual 1-pipe): Use when a limited air capacity is required to operate a single valve and/or actuator.

3-pipe (dual 2-pipe): Use for multiple valves and actuators with or without high/low limiting controls which require higher air capacities.

Application Drawings





193 HC Thermostat Specifications

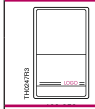
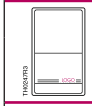
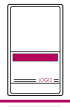
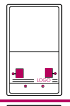
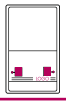
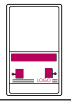
For complete conversion kits, refer to the Retroline® Retrostats starting on page F-15.

Scale; Range
Major (minor) Divisions..... 45 to 85°F, 10(2)°F (7 to 30°C, 5(1)°C)
Factory Calibration .....72°F, 7.5 psi ±0.3 (22°C, 52 kPa @ 1.8)
Sensitivity Adjustment Range .....1 to 4 psi/°F (12 to 50 kPa/°C)
Factory Setting ..... 2.5 psi/°F (31 kPa/°C)
Limit Stop
Field Adjustment Range ..... 45/85°F (7/30°C)
Fixed Limit Stop Range..... 55/75°F (13/24°C)
Temperature
Storage.....-10 to +140°F (-23 to +60°C)
Ambient Operating ..... 40 to 140°F (4 to 60°C)
Accuracy at Factory
Calibration ..... ±2°F (±1.1°C)
Response ..... 0.1°F (0.06°C)
Supply Air Pressure
Two Pressure (recommended)..... 25 psi (172 kPa)
Maximum..... 30 psi (207 kPa)

Nominal Air Consumption for Air Compressor Sizing
1-pipe ..... 50 scim (14 ml/s)
2-pipe ..... 40 scim (11 ml/s)
Nominal Air Capacity for Air Main Sizing
1-pipe ..... 50 scim (14 ml/s)
2-pipe ..... 40 scim (11 ml/s)
Nominal Chassis Air Capacity
1-pipe Supply ..... 25 scim (6.8 ml/s) per side
2-pipe Supply ..... 230 scim (63 ml/s) per side
1-pipe Exhaust ..... 30 scim (8 ml/s) per side
2-pipe Exhaust ..... 150 scim (41 ml/s) per side
Air Connections .....5/32" (4 mm) OD tubing
Dimensions (with cover) ..... 2.16" W x 3.34" H x 1.59" D (55 mm W x 85 mm H x 40 mm D)
Shipping Weights
Thermostat Chassis and Wall Plate .....0.53 lb. (0.24 kg)
Plastic Cover .....0.07 lb. (0.04 kg)
Metal Cover (dual).....0.27 lb. (0.12 kg)

193 HC Thermostat Product Ordering

Model #	Thermostat Chassis Type				Thermostat Chassis & Wall Plate	
					Control Action	
	Output	Setpoint	Air Output Capacity	Thermometer & Setpoint Scales	Heat Direct	Heat Reverse
193 HC 1-pipe	Single	Dual (Heat and Cool)	Low (No Relay)	°F °F	**193-211** Cool (DA) **193-212** Cool (RA)	**193-213** Cool (DA) **193-214** Cool (RA)
193 HC 2-pipe		Dual (Heat and Cool)	High (Integral Relay)	°F °F °C	**193-215** Cool (DA) **193-216** Cool (RA) **193-235** Cool (DA)	**193-217** Cool (DA) **193-218** Cool (RA) —

Thermostat Covers *(Sold Separately)*	Plastic Part No.		Metal Part No.
	Desert Beige	White	
 • Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer concealed • No logo	**192-257**	**192-257W**	**192-357**
 • Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer concealed • With logo	**192-256**	**192-256W**	**192-356**
 • Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer exposed	**192-254**	**192-254W**	**192-354**
 • Adjustment setpoint key • Indicator setpoint exposed • Chassis thermometer concealed	**192-267**	**192-267W**	**192-367**
 •Adjustment setpoint key •Indicator setpoint exposed •Chassis thermometer exposed •Use with 1/2" setpoint knob option	**192-268**	—	**192-368**
 • Adjustment setpoint exposed • Indicator setpoint exposed • Chassis thermometer concealed • Use with 1/2" setpoint knob option	**192-258**	—	—
 • Adjustment setpoint exposed • Indicator setpoint exposed • Chassis thermometer concealed	**192-260**	**192-260W**	—

Note: • "Exposed features" are indicated in **red** on corresponding illustration.
• Universal Cover sold on page **F-92.**

Powerstar (Hesitation) Free Energy Band Heating/Cooling Pneumatic Room Thermostats

193 HC Thermostat chassis.

Typical wall plate and screws.

193 HC Thermostat with plastic cover. Chassis wall plate with easy maintenance plug-in adapters shown (optional).

Description

Providing proportional, single output, dual setpoint, 2-pipe pneumatic room temperature control, the 193 HC Powerstar (Hesitation) Free Energy Band Heating/Cooling Pneumatic Room Thermostat is designed to sequence a heating device or a cooling device.

The hesitation feature keeps the output pressure constant through a 6°F (10.8°C) range (typical), causing a deadband.

Features

- Dual setpoint dials available in Fahrenheit or Celsius scales
- Sensitive bimetal responds to temperature changes
- Integral, field adjustable limit stops
- Adjustable Free Energy Band
- Wall mounting plate for connection to a variety of rough-in terminal boxes included
- Test port for fast check of output pressure without removing the cover
- Field replaceable thermometer, setpoint dials, restrictors, and filters

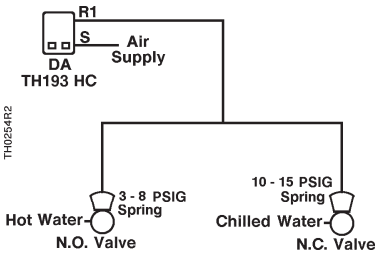
Options

- Fixed limit stops to meet government specifications
- Quick-connect air connections for ease of installation and service
- Large, 1/2" setpoint knob for convalescent homes

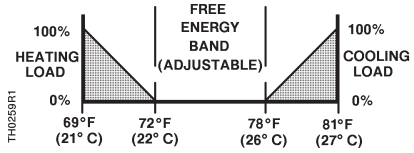
Applications

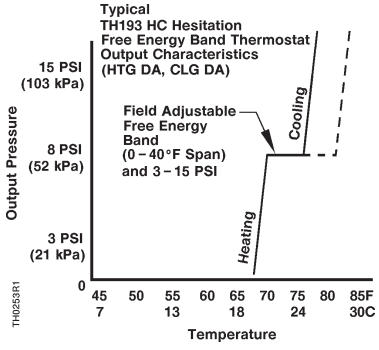
The 193 HC Powerstar (Hesitation) Free Energy Band Heating/Cooling Pneumatic Room Thermostat is an excellent choice for saving energy by sequencing heating and cooling valves. In most heat/cool pneumatic applications, a 3 to 8 psi (21 to 55 kPa) heating valve and a 10 to 14 psi (69 to 103 kPa) cooling valve is used. By design, this provides a 2 psi (14 kPa) deadband where no heating or cooling is occurring. The hesitation feature allows you to change the deadband range to a 3, 4 or 5 psi (21, 28, or 34 kPa) range to save energy. Refer to the Input/Output chart below for more information.

Application Drawing



Input/Output Characteristics





193 HC Thermostat Specifications

Scale; Range
Major (minor) Divisions..... 45 to 85°F, 10(2)°F/ (7 to 30°C, 5(1)°C)

Factory Calibration
"FEB" Output Pressure..... 7.5 psi (52 kPa)
Temperature..... 72°F (22°C)
Sensitivity.....2.5 psi/°F (31 kPa/°C)

Sensitivity Adjustment Range ..... 1 to 4 psi/°F (12 to 50 kPa/°C)

Limit Stop, Field Adjustment Range ..... 55/75°F (13/24°C)

Temperature
Storage.....-10 to +140°F (-23 to +60°C)
Ambient Operating ..... 40 to 140°F (4 to 60°C)

Accuracy at Factory
Calibration ..... ±2°F (±1.1°C)
Response ..... 0.1°F (0.06°C)

Supply Air Pressure
Recommended..... 25 psi (172 kPa)
Maximum..... 30 psi (207 kPa)

Free Energy Band
Output Pressure Adjustment ..... 1 to 15 psi (7 to 103 kPa)
Range..... 0 to 40°F (0 to 20°C)

Nominal Air Capacity for Compressor Sizing ..... 40 scim (11 ml/s)

Nominal Air Capacity for Air Main Sizing ..... 40 scim (11 ml/s)

Nominal Chassis Air Capacity
Supply ..... 150 scim (41 ml/s)
Exhaust ..... 150 scim (41 ml/s)
Supply/2-pipe Exhaust ..... 150 scim (41 ml/s) per side

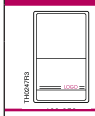
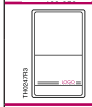
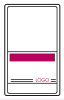
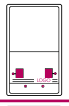
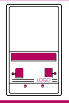
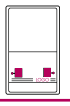
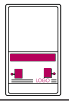
Air Connections .....5/32" (4 mm) OD tubing

Dimensions (with cover) ..... 2.16" W x 3.34" H x 1.59" D (55 mm W x 85 mm H x 40 mm D)

Shipping Weights
Thermostat Chassis and Wall Plate .....0.53 lb. (0.24 kg)
Plastic Cover .....0.07 lb. (0.04 kg)
Metal Cover (dual).....0.27 lb. (0.12 kg)

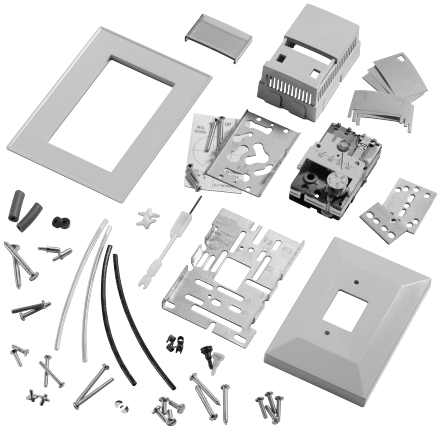
193 HC Thermostat Product Ordering

Model #	Thermostat Chassis Type				Thermostat Chassis & Wall Plate	
					Control Action	
	Output	Setpoint	Air Output Capacity	Thermometer & Setpoint Scales	Heat (DA) / Cool (DA)	Heat (RA) / Cool (RA)
193 HC Hesitation	Single	Dual (Heat and Cool)	High (Integral Relay)	°F	**193-219**	**193-220**

Thermostat Covers *(Sold Separately)*	Plastic Part No.		Metal Part No.
	Desert Beige	White	
 • Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer concealed • No logo	**192-257**	**192-257W**	**192-357**
 • Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer concealed • With logo	**192-256**	**192-256W**	**192-356**
 • Adjustment setpoint concealed • Indicator setpoint concealed • Chassis thermometer exposed	**192-254**	**192-254W**	**192-354**
 • Adjustment setpoint key • Indicator setpoint exposed • Chassis thermometer concealed	**192-267**	**192-267W**	**192-367**
 •Adjustment setpoint key •Indicator setpoint exposed •Chassis thermometer exposed •Use with 1/2" setpoint knob option	**192-268**	—	**192-368**
 • Adjustment setpoint exposed • Indicator setpoint exposed • Chassis thermometer concealed • Use with 1/2" setpoint knob option	**192-258**	—	—
 • Adjustment setpoint exposed • Indicator setpoint exposed • Chassis thermometer concealed	**192-260**	**192-260W**	—

Note: • "Exposed features" are indicated in **red** on corresponding illustration.
• Universal Cover sold on page **F-92.**

RETROLINE® Powerstar Retrostat Pneumatic Room Thermostats



192/194 Dual Setpoint Pneumatic Room Thermostat Kit.

RETROLINE®
easily replaces:

- Barber-Colman (Siebe)
- Johnson Controls
- Honeywell
- Robertshaw (Siebe)

Description

The Powerstar Retroline 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.

Features

- Complete kit including Retrostat cover kit with exposed or concealed setpoint adjustment
- Setpoint dials available in Fahrenheit or Celsius scales
- Factory calibrated for accuracy
- All installation hardware and calibration wrench provided.
- Fits into large format wall openings, using included “goof plate.”
- Integral, field adjustable limit stops
- Test port for fast check of output pressure without removing the cover
- Field replaceable thermometer, setpoint dial(s), restrictor(s), and filter(s)

Options

- Quick-connect air connections for ease of installation and service
- Large, 1/2" setpoint knob for convalescent homes

Applications

Retroline Retrostat kits are available for most 2-pipe applications in direct and reverse acting models, including:

- Single Temperature
- Day/Night
- Heat/Cool

Refer to the Powerstar products to select the appropriate application.

192/194 Pneumatic Room Thermostats Specifications

Single Setpoint			
Description	Thermometer & Setpoint Scales	Control Action	
		Direct	Reverse
Single Temperature	°F	192-840	192-841
	°C	192-850	192-851

Kits include covers.
If a different cover is required, refer to the Accessories and Service Kit section.

Dual Setpoint			
Action/Changeover Pressure	Manufacturer	Thermometer & Setpoint Scales	Kit Part No. (Desert Beige)
Day/Night			
Day (DA) 13 psi (90 kPa) / **Night** (DA) 18 psi (124 kPa)	Honeywell	°F	194-3042
Day (DA) 13 psi (90 kPa) / **Night** (DA) 18 psi (124 kPa)	Honeywell	°C	194-3142
Day (DA) 15 psi (103 kPa) / **Night** (DA) 20 psi (138 kPa)	Johnson/B-C	°F	194-3043
Day (DA) 15 psi (103 kPa) / **Night** (DA) 20 psi (138 kPa)	Johnson/B-C	°C	194-3143
Day (DA) 18 psi (124 kPa) / **Night** (DA) 25 psi (172 kPa)	Siemens	°F	192-3044
Day (DA) 18 psi (124 kPa) / **Night** (DA) 25 psi (172 kPa)	Siemens	°C	192-3144
Day (RA) 13 psi (90 kPa) / **Night** (RA) 18 psi (124 kPa)	Honeywell	°F	194-3052
Day (RA) 15 psi (103 kPa) / **Night** (RA) 20 psi (138 kPa)	Johnson/B-C	°F	194-3053
Day (RA) 18 psi (124 kPa) / **Night** (RA) 25 psi (172 kPa)	Siemens	°F	192-3054
Day (RA) 18 psi (124 kPa) / **Night** (RA) 25 psi (172 kPa)	Siemens	°C	192-3154*
Heat/Cool			
Heat (DA) 18 psi (124 kPa) / **Cool** (RA) 13 psi (90 kPa)	Honeywell	°F	194-3082
Heat (DA) 20 psi (138 kPa) / **Cool** (RA) 15 psi (103 kPa)	Johnson/B-C	°F	194-3083*
Heat (DA) 25 psi (172 kPa) / **Cool** (RA) 18 psi (124 kPa)	Siemens	°F	192-3084*
Heat (DA) 25 psi (172 kPa) / **Cool** (RA) 18 psi (124 kPa)	Siemens	°C	192-3184

Note:
- For detailed specifications on Day/Night, refer to 192 DN or DNV.
- For detailed specifications on Heat/Cool, refer to 193 HC.
- The changeover pressures for RobertShaw thermostats are 16 psi Day/25 psi Night.
- All kits include covers.

Retroline Powerstar Retrostat Pneumatic Room Thermostat Product Ordering

Manufacturer Part No.	Manufacturer	Control Action/Temperature Scale	Retroline Part No.	
			Kit	Replace. Chassis
T-4002-201[1]	Johnson Controls	Single Temperature, Direct Acting	192-840	192-202
T-4002-202[1]	Johnson Controls	Single Temperature, Reverse Acting	192-841	192-203
T-4002-203	Johnson Controls	Single Temperature, Direct Acting	192-840	192-202
T-4002-204	Johnson Controls	Single Temperature, Reverse Acting	192-841	192-203
T-4506-201[1]	Johnson Controls	Day (DA) 15 psi (103 kPa) changeover / Night (DA) 20 psi (138 kPa)	194-3043	194-2043
T-4506-202	Johnson Controls	Day (DA) 15 psi (103 kPa) changeover / Night (DA) 20 psi (138 kPa)	194-3043	194-2043
T-4506-203[1, 2]	Johnson Controls	Day (DA) 15 psi (103 kPa) changeover / Night (DA) 20 psi (138 kPa)	194-3043	194-2043
T-4506-204[2]	Johnson Controls	Day (DA) 15 psi (103 kPa) changeover / Night (DA) 20 psi (138 kPa)	194-3043	194-2043
T-4506-201[1]	Johnson Controls	Day (DA) 15 psi (103 kPa) changeover / Night (DA) 20 psi (138 kPa)	194-3043	194-2043
T-4506-202	Johnson Controls	Day (DA) 15 psi (103 kPa) changeover / Night (DA) 20 psi (138 kPa)	194-3043	194-2043
T-4506-203[1, 2]	Johnson Controls	Day (DA) 15 psi (103 kPa) changeover / Night (DA) 20 psi (138 kPa)	194-3043	194-2043
T-4506-204[2]	Johnson Controls	Day (DA) 15 psi (103 kPa) changeover / Night (DA) 20 psi (138 kPa)	194-3043	194-2043
T-4506-209[1]	Johnson Controls	Day (RA) 15 psi (103 kPa) changeover / Night (RA) 20 psi (138 kPa)	194-3053	194-2053
T-4506-217[1, 2]	Johnson Controls	Day (RA) 15 psi (103 kPa) changeover / Night (RA) 20 psi (138 kPa)	194-3053	194-2053
T-4756-205[1]	Johnson Controls	Heat (DA) 20 psi (138 kPa) changeover / Cool (RA) 15 psi (103 kPa)	194-3083	194-2083
T-4756-206	Johnson Controls	Heat (DA) 20 psi (138 kPa) changeover / Cool (RA) 15 psi (103 kPa)	194-3083	194-2083
TP970A1002	Honeywell	Single Temperature, Direct Acting	192-840	192-202
TP970A1012	Honeywell	Single Temperature, Direct Acting	192-840	192-202
TP970A1035	Honeywell	Single Temperature, Direct Acting	192-840	192-202
TP970A1038	Honeywell	Single Temperature, Direct Acting	192-840	192-202
TP970A1053	Honeywell	Single Temperature, Direct Acting	192-840	192-202
TP970A1061	Honeywell	Single Temperature, Direct Acting	192-840	192-202
TP970A2004	Honeywell	Single Temperature, Direct Acting	192-840	192-202
TP970A1002	Honeywell	Single Temperature, Reverse Acting	192-841	192-203
TP970B1028	Honeywell	Single Temperature, Reverse Acting	192-841	192-203
TP970B1036	Honeywell	Single Temperature, Reverse Acting	192-841	192-203
TP970B1044	Honeywell	Single Temperature, Reverse Acting	192-841	192-203
TP971A1003	Honeywell	Day (DA) 13 psi (90 kPa) changeover / Night (DA) 18 psi (124 kPa)	194-3042	194-2042
TP971A1029	Honeywell	Day (DA) 13 psi (90 kPa) changeover / Night (DA) 18 psi (124 kPa)	194-3042	194-2042
TP971A1037	Honeywell	Day (DA) 13 psi (90 kPa) changeover / Night (DA) 18 psi (124 kPa)	194-3042	194-2042
TP971A1045	Honeywell	Day (DA) 13 psi (90 kPa) changeover / Night (DA) 18 psi (124 kPa)	194-3042	194-2042
TP971A1086	Honeywell	Day (DA) 13 psi (90 kPa) changeover / Night (DA) 18 psi (124 kPa)	194-3042	194-2042
TP971B1001	Honeywell	Day (RA) 13 psi (90 kPa) changeover / Night (RA) 18 psi (124 kPa)	194-3052	194-2052
TP971B1004	Honeywell	Day (RA) 13 psi (90 kPa) changeover / Night (RA) 18 psi (124 kPa)	194-3052	194-2052
TP972A1002	Honeywell	Heat (DA) 18 psi (124 kPa) changeover / Cool (RA) 13 psi (90 kPa)	194-3082	194-2082
TP972A1028	Honeywell	Heat (DA) 18 psi (124 kPa) changeover / Cool (RA) 13 psi (90 kPa)	194-3082	194-2082
TP972A1036	Honeywell	Heat (DA) 18 psi (124 kPa) changeover / Cool (RA) 13 psi (90 kPa)	194-3082	194-2082
TP972A1101	Honeywell	Heat (DA) 18 psi (124 kPa) changeover / Cool (RA) 13 psi (90 kPa)	194-3082	194-2082

Ordering Notes

1. Suggested Retrofit Kit converts horizontal thermostat to vertical position.
2. Suggested Retrofit Kit has an additional manual changeover switch, not provided on the original.

Retroline Powerstar Retrostat Pneumatic Room Thermostat Product Ordering

Manufacturer Part No.	Manufacturer	Control Action/Temperature Scale	Retroline Part No.	
			Kit	Replace. Chassis
TK-18	Barber-Colman	Single Temperature, Direct Acting	**192-840**	**192-202**
TK-19	Barber-Colman	Single Temperature, Reverse Acting	**192-841**	**192-203**
TK-19-1	Barber-Colman	Single Temperature, Reverse Acting	**192-841**	**192-203**
TK-19-19	Barber-Colman	Single Temperature, Reverse Acting	**192-841**	**192-203**
TK-1001	Barber-Colman	Single Temperature, Direct Acting	**192-840**	**192-202**
TK-1101	Barber-Colman	Single Temperature, Reverse Acting	**192-841**	**192-203**
TK-1001-116	Barber-Colman	Single Temperature, Direct Acting	**192-850**	**192-222**
TK-1002	Barber-Colman	Single Temperature, Direct Acting	**192-840**	**192-202**
TK-1002	Barber-Colman	Single Temperature, Reverse Acting	**192-841**	**192-203**
TK-5001-116	Barber-Colman	Single Temperature, Direct Acting	**192-850**	**192-222**
TKR-18	Barber-Colman	Single Temperature, Direct Acting	**192-840**	**192-202**
TKR-18-91	Barber-Colman	Single Temperature, Direct Acting	**192-840**	**192-202**
TKR-19	Barber-Colman	Single Temperature, Reverse Acting	**192-841**	**192-203**
TKR-1001	Barber-Colman	Single Temperature, Direct Acting	**192-840**	**192-202**
TKR-1101	Barber-Colman	Single Temperature, Reverse Acting	**192-841**	**192-203**
2212-118	Robertshaw	Single Temperature, Direct Acting	**192-840**	**192-202**
2212-119	Robertshaw	Single Temperature, Reverse Acting	**192-841**	**192-203**
2212-128	Robertshaw	Single Temperature, Direct Acting	**192-840**	**192-202**
2212-129	Robertshaw	Single Temperature, Reverse Acting	**192-841**	**192-203**
2212-418	Robertshaw	Single Temperature, Direct Acting	**192-840**	**192-202**
2212-419	Robertshaw	Single Temperature, Reverse Acting	**192-841**	**192-203**
2212-518	Robertshaw	Single Temperature, Direct Acting	**192-840**	**192-202**
2212-519	Robertshaw	Single Temperature, Reverse Acting	**192-841**	**192-203**
T15-101	Robertshaw	Single Temperature, Direct Acting	**192-840**	**192-202**
T18-101	Robertshaw	Single Temperature, Direct Acting	**192-840**	**192-202**
T18-201	Robertshaw	Single Temperature, Direct Acting	**192-840**	**192-202**
T18-301	Robertshaw	Single Temperature, Direct Acting	**192-840**	**192-202**
T18-3011	Robertshaw	Single Temperature, Direct Acting	**192-840**	**192-202**
192-202	Powers	Single Temperature, Direct Acting	**192-840**	**192-202**
192-203	Powers	Single Temperature, Reverse Acting	**192-841**	**192-203**
192-204	Powers	Day (DA) 18 psi (124 kPa)/Night (DA) 25 psi (172 kPa) changeover	**192-3044**	**192-204**
192-205	Powers	Day (RA) 18 psi (124 kPa)/Night (RA) 25 psi (172 kPa) changeover	**192-3054**	**192-205**
192-208	Powers	Heat (DA) 25 psi (172 kPa)/Cool (RA) 18 psi (124 kPa) changeover	**192-3084**	**192-208**
192-222	Powers	Single Temperature, Direct Acting	**192-850**	**192-222**
192-223	Powers	Single Temperature, Reverse Acting	**192-851**	**192-223**
192-224	Powers	Day (DA) 18 psi (124 kPa) changeover/Night (DA) 25 psi (172 kPa)	**192-3144**	**192-224**
192-225	Powers	Day (RA) 18 psi (124 kPa) changeover/Night (RA) 25 psi (172 kPa)	**192-3154**	**192-225**
192-228	Powers	Heat (DA) 25 psi (172 kPa) changeover/Cool (RA) 18 psi (124 kPa)	**192-3184**	**192-228**

Pneumatic Room Thermostats

832 D Pneumatic Room Thermostat and screws.

Description

The single setpoint, direct acting thermostat provides gradual acting pneumatic room temperature control for heating and cooling applications. The 832 D Thermostat is ruggedly constructed for dependable, long-term service.

Features

- All metal construction
- Rapid response to temperature change
- Unique design of supply and exhaust air valves prevents waste
- Quiet operation
- Easy-to-calibrate and service
- Tamper-proof cover screws
- Exposed remote changeover control
- Calibrated thermometer

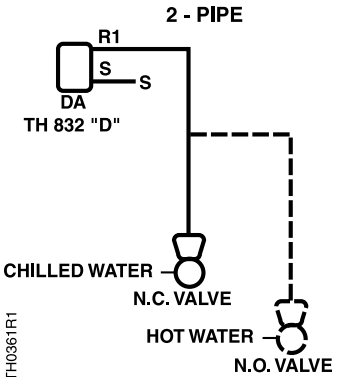
Applications

Designed for controlling rooms heated or cooled by radiation, ventilation, or an air conditioning system, the 832 D Pneumatic Room Thermostat is versatile and responsive for individual room control.

Other applications include room control of radiant panels, finned radiation, and unit ventilators.

Application Drawing

Dotted lines are alternative control schemes.



832 D Pneumatic Room Thermostat Specifications

Control Action ..... Direct
Operating Range ..... 60 to 85°F (15 to 30°C)
Sensitivity Fixed ..... 2.5 psi/°F (31 kPa/°C)
Temperature Response ..... 0.5°F (0.3°C)
Maximum Ambient Temperature ..... 110°F (43°C)
Dial Graduations ..... 2°F (1.1°C)
Normal Air Supply Pressure ..... 18 psi (124 kPa)
Maximum Operating Pressure ..... 30 psi (207 kPa)
Dimensions ..... 2.88" W x 5.63" H x 2.19" D (73 mm W x 143 mm H x 56 mm D)
Air Consumption for Compressor Sizing ..... 10 scim (2.7 ml/s)
Cover Style ..... Key or concealed setpoint adjustment
Cover Finish ..... Silver; Special order other finishes.
Shipping Weight ..... 3.0 lb. (1.36 kg)

832 D Pneumatic Room Thermostat Product Ordering

Description	Thermostat Part No.[2]	Cover Assembly
Concealed Adjustment with Thermometer	**832-0120**	**856-036**
Concealed Adjustment without Thermometer	**832-0490**	**856-046**[1]
Exposed Key Adjustment with Thermometer	**832-0500**	**856-044**
Exposed Knob Adjustment with Thermometer	**832-1260**	**856-044**

Ordering Notes

1. Blind cover, **856-046,** does not include mounting screws, **856-014,** that are required for installation.
2. Does not include adjustment key, **856-055,** that is required for installation.

Thermostat comes complete with cover.

Order the Calibration Kit in the Accessories and Service Kits section.

Accessories & Service Kits F-87

TECH TIP

To calibrate any pneumatic thermostat, perform the following:

1. Remove the cover.
2. Measure the ambient temperature.
3. Set the setpoint dial to the ambient temperature.
4. Measure the controller output pressure (branch pressure).
5. Turn the calibration screw(s) until the branch pressure equals the midpoint of the control span [usually 8 psi (55 kPa)].
6. Replace the cover.

Limitem Rigid Bulb Thermostats

356 Limitem Rigid Bulb Thermostat.

Description

The 356 Limitem Rigid Bulb Thermostat is a pneumatically operated, duct-mounted thermostat, which is available in either direct or reverse acting in a variety of ranges.

Features

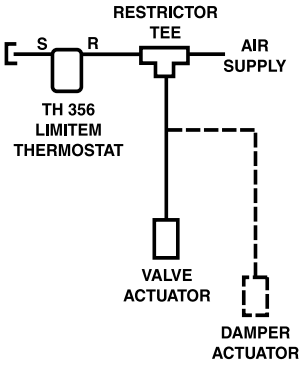
- Durable copper motor tube and steel rod temperature sensing element
- Two-valve design reduces air waste
- Duct mounting hardware included
- All metal construction
- 18" (46 cm) sensing tube

Applications

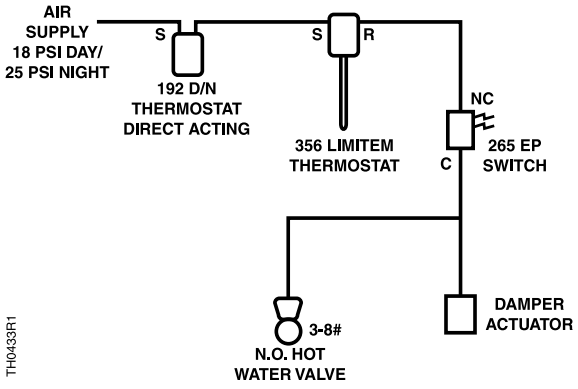
The 356 Limitem Rigid Bulb Thermostat provides primary control for unit ventilators, fan coils and other air handling units. Can also be used as low limit control for air flow to a controlled space.

Application Drawings

Dotted lines are alternative control schemes.



1-pipe.



2-pipe.

356 Limitem Rigid Bulb Thermostat Specifications

Control Action ..... Direct or Reverse
Maximum Supply Air Pressure ..... 30 psi (207 kPa)
Sensitivity Range (adjustable) ..... 0.25 to 2 psi/°F (3 to 25 kPa/°C)
Factory Sensitivity Setting ..... 1.25 psi/°F (15 kPa/°C)
Temperature Response ..... 0.50°F (0.9°C)
Dial Graduations ..... 5°F (2.7°C)/2°C (3.6°F)
Maximum Ambient Temperature
Case ..... 200°F (93°C)
Bulb (Direct Acting) ..... 225°F (107°C)
Bulb (Reverse Acting) ..... 250°F (121°C)
Nominal Air Supply Pressure ..... 18 to 25 psi (124 to 172 kPa)
Maximum External Pressure (on bulb) ..... 250 psi (1722 kPa)
Mounting ..... Flange or 3/8" NPT
Air Connections ..... 1/8" NPT
Dimensions
Bulb Length ..... 18" (457 mm)
Flange OD ..... 2.56" (65 mm)
Case ..... 1.5" Diameter x 3" L (33 mm Diameter x 76 mm L)
Shipping Weight ..... 2.0 lb. (0.91 kg)

356 Limitem Rigid Bulb Thermostat Product Ordering

Control Action	Temperature Operating Range	Part No.
Direct Acting	0 to 100 °F (-18 to +38°C)	**356-0012**
Direct Acting	30 to 180°F (-1.11 to +82.2°C)	**356-0750**
Reverse Acting	0 to 100°F (-18 to +38°C)	**356-0013**
Reverse Acting	30 to 180°F (-1.11 to +82.2°C)	**356-1005**
Reverse Acting	100 to 250°F (37.8 to 121°C)	**356-1006**

Accessories & Service Kits F-87

TECH TIP

When using the Limitem as a one-pipe device, a 40 scim (11 ml/s) restrictor will limit your output to 80% of supply. A 20 scim (5 ml/s) restrictor will limit your output to 60% of supply.

Example: With a 20 scim (5 ml/s) restrictor and 25 psi (11.3 kPa) supply, your maximum output is 15 psi (6.8 kPa).

Limitem Remote Bulb Thermostats

357 D Limitem Remote
Thermostat with an average bulb.

Description

The 357 D Limitem Remote Bulb Thermostat is a pneumatically-operated thermostat that is gradual, direct acting with a remote or averaging bulb.

Features

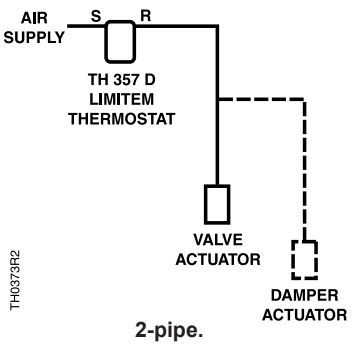
- Direct acting only
- Remote or averaging bulbs for flexibility in installation
- Liquid-filled sensing element for rapid response to temperature changes
- Two-valve design reduces air waste
- Adjustable sensitivity

Applications

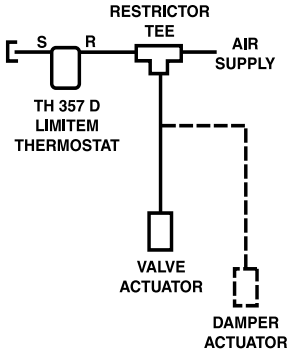
The 357 D Limitem Remote Bulb Thermostat provides primary monitoring and control for air handling units or a low limit control.

Application Drawings

Dotted lines are alternative control schemes.



2-pipe.



1-pipe.

357 D Limitem Remote Bulb Thermostat Specifications

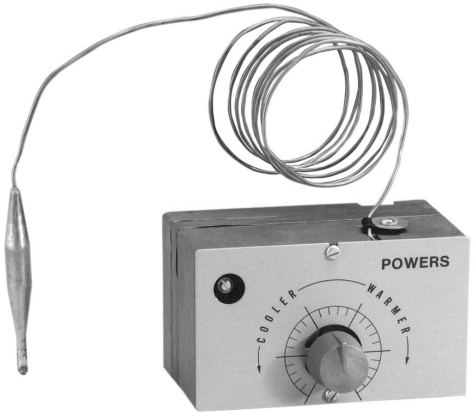
Control Action ..... Direct
Maximum Supply Air Pressure ..... 30 psi (207 kPa)
Sensitivity Range (adjustable) ..... 0.33 to 3.5 psi/°F (4 to 43 kPa/°C)
Factory Sensitivity Setting ..... 1.25 psi/°F (15 kPa/°C)
Bulb ..... Liquid-filled
Temperature Response ..... 0.5°F (0.3°C)
Dial Graduations ..... 5°F (2.7°C), 2°C (3.6°F)
Maximum Ambient Temperature (case) ..... 180°F (82°C)
Nominal Air Supply Pressure ..... 18 to 25 psi (124 to 172 kPa)
Mounting ..... Bracket supplied
Air Connection ..... 1/8" NPT
Dimensions (Case) ..... 1.75" Diameter x 3.5" H (44.5 mm Diameter x 88.9 mm H)
Shipping Weight ..... 2.0 lb. (0.9 kg)

357 D Limitem Remote Bulb Thermostat Product Ordering

Temperature Operating Range	Sensing Element	Capillary	Bulb	Maximum Ambient Temp.	Part No.
20 to 100°F (-6.7 to +37.8°C)	Remote Bulb	8' (2.4 m)	3/8" x 4' (0.95 mm x 10.2 cm)	201°F (94°C)	**357-0003**
5 to 145°F (1.7 to 62.8°C)	Averaging Bulb	40' (12.2 m)	3/32" x 15' (0.24 mm x 457 cm)	210°F (99°C)	**357-0004**
120 to 230°F (48.9 to 110°C)	Remote Bulb	40' (12.2 m)	3/8" x 4" (0.95 mm x 10.2 cm)	261°F (127°C)	**357-0005**
35 to 145°F (1.7 to 62.8°C)	Averaging Bulb	6" (15 cm)	3/32" x 8' (0.24 mm x 244 cm)	211°F (99.4°C)	**357-0001**

Accessories & Service Kits F-87

Unit Mounted Thermostats



188 Unit Mounted Thermostat.

Description

The 188 Unit Mounted Thermostat is a gradual acting thermostat with a remote bulb operating on the force-balance principle, using pneumatic feedback to obtain linearity and maintain selected room temperature by positioning pneumatic devices to control heating or cooling.

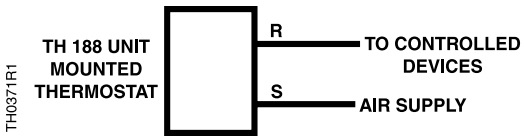
Features

- Liquid-filled thermal system temperature sensing element
- Durable die-cast metal case with rugged setpoint knob
- Adjustable sensitivity
- Universal mounting bracket for easy installation
- Integral adjustable limit stops
- Available as:
  – Direct Acting only (Heating)
  – Reverse Acting only (Cooling)
  – Heat or Cool depending on supply air pressure

Applications

The 188 Unit Mounted Thermostats are designed primarily for use in fan coil induction units and unit ventilators to control the temperature within an occupied space. The thermostat's temperature range is limited to applications at ambient temperatures.

Typical Connections



188 Unit Mounted Thermostat Specifications

Control Action ..... Heating/Cooling, Direct and Reverse; Direct only; Reverse only

Operating Range ..... 60 to 85°F (15.5 to 29.4°C)

Operating Pressure ..... 30 psi (207 kPa) max.

Adjustment Sensitivity ..... 1 to 5.25 psi/°F (12 to 65 kPa/°C)

Factory Sensitivity Setting ..... 2.25 psi/°F (28 kPa/°C)

Temperature Response ..... 0.2°F (0.1°C)

Maximum Ambient Temperature
- Case ..... 135°F (57.2°C)
- Bulb ..... 231°F (111°C)

Scale Graduations ..... 1°F (0.55°C)

Nominal Air Supply Pressure
- Direct or Reverse Acting ..... 25 psi (172 kPa)
- Heating/Cooling ..... 25 psi (172 kPa)/18 psi (124 kPa)

Average Air Usage
- 20 scim Restrictor ..... 25 scim (6.8 ml/s)
- 40 scim Restrictor ..... 45 scim (12.2 ml/s)

Air Connections ..... 1/4" (6 mm) Brass barbed for polyethylene tubing

Bulb Size ..... 3/8" Diameter x 3-1/2" L (9.5 mm Diameter x 89 mm L)

Capillary Length ..... 48" (121.9 cm) approx.

Finish ..... Corrosion-resistant Zinc Chromate

Dimensions (case)
- Heating/Cooling, Reverse Acting ..... 3.1" W x 2.4" H x 2.13" D (100 mm W x 61 mm H x 54 mm D)
- Direct Acting ..... 3.1" W x 2.4" H x 1.38" D (100 mm W x 61 mm H x 35 mm D)

Shipping Weight ..... 3.0 lb. (1.36 kg)

188 Unit Mounted Thermostat Product Ordering

	Control Action	Changeover Pressure	Average Air Usage	Part No.
Single Setpoint	Direct Acting / 25 psi (172 kPa)	—	40 scim (11 ml/s)	**188-0031**
Single Setpoint	Reverse Acting (Cooling) 18 psi	—	20 scim (5 ml/s)	**188-0024**
Heat/Cool	Direct Acting / Reverse Acting (Cooling) 18 psi (124 kPa)	—	40 scim (11 ml/s)	**188-0030**
Heat/Cool	Retroline Direct Acting/Reverse Acting 18 psi (124 kPa) / 13 psi (90 kPa). Retroline replacement for **Honeywell LP916BXXXX.**	15 psi (103 kPa)	40 scim (11 ml/s)	**188-0033**
Heat/Cool	Retroline Direct Acting/Reverse Acting 20 psi (138 kPa) / 15 psi (103 kPa). Retroline replacement for **Johnson Controls T-3300-2.**	17 psi (117 kPa)	40 scim (11 ml/s)	**188-0034**

Accessories & Service Kits F-87

Pneumatic High and Low Temperature Detection Thermostats

134 Pneumatic Low Temperature Detection Thermostat.

Description

The 134 High and Low Temperature Detection Pneumatic Thermostats automatically “lockout” at setpoint and require manual reset.

Features

- Snap-acting pneumatic switch
- Sight-set calibrated setpoint scale
- No leakage of air prior to reset of switch
- Easily adjustable settings
- Normally closed air valve; bleeds to less than 2 psi (14 kPa) when supplied through a restrictor
- Barb fitting for push-on connection of 1/4" (6 mm) OD polyethylene tubing
- Holds dead-ended line to approximately 22 psi (152 kPa) air pressure

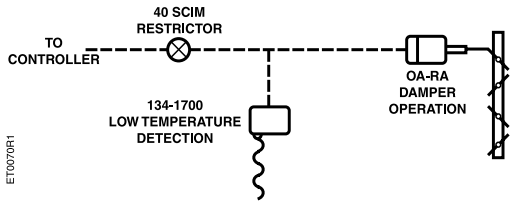
Applications

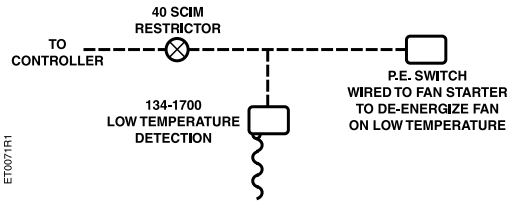
The 134 Pneumatic High and Low Temperature Detection Thermostats are used on pneumatic heating and cooling systems in areas protected from the weather.

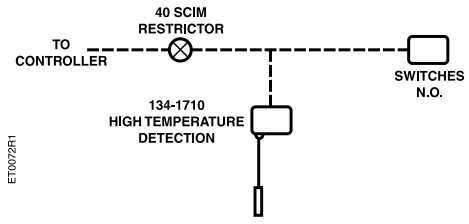
On a typical high limit application, the thermostat shuts down air conditioning or ventilating fans when the duct temperature becomes excessively high. A normally closed switch opens at setpoint.

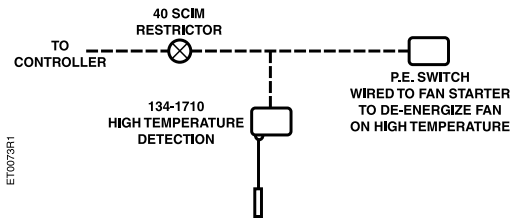
On a typical low temperature application, the thermostat stops the fan or closes a damper when the temperature drops to the setpoint at any one foot (30.5 cm) or more of the sensing element.

Application Drawings









134 Pneumatic Thermostat Specifications

Part No. 134-1700

Ambient Temperature Range ..... Greater than setpoint to 140°F (60°C)

Pneumatic Switch ..... NC, 0.020" (0.6 mm) diameter bleed

Control Point Low Temperature Thermostat ..... Lowest temperature at any one foot section of the sensing bulb

Case Finish ..... Gray Baked Enamel

Shipping Weight ..... 2.45 lb. (1.11 kg)

Part No. 134-1710

Ambient Temperature Range ..... -40 to +140°F (-40 to +60°C)

Pneumatic Switch ..... NC, 0.02" (0.6 mm) diameter bleed

Control Point Low Temperature Thermostat ..... Lowest temperature at any one foot section of the sensing bulb

Case Finish ..... Gray Baked Enamel

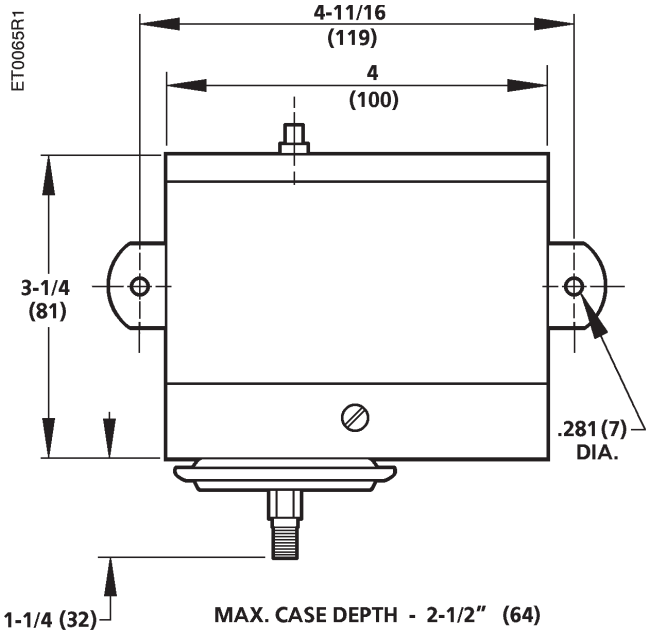
Shipping Weight ..... 2.38 lb. (1.08 kg)

134 Pneumatic Thermostat Product Ordering

Temp.	Temperature Range	Differential	Max. Bulb Temp.	Bulb & Capillary Length	Switch Reclose	Part No.
Low	15 to 55°F (-9 to +12.8°C) with stop at 35°F (1.67°C)	5°F (2.8°C) Non-Adjustable	400°F (204°C)	20' (6 m)	Temperature must increase by 5°F (2.8°C) before pneumatic switch can be reclosed.	**134-1700**
High	100 to 170°F (38 to 77°C)	10°F (5.6°C) Non-Adjustable	250°F (121°C)	2.7" (69 mm) Dia. x 10" (25.4 cm) L bulb with 6' (183 mm) capillary	Temperature must drop 10°F (5.6°C) before pneumatic switch can be reclosed.	**134-1710**

Accessories & Service Kits F-87

Dimensions



Dimensions shown in inches (mm).

Single Input Receiver-Controller

Powers RETROLINE®
easily replaces:

- Barber-Coleman
- Johnson Controls
- Honeywell
- Robertshaw
- Seibe

195 Single Input Receiver-Controller.

Description

The 195 Single Input Receiver-Controller is a pneumatic controller which receives one pneumatic input, and produces a pneumatic output signal based on the net pneumatic input and the mechanical settings of the setpoint and percent proportional band. This controller can be easily changed from direct to reverse acting.

Powers Retroline Receiver-Controller (195-1000) includes decals and installation instructions to replace competitive models.

Features

- Rugged proven design
- Plug-in air connections for ease of installation, calibration, and service
- Internal restrictors for transmitter inputs
- Stick-on scales included for setpoint dial in standard transmitter ranges
- Large, easy-to-read scales on all adjustments
- Calibration card for converting transmitter range to 3 to 15 psi (21 to 103 kPa) signal
- Tamper-resistant cover

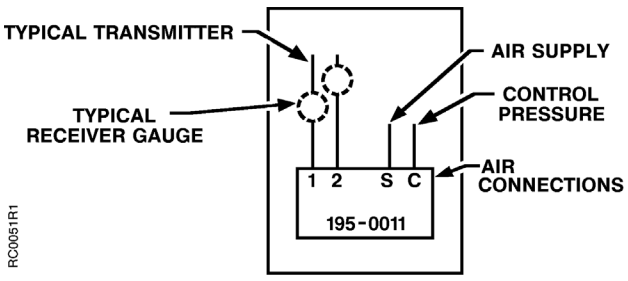
Options

- Retroline products for replacing competitive products

Applications

The 195 Single Input Receiver-Controller is a one-input, direct/reverse acting instrument used to control temperatures, humidity, and pressure of mechanical equipment in commercial and industrial facilities.

Typical Connections



195 Specifications

Action
Input #1 ..... Direct
Input #2 ..... Reverse

Pneumatic Inputs ..... 3 to 15 psi (21 to 103 kPa)

Control Output .....0 psi (0 kPa) to supply pressure 22 psi (152 kPa)

Operating Ambient Temperature Range ..... 40 to 120°F (4 to 49°C)

Supply Pressure
Operating..... 22 psi (152 kPa)
Maximum Safe ..... 30 psi (207 kPa)

% Proportional Band Adjustment Range .....2 to 20% for a 5 psi (34 kPa) control pressure change

Air Consumption ..... 60 scim (17 ml/s),

Air Capacity ..... 2 psi (14 kPa) Pressure Change at 9 psi (62 kPa) control pressure
Supply ..... 640 scim (175 ml/s)
Exhaust ..... 590 scim (161 ml/s)

Mounting ..... Surface

Air Connections
Barb fittings for 1/4" (6 mm) OD polyethylene tubing. Two plug-in connectors are provided; one for the direct acting and the reverse acting transmitter inputs and one for supply and control lines. 1/8" NPT connection provided for control pressure gauge (gauge not included).

Case Material .....Lexan, 20% glass-filled

Dimensions ..... 6.75" W x 5.69" H x 3.5" D (171 mm W x 144 mm H x 89 mm D)

Shipping Weight .....3.1 lb. (1.4 kg)

195 Product Ordering

Description	Part No.
Single Input Receiver-Controller	**195-0011**

RETROLINE®

Manufacturer	Manufacturer Part No.	Part No.[1]
Barber-Coleman	RKS-1001	**195-1000**
Barber-Coleman	RKS-2001	**195-1000**
Barber-Coleman	RKS-5001	**195-1000**
Honeywell	RP908A	**195-1000**
Honeywell	RP920A	**195-1000**
Johnson Controls	T-5800-1	**195-1000**

Ordering Note

1. Includes **195-0011** plus decals to replace any competitive single input receiver-controller.

Accessories & Service Kits F-87

Multiple Input Receiver-Controller

Powers RETROLINE®
easily replaces:

- Barber-Coleman
- Johnson Controls
- Honeywell
- Robertshaw
- Seibe

195 Multiple Input Receiver-Controller with Control Pressure Gauge.

Description

The 195 Multiple Input Receiver-Controller is a pneumatic controller that receives up to three pneumatic inputs and produces a pneumatic output signal based on the net pneumatic input and the setpoint, percent proportional band, and authority settings. The Controller can be easily changed from direct to reverse acting.

Powers Retroline Receiver-Controller (195-1000) includes decals and installation instructions to replace competitive models.

Features

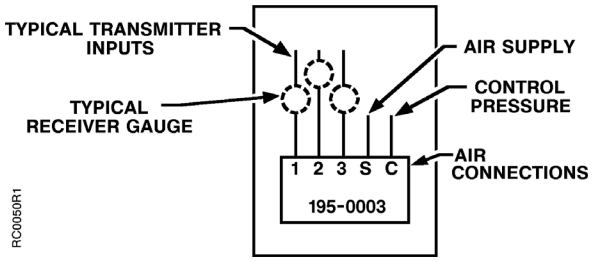
- Rugged proven design
- Plug-in air connections for ease of installation, calibration, and service
- Internal restrictors for transmitter inputs
- Stick-on scales included for setpoint dial in standard transmitter ranges
- Large, easy-to-read scales on all adjustments
- Calibration card for converting transmitter range to 3 to 15 psi (21 to 103 kPa) signal
- 0 to 30 psi (0 to 200 kPa) Pressure Gauge
- Retroline products for replacing competitive products

Applications

The 195 Multiple Input Receiver-Controller is commonly used when the setpoint needs to be automatically reset based on a separate input; can also be used as a single input device.

Example: Change hot water supply temperature setpoint based on outside air temperature.

Typical Connections



195 Specifications

Action
Input #1 ..... Direct
Input #2 ..... Reverse

Reset
Input #3 ..... Direct reset relative to Input #2
Reverse reset relative to Input #1

Pneumatic Inputs ..... 3 to 15 psi (21 to 103 kPa)

Control Output .....0 psi (0 kPa) to supply pressure 22 psi (152 kPa)

Operating Ambient Temperature Range ..... 40 to 120°F (4 to 49°C)

Supply Pressure
Operating..... 22 psi (152 kPa)
Maximum Safe ..... 30 psi (207 kPa)

% Proportional Band Adjustment Range .....2 to 20% for a 5 psi (34 kPa) control pressure change

% Authority Adjustment Range ..... 20 to 200%

Air Consumption ..... 60 scim (17 ml/s), *not including transmitters*

Air Capacity .....@ 2 psi (14 kPa) Pressure Change and 9 psi (62 kPa) control pressure
Supply ..... 640 scim (175 ml/s)
Exhaust ..... 590 scim (161 ml/s)

Mounting .....Surface, vertical

Air Connections
Barb fittings for 1/4" (6 mm) OD polyethylene tubing. Two plug-in connectors are provided; one for the three transmitter inputs and one for supply and control lines. 1/8" NPT connection provided for control pressure gauge.

Case Material .....Lexan, 20% glass-filled

Dimensions ..... 6.75" W x 5.69" H x 3.5" D (171 mm W x 144 mm H x 89 mm D)

Shipping Weight .....3.1 lb. (1.4 kg)

195 Product Ordering

Description	Part No.
Multiple Input Receiver-Controller	**195-0003**

RETROLINE®

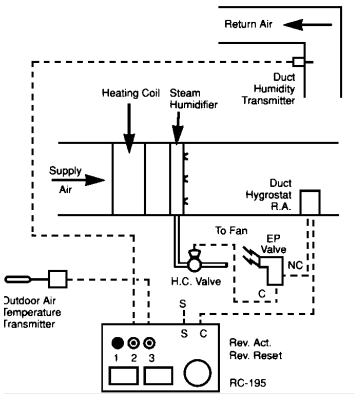
Manufacturer	Manufacturer Part No.	Part No.[1]
Barber-Coleman	RKS-3002	**195-2000**
Barber-Coleman	RKS-4002	**195-2000**
Johnson Controls	T-5800-3	**195-2000**
Robertshaw	P-341	**195-2000**
Robertshaw	P-541	**195-2000**
Honeywell	RP908B	**195-2000**
Honeywell	RP920B	**195-2000**

Ordering Note

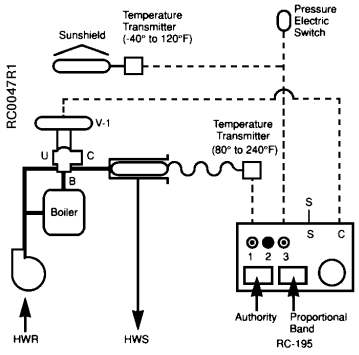
1. Includes **195-0003** plus decals to replace competitive receiver-controllers.

Accessories & Service Kits F-87

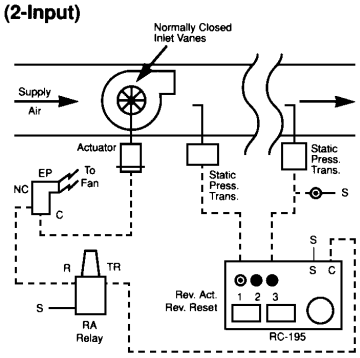
Dimensions/Engineering Drawings



Humidity Control



Temperature Control



Static Pressure Control

Temperature Transmitters

Powers RETROLINE®
easily replaces:

- Barber-Coleman
- Johnson Controls
- Honeywell
- Robertshaw
- Seibe

184-0340 Room Temperature Transmitter.

184-0005 Temperature Transmitter with Remote Bulb.

184 Temperature Transmitter with Averaging Bulb.

184 Temperature Transmitter with Rigid Bulb.

Description

The 184 Temperature Transmitters are direct acting, one-pipe instruments that sense temperature and transmit a proportional 3 to15 psi (21 to 103 kPa) pneumatic signal to a remotely located receiver gauge and/or receiver controller. Temperature Transmitters operate on the force-balance principle, using internal feedback for excellent linearity and accuracy.

Powers Retroline transmitters easily replace any competitive model. Refer to the appropriate product to locate the Retroline replacement.

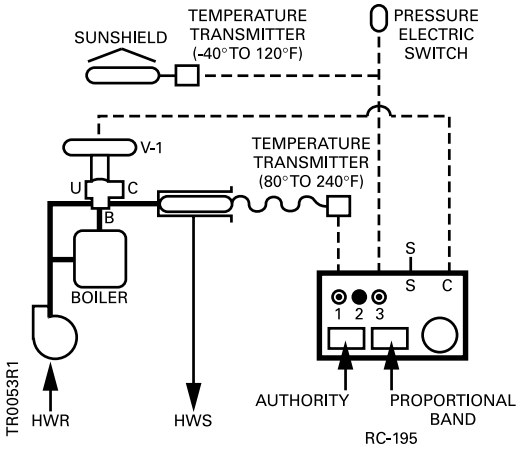
Features

- 1-pipe, direct acting
- Rapid response to temperature changes over their full range
- Available in a variety of sensing elements and temperature ranges
- Available with rigid bulb, remote averaging bulb, and room transmitter
- Internal feedback for excellent linearity and accuracy

Applications

The 184 Temperature Transmitters can be used for a variety of applications to monitor temperature and are ideal for those requiring indication with a receiver-controller.

Application Drawing



Hot water temperature setpoint reset.

Retroline® 184 Temperature Transmitters Specifications

Action ..... Direct

Output Air Pressure ..... 3 to 15 psi (21 to 103 kPa)

Ambient Temperature Range ..... 40 to 120°F (4.4 to 49°C)

Input (supply) Air Pressure
- Restrictor Size ..... 40 scim (11 ml/s)
- Calibration Pressure ..... 22± 1.0 psi (152± 6.9 kPa)
- Maximum ..... 30 psi (207 kPa)

Thermal System
- Room ..... Bimetal
- Rigid Bulb ..... Rod and tube
- Remote Bulb ..... Liquid-filled

Air Consumption ..... 35 scim (10 ml/s)

Air Connections ..... 1/8" NPT (Except for room type)

Mounting
- Room ..... Wall terminal
- Rigid Bulb ..... Mounting flange
- Remote Bulb ..... Mounting flange or well bracket mounting kit
- Averaging Bulb ..... Mounting flange

Cover Finish
- Room ..... Desert Beige, plastic
- Rigid, Averaging and Remote Bulb ..... Gray

Dimensions
- Room ..... 2.16" W x 3.35" H x 1.59" D (55 mm W x 85 mm H x 40 mm D)
- Averaging Bulb/Remote Bulb ..... 1.875" W x 3" H x 1.69" D (48 mm W x 76 mm H x 33 mm D)

Temperature Transmitter Product Ordering

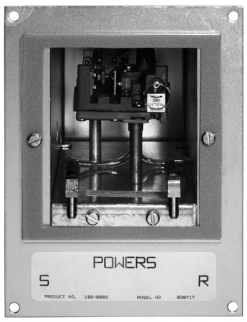
Description	Temperature Range	Part No.
Rigid Bulb Transmitter 9" bulb (229 mm)	35 to 135ºF (2 to 57ºC)	**184-0001**
	50 to 100ºF (10 to 38ºC)	**184-0002**
	80 to 240ºF (27 to 116ºC)	**184-0003**
	0 to 100ºF (-18 to 38ºC)	**184-0028**
Remote Averaging Bulb Transmitter 3/32" Dia. X 20' L (2 mm x 6.1 m L) w/ 12" (305 mm) capillary	35 to 135ºF (2 to 57ºC)	**184-0004**
	0 to 100ºF (-18 to 38ºC)	**184-0048**
Remote Bulb Transmitter 1/4" Dia. X 4' L (6 mm x 102 mm L), 3' (0.92 mm) armored capillary	-40 to +120ºF (-18 to +38ºC)	**184-0005**
	50 to 100ºF (10 to 38ºC)	**184-0018**
	80 to 240ºF (27 to 116ºC)	**184-0014**
	0 to 000ºF (-18 to +38ºC)	**184-0036**
	-10 to +65ºF (-23 to +18ºC)	**184-0015**
	35 to 135ºF (2 to 57ºC)	**184-0034**
	30 to 190ºF (-1 to +88ºC)	**184-0041**
Remote Bulb Transmitter 1/4" Dia. X 4' L (6 mm x 102 mm L), 3' (0.92 mm) armored capillary	-40 to +120ºF (-40 to +49ºC)	**184-0006**
Room Temperature Transmitter With cover and wall plate	50 to 100ºF (10 to 38ºC)	**184-0340**

Manufacturer Cross-Reference

Manufacturer Part No.	Description	Temperature Range	Part No.
Honeywell			
LP914A1003	**Rigid Bulb Transmitter** 12" bulb (255 mm)	-40 to+160°F (-40 to +371°C)	**184-0120**
LP914A1052	**Rigid Bulb Transmitter** 6" bulb (152 mm)	40 to 240°F (4 to 116°C)	**184-0121**
Johnson Controls			
T5210-1002	**Remote Bulb Transmitter** 1/4" x 7-5/8" bulb (6.4 mm x 194 mm) w/ 8" (203 mm) capillary	0 to100°F (-18 to 38°C)	**184-0123**
T5210-1004	**Remote Bulb Transmitter** 1/4" x 7-5/8" bulb (6 mm x 194 mm) w/ 8" (203 mm) capillary	40 to 240°F (4 to 116°C)	**184-0122**
T5210-1007	**Averaging Bulb Transmitter** 3/32" x 18-3/4' bulb 2.4 mm x 5.7 m) w/ 12" (0.305 m) capillary	50 to 150°F (10 to 38°C)	**184-0129**
T5210-1009	**Averaging Bulb Transmitter** 3/32" x 18-3/4' bulb (2 mm x 5.7 m) w/ 12" (0.305 m) capillary	0 to 100°F (-18 to +38°C)	**184-0125**
T5210-1113	**Remote Bulb Transmitter** 1/4" x 7-5/8" bulb (6 mm x 194 mm) w/ 50" (1.27 m) capillary	-40 to +160°F (-40 to +71°C)	**184-0124**

Pneumatic Room and Duct Hygrostats

186 Room Hygrostat.



186 Duct Hygrostat.

Energy & Atmosphere

Indoor Environmental Quality

Description

The 186 Room and Duct Hygrostats are pneumatic instruments sensitive to slight changes in relative humidity.

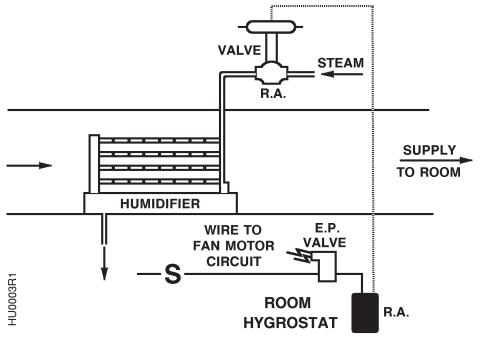
Features

- **Adjustable sensitivity**
- Sensitive hygroscopic membrane
- Includes temperature compensation
- Galvanized steel housing standard on duct model
- Models available for normal comfort range and high limit range
- Room type comes complete with standard cover and wall plate
- Duct type comes mounted inside a duct mounting box

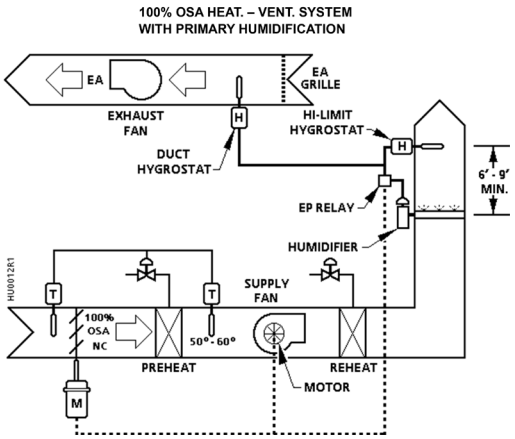
Applications

The 186 Room and Duct Hygrostats provide control of relative humidity for comfort control in hospitals, schools and office buildings.

Application Drawings



Room Application.



Duct Application.

Pneumatic Room and Duct Hygrostats Specifications

Sensitivity ..... 1/4 to 4 psi/% RH
Normal Supply Pressure ..... 15 to 25 psi (103 kPa to 172 kPa)
Maximum Supply Pressure ..... 30 psi (207 mm)
Air Consumption ..... 15 scim (4 ml/s)
Effect of 10°F Temperature Change ..... Shift of 1% RH
Effect of 5 psi Supply Pressure Change (mid sensitivity) ..... 7.0 min./vol unit
Duct Box ..... Extends 6" (152 mm) into duct
Air Connections
Duct ..... Barb fitting for 1/4" (64 mm) OD polyethylene tubing
Room ..... 5/32" (4 mm) OD polyethylene tubing

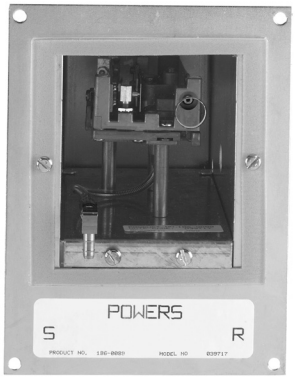
Dimensions
Chassis ..... 2.9" H x 1.75" W x 1.13" D (73.66 mm W x 44.45 mm H x 28.70 mm D)
Room ..... 2.16" W x 3.34" H (55 mm W x 85 mm H)
Duct ..... 4.5" W x 5.88" H x 6" D (114 mm x W 149 mm H x 152 mm D)
Standard Room Cover ..... Desert Beige, plastic
Shipping Weights
186-0013 & 186-0019 ..... 0.84 lb. (0.38 kg)
186-0087; 186-0088; 186-0090; 186-0091 ..... 3.3 lb. (1.5 kg)

Description	Control Range	Type of Control	Part No.	
			Direct Control Action	Reverse Control Action
Room	20 to 90% RH	Humidification/Dehumidification	**186-0013**	**186-0019**
Duct	20 to 90% RH	Humidification/Dehumidification	**186-0087**	**186-0088**
Duct	55 to 95% RH	High Limit	—	**186-0090**
Duct	25 to 65% RH	Room Comfort	—	**186-0091**

Accessories & Service Kits F-87

Room and Duct Humidity Transmitters

186-0043 Room Humidity Transmitter.



186-0089 Duct Humidity Transmitter.

Description

The 186 Room and Duct Transmitters are one-pipe, direct acting pneumatic instruments that sense space humidity and transmit a 3 to 15 psi (21 to 103 kPa) pneumatic signal to a remote receiver gauge and/or receiver-controller to read percent relative humidity.

Features

- Inorganic sensing element for rapid response to humidity changes
- Bimetal temperature compensation minimizes temperature effects
- Cover included with Room Transmitter
- Available for room mounting (vertical) and duct mounting that is at least 6-inches (152 mm) high and 6-1/2-inches (165 mm) deep

Applications

The 186 Room and Duct Humidity Transmitters operate on a force-balance principle with internal feedback to obtain linearity to accurately sense relative humidity.

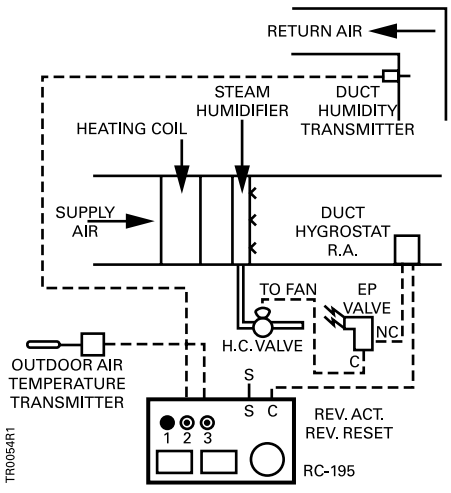
The transmitter output can be sent to a receiver-controller for control of an air conditioning or process control system

Recomendation

Room: Air velocity must be at least 30 FPM (0.15m/s) and the transmitter should be located where it senses actual *room conditions* (away from doors, equipment, etc.).

Duct: Duct transmitters should be used whenever possible in the return air duct.

Application Drawing



Typical Application of Return Air Duct

186 Humidity Transmitters Specifications

Action ..... Direct

RH Range ..... 20 to 80% RH

Maximum Operating Temperature ..... 135°F (57°C)

Supply Pressure
- Maximum ..... 30 psi (207 kPa)
- Normal Operating ..... 22± 1.0 psi (152± 6.89 kPa)

Effect of 10°F (5.6°C) Temperature Change ..... Shift of 1% RH

Air Consumption ..... 35 scim (9.6 ml/s)

Output Pressure ..... 3 to 15 psi (21 to 103kPa)

Air Connections ..... 1/8" (3 mm)

Mounting
- Room ..... Wall terminal
- Duct ..... Duct at least 6" H x 6.5" D (152 mm H x 165 mm D)

Standard Room Cover Finish ..... Desert Beige, plastic

Duct Box
- Material ..... Galvanized Steel

Air Connections ..... 1/4" (6 mm) barbed connection

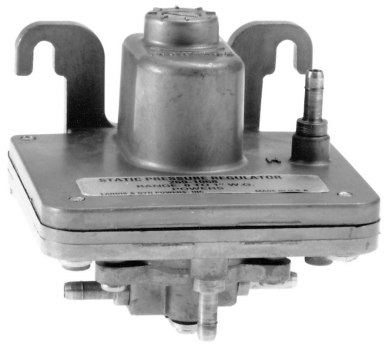
Dimensions
- Room ..... 2.06" W x 3.19" H x 1.37 D (53 mm W x 81 mm H x 35 mm D)
- Duct ..... 4.5" W x 5.87" W x 6" D (114 mm W x 149 mm W x 152 mm D)

Shipping Weights
- Room ..... 0.84 lb. (0.38 kg)
- Duct ..... 3.14 lb. (1.42 kg)

186 Humidity Transmitters Product Ordering

Description	Part No.
Duct Humidity Transmitter	**186-0089**
Room Humidity Transmitter	**186-0043**

Static Pressure and Liquid Level Regulators



269 Static Pressure and Liquid Level Regulator.

Description

The 269 Static Pressure and Liquid Level Regulator is a direct acting, pneumatic differential controller that measures static or head pressure, and is used to directly control inlet vanes, damper actuators, or similar devices.

Features

- Removable restriction for ease of servicing
- Integral mounting bracket for horizontal mounting
- Adjustable setpoint
- Many models available covering a wide range of pressures

Applications

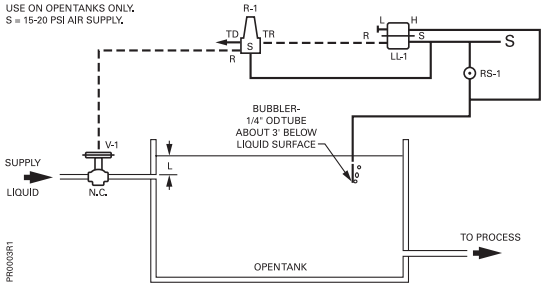
269 Static Pressure Regulator

The 269 Static Pressure Regulator can be used to control velocity, static, or differential pressure to pneumatically control a damper or similar device.

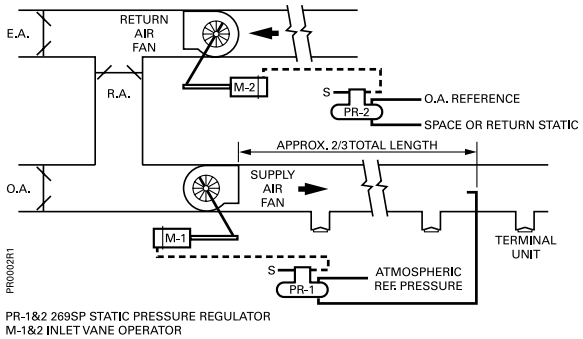
269 Liquid Level Regulator

The 269 Liquid Level Regulator is used to maintain liquid level in an industrial process by pneumatically controlling a valve.

Application Drawings



Typical Application of Liquid Level Regulation



Typical Application of Static Pressure

269 Regulators Specifications

Control Action ..... Direct

Supply Pressure
Normal ..... 20 psi (140 kPa)
Maximum ..... 30 psi (207 kPa)

Maximum Ambient Temperature ..... 120°F (50°C)

Maximum Allowable Pressure
"H" and "L" Port ..... 10" W.G. (2.5 kPa) Differential

Number of Turns for Setpoint Change of 1" W.G.
269-1066 ..... approx. 6 turns
269-1067 ..... approx. 1/2 turn
269-1068 ..... approx. 6 turns
269-1069 ..... approx. 1/4 turn

Response
269-1066, 269-1067, 269-1068 ..... 0.005" W.G. (1.2 Pa)
269-1069 ..... 0.01" W.G. (2.5 Pa)

Air Connections ..... Barb fitting for 1/4" (6 mm) OD polyethylene tubing

Dimensions ..... 3.125" H x 3.25" W x 3.31" D
(79 mm H x 83 mm W x 84 mm D)

Shipping Weight ..... 1.5 lb. (0.07 kg)

269 Regulators Product Ordering

Differential Range	Sensitivity (Fixed)	Mounting Position	Part No.
0.05 to 1.00" W.G. (12 to 249 Pa) 0.20 to 1.00" W.G. (50 to 249 Pa)	2.25 psi/0.01" W.G. (6.2 kPa/Pa) 40 scim restrictor	Upright Upside Down	**269-1066**
0.05 to 3.00" W.G. (12 to 746 Pa) 0.20 to 3.00" W.G. (50 to 746 Pa)	1 psi/0.01" W.G. (2.8 kPa/Pa) 40 scim restrictor	Upright Upside Down	**269-1067**
0.05 to 1.00" W.G. (12 to 249 Pa) 0.20 to 1.00" W.G. (50 to 249 Pa)	2.25 psi/0.01" W.G. (6.2 kPa/Pa) 80 scim restrictor	Upright Upside Down	**269-1068**
Liquid Level[1] 1.00 to 8.00" W.G. (250 to 1990 Pa)	1 psi/0.1" W.G. (0.3 kPa/Pa) 40 scim restrictor	Upright Upside Down	**269-1069**

Ordering Note

1. This is not a differential range; "H" and "L" ports are internally connected.

Air Station Equipment

656-0009
High Capacity, 3-way Pilot Valve.

201-1000 Single-stage,
Compressed Air Pressure Reducing Valve.

908-051
Compressed Air Filter.

Description

Providing pneumatic control, Air Station Equipment, which includes Single- and Dual-stage Pressure Reducing Valves and High Capacity, 3-way Pilot Valves, responds rapidly to large volume demands and supply pressure variations. The Compressed Air Filter removes water or oil to 0.025 particle size.

Features

Pressure Reducing Valve

- 200 mesh stainless strainer
- Locking handle
- Dual tappings for right or left-hand gauge (201-1000)
- Gauge plug and bushing
- 2-1/2" (64 mm) gauge with 0 to 30 psig (0 to 207 kPa) (201-1001, 201-1002)

Compressed Air Filter

- 10 scfm (17 m^3/hr) capacity
- Drain port
- Replaceable cartridge

Applications

Air Station Equipment and compressor systems are available for schools, hospitals, commercial office and industrial buildings, and other facilities.

Compressed air systems include:

- Single (low) pressure
- Dual (low and high) pressure
- Dual, low pressure for two pressure systems

Your local Siemens Building Technologies representative can assist you in selecting the appropriate air compressors and accessories for optimum efficiency and duty cycling.

Air Station Equipment Specifications

Single-stage, Compressed Air Pressure Reducing Valve, 201-1000

Capacity ..... 8 scfm (17 m^3/hr)
Maximum Inlet Pressure ..... 250 psig (1734 kPa)
Reducing Pressure Range ..... 0 to 50 psig (0 to 345 kPa)
Inlet/Outlet Connections ..... 1/4" NPT Female
Gauge Port ..... 1/4" NPT Male x 1/8" NPT Female bushing
Shipping Weight ..... 1.7 lb. (0.8 kg)

Compressed Air Filter, 908-051

Capacity ..... 10 scfm (17 m^3/hr)
Maximum Pressure ..... 150 psig (1034 kPa)
Inlet/Outlet Ports ..... 3/8" NPT Female
Shipping Weight ..... 2.1 lb. (0.95 kg)

High Capacity, 3-way Pilot Valve

Application ..... Two-pressure systems/ Day-Night or Heat-Cool
Inlet/Outlet Ports ..... 1/2" (12 mm) O.D. SAE flare
Pilot Port ..... 1/8" NPT Female
Actuator ..... 3 to 8 psi, 10 to 15 psi (69 to 103 kPa)
Valve Specifications ..... Cv=2.5, 14 scfm (24 m^3/s) based on 18 psig (124 kPa) with a 1 psi (7 kPa) pressure drop
Shipping Weight ..... 2.0 lb. (0.9 kg)

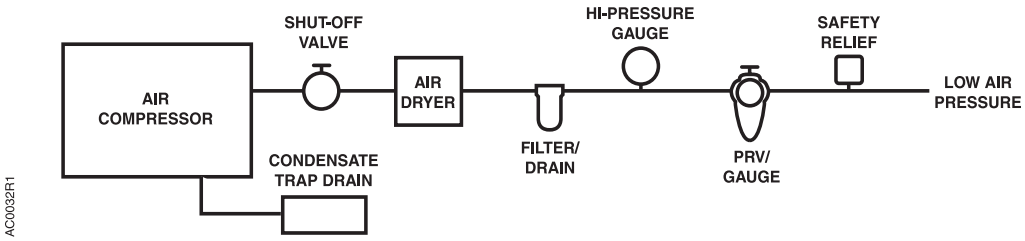
High Capacity, 3-way Pilot Valve

Application ..... Two-pressure systems/ Day-Night or Heat-Cool
Inlet/Outlet Ports ..... 1/2" (13 mm) O.D. SAE flare
Pilot Port ..... 1/8" NPT Female
Actuator ..... 3 to 8 psi (21 to 55 kPa)
Valve Specifications ..... Cv=2.5, 14 scfm (24 m^3/s) based on 18 psig (124 kPa) with a 1 psi (7 kPa) pressure drop
Shipping Weight ..... 2.0 lb. (0.9 kg)

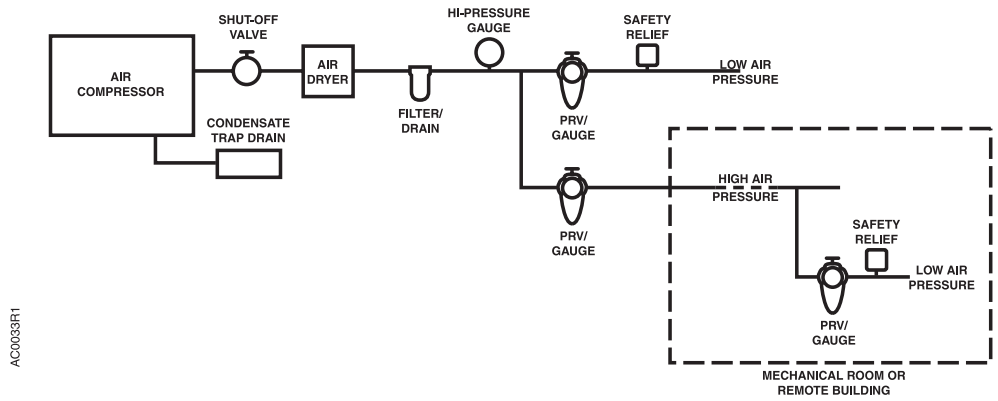
Air Station Equipment Product Ordering

Description	Part No.
Single-stage, Compressed Air Pressure Reducing Valve	**201-1000**
Compressed Air Filter	**908-051**
High Capacity, 3-way Pilot Valve (10 to 15 psi)	**656-0009**
High Capacity, 3-way, Pilot Valve (3 to 8 psi)	**656-0010**

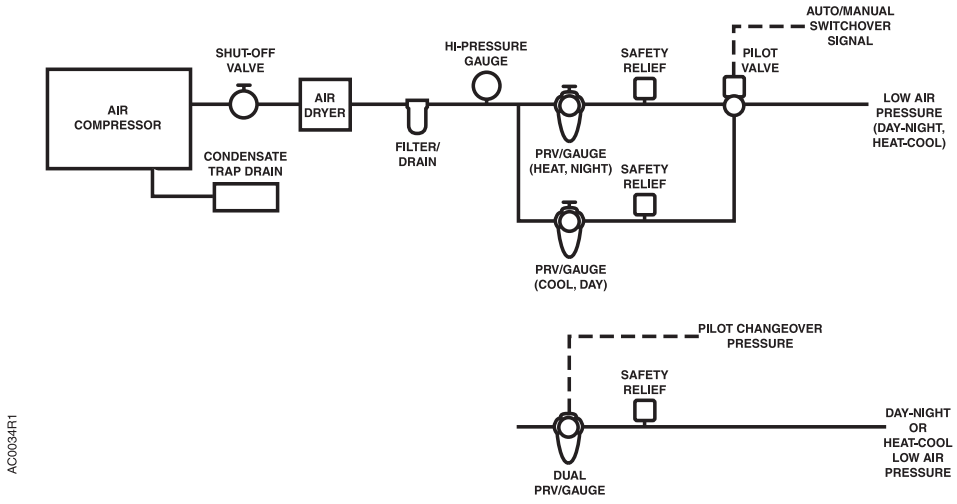
Accessories & Service Kits F-87



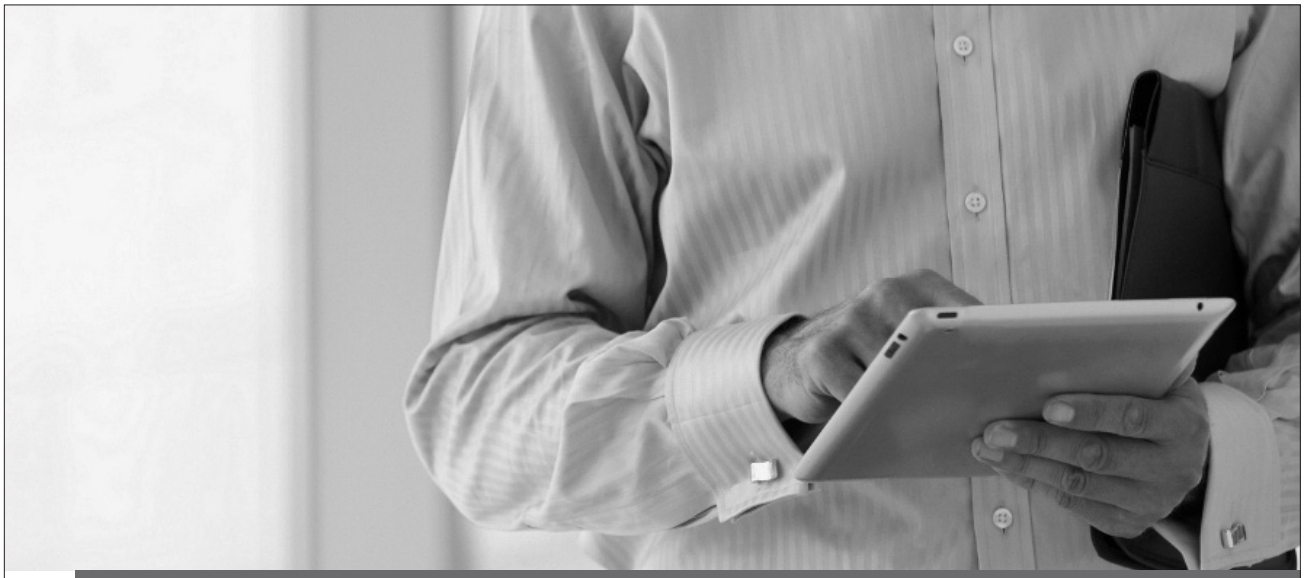
Single Pressure.



Low and High Pressure.



Dual Pressure.



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External Restrictors

In-line Threaded Restrictor.

In-line Barbed Restrictor.

Tee Barbed Restrictor.

Description

Restrictors are available in a variety of orifice sizes and connection types.

Features

External Types 1, 2 and 3

- Air filter
- 1/8-inch NPT threaded connection (Type 1)
- Barbed connection for 1/4-inch (6 mm) plastic tubing (Types 2 and 3)
- Color-coded (Types 2 and 3)
- Air flow direction arrow to minimize installation errors
- Air flow restrictor capacity molded (Types 2 and 3) or stamped (Type 1) on body

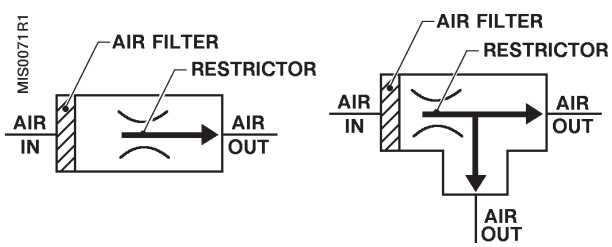
Applications

External restrictors are used:

- For 1-pipe room thermostats, 20 scim (5.5 ml/s), refer to Figure 3.
- For 1-pipe transmitters, 40 scim (11 ml/s), refer to Figures 1 and 2.
- When installed tubing lengths exceed maximum recommended values, refer to Figure 2.
- With check valves to provide air flow time delays:
  —Slow to supply, fast to exhaust, refer to Figure 4.
  —Fast to supply, slow to exhaust, refer to Figure 5.
- VAV vortex control. Use 80 scim (22 ml/s) restrictor in positioning relay control pressure line to prevent cycling.
- When other air capacities, 10 scim (2.7 ml/s), 80 scim (22 ml/s), or 320 scim (87 ml/s) are required to compensate for tubing size or response time.

Figures are on page F-47.

Typical Connections



Restrictor Specifications

Materials
Type 1.....Brass
Type 2 and 3.....Plastic

Ambient Temperature
Minimum.....40°F (4°C)
Maximum.....140°F (60°C)

Air Connections
Type 1.....1/8" NPT thread
Type 2 and 3.....Barb for 1/4" (6 mm) OD polyethylene tubing

Mounting .....In-line

Flow Capacity at Various Air Pressure Drop

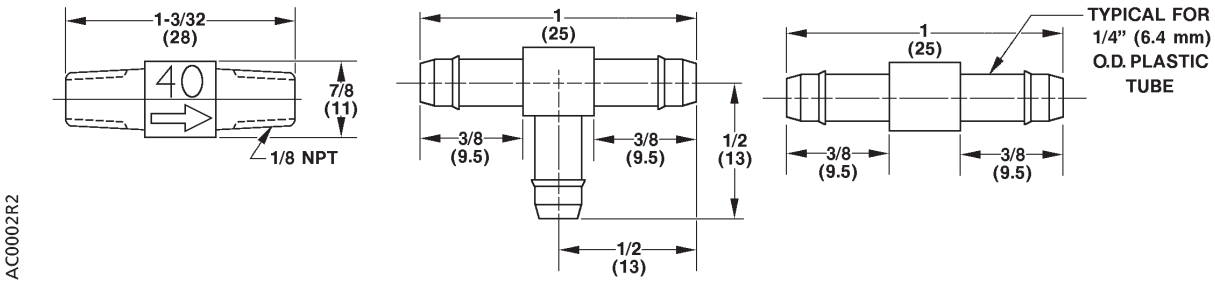
Air Pressure	% of Max. Flow Capacity	Nominal Capacity				
		10	20	40	80	320
22 psi (152 kPa)	100%	10 scim (2.7 ml/s)	20 scim (5.5 ml/s)	40 scim (11 ml/s)	80 scim (87 ml/s)	320 scim (87 ml/s)
10 psi (69 kPa)	70%	7 scim (1.9 ml/s)	14 scim (3.8 ml/s)	28 scim (7.6 ml/s)	56 scim (15 ml/s)	224 scim (61 ml/s)
5 psi (34 kPa)	50%	5 scim (1.4 ml/s)	10 scim (2.7 ml/s)	20 scim (5.5 ml/s)	40 scim (11 ml/s)	160 scim (44 ml/s)
2.5 psi (17 kPa)	35%	3.5 scim (1.0 ml/s)	7 scim (1.9 ml/s)	14 scim (3.8 ml/s)	28 scim (7.6 ml/s)	112 scim (31 ml/s)

Restrictor Product Ordering

Nominal Air Capacity	Orifice Diameter	Part No.			Barbed Restrictor Body Color
		Type 1 In-line Threaded *(Pkg. of 1)*	Type 2 In-line Barbed *(Pkg. of 5)*	Type 3 Tee Barbed *(Pkg. of 5)*	
10 scim (2.7 ml/s)	0.0035" (0.09 mm)	—	**184-115**	**184-112**	Red
20 scim (5.5 ml/s)	0.0051" (0.13 mm)	**184-040**	**184-116**	**184-113**	Yellow
40 scim (11 ml/s)	0.0074" (0.19 mm)	**184-041**	**184-117**	**184-114**	Green
80 scim (22 ml/s)	0.0098" (0.25 mm)	**184-042**	—	—	—
320 scim (87 ml/s)	0.0201" (0.51 mm)	**184-052**	—	—	—

If inoperative, replace the unit.

Dimensions



Dimensions shown in inches (mm).

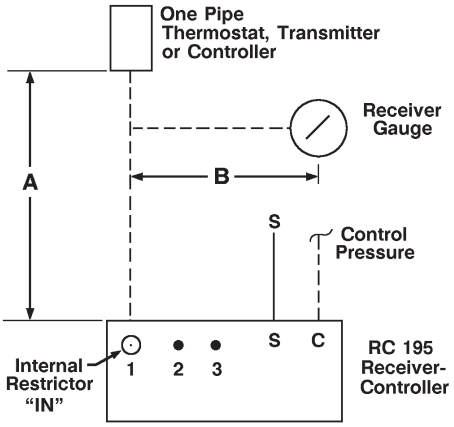


Figure 1.

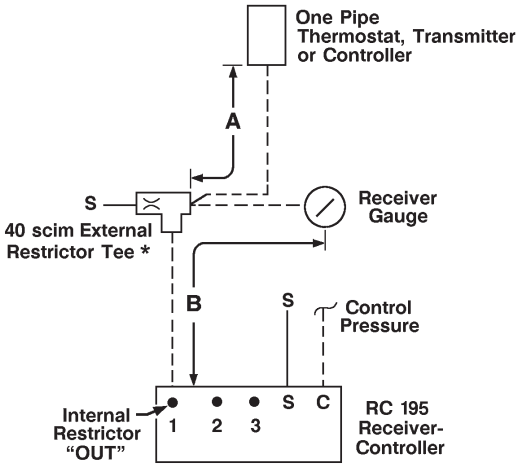


Figure 2.

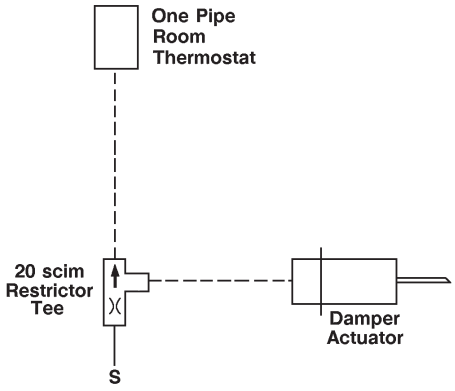


Figure 3.

* Use External Restrictor with RC195 when "A" length exceeds 300 ft. (91 m) or when "A & B" length exceeds 1,000 ft. (305 m).

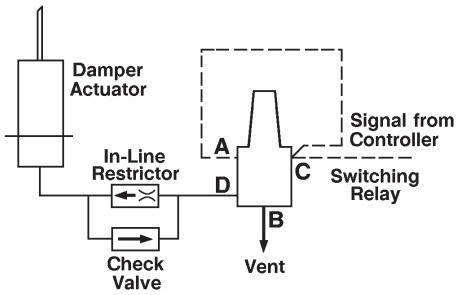


Figure 4.

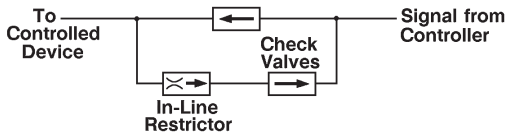
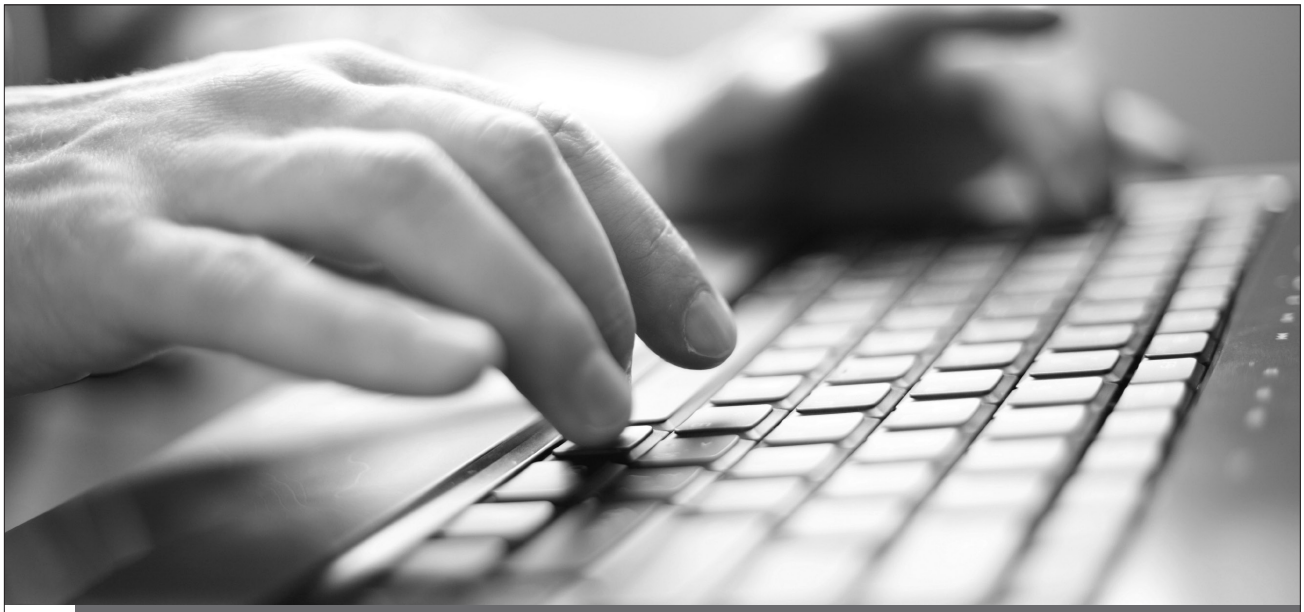


Figure 5.



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Pneumatic Tube Fitting Kit

141-0601 Pneumatic Tube Fitting Kit.

141-464 Case.

Description

The Pneumatic Tube Fitting Kit provides the service or installation mechanic with a compact and convenient source of the most commonly used brass barbed fittings for 1/4-inch (6 mm), 3/8-inch (10 mm) and 1/2-inch (13 mm) OD polyethylene tubing.

Features

- Rustproof, odor and oil resistant case
- Translucent lid for easy identification of fittings
- Double positive latches
- 15 dividers for configuring up to 24 compartments
- Lower cost for fittings
- Representative quantities of commonly used 1/4-inch (6 mm), 3/8-inch (10 mm) and 1/2-inch (13 mm) brass fittings

Applications

The Pneumatic Tube Fitting Kit is useful for servicing, modifying, or adding to pneumatic control systems. Purchasing in quantity reduces material costs. Labor savings is the major reason to have this convenient kit in your service shop or van.

Pneumatic Tube Fitting Kit Specifications

Case Material ..... Copolymer Resin

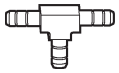
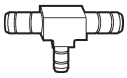
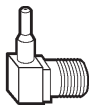
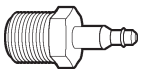
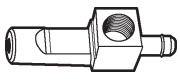
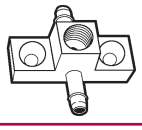
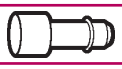
Dimensions ..... 15" L x 11.75" W x 2.5" D
(381 mm L x 298 mm W x 64 mm D)

Shipping Weight
Case .....3.0 lb. (1.4 kg)
Case and Fittings .....7.0 lb. (3.2 kg)

Other Supplies and Equipment

The fittings in this kit represent most of the commonly used polyethylene tube fittings required by HVAC mechanics.

Kit Includes:

	Description	Quantity
	**Barbed Tee.**	
	• 1/4" (6 mm)	12
	• 3/8" (10 mm)	6
	• 1/2" (13 mm)	6
	**1/4" (6 mm) Barbed Reducing Tee.**	
	• 3/8" (10 mm)	6
	• 1/2" (13 mm)	6
	**90° Elbow.**	
	• 1/4" (6 mm)	12
	• 3/8" (10 mm)	6
	• 1/2" (13 mm)	6
	**1/8" NPT Male x 90° Elbow.** • 1/4" (6 mm) or 5/32" (4 mm)	12
	**1/4" (6 mm) OD Copper Coupling.** • 1/4" (6 mm)	10
	**1/8" NPT Male.** • 1/4" (6 mm)	10
	**Gauge Tee 1/8" NPT Male/NPT Female.** • 1/4" (6 mm)	10
	**Gauge Tee 1/8" NPT Female.** • 1/4" (6 mm)	5
	**Plug.** • 1/4" (6 mm)	10
	**Reducer Coupling OD.** • 1/4" (6 mm)	10
	**Coupling.**	
	• 1/4" (6 mm)	12
	• 3/8" (10 mm)	10
	• 1/2" (13 mm)	10

Pneumatic Tube Fitting Kit Product Ordering

Description	Part No.
Complete Kit with 159 fittings	**141-0601**
Case only	**141-464**

Controls Cabinet/Enclosure

567-351 Exposed Panel Assembly.

Description

Designed to conveniently group control system components, 567 Controls Cabinets are available in two styles, exposed and flush mount.

With the exposed panels, the control components can be mounted in the door or mounted within the enclosure using the perforated panel. The cabinet housing, door, and perforated mounting plate may be ordered as a unit or separately.

The flush mount panel is designed to recess the panel into a wall. The controls are mounted within the enclosures on a perforated panel. Order both the cabinet and the mounting kit.

Features

- Panels are symmetrical, and can be mounted with door hinge on left or right-hand side
- Removable door with lock and keys
- Removable perforated subpanel permits mounting controls without drilling holes
- Attractive gray finish permits use in occupied areas
- Support kit is available for floor mounting (medium and large exposed cabinets only)
- Variety of mounting methods available
- Knockouts are provided for electrical or pneumatic piping
- Panels listed under UL508 Industrial Control Panel Enclosures
- CSA listed under LR 84214
- NEMA Type 1
- Exposed Panels available in 6" or 9" depth

Applications

The 567 Controls Cabinets provide a convenient central location for equipment mounting, termination of piping, wiring adjustment, and calibration.

Panels may be used with DDC and/or pneumatic systems using either copper or polyethylene tubing for transmission lines, with wired electric/electronic systems, or with a combination of both. Within the panel enclosure, use polyethylene pneumatic tubing for easy installation and arrangement and for a flexible connection to hinged door components.

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. After reassembly, final connections are then made.

567 Controls Cabinet Specifications

Exposed Panel

Dimensions — 9" Depth

Size 3: ..... 24.94" H x 24.38" W x 9.38" D
(633 mm H x 619 mm W x 238 mm D)

Size 4: ..... 36.5" H x 24.38" W x 9.38" D
(927 mm H x 619 mm W x 238 mm D)

Dimensions — 6" Depth

Size 1: ..... 19.5" H x 16.38" W x 5.75" D
(495 mm H x 416 mm W x 146 mm D)

Size 2: ..... 20.0" H x 20.0" W x 6.0" D
(508 mm H x 508 mm W x 152 mm D)

Size 3: ..... 24.94" H x 24.38" W x 6.0" D
(633 mm H x 619 mm W x 152 mm D)

Size 4: ..... 36.5" H x 24.38" W x 6.0" D
(927 mm H x 619 mm W x 152 mm D)

Shipping Weights — 9" Depth

Size 3: ..... 39.0 lb. (18 kg)
Size 4: ..... 72.0 lb. (33 kg)

Shipping Weights — 6" Depth

Size 1: ..... 20.0 lb. (9 kg)
Size 2: ..... 28.0 lb. (13 kg)
Size 3: ..... 38.0 lb. (17 kg)
Size 4: ..... 63.0 lb. (29 kg)

Flush Mount Panel — 567-391

Dimensions ..... 19.5" H x 16.13" W x 5.13" D
(495 mm H x 410 mm W x 130 mm D)

Shipping Weight ..... 20.0 lb. (9 kg)

Panel Door

Shipping Weights

Size 1: ..... 8.0 lb. (3.6 kg)
Size 3: ..... 13.0 lb. (5.9 kg)
Size 4: ..... 20.0 lb. (9 kg)

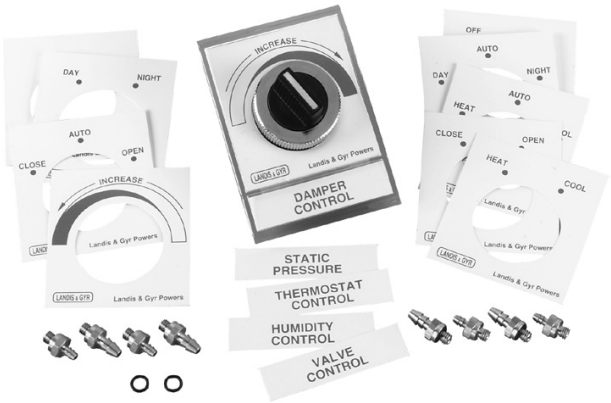
567 Controls Cabinet Product Ordering

Size	Part No. — 9"	Part No. — 6"
Exposed Panel Assembly		
Size 1	—	**567-351**
Size 2	—	**567-454**
Size 3	**567-352**	**567-452**
Size 4	**567-353**	**567-453**
Panel Door Only		
Size 1	**567-361**	—
Size 3	**567-362**	—
Size 4	**567-363**	—
Panel Enclosure		
Size 1	**567-371**	—
Size 3	**567-372**	—
Size 4	**567-373**	—
Mounting Plate Only		
Size 1	**567-381**	—
Size 3	**567-382**	—
Size 4	**567-383**	—
Flush Mount Panel & Kit		
Flush Mount Panel	**567-391**	—
Flush Mount Kit contains escutcheon, hinged locking door and two keys	**567-390**	—

Control Panel Accessories

Description	Part No.
Replacement Door Lock & Key Assembly	**567-225**
Floor Mount Support Kit (Size 3)	**567-334**
Floor Mount Support Kit (Size 4)	**567-335**

Selector Switches



Floating Selector Switch.

Description

The 786 Selector Switch is used to deliver or stop the flow of compressed air to selected controllers valves, or dampers in commercial applications.

The common port may be connected to two or three ports depending on the switch model.

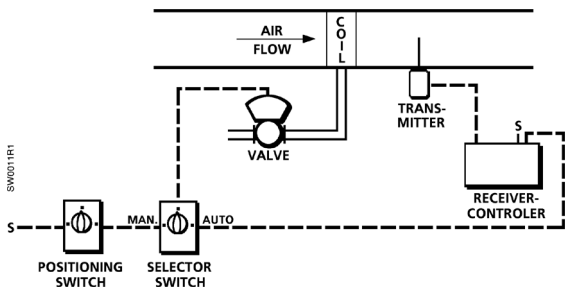
Features

- Compact design and lightweight construction
- Click stop for positive positioning
- Easy panel mounting through 1-7/32-inch (31 mm) diameter knockout
- 10-32 Female connection ports
- Dial label and nomenclature sheets for most applications
- Barb fitting for 5/32-inch (4 mm) OD tubing for port connections

Applications

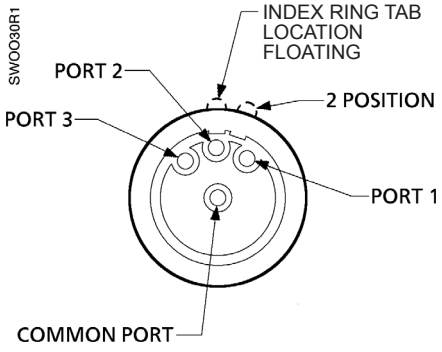
The 786 floating Selector Switch is used in compressed air systems to connect and direct supply and signal pressures. Typical applications are OPEN/CLOSE damper position, DAY/NIGHT thermostat operation, and ON/OFF/AUTO system operation. The compact design makes these especially adaptable to panel groupings.

Application Drawing



Standard and Large Capacity.

Typical Connections



2- and 3-position Selector Switch.

786 Selector Switches Specifications

Medium ..... Air

Air Connections
- Standard Switch ..... 1/16" NPT
- LC Switch ..... 1/8" NPT

Inlet Pressure
- Nominal ..... 30 psi (206 kPa)
- Maximum ..... 125 psi (858 kPa)

Operating Temperature ..... 35 to 150ºF (2 to 66ºC)

Capacity at 1 psi (7 kPa) Differential
- 5/32" (4 mm) OD tubing ..... 250 scim (68 ml/s)
- 1/4" (3 mm) OD tubing ..... 480 scim (130 ml/s)

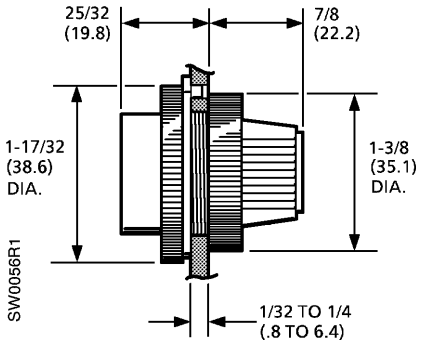
Port Threads ..... 10-32 NPT female

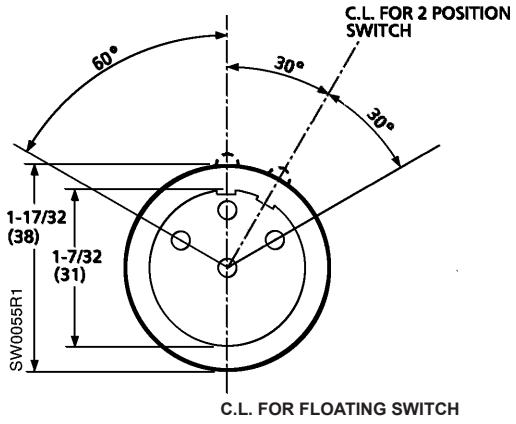
Materials
- Body ..... Acetal
- O-rings ..... Buna N

786 Selector Switches Product Ordering

Description	Part No.
2-position	**786-0600**
Floating	**786-0610**

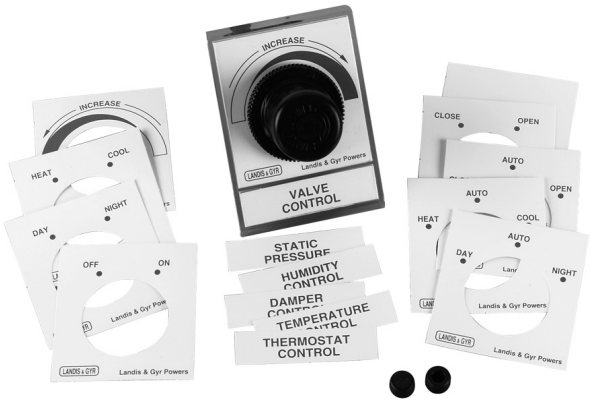
Dimensions





Dimensions shown in inches (mm).

Positioning Switch



141 Positioning Switch.

Description

The 141 Positioning Switch is used to deliver any manually selected pressure over a range of 0 to 30 psi (0 to 207 kPa) to air-operated equipment. The adjustment knob can be left free to rotate or held in position by snapping the locking ring.

Features

- Compact design and lightweight construction
- Non-rising low torque pressure adjustment knob with snap-action locking ring for maintaining pressure setting
- Available in manual select or bleed type models
- Easy to surface or panel mount
- Easy panel mounting through 1-7/32" (31 mm) diameter knockout
- Includes dial label and nomenclature sheet for most applications

Applications

The 141 Positioning Switch is used in compressed air systems to maintain a uniform outlet pressure despite changes in the inlet pressure and changes in downstream flow requirements; especially suited for installations where space is limited and where panel mounting with a flush-mount knob is desired.

141 Postitioning Specifications

Medium ..... Air
Air Connections ..... 1/8" NPT female
Inlet Pressure
Nominal ..... 30 psi (206 kPa)
Maximum ..... 400 psi (2745 kPa)

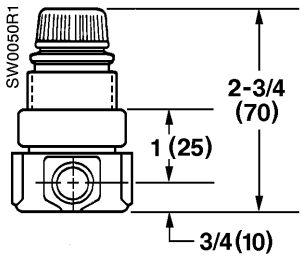
Operating Temperature ..... 0 to 150ºF (-18 to +66ºC)
Capacity at 1 psi (7 kPa) Differential
5/32" (4 mm) OD tubing ..... 500 scim (140 ml/s)
1/4" (6 mm) OD tubing ..... 650 scim (180 ml/s)
Shipping Weight ..... 0.5 lb. (0.23 kg)

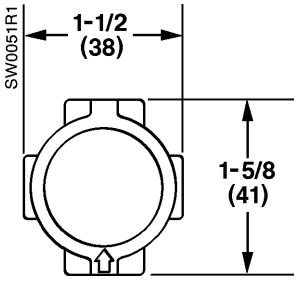
141 Positioning Product Ordering

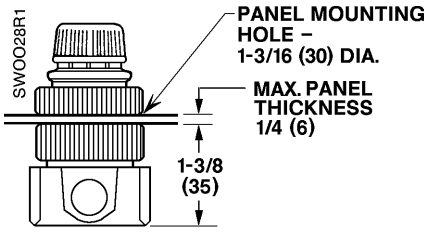
Description	Part No.
Positioning Switch	**141-0600**

Accessories & Service Kits F-87

Dimensions







Dimensions shown in inches (mm).

Electric Enthalpy Control Switch

141 Enthalpy Control Switch.

Description

The 141 Electric Enthalpy Control Switch is designed to sense the BTU heat content of ventilation air. A SPST, snap-acting electric switch automatically initiates corrective damper control or alarm circuitry whenever the sensed air condition either rises above or falls below desired settings.

Features

- SPST, snap-acting switch
- Direct mount on ventilation duct
- Mounting template and screws provided
- Factory-calibrated
- Adjustable

Applications

The 141 Electric Enthalpy Control Switch senses outdoor ventilation air on air conditioning systems to automatically reduce ventilation whenever the outdoor air has a higher than desired heat content.

Reduction of outdoor air, when it has a higher heat content than return air from the interior space, provides significant load reduction and energy savings for summer air conditioning systems.

Reduction of system load also tends to improve system performance by allowing more effective space dehumidification (improved latent heat removal under light load) or by reducing the time span required to cool a space on initial starting.

141 Control Switch Specifications

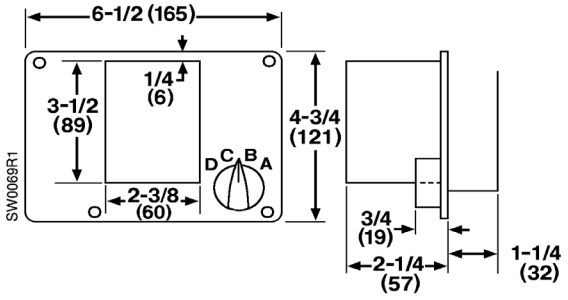
Electrical Rating ..... 2.5 amps max. @ 24 Vac
Electrical Connection ..... Metal enclosure with 1/2" (13 mm) conduit opening
Switching Action ..... SPDT
Differential ..... Approx. 8% RH and 2°F (-29°C)
Shipping Weight ..... 1.5 lb. (0.7 kg)

141 Control Switch Product Ordering

Description	Part No.
Electric Enthalpy Control Switch	**141-0566**

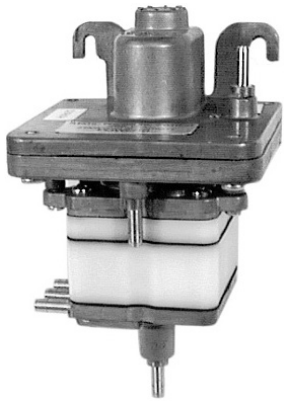
Dimensions

Electric Enthalpy Control Switch



Dimensions shown in inches (mm).

Static Pressure Switch



269-1200 Static Pressure Switch.

Description

The 269 Static Pressure Switch senses static pressure and performs a three-way switching function when the specified static pressure level is reached.

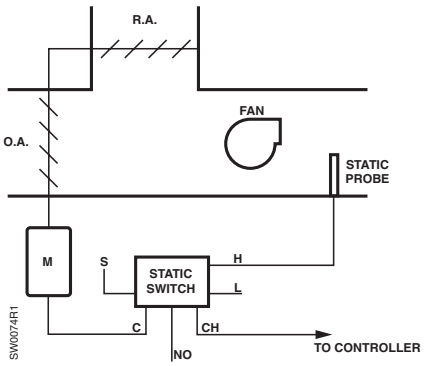
Features

- Accurate and repeatable switching thresholds
- 1/8-inch (3 mm) OD brass barb port fittings

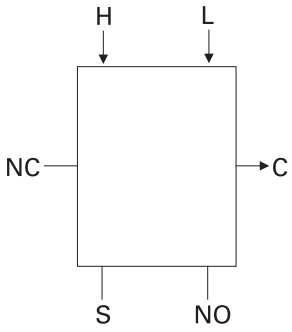
Applications

In a typical application, the 269 Static Pressure Switch is used to close outside air dampers when the fan is not moving any air.

Application Drawing



Typical Connections



269 Static Pressure Switch.

269 Pressure Switch Specifications

Switching Threshold (differential H to L)
Increasing Static to 0.25" W.G. (62.25 kPa) ..... Switches C to NC
Decreasing Static to 0.10" W.G. (62.25 kPa) ..... Switches C to NO

Air Capacity @ 1 psi Pressure Drop ..... 300 scim (82 ml/s)

Air Supply ..... 18 to 28 psi (124 to 193 kPa)

Maximum Ratings Pressure
Ports S, C, NC or NO .....30 psi (206 kPa) max.
Ports H & L..... 10" W.G. (2.5 kPa) max. differential

Temperature
Operating..... 35 to 120°F (2 to 48°C)
Storage..... 10 to 140°F (-23 to +60°C)

Air Consumption ..... 30 scim (8.2 ml/s)

Dimensions ..... 5.20" H x 3.25" W x 3.32" D
(132 mm H x 83 mm W x 64 mm D)
2-1/2" (64 mm) mounting hole centers

Shipping Weight .....1.75 lb. (0.79 kg)

269 Pressure Switch Product Ordering

Description	Part No.
Static Pressure Switch	**269-1200**

Accessories & Service Kits F-87

Differential Static Pressure Airflow Switches

141 Differential Static Pressure Airflow Switches.

Description

The 141 Airflow Switch senses static differential pressure and at setpoint open/closes a set of electrical contacts.

Features

- Available in ranges:
  – 0.05 to 1" W.C. (12.45 to 249 Pa)
  – 1 to 12" W.C. (249 to 2988 Pa)
- Available with auto reset
- Can be used in multiple applications:
  – Proof of flow
  – High limit cut out
  – Filter 'dirty' indication

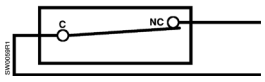
Applications

The 141 Airflow Switch actuates electrical circuits (positive pressure), fan inlet (negative pressure), or across the fan (differential pressure) to detect excessively high positive pressures or low negative pressures and turn off the fan before damage occurs to ducts or dampers.

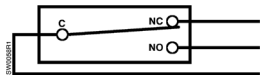
The manual reset switch (141-0575) should be used for applications that require safety lock out (shut down) of the fan. The switch can be used on the fan discharge.

The auto reset switch should be used for applications that require positive proof of airflow (or fan operation) or detect high differential pressures associated with dirty air filters or similar maintenance alarms that do not require safety lock or (shut down) of the fan.

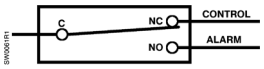
Typical Connections



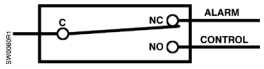
141-0575
Manual Reset Switch.



141-0518 and 141-0574
Auto Reset Switches.



Auto Reset Switches to Prove Excessive Airflow or Pressure.



Auto Reset Switches to Prove Insufficient Airflow or Pressure.

141 Airflow Switches Specifications

Medium ..... Air

Switch Action Manual Reset
(must be manually rest by operator)..... NC; only opens on increasing pressure signal

Ambient Temperature Range .....-40 to +180°F (-40 to +82°C)

Maximum Overpressure ..... 0.5 psi (3.4 kPa)

Mounting Position ..... Diaphragm in any vertical plane

Body .....Zinc-plated Steel with blue erudite dip

Electrical Ratings
Non-inductive ..... 15 amps @ 120 to 277 Vac
Pilot Duty.....300 VA @ 120 to 277 Vac

Conduit Opening .....1/2" (13 mm) conduit size

Sample Line Connectors .....2 connectors, complete with nuts and ferrules, which accept 1/4" (6 mm) OD copper or polyethylene tubing

Material .....Aluminized Steel

Agency Approvals ..... UL MFHX File MH9888
CSA 1811M25

Dimensions ..... 6.13" H x 3.88" W x 3.19" D
(156 mm H x 98 mm W x 81 mm D)

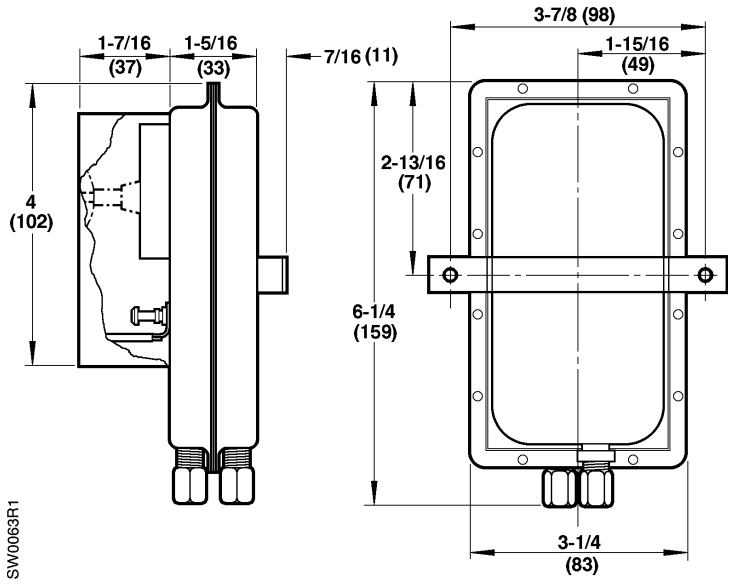
Shipping Weight .....1.0 lb. (0.45 kg)

141 Airflow Switches Product Ordering

Set Point Range (Field Adjustable)	Switching Action/Reset	Factory Set Point Accuracy	Differential	Part No.
1" to 12" W.C. (250 to 3000 kPa)	SPDT/Auto Reset	1" ± 0.1" W.C. (250 kPa ± 25 kPa) to 12" ± 1.2" W.C. (3000 kPa ± 300 kPa)	0.25" W.C. (62.5 kPa) max. at 1" W.C. (25 kPa) set point to 1.2" W.C. (300 kPa) max. at 12" W.C (3000 kPa) set point	**141-0518**
1" to 12" W.C. (250 to 3000 kPa)	SPST/ Manual Reset	1" ± 0.1" W.C. (250 kPa ± 25 kPa) to 12" ± 1.2" W.C. (3000 kPa ± 300 kPa)	Not Applicable	**141-0575**
0.05" to 1.0" W.C. (12.5 to 250 kPa)	SPDT/ Auto Reset	0.05" ± 0.02" W.C. (12.5 kPa ± 5 kPa) to 1.0" ± 0.1" W.C. (250 kPa ± 25 kPa)	0.02" W.C. (5 kPa) at min. set point 0.1" W.C. (25 kPa) at max. set point	**141-0574**

Accessories & Service Kits F-87

Dimensions



Dimensions shown in inches (mm).

Pressure Electric Switch

134 Pressure Electric Switch.

Description

The 134 Pressure Electric Switches are heavy duty pressure-actuated, mechanical contact type switches used to open or close electrical circuits from pressure signals in pneumatic control systems.

Features

- DPST or SPDT snap-acting
- External adjustment and indication of set point and differential
- Screw terminals are easily accessible for field wiring
- Long life, heavy duty contact mechanism
- Normally open or normally closed contacts models available
- Not position sensitive, can be mounted in any position
- Mounting bracket included

Applications

The 134 Pressure Electric Switches are used wherever it is necessary to close (or open) an electrical circuit on the basis of a predetermined air pressure signal. This switch is to be used in areas protected from the weather. Typical applications include the control of air compressors, fans, pilot lights, resistance heating elements, control of electric heating loads or motors on fans, pumps or small air compressors.

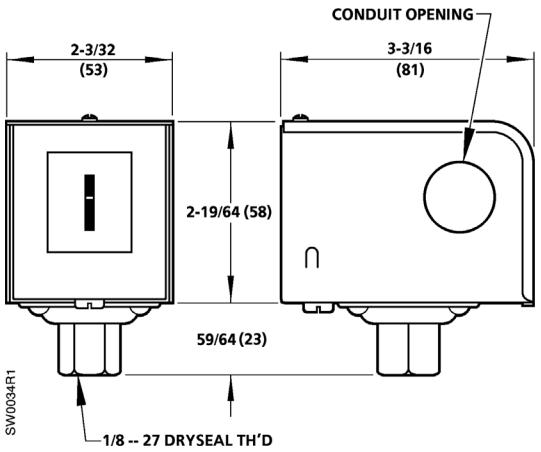
134 Electric Switch Specifications

Medium ..... Compressed air
Set Point Range ..... 3 to 30 psi (20 to 200 kPa)
Differential ..... Adjustable from 1.5 to 20 psi (10 to 138 kPa)
Maximum Pressure ..... 50 psi (345 kPa)
Pressure Connection ..... 1/8" male NPT
Conduit Opening .....1/2" (13 mm) nominal conduit
Ambient Temperature ..... 32 to 140°F (0 to 60°C)
Pilot Duty
134-1450, 134-1451 .....125 VA @ 600 Vac
134-1460 .....125 VA @ 24 to 277 Vac
Agency Approval (for 134-1450 only) ..... UL file E 35198
Shipping Weight .....2.0 lb. (0.9 kg)

134 Electric Switch Product Ordering

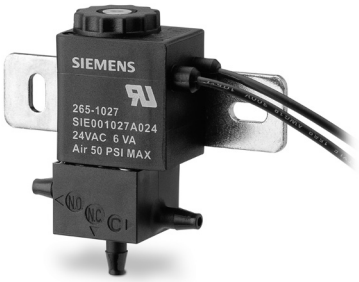
Description	Switch Action	Electrical Rating	Part No.
Pressure Differential, Adjustable Switch, 1.5 to 10 psi	DPST (NO)	**IND:** 12 A @ 120, 208 & 240 Vac	**134-1450**
	DPST	**Non-IND:** 12 A @ 120 to 277 Vac	**134-1451**
Fixed Differential Switch 2.0 psi	SPDT (NC)	**IND:** 16 A @ 120 Vac;8 A @ 240 Vac **Non-IND:** (SPDT) 16 A @ 120 to 277 Vac (SPST) 24 A @ 120 to 277 Vac	**134-1460**

Dimensions



Dimensions shown in inches (mm).

Three-way EP Valves



265-1027
3 EP Valve

265-1021
3 EP Valve

Description

A general purpose, electrically operated, two-position three-way valve designed to control air flow, the 265 Three-Way Valve can be used for interlock between an electrical system and a pneumatic control system; available in open frame (yoke) and junction box (splice box) types.

Features

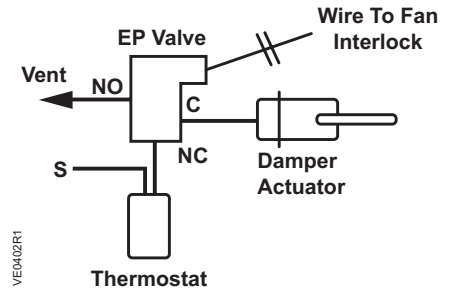
- UL and cUL recognized per UL429
- Valve may be mounted in any position
- Mounting holes provided in the yoke
- Wide selection of AC voltages
- Junction box and Open frame types available

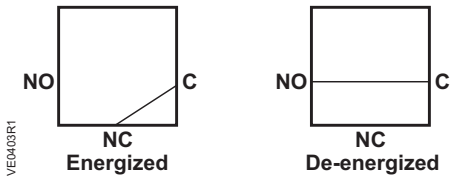
Applications

The 265 EP Three-way Valves are commonly-used to alternately apply pressure to and exhaust pressure from pneumatically-controlled devices, such as valves and damper actuators, by an electrical input energizing or de-energizing the solenoid of the valve.

A standard method is shown in the Application Drawings below. The input air is connected to port 1 (normally closed) and the output is connected to port 3 (common). Thus when the solenoid is energized, port 1 connects to port 3 permitting the thermostat to control the damper actuator. When the solenoid is de-energized, port 2 (normally open) is connected to port 3, exhausting air from the actuator permitting it to return to its normal position.

Application Drawings





265 EP Valves Specifications

Ambient Temperature
- Junction Box Type ..... 0 to 100°F (0 to 38°C)
- Open Frame Type ..... 0 to 110°F (0 to 43°C)

Controlled Medium ..... Air only

Maximum Air Pressure ..... 50 psi (207 kPa)

Air Flow Capacity
- Inlet Pressure ..... 20 psi (138 kPa)
- Differential Pressure ..... 1 psi (7 kPa)
- Air Flow ..... 600 scim (164 cm^3/s)

Cv Flow Factor 0.06

Electrical Ratings
- Voltages ..... 24 to 240 Vac
- Power Consumption ..... 6 VA

Mounting Bracket ..... 1 oval and open-ended hole; part of the yoke.

Junction Box ..... NEMA 1 Enclosure

Air Connections ..... Barbed fittings for 1/4" (6 mm) OD tubing

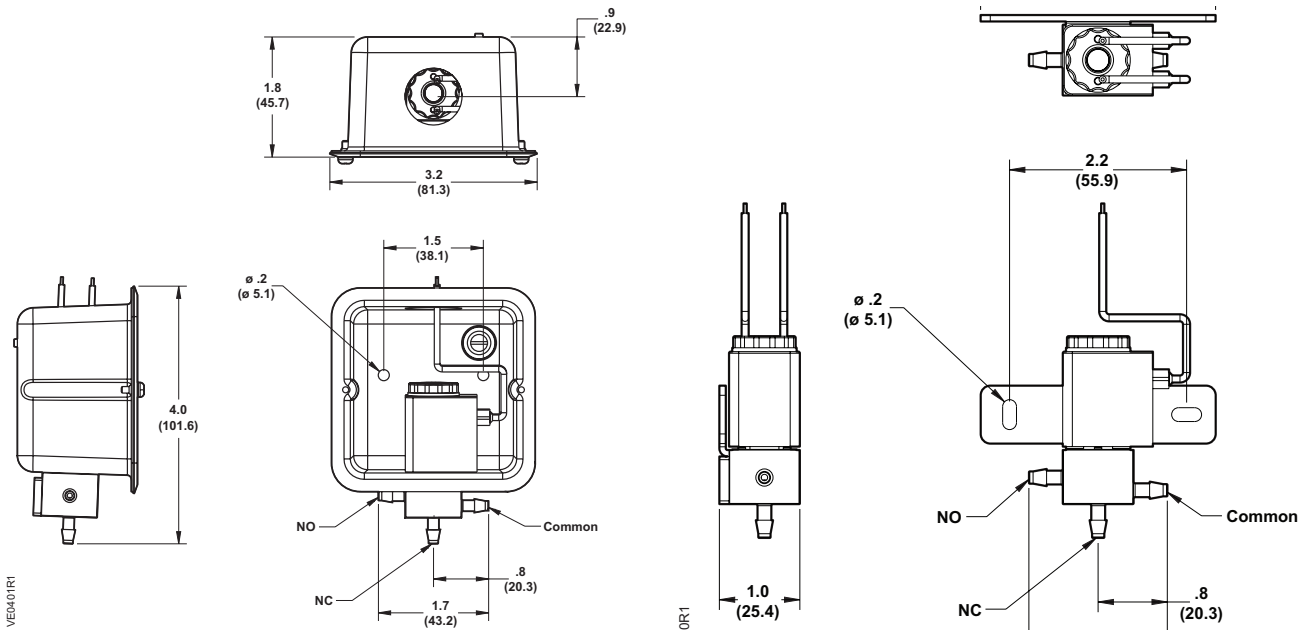
Materials
- Body ..... Glass Filled Thermoplastic
- Internal ..... Buna N, Copper, Stainless Steel

Shipping Weight
- Open Frame Type ..... 0.25 lb. (0.11 kg)
- Junction Box Type ..... 0.50 lb. (0.23 kg)

265 EP Valves Product Ordering

AC Voltage		
60 Hz	50 Hz	Part No.
Junction Box		
24	—	**265-1021**
120	110	**265-1022**
240	220	**265-1024**
Open Frame		
24	—	**265-1027**
120	110	**265-1028**

Dimensions



Dimensions shown in inches (mm).

Multi-purpose Relay

243-0009
Multi-purpose Relay.

Description

The 243 Multi-purpose Relay is pneumatic auxiliary devices designed to provide a variety of pneumatic control functions for the typical control system.

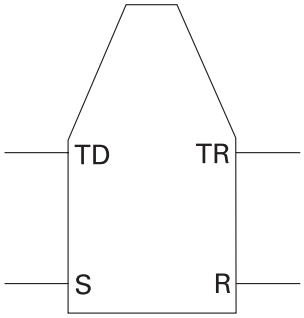
Features

- Use for your most common applications
- High accuracy/repeatability
- Two-valve design prevents constant air loss
- Internal relief mechanism for fail safe operation

Applications

The 243 Multi-purpose Relay is used as direct and reverse acting, amplifying, signal advancing, minimum pressure relay, and lower pressure transfer.

Typical Connections



R = output
TD = direct acting input
TR = reverse acting input
S = air supply

For more detailed information on applications, refer to page G-27 in the Engineering section.

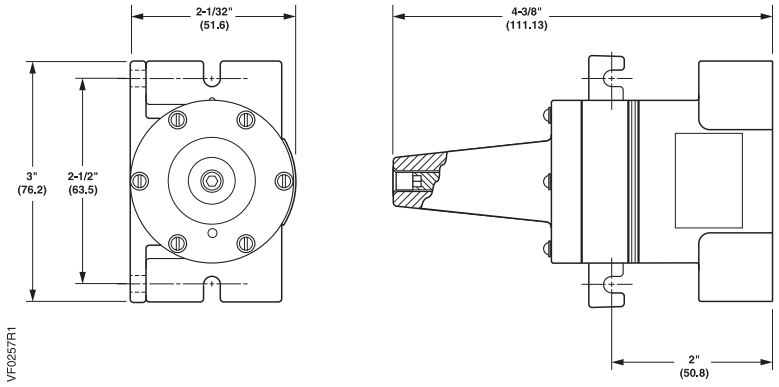
243 Relay Specifications

Ambient Temperature Range
Operational..... 40 to 120°F (4 to 49°C)
Storage.....-20 to +120°F (-29 to +49°C)
Hysteresis ..... 0.25 psi (1.7 kPa)
Relief Valve Differential ..... 1.0 psi (6.9 kPa)
Air Capacity ..... 400 scim (109 ml/s)
Air Consumption (max.) ..... 7 scim (2 ml/s)
Spring Range .....0 to 25 psi (0 to 172 kPa
Air Connections..... 1/8" NPT
Spring Adjustment Range ..... 25 psi (0 to 172 kPa)
Supply Air
Normal..... 25 psi (172 kPa)
Maximum..... 30 psi (207 kPa)
Shipping Weight .....1.5 lb. (1.35 kg)

243 Relay Product Ordering

Description	Part No.
Multipurpose Relay	**243-0009**

Dimensions



Dimensions shown in inches (mm).

Balance-retard Relay

243-0010
Balance-retard Relay.

Description

The 243 Balance-retard Relay is gradual-acting, pneumatic devices designed to provide special functions such as balancing, signal retard, hesitation, and pressure limiting.

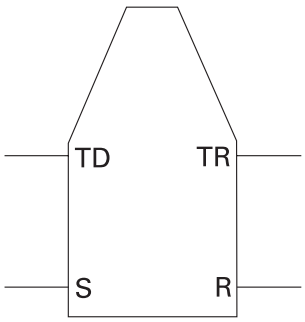
Features

- Internal relief valve for fail-safe operation
- Adjustable retard setting

Applications

The 243 Balance-retard Relay is adjustable and the ports can be pneumatically piped in a variety of different combinations. Each combination represents a relay application that can be used to perform a specific function in a control loop. The relay is factory set for balancing action.

Typical Connections



R = output
TD = direct acting input
TR = reverse acting input
S = air supply

For more detailed information on applications, refer to page G-27 in the Engineering section.

243 Balance-retard Specifications

Ambient Temperature Range
- Operational ..... 40 to 120°F (4 to 49°C)
- Storage ..... -20 to +120°F (-29 to +49°C)

Hysteresis ..... 0.25 psi (1.7 kPa)

Relief Valve Differential ..... 1.0 psi (6.9 kPa)

Air Capacity ..... 400 scim (109 ml/s)

Air Consumption (max.) ..... 7 scim (2 ml/s)

Spring Range ..... 0 to 25 psi (0 to 172 kPa)

Air Connections ..... 1/8" -27 Female NPT

Spring Adjustment Range
- Balance ..... 0 to 15 psi (0 to 103 kPa)
- Retard ..... 0 to 10 psi (0 to 69 kPa)

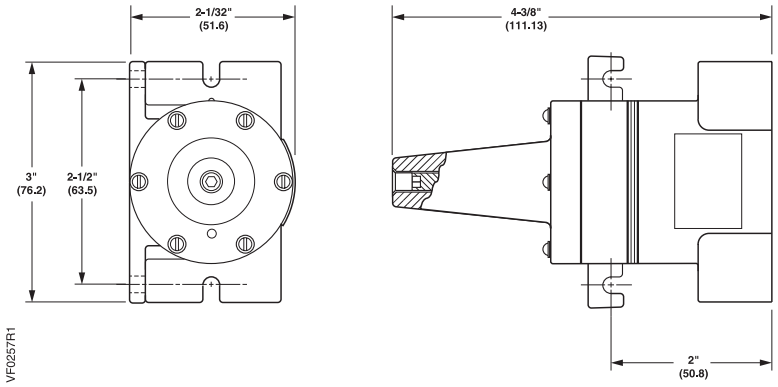
Supply Air
- Normal ..... 25 psi (172 kPa)
- Maximum ..... 30 psi (207 kPa)

Shipping Weight ..... 1.5 lb. (1.35 kg)

243 Balance-retard Product Ordering

Description	Part No.
Balance-retard Relay	**243-0010**

Dimensions



Dimensions shown in inches (mm).

Analog Relay

243-0011 Analog Relay.

Description

The 243 Analog Relays are pneumatic auxiliary devices designed to assist the engineer in obtaining specialized control action within a pneumatic control system.

Features

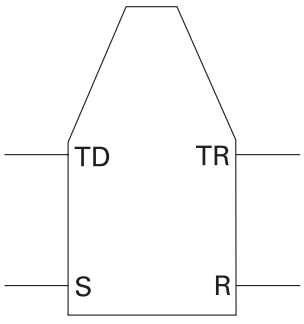
- Multi-function
- Lightweight commercial model with molded barb fittings for 1/8" (3 mm) polyetheylene tubing
- Heavy duty die-cast model with 1/8" NPT ports
- Mounting bracket included with both models; can be mounted in any position

Applications

The 243 Analog Relay is used for amplifying, summing, differential pressure, ratio control higher pressure and signal characterization control. The relay has a two-valve design to ensure stability and prevent unnecessary air consumption.

This relay does not require any adjustment or calibration and can be mounted in any position. An internal relief is provided to assure fail-safe operation on loss of air supply.

Typical Connections



R = output
TD = direct acting input
TR = reverse acting input
S = air supply

For more detailed information on applications, refer to page G-27 in the Engineering section.

243 Analog Relay Specifications

Air Supply
Normal..... 0 to 25 psi (0 to 172 kPa)
Maximum..... 30 psi (207 kPa)

Ambient Temperature Range
Operating..... 40 to 120°F (4 to 49°C)
Storage.....-20 to +120°F (-29 to +49°C)

Hysteresis ..... 0.25 psi (1.7 kPa)

Relief Valve Differential ..... 1.0 psi (6.9 kPa)

Air Capacity ..... 400 scim (109 ml/s)

Air Consumption (max.) ..... 7 scim (2 ml/s)

Mounting .....Integral brackets for wall or panel

Spring Adjustment Range Action .....Gradual

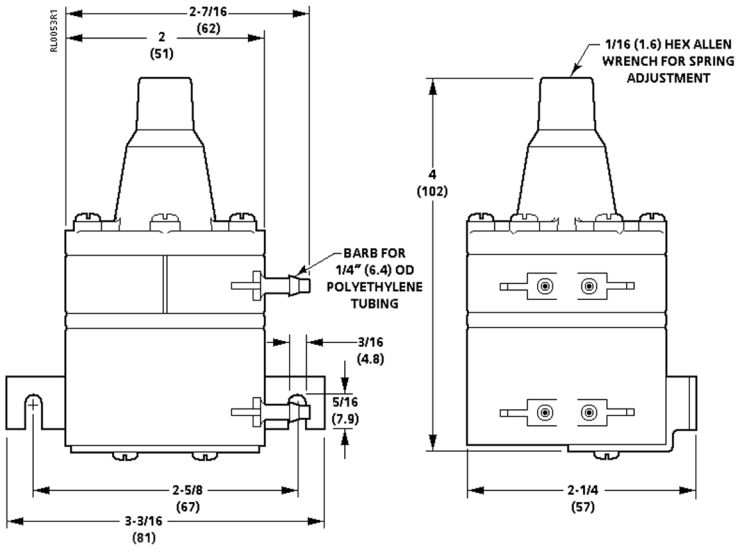
Supply Air
Normal..... 25 psi (172 kPa)
Maximum..... 30 psi (207 kPa)

Shipping Weight .....1.5 lb. (1.35 kg)

243 Analog Relay Product Ordering

Description	Part No.
Analog Relay	**243-0011**

Dimensions



Dimensions shown in inches (mm).

Switching Relay

243 Switching Relay.

Description

The 243 Switching Relay is a compact three-way air valve that can be used to perform a variety of switching and diverting functions.

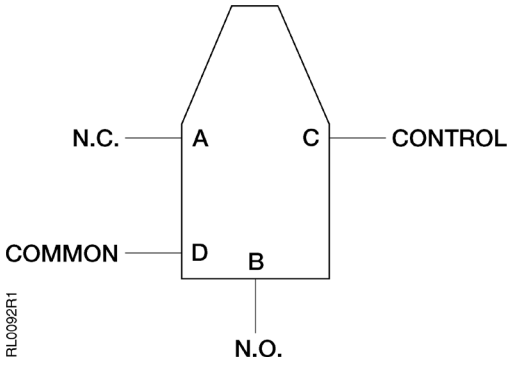
Features

- Adjustable changeover pressure
- Factory calibrated at 9 psi (62 kPa) for most applications
- 1/8" NPT threaded ports

Applications

The 243 Switch Relay action connects common port to either of two other ports.

Typical Connections



When air pressure to the C port is increased, ports A and D are connected. When air pressure to the C port is decreased, ports B and D are connected.

For more detailed information on applications, refer to page G-27 in the Engineering section.

243 Switching Relay Specifications

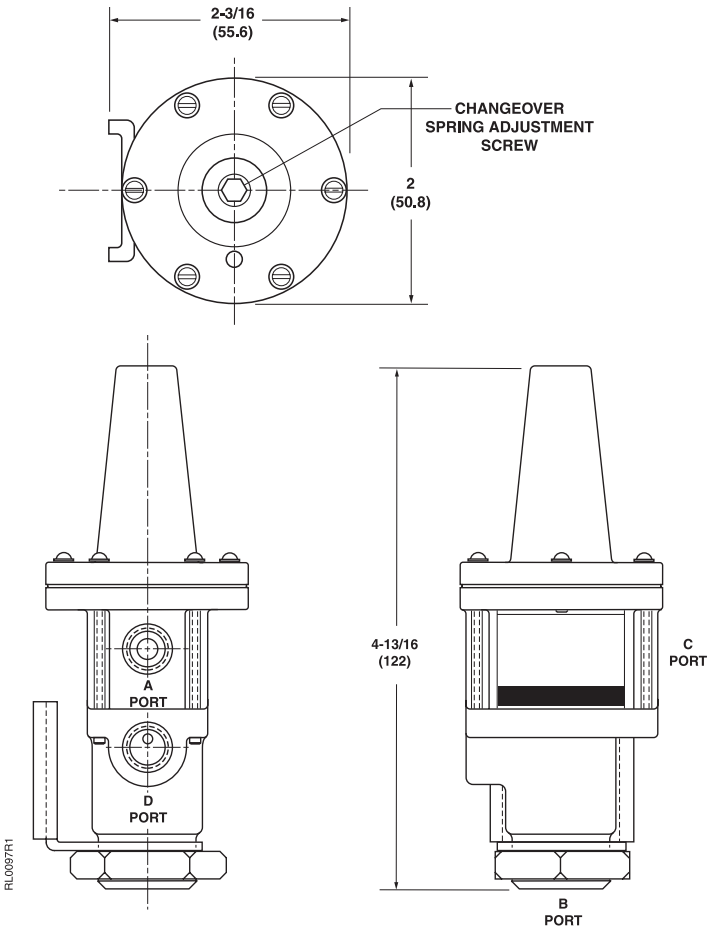
Maximum Instrument Air Supply ..... 30 psi (207 kPa)
Changeover Range ..... 3 to 25 psi (21 to 172 kPa)
Standard Changeover Setting ..... 9 psi (62 kPa)
Changeover Differential (nominal) ..... 1.5 psi (10.3 kPa)
Ambient Temperature
Maximum..... 160°F (71.1°C)
Minimum ..... -20°F (-28.8°C)
Air Connection ..... 1/8" NPT

Adjustable Changeover Range ..... 0 to 25 psi (0 to 172 kPa)
Changeover Differential .....1.5 psi (10 kPa) nominal
Standard Changeover Settings ..... 9 psi (62 kPa)
Nominal Capacity @ 2 psi ΔP
A Port ..... 800 scim
B Port ..... 1100 scim
Shipping Weight .....2.0 lb. (0.9 kg)

243 Switching Relay Product Ordering

Description	Part No.
Switching Relay	**243-0001**

Dimensions



Dimensions shown in inches (mm).

Reverse Acting Relay

243 Reverse Acting Relay.

Description

The 243 Reverse Acting Relay provides a proportional output signal that varies inversely with the input signal. A spring adjustment is provided to allow setting a desired reverse acting schedule required by a particular application.

Features

- Lightweight and compact
- Can be mounted in any position
- Mounting bracket and screws included
- Field adjustable spring range
- Can be used as a signal inverting relay
- Force-balance operation minimizes air consumption
- Internal relief provides fail-safe operation
- Amplifies air volume to minimize system lag

Applications

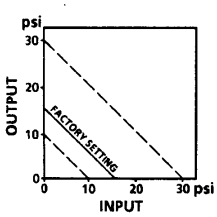
The 243 Reverse Acting Relay has two applications. For both, the supply air pressure must be equal to or greater than the spring setting.

Signal Reverse Acting Relay Application: The relay reverses a controller signal to match the operation of a control element. An increase in input pressure causes equivalent decrease in output pressure.

Signal Inverting Application: A typical application reverses the action of a face and bypass damper actuator on a coil used for both heating and cooling. The output pressure is directly proportional to the input pressure until one-half the spring setting is reached. After this point, the output pressure is inversely proportional to the input until the output reaches zero.

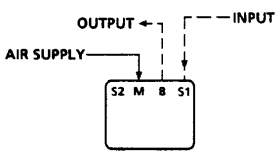
Typical Input/Output Drawings

Reverse Acting Relay Application

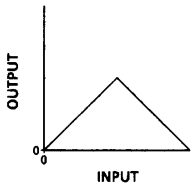


An increase in input pressure causes equivalent decrease in output pressure.

Input S1	Input B
0	15
5	10
10	5
15	0

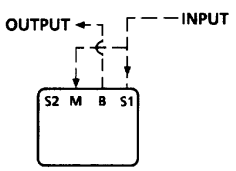


Signal Inverting Application



The output pressure is directly proportional to the input pressure until one-half the spring setting is reached. After this point, the output pressure is inversely proportional to the input until the output reaches zero.

Input S1+M	Output B
3	3
7.5	7.5
12	3
15	0



Key

B	Output Pressure	**S1**	Input Pressure	**SP**	Spring Setting
M	Supply Air	**S2**	Not Used		

243 Reverse Acting Specifications

Operating Range ..... 0 to 30 psi (0 to 207 kPa)

Adjustment Using 5/64" (2 mm) Hex Wrench
- Range Adjustment ..... 10 to 30 psi (69 to 207 kPa)
- Factory Setting ..... 15 psi (103 kPa)

Maximum Ambient Temperature ..... 104°F (60°C)

Maximum Air Pressure ..... 30 psi (207 kPa)

Air Capacity ..... 230 scim (63 ml/s)

Air Consumption for Air Compressor Sizing ..... 29 scim (8 ml/s)

Material
- Housing ..... Glass-filled Nylon

Air Connections ..... Barbed nipple for 1/4" (6 mm) OD polyethylene tubing

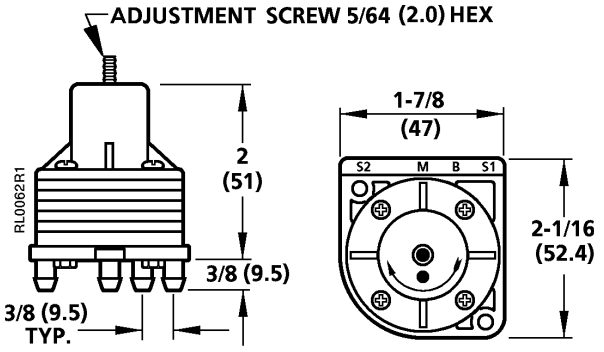
Mounting ..... Mounting bracket included

Shipping Weight ..... 0.27 lb. (0.13 kg)

243 Reverse Acting Product Ordering

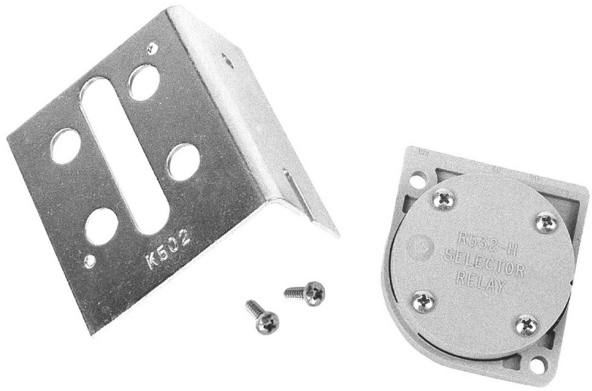
Description	Part No.
Reverse Acting Relay	**243-0024**

Dimensions



Dimensions shown in inches (mm).

Highest Pressure Signal Selector



243 Highest Pressure Signal Selector and Mounting Bracket.

Description

A dual input, single output logic device, the 243 Highest Pressure Signal Selector, is used in pneumatic control systems to compare pressure signals.

Features

- Selects the highest of two input signals
- Small, lightweight
- Mounting bracket provided

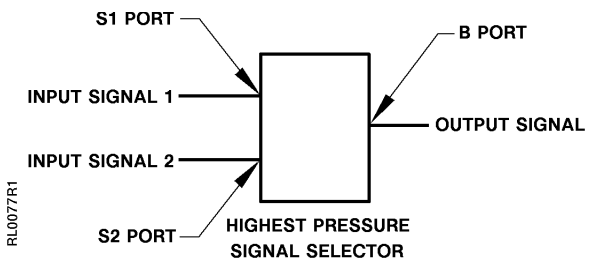
Applications

The 243 Highest Pressure Signal Selector is used where two proportional high capacity air signals (2-pipe thermostat) must be compared and the highest of the two signals transmitted to another logic or final control device.

Recommendation

Use 243-0019 selector to compare more than two inputs.

Typical Connections



Input Signal 2	Input Signal 1	Output Signal
3 psi	15 psi	15 psi
15 psi	3 psi	15 psi
9 psi	9 psi	9 psi

243 Signal Selector Specifications

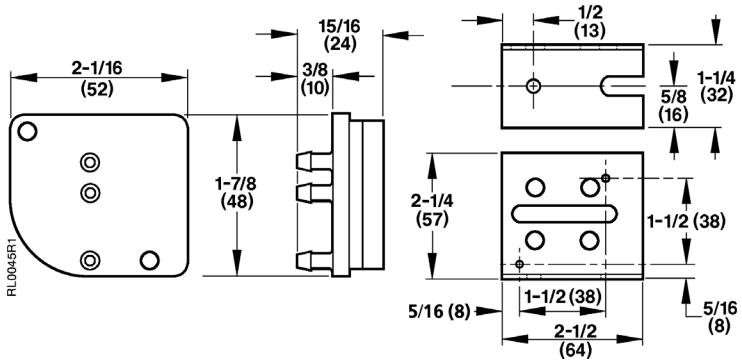
Action ..... Direct
Maximum Air Pressure ..... 30 psi (207 kPa)
Adjustments ..... None
Connections ..... 1/4" (6 mm) OD polyethylene tubing

Operating Ambient Temperature
Minimum ..... 40°F (4°C)
Maximum ..... 140°F (60°C)
Air Consumption ..... None
Air Capacity @ P = 2 psi ..... 130 scim (35 ml/s)
Materials ..... Glass-filled Nylon
Shipping Weight ..... 0.25 lb. (0.10 kg)

243 Signal Selector Product Ordering

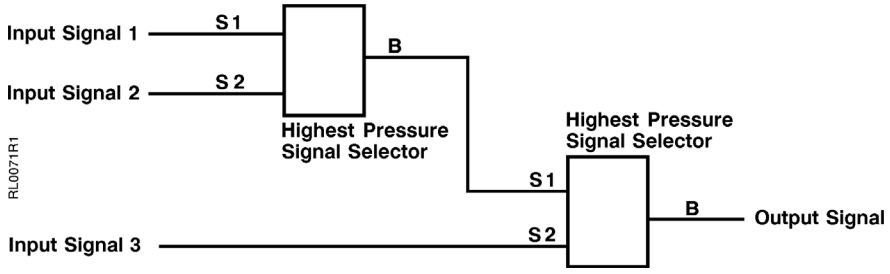
Description	Part No.
Highest Pressure Signal Selector	243-0018
If inoperative, replace the unit.	

Dimensions and Engineering Drawings

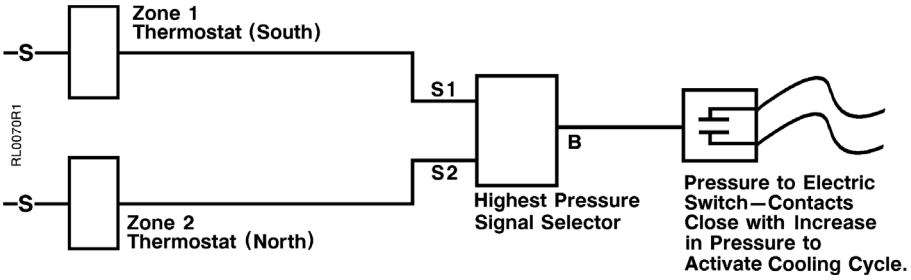


Dimensions shown in inches (mm).

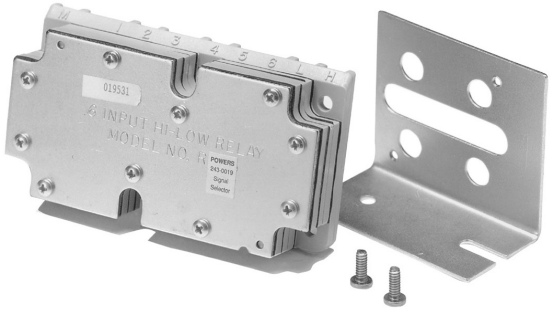
Highest of the Three Signal Pressures.



Single Fan Cooling Control from Two Zone Direct Acting Thermostats.



Lowest and Highest Signal Selector



243 Lowest and Highest Pressure
Signal Selector and Mounting Bracket.

Description

The 243 Lowest and Highest Signal Selector is a six-input, dual output logic device for use in pneumatic control systems.

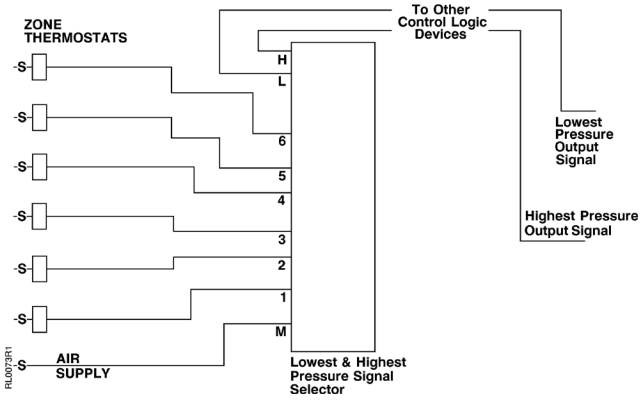
Features

- Accepts up to 6 inputs
- Selects both or highest/lowest signal
- Easily supported in-line or mounted using provided hardware
- Small, lightweight

Applications

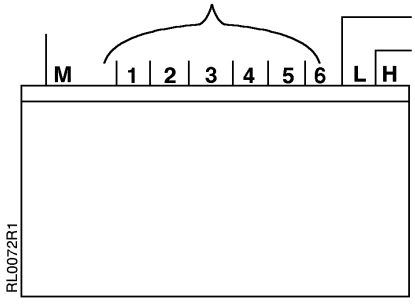
The 243 Lowest and Highest Signal Selector is used where up to six input air signals must be compared and the lowest and/or highest of the signals transmitted to another logic or final control device. Unused input ports must be connected to the highest numbered input port being used. This is a low capacity output device, therefore, an amplifying relay will be required for many applications.

Application Drawing



Typical Connections

Input Port #	Input Signal	Lowest Pressure Output Signal	Highest Pressure Output Signal
1	3 psi	—	—
2	6 psi	—	—
3	9 psi	—	—
—	—	3 psi	15 psi
4	10 psi	—	—
5	13 psi	—	—
6	15 psi	—	—



243 Signal Selector Specifications

Action ..... Direct

Air Supply Pressure
- Normal Operating ..... 20 psi (138 kPa)
- Maximum ..... 30 psi (207 kPa)

Adjustments ..... None

Connections ..... 1/4" (6 mm) OD polyethylene tubing

Operating Ambient Temperature
- Minimum ..... 40°F (4°C)
- Maximum ..... 140°F (60°C)

Air Consumption ..... 44 scim (12 ml/s)

Air Capacity @ P = 2 psi
- Highest ..... 5 scim (1.4 ml/s)
- Lowest ..... 10 scim (2.7 ml/s)

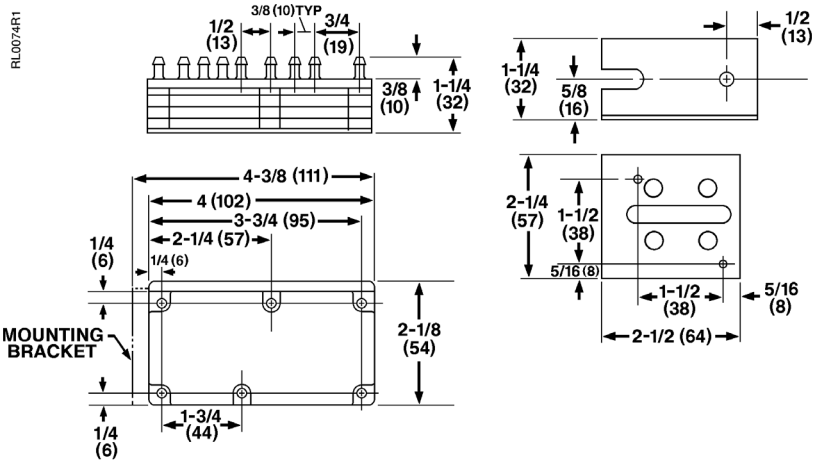
Material ..... Glass-filled Nylon

Shipping Weight ..... 0.63 lb. (0.295 kg)

243 Signal Selector Product Ordering

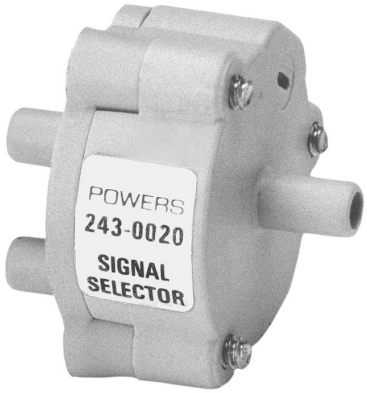
Description	Part No.
Lowest and Highest Signal Selector	**243-0019**
If inoperative, replace the unit.	

Dimensions



Dimensions shown in inches (mm).

Lowest Pressure Signal Selector



243 Lowest Pressure Signal Selector.

Description

The 243 Lowest Pressure Signal Selector is a dual input, single output logic device for use in pneumatic control systems.

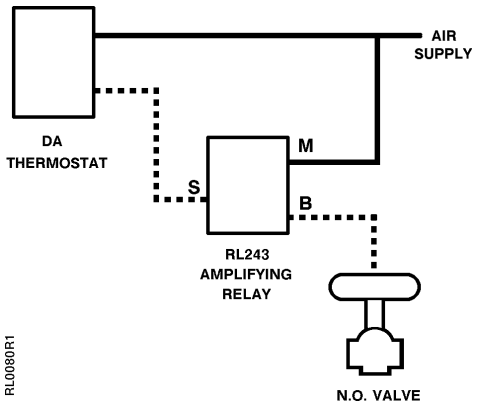
Features

- Small, lightweight
- Can be mounted in any position
- Can be supported by the 1/4-inch (6 mm) poly tubing connected to the input and output fittings
- Can be used as volume amplifying relay
- Cascade multiple selectors for more than two inputs

Applications

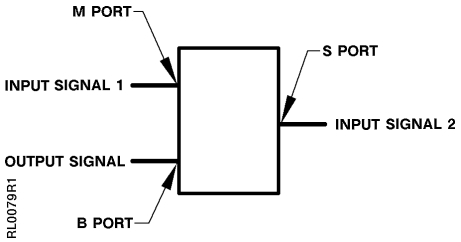
The 243 Lowest Pressure Signal Selector is used where two input air signals must be compared and the lowest of the two signals transmitted to another logic or final control device. The 243 Lowest Pressure Signal Selector can also be used as a direct acting amplifying relay.

Application Drawing



Direct Acting Amplifying Relay.

Typical Connections



243 Signal Selector Specifications

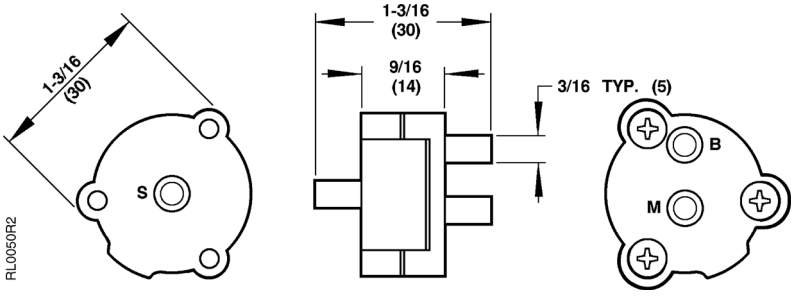
Action ..... Direct
Maximum Pressure ..... 30 psi (207 kPa)
Adjustments ..... None
Connections ..... 1/4" (6 mm) OD polyethylene tubing
Operating Ambient Temperature
Minimum..... 40°F (4°C)
Maximum..... 140°F (60°C)

Air Consumption ..... 29 scim (8 ml/s)
Air Capacity @ P = 2 psi ..... 82 scim (22 ml/s)
Material ..... Glass reinforced nylon
Diaphragm ..... Nylon reinforced fairprene
Mounting ..... In-line
Shipping Weight ..... 0.31 lb. (0.01 kg)

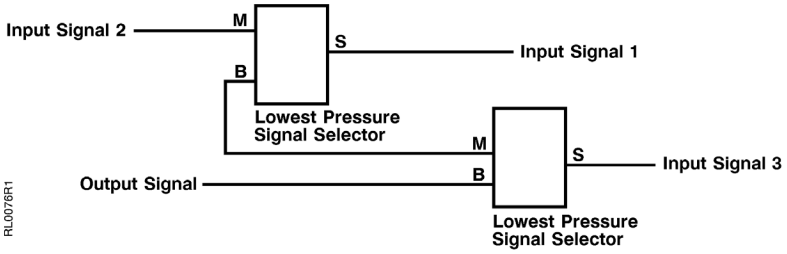
243 Signal Selector Product Ordering

Description	Part No.
Lowest Pressure Signal Selector	**243-0020**
If inoperative, replace the unit.	

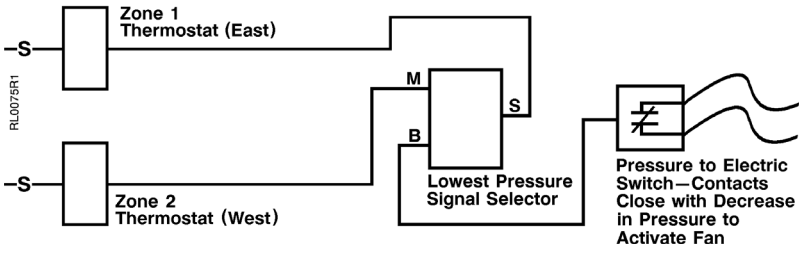
Dimensions and Engineering Drawings



Dimensions shown in inches (mm).

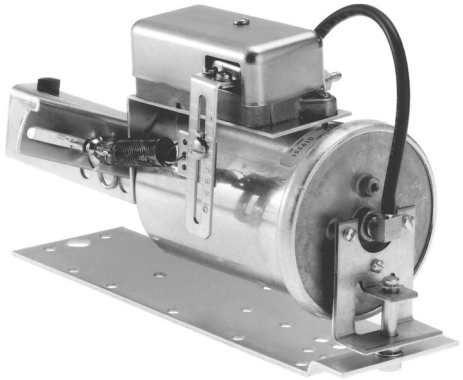


Input Signal 2	Input Signal 1	Output Signal
3 psi	15 psi	3 psi
15 psi	3 psi	3 psi
9 psi	9 psi	9 psi



Lowest of Three Signal Pressures.

Positioning Relay



147 Positioning Relay and Mounting Kit shown on a No. 3 Damper Actuator.

Description

The 147 Positioning Relay is a compact pneumatic auxiliary device designed to provide positive positioning of a pneumatic valve or damper actuator.

Features

- Designed to operate at a very low bleed rate to minimize air consumption
- Provides simplified adjustment of both starting pressure and operating span
- Adjustable start point
- Adjustable span
- Rapid response
- Good repeatability
- Consistency of operation

Applications

The 147 Positioning Relay accurately positions damper actuator in response to a control air signal change. Damper actuators that are equipped with a Positioning Relay can use full control air pressure at any point in stem travel to initiate stem movement or to maintain stem position. However, the actuator spring still provides the necessary force to move the stem in the opposite direction.

A mounting kit is required for direct attachment of the relay to a pneumatic damper actuator or valve actuator.

NOTE: Refer to pages B-39 - B47 for a complete line of pneumatic damper actuators.

147 Positioning Relay Specifications

Ambient Temperature Range
Operating..... 35 to 160°F (2 to 71°C)
Storage.....-20 to +160°F (-29 to +72°C)
Maximum Pilot Signal Pressure ..... 30 psi (207 kPa)
Maximum Supply Air Pressure ..... 60 psi (413 kPa)
Start Point Adjustment Range ..... 3 to 10 psi (21 to 69 kPa)
Operating Span Adjustment Range ..... 3 to 12 psi (21 to 83 kPa)
Response ..... 0.10 psi (0.689 kPa) input change

Air Capacity @ ΔP ..... 410 scim (112 ml/s)
Air Consumption .....40 scim (11 ml/s
Air Connections ..... 1/8" NPT
Materials
Body .....Zinc
Cover ..... Steel
Shipping Weight (with mounting kit) .....2.0 lb. (0.9 kg)

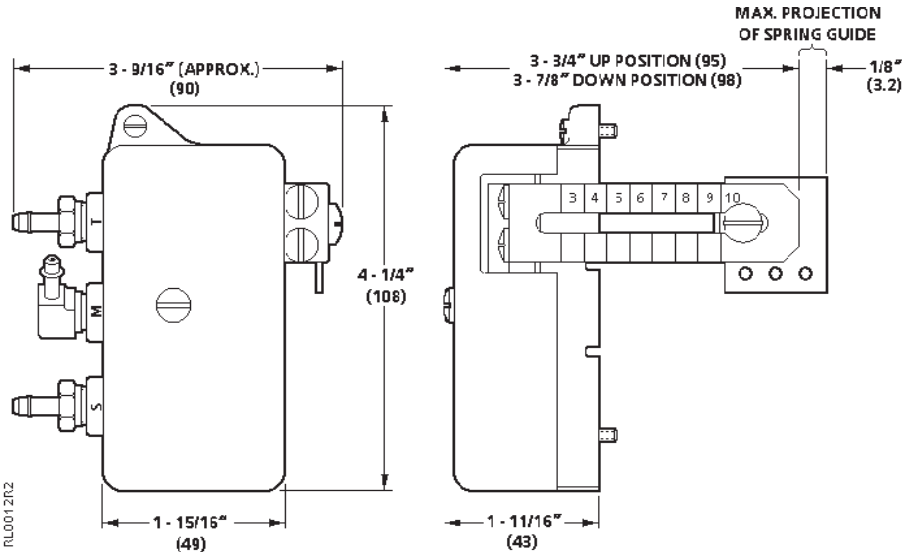
147 Positioning Relay Product Ordering

Description	Part No.	
	Positioning Relay	Mounting Kit
Positioner		
Field mount positioner for No. 3 Damper Actuator mfg. after 1/93	**147-2000**	**147-104**
Field mount positioner for No. 4	**147-2000**	**147-314**
Field mount positioner for No. 6	**147-2000**	**147-276**
8-inch Valve Actuator		
For 599 Series Flowrite actuators mfg. after 3/96	**599-00426**[1]	
For Model 3 Flowrite actuators mfg between 3/93 and 1/96	**147-2000**	**—**
For Models 1 and 2 Flowrite actuators.[2]	**147-2000**	**—**
12-inch Valve Actuator		
For 599 Series Flowrite actuators mfg. after 1/96	**599-00423**[1]	
For Flowrite actuators mfg. between 3/78 and 1/96	**147-2000**	**—**

Ordering Note:

1. Relay and mounting hardware included.
2. Also order spring arm, **147-307**, for use with 591 5 and 6-inch balanced valves.

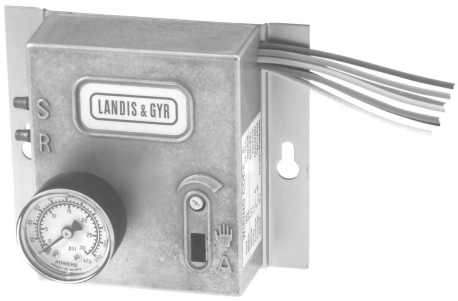
Dimensions



Dimensions shown in inches (mm).

Electronic-to-Pneumatic Transducer

545-208 Electronic-to-Pneumatic Transducer.



545-113 Electronic-to-Pneumatic Transducer.

Description

The 545 Electronic-to-Pneumatic (AO-P) Transducer converts an electronic signal into a linear pneumatic signal; available in remote mount and panel mount.

Features

- Insensitive to vibration and mounting position to allow mounting directly on equipment
- Hand-Auto switch and override dial allow for manual control of output pressure for troubleshooting and emergencies
- Accurate and repeatable output pressure signal
- Easy-to-install, no setup or calibration is required
- Wall-mount without an additional enclosure to reduce cost
- Factory-installed 0 to 30 psi (0 to 207 kPa) gauge included
- High capacity, non-bleed device

Options

- Electrical connections to remotely monitor Hand-Auto switch position and output pressure

Applications

The 545 Electronic-to-Pneumatic Transducers are used for accurate positioning of valve and damper actuators.

545 Transducer Specifications

Supply Voltage ..... 19 to 26 Vac (24 Vac typical)
Power Consumption ..... 1 VA max.
Input Signal/Impedance ..... 0 to 10 Vdc/20 K Ohm
Output Signal ..... 0 to 20 psi (0 to 138 kPa)
Output Capacity ..... 500 scim (135 ml/s) min. @ 5 psi (34.5 kPa) Drop (20 psi input, 15 psi output)
Output Repeatability .....0.05 psi (0.35 kPa) max. (includes hysteresis)
Output Fail-safe .....0 psi (0 kPa) in response to sustained power loss
Output Fail-safe Exhaust Capacity ..... 100 scim (27 ml/s) @ 5 psi (34.5 kPa) drop (unpowered)
Air Supply Pressure .....30 psi (207 kPa) max. safe pressure, clean, dry, (instrument quality air required)
Air Consumption for Compressor Sizing ..... 8 scim (2.2 ml/s)
Tubing Connection ..... Two-1/4" (6 mm) OD nominal, barbed fitting

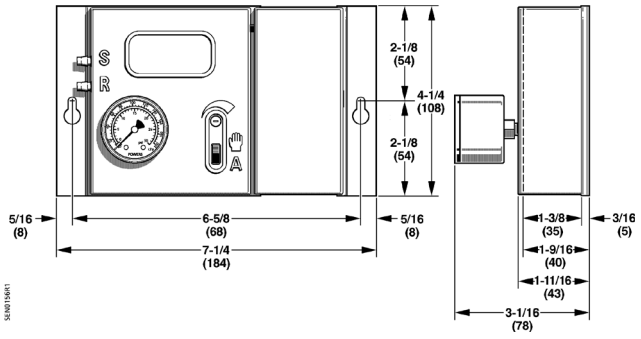
Conduit Connections ..... Remote mount model has Two - 1/2" (13 mm) conduit connections
Output Accuracy .....@ 77°F (25°C) ± 0.25 psi (1.72 kPa) max.
@ 32 to 122°F (0 to 50°C) ± 0.50 psi (3.45 kPa) max.
@ -40 to +185°F (-40 to +85°C) ± 1.0 psi (6.90 kPa) max.
Ambient Temperature Range
Operating and Storage.....-40 to +185°F (-40 to +85°C)
Operating Humidity ..... 10% to 95% RH, non-condensing
Vibration .....Tested to EIA STD, RS-152B FEB 71
Override Controls .....Continuous variable output override (does not function without power)
Override Monitoring
Hand-Auto ..... A dry contact indicates the position of the Hand-Auto Switch to an external device.
Hand-Auto Override
Dry Contact Rating..... 30 Vac @ 100 mA, 42 Vdc
Override Monitoring Output Pressure ..... Optional 0 to 5 Vdc linear signal monitors output pressure
Dimensions
Remote Mount ..... 4.25" H x 7.25" W x 3.06" D (108 mm H x 184 mm W x 78 mm D)
Panel Mount ..... 4.25" H x 5.75" W x 3.06" D (108 mm H x 146 mm W x 78 mm D)
Shipping Weight .....2.0 lb. (0.9 kg)

545 Transducer Product Ordering

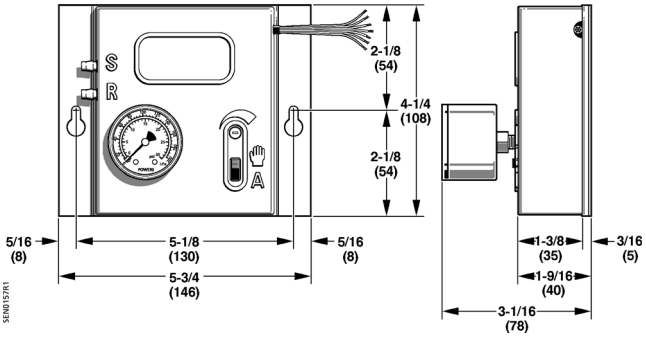
Description	Part No.
Remote Mount	
AO-P Transducer with Integral Enclosure	**545-208**
Panel Mount	
AO-P Transducer	**545-113**

Dimensions and Engineering Drawings

545 AO-P Transducer with Integral Enclosure



545 AO-P Transducer



Dimensions shown in inches (mm).

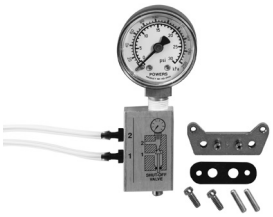
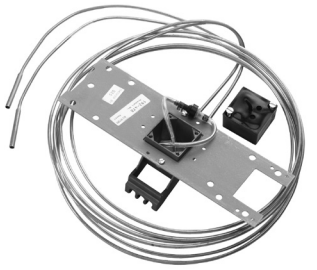
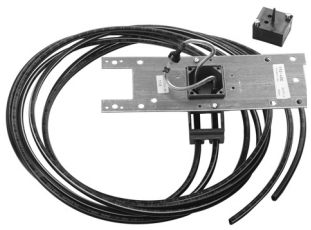
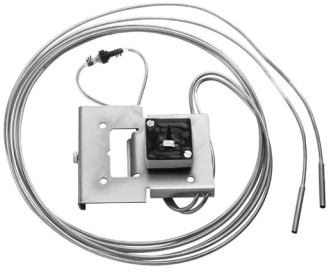
Table of Contents

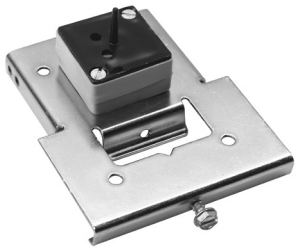
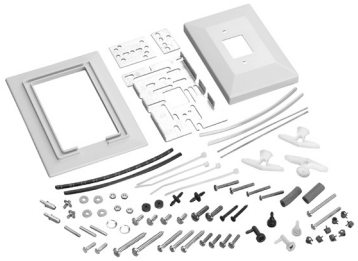
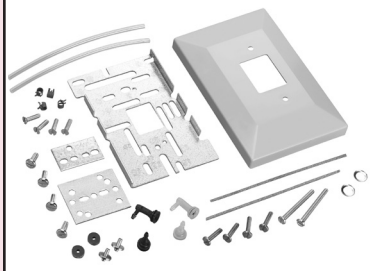
(Continued on next page)

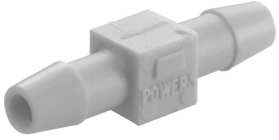
((Continued on next page)

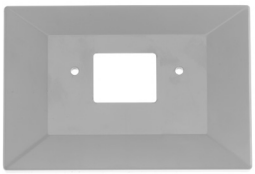
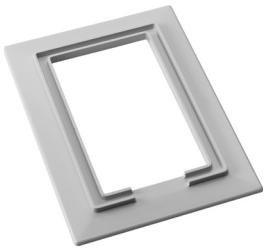
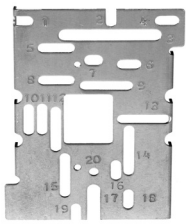
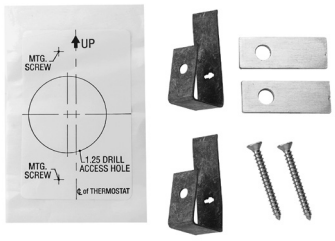
Accessories & Service Kits

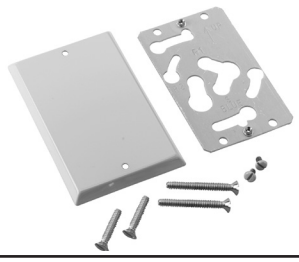
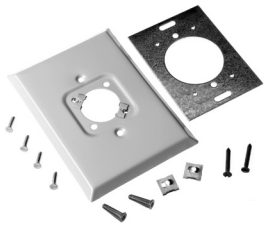
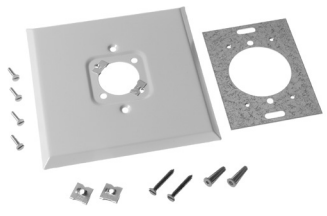
	Description	Product Group	Quantity	Part No.
All Models				
	**Calibration Gauge.** • 0 to 30 psi (0 to 207 kPa) • Dual scale in psi/kPa • 1% accuracy (ANSI grade 1A) • 2-1/2" (64 mm) dial face • 1/8" NPT bottom connection	All models	1	**142-0455**
	**Calibration Thermometer.** 40 to 140°F (4 to 60°C), 1% accuracy with pocket case and clip.	All models	1	**141-0573**
	**Lockable Wall Box.**	Any Siemens Thermostat	1	**141-570**
Powerstar				
	**Pressure Gauge.** Dual English/Metric scale 0 to 30 psi (0 to 200 kPa) compound gauge back connected 1/8" NPT male.	19X 356 184 195	1	**142-0373**
	**Pressure Gauge.** 0 to 30 psi compound gauge, bottom connected 1/8" NPT male. Replacement or for use with **192-633.**	19X 356	1	**142-0426**
	**Needle Probe.** 1-1/2" (38 mm) diameter gauge 0 to 30 psi/0 to 200 kPa and calibration cover wrench.	19X 356	1	**192-633**
	Needle Probe. (no gauge)	19X 356	Pkg of 5	**192-759**
	**Pneumatic Thermostat Calibration Kit.** Contains thermometer, gauge squeeze bulb, and fittings for testing room and duct thermostats, pneumatic valve and damper actuators. Includes convenient carrying case.Includes 832-178.	19X 832	1	**832-177**

	Description	Product Group	Quantity	Part No.
Powerstar				
	**Calibration Tools.** Special tools for calibrating 180, 182, 192 and 832 thermostats. Packed in polyethylene box that fits into carrying case of kit, 832-177.	192 832	1	**832-178**
	**Test Head Kit.** Used for testing 1-pipe transmitters, thermostat air lines for leakage. Packed in polyethylene box that fits into carrying case of kit, 832-177.	192 832	1	**832-179**
	**Calibration and Cover Screw Wrench** with pocket clip.	19X	Pkg of 5	**192-632**
	**Wall Box Rough-In.** For 2-pipe dual 1/8" (3 mm) OD copper with plaster plate. 8' (2 m) long, belled to 3/16" (5 m) OD with thermostat chassis plug-in adapters for easy maintenance.	19X 832 186	1	**192-478**
	**Wall Box Rough-In.** For 1- or 2-pipe dual 1/4" (6 mm) OD polyethylene with plaster plate. 10' (2 m) long. With thermostat chassis plug-in adapters for easy maintenance.	19X 186	1	**192-480**
	**Stud Mounting Bracket.** 6' (2 m) L. Cut to required length.	192	1	**141-098**
	**Stud Mounting Bracket and Dual Copper Tubing**, belled to 3/16" (5 mm) OD with plug-in adapters for easy maintenance.	19X 186	1	**192-482**

	Description	Product Group	Quantity	Part No.
Powerstar				
	**Metal/Wood Stud Bracket.** Drywall rough-in.	19X 186	Pkg of 5	**182-683**
	**Universal Kit.** Retrofit thermostats including Honeywell, Johnson Controls, and others. Desert Beige (standard). For White, add **W** to part number.	19X	1	**192-300**
	**Honeywell Kit.** Fits Honeywell and others. Desert Beige (standard). For White, add **W** to part number.	19X	1	**192-483**
	**Johnson Kit.** Retrofit to 19X thermostat. Fits Johnson Controls and others. Desert Beige (standard). For White, add **W** to part number.	19X	1	**192-484**
	**Aspirator Conversion Kit.** For 2-pipe thermostat chassis only. Converts existing 18XAP installed aspirator wall box for use with chassis. Kit includes plate, gasket, hardware, and instruction sheet. Order 19X chassis separately.	18XAP to 19X	1	**192-648**

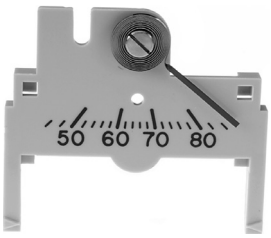
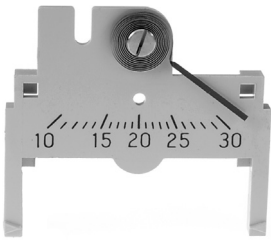
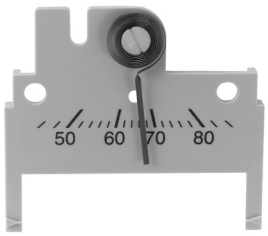
	Description	Product Group	Quantity	Part No.
Powerstar				
	**1- or 2-pipe;** split for 3-pipe. Dual 1/4" (6 mm) OD polyethylene with plug-in adapters. 10' (2 m) long.	19X	1	**192-600**
	1- or 2-pipe. Dual 1/4" (6 mm) OD polyethylene with plug-in adapters. 40' (12 m) long.	19X	1	**192-755**
	1- or 2-pipe. Dual 5/32" (4 mm) OD polyethylene with plug-in adapters. 40' (12 m) long.	19X	1	**192-750**
	**Preassembled Plastic Tubing Loop.** 8" (203 mm) long, with anti-kink spring, plug-in thermostat adapter. Mates to 1/4" (6.4 mm) OD polyethylene tube barbed fitting.	19X	Pkg of 10	**192-481**
	**Preassembled Plastic Tubing Loop.** 8" (203 mm) long, with anti-kink spring, thermostat plug-in adapter. Mates to 5/32" (4 mm) OD polyethylene tubing.	19X	Pkg of 10	**192-505**
	**Preassembled Plastic Tubing Loop.** 8" (203 mm) long, with anti-kink spring. Cut and attach directly to thermostat chassis. Attach compression rings to prevent air leakage. Mates to 1/4" (6 mm) OD polyethylene tubing.	19X	Pkg of 10	**180-896**
	**20 scim (5 ml/sec) Restrictors.** For 1-pipe systems. 1/4" (6 mm) OD polyethylene barb unless noted. Brass coupling, 1/8" NPT.	192 (1-pipe) 184	1	**184-040**
	**20 scim (5 ml/s) In-line Restrictors.**	192 184	Pkg of 5	**184-116**
	**20 scim (5 ml/s) Restrictor Tee.**	192 184	Pkg of 5	**184-113**
	**External Restrictor Installation Kit.** For dual 1-pipe systems. Supply, thermostat and two-controlled devices.	19X	1	**184-130**

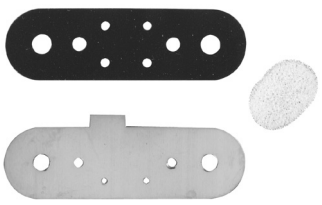
	Description	Product Group	Quantity	Part No.
Powerstar				
	**Adapter Base.** 3.38" W x 5.69" H (86 mm W x 18 mm H).	19X		
	• Desert Beige (standard)		1	**192-307**
	• White		1	**192-307W**
	**Adapter Frame.** 4.38" W x 5.31" H x 0.09" D (111 mm W x 151 mm H x 2 mm D).	19X		
	• Desert Beige (standard)		1	**192-308**
	• White		1	**192-308W**
	**Multi-Slotted Plate.** Use with adapter bases. Not for use with thin profile adapter base.	19X	1	**192-301**
	**Thin Profile Adapter Base.** Measures 3.38" x 4.97" H (86 mm x 126 mm).	19X		
	• Desert Beige (standard)		Pkg of 5	**192-507**
	**Extra Wall Plate and Mounting Screws.** Order only if required for repair or advance mounting prior to factory delivery of chassis (chassis P/N includes wall plate and screws).	19X	1	**192-644**
	**Mounting Clips, Spacer and Template** for finished drywall.	19X	Pkg of 10	**182-685**

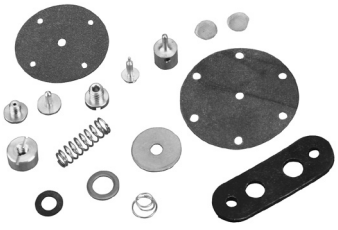
	Description	Product Group	Quantity	Part No.
Powerstar				
	**Terminal Wall Box Cover Kit.** Covers abandoned thermostat locations with blank plate. Dimensions 3.13" x 3.25" (54 mm x 84 mm). • Desert Beige (standard)	19X	1	**192-320**
	**Retrostat Plastic Thermostat Cover Kit.** With dial plates that expose or conceal the set point indicator and/or thermometer. Thumb wheel covers to conceal setpoint adjustment. Snap-out tab for Day/Night lever.	19X		
	• Desert Beige (standard)		1	**192-868**
	• White		1	**192-868W**
	**Gym Guards.** • Desert Beige	19X DN or DNV	1	**182-624**
	**Finish Plate.** Mounts on 4" x 4" (102 mm x 102 mm) electrical box. Pneumatic thermostat mounts to finish plate. 1/2" (13 mm) diameter hole provided for electrical switch. Stainless steel finish.	19X	1	**192-729**
	**Finish Plate.** 1 gang[1], 1 room thermostat.[3]	19X		
	• Brushed Finish		1	**192-860**
	• Desert Beige		1	**192-861**
	**Finish Plate.** 2 gang[2], 1 room thermostat.[3]	19X		
	• Brushed Finish		1	**192-731**
	• Desert Beige		1	**192-732**

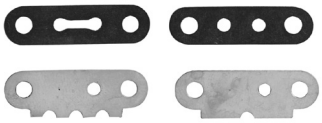
Ordering Notes

1. 1 gang: 3.75" (95 mm) W x 5" (127 mm) H.
2. 2 gang: 5" (127 mm) W x 5" (127 mm) H.
3. For use with pneumatic or automation room sensors and pneumatic or commercial light switches; comes in brushed, stainless steel finish.

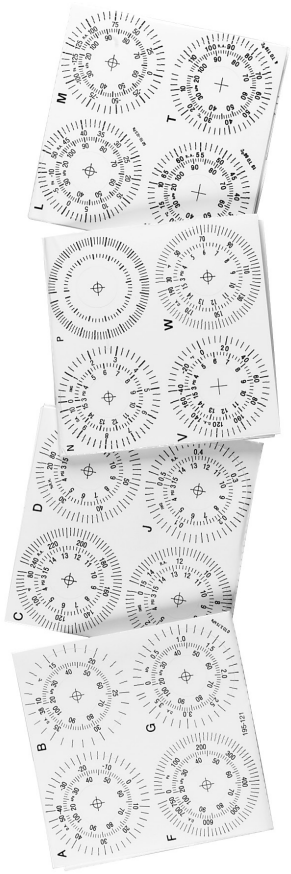
	Description	Product Group	Quantity	Part No.
Powerstar				
 Model 1 and 2	**Thermostat Thermometer Kits.** • Scale Range: 45 to 85°F • Use with Model 1 and 2	19X	Pkg of 5	**192-775**
 Model 1 and 2	**Thermostat Thermometer Kits.** • Scale Range: 10 to 30°C • Use with Model 1 and 2	19X	Pkg of 5	**192-776**
 Model 3 and greater	**Thermostat Thermometer Kits.** • Scale Range: 45 to 85°F • Use with Model 3 and greater	19X	Pkg of 5	**192-786**
	• Scale Range: 10 to 30°C • Use with Model 3 and greater	19X	Pkg of 5	**192-785**
 	**Setpoint Dials.**	19X		
	Fahrenheit of D.A. Right Side		Pkg of 10	**192-779**
	Fahrenheit of R.A. Right Side		Pkg of 10	**192-780**
	Celsius of D.A. Right Side		Pkg of 10	**192-783**
	Celsius of R.A. Right Side		Pkg of 10	**192-784**
	Fahrenheit of D.A. Left Side		Pkg of 10	**192-777**
	Fahrenheit of R.A. Left Side		Pkg of 10	**192-778**

	Description	Product Group	Quantity	Part No.
Powerstar				
	**Replacement Chassis Tube Connector** and mounting screws. Also provides access to filters and restrictor plate (10 thermostats).	19X	Material for 10 thermostats	**192-525**
	**Plug-in Adapters** For quick thermostat removal. Fits on 5/32" (4 mm) OD polyethylene tubing. Use with compression rings, listed below.	19X		
	• Straight, blue		Pkg of 20	**192-485**
	• Straight, white		Pkg of 20	**192-486**
	**Plug-in Adapters (Elbow).**	19X		
	• Blue (provides quick thermostat removal).		Pkg of 20	**192-487**
	• White (provides quick thermostat removal).		Pkg of 20	**192-488**
	**Replacement Cover Screws.**	19X	Pkg of 20	**192-536**
	**Restrictor Plate Replacement Kit.** Contains replacement filters, restrictor plates, and gaskets.	19X	Material for 10 thermostats	**192-321**

	Description	Product Group	Quantity	Part No.
832 D/DN				
	**Adjustment Key.** Opens Powers cover and changes setpoint.	832 D, 832 DN	1	**856-055**
	**"D" Base Kit.** For mounting "D" thermostat with exposed tubing. Black base with cutout on top.	832 D, DN	1	**832-034**
	**"D" Thermostat Friction Knob.**	832	1	**833-033**
	**"D" Thermostat Replacement Unit.** Contains chassis only.	832 D	1	**832-040**
	**Exhaust and Supply Valve Repair Kit.** Contains parts for replacement of supply and exhaust valves in one thermostat.	832	1	**832-164**

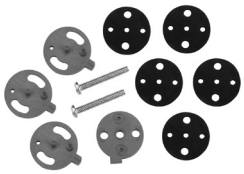
	Description	Product Group	Quantity	Part No.
188/134				
	**Remote Bulb Duct Mounting Kit.**	188 134	1	**808-517**
	**Restrictor Plate Replacement Kit.** • Restrictor plates and gaskets for 20 scim (5.4 ml/s) restriction • Restrictor plates and gaskets for 40 scim (11 ml/s) restriction	188	5 sets of each	**188-159**
134/357				
	**Capillary Clip.**	134 357	Box of 100	**7421700060**
	**Electric Thermostat Guard.** For electric thermostats no larger than 5-1/4" H x 3/4" W x 2" D. (133 mm H x 19 mm W x 51 mm D). Made of cast aluminum. Allen Key included.	134	1	**134-117**
	**Concealed Adjustment Faceplate.**	134	1	**134-034**

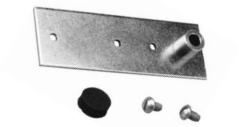
	Description	Product Group	Quantity	Part No.
356/357				
	**Coil Clip.**	357	1	**356-115**
	**Swivel Flange Mounting Kit.**	356	1	**356-090**
	**Flange Kit.**	356	1	**808-412**
	**Copper Well**. For 357-0003 and 357-0005; Models 1 and 4.	357	1	**134-061**
	**Allen Wrench Kit.** (pack of 5)	356/357	5	**192-623**

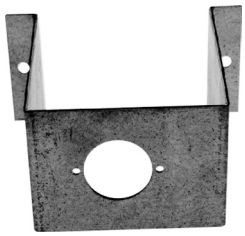
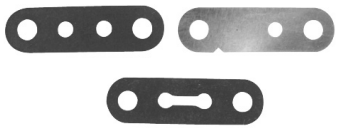
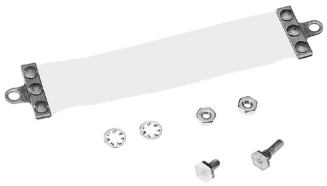
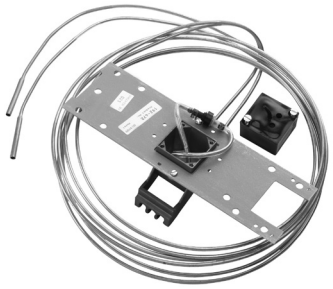
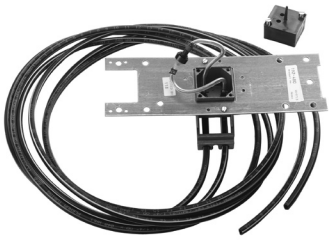
	Description	Product Group	Quantity	Part No.
185/195 Receiver-Controllers				
	**Setpoint Dial Sheets.** Direct Acting and Reverse Acting.	195	4 Sheets	**195-130**

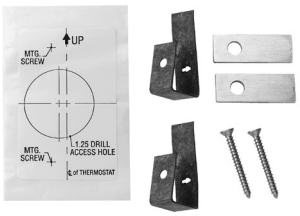
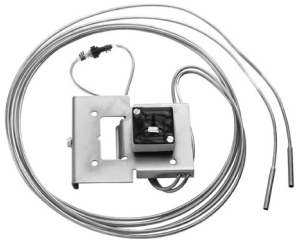
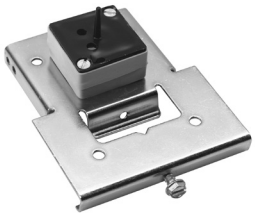
English Units	Metric Units	Scale ID
-40 to +120°F	-40 to +50°C	**A**
50 to 100°F	10 to 38°C	**B**
80 to 240°F	26 to 117°C	**C**
20 to 80% RH	-18 to +38°C	**D**
0 to 100°F	1 to 58°C	**E**
35 to 135°F	0 to 750 Pa	**F**
0 to 3 W.G.	0 to 3.75 kPa	**G**
0 to 15 W.G.	20 to 80% RH	**H**
0 to 0.5 W.G.	0 to 125 Pa	**J**
Blank 10 divisions	Blank 9 divisions	**K (DA)**
Blank 16 divisions	Blank 11 divisions	**K (RA)**
-0.05 to ±0.2" W.G.	-12.5 to +50 Pa	**L**
-0.5 to +0.5" W.G.	-125 to +125 Pa	**M**
0 to 10" W.G.	0 to 2.5 kPa	**N**
Blank 20 divisions	Blank 15 divisions	**P**
0 to 50 psi	0 to 345 kPa	**R**
50 to 150°F	10 to 66°C	**S**
40 to 240°F	4 to 116°C	**T**
-40 to +160°F	-40 to +71°C	**V**
30 to 190°F	-1 to +88°C	**W**

Ordering Notes
- Add Scale ID as suffix to Part No.
- Indicate English or Metric units.

	**Receiver-Controller Restriction Kit.** Includes three input restriction plates, one pilot relay restriction plate, gaskets, and two screws.	195	1 Kit	**195-066**
	**Receiver-Controller Connector Kit.** Includes two plug-in connector assemblies, one 3-barb input connector assembly.			
	• Multiple-Input	195	1 Kit	**195-067**
	**Termination Strip.** For numbered ports 1 through 10, straight through connections for 1/4" (6 mm) OD polyethylene tubing.	195	1	**195-082**
	**In-Line Air Filter.**	195	1	**908-033**

	Description	Product Group	Quantity	Part No.
184 Temperature Transmitters				
	**Well Mounting Bracket Kit.**	184	1	**184-105**
	**Copper Well.** 1/4" D x 4" L (6 mm D x 102 mm L)	184	1	**184-119**
	**Stainless Steel Well.** 1/4" D x 4" L (6 mm D x 102 mm L)	184	1	**184-118**
	**Outdoor Bulb Shield.** 9" (229 mm) L	184	1	**134-084**
141 Air Velocity Transmitters				
	**Static Pressure Sensor Probe.**	141	1	**269-062**
	**Static Pressure Probe Kit.**	SW269	1	**189-142**
Multiple Applications				
	**Check Valve.** Connections for 1/4" (6 mm) OD polyethylene tubing. Capacity is 30 scim (8.2 ml/sec) at 1 psi (7 kPa) drop. 450 scim (123 ml/sec) at 8 psi (55 kPa) drop.	Multiple Applications	Package of 10	**380-024**
	**Copper to Polyethylene Tubing Adapters.** 24" length. Adapts 1/4" (6 mm) OD polyethylene tubing to 1/4" (6 mm) OD copper tubing. Eliminates the need for compression fitting.	Multiple Applications	Package of 50	**141-426**
Air Station Equipment				
	**Air Filter Replacement Element.** For use with 908-051.	Air Station Equipment	1	**908-052**
	**Cartridge Kit.** For use with 1 908-046 Filter. 500 scim (137 ml/sec) with 25 psi (127 kPa) supply for oil removal.	Air Station Equipment	1	**908-042**

	Description	Product Group	Quantity	Part No.
SW786 Selector Switches				
	**Flush Mounting Bracket.**	SW786	1	**786-131**
186				
	**Hygrostat Restrictor Repair Kit.** Includes enough restrictor for plates and upper and lower Hygrostats gaskets.	186	Material for 10 Hygrostats	**180-893**
	**Membrane Element Kit.** Replaces membrane element. Contains one element assembly, screws, nuts, and lock washers.	186	1	**186-062**
	**Wall Box Rough-In.** For 2-pipe dual 1/8" (3 mm) OD copper with plaster plate. 8' (2 m) long, belled to 3/16" (5 m) OD with thermostat chassis plug-in adapters for easy maintenance.	186	1	**192-478**
	3-pipe dual 1/8" (3 mm) OD copper with plaster plate. 8' (2 m) long, belled to 3/16" (5 m) OD with thermostat chassis plug-in adapters for easy maintenance.	186	1	**192-498**
	**Wall Box Rough-In.** For 1- or 2-pipe dual 1/4" (6 mm) OD polyethylene with plaster plate. 10' (2 m) long. With thermostat chassis plug-in adapters for easy maintenance.	186	1	**192-480**
	3-pipe dual 1/4" (6 mm) OD polyethylene with plaster plate. 8' (2.4 m) long. With thermostat chassis plug-in adapters for easy maintenance.	186	1	**192-499**

	Description	Product Group	Quantity	Part No.
186				
	**Mounting Clips, Spacer and Template for finished drywall.**	186	Package of 10	**182-685**
	**Stud Mounting Bracket and Dual Copper Tubing.** Belled to 3/16" (5 mm) OD with plug-in adapters for easy maintenance.	186	1	**192-482**
	**Metal/Wood Stud Bracket.** Drywall rough-in. Wall mounting kit for either wood or metal stud. This kit does not offer a conduit connection and is to be used for open wire projects. Kit comes 5/box.	186	Package of 5	**182-683**
	**Dual 1/8" (3 mm) OD Copper Tubing with Plug-in Adapters.** For 1- or 2-pipe. Split for 3-pipe.	186	1	**192-479**
	**Plug-in Adapter.** Includes Tee 20 scim restrictor for 1-pipe.	186	Package of 10	**192-875**