



**Robertshaw**

**PARAGON**

**UNI-LINE**

**SMARTsense**

# UNI-LINE<sup>®</sup>

## GLOBAL

### PRODUCT CATALOG

The brands you  
trust **delivering**  
**comprehensive**  
**solutions.**



**Robertshaw**<sup>®</sup>

**Easy and efficient**

Robertshaw<sup>®</sup> Heating Controls are Simply the Right Choice<sup>™</sup>. Robertshaw Heating products offer kitted solutions and universal features that enable a single product to replace hundreds.



## **RANCO**

### **Solutions-driven innovation**

Ranco® Controls have been an industry standard for 100 years with a full line of refrigeration products. Our quality and features make Ranco an easy choice, with universal controls to reduce inventory and features like the Super Cap® to reduce breakage and costly callbacks.



## **PARAGON**

### **Increased versatility**

Paragon® Defrost Controls lead the pack in versatility with the only multi-voltage timer engineered to refrigeration standards. At four defrosts a day, the Paragon Universal Defrost Timer is rated to last 16 years longer than competitive offerings.



## **SMARTsense** **PERFECTsense**

### **The Smarter Choice**

SmartSense® and PerfectSense™ by Uni-Line® wall thermostats, zoning and sensor modules are Simply the SMART Choice™ for flexible, easy to use and install, residential and commercial heating and air conditioning controls.

## COOKING

Electric Infinite Switches .....	A2	Gas Valves.....	A24
Energy Regulators.....	A4	Oven Spark Ignition Modules .....	A31
Electric Thermostats.....	A8	Hot Surface Ignitors.....	A32
Gas Thermostats.....	A18		

## ENERGY

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Electric Timers - Electronic .....	B5		

## HEATING

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Water Heating Gas Valves .....	C15	Pilots.....	C34
Electric Water Heating Thermostats.....	C16	Thermocouples.....	C36
Heating Kits .....	C18	Thermopiles.....	C38
Ignition Controls .....	C21	Air Pressure Sensing Switches .....	C40
		Heating Accessories.....	C42

## REFRIGERATION

Defrost Timers - Auto Voltage .....	D2	Pressure Controls .....	D30
Defrost Timers - Electromechanical.....	D8	Refrigeration Accessories .....	D35
Defrost Timers - Electronic .....	D12	Reversing Valves .....	D36
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### New Catalog Feature:

This Catalog now includes a region code if a product is designed specifically for a region. These codes are included in the Part Number column.

- ANZ = Australia and New Zealand
- EU = Europe
- MEX = Mexico
- CAN = Canada
- SA = South America
- NA = North America



Selecting the table setting is as important as the cooking controls used to deliver uncompromising excellence.

The Robertshaw® electromechanical and electronic controls offer reliability and custom solutions for setting, controlling and monitoring temperatures in commercial cooking applications.

Electric Infinite Switches .....	A2
Energy Regulators.....	A4
Electric Thermostats.....	A8
Gas Thermostats.....	A18
Gas Valves.....	A24
Oven Spark Ignition Modules .....	A31
Hot Surface Ignitors.....	A32



# COOKING





# COOKING

# Robertshaw®



5500-134

## ELECTRIC INFINITE SWITCHES

### 5500 Series

The Robertshaw® 5500 Series Infinite Switch is a rotary switch which controls the power dissipated by a heating element. It is used on electric ranges, hot plates, warming drawers and zones, barbecue grills, space heaters, quartz heaters and many applications which call for proportionate control of a resistive load.

### Features and Benefits

- Small compact design
- Clockwise or counterclockwise rotation
- Variety of shaft lengths and configurations
- Screw mount or bushing mount
- Push-To-Turn (PTT) or Non-Push-To-Turn (Non-PTT)

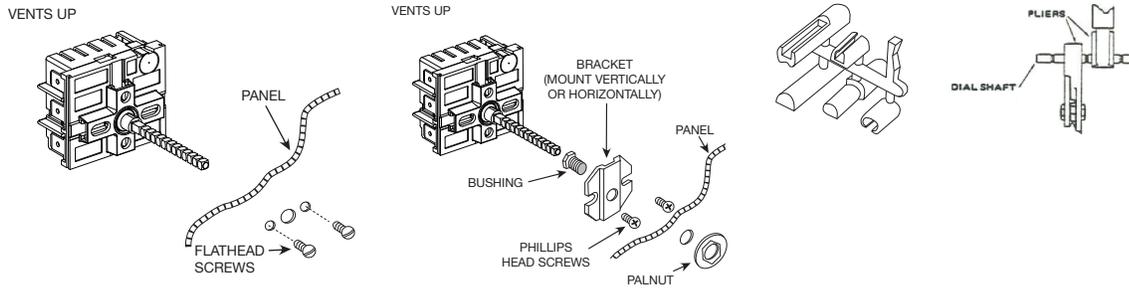
### Specifications

Part Numbers	Description	% Input at Low	Dial	Dial Shaft Type	Dial Shaft Length	Mounting Type	Electrical Rating
5500-102M	Residential 120V AC Uni-Kit®	5%	None	A	2"	Universal	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5500-134M	Commercial 120V AC Uni-Kit	5%	Black	D	2"	Universal	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5500-135M	Commercial 120V AC Uni-Kit	5%	White	D	2"	Universal	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5500-200M	Residential 240V AC Uni-Kit Push-to-Turn	5%	None	A	2"	Universal	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5500-202M	Residential 240V AC Uni-Kit	5%	None	A	2"	Universal	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5500-212M	Residential 240V AC PTT Uni-Kit - GE	5%	None	G	2"	Universal	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5500-234M	Commercial 240V AC Uni-Kit	5%	Black	D	2"	Universal	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5500-235M	Commercial 240V AC Uni-Kit	5%	White	D	2"	Universal	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5500-287M	Residential 240V AC PTT Uni-Kit - Whirlpool	5%	None	D	1 3/8"	Screw	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5502-303M	240V AC Infinite Switch	5%	None	P	1"	Palnut	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5502-350M	240V AC Infinite Switch	5%	None	P	1"	Palnut	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5502-448M	240V AC Infinite Switch	5%	None	P	.812"	Screw	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5502-468M	240V AC Infinite Switch	23%	None	P	.875"	Palnut	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)
5502-915M	120V AC Infinite Switch	5%	None	P	.812"	Screw	100 to 3600 Watts at 240V AC 15 Amps @ 200°F (93°C)



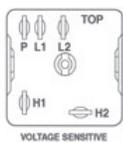


## Product Drawings



## Wiring Robertshaw VSI To Robertshaw 5500M Series

Connect wires from old switch to new switch as follows:



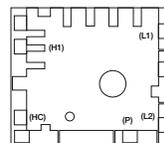
**VSI Switch**  
Terminal #

- L1
- L2
- P
- H1
- H2

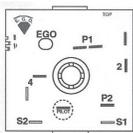
connect to  
connect to  
connect to  
connect to  
connect to

**5500 M (MPA) Switch**  
Terminal #

- L1
- L2
- P
- H1
- HC



## Wiring Ego To Robertshaw



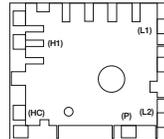
**Old (EGO) Switch**  
Terminal #

- P1
- P2
- Pilot
- 4
- 2

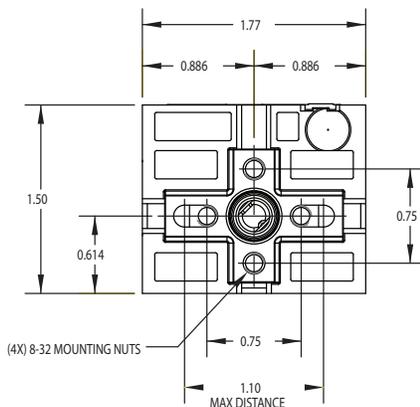
connect to  
connect to  
connect to  
connect to  
connect to

**5500 M (MPA) Switch**  
Terminal #

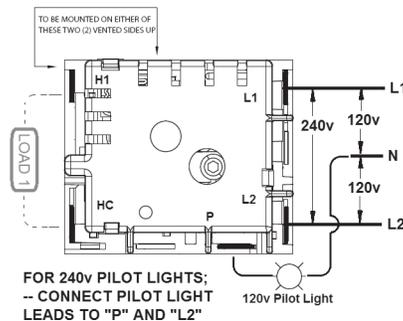
- L2
- L1
- P
- H1
- HC



## Mounting Dimensions



## Wiring Schematic



1 Year  
Limited  
Warranty



# COOKING

Robertshaw®



M32314K

## ENERGY REGULATORS

### M Series

The Robertshaw® M Series Infinite Switch is a rotary switch which controls the power dissipated by a heating element. It is used on electric ranges, hot plates, warming drawers and zones, barbecue grills, space heaters, quartz heaters and many applications which call for proportionate control of a resistive load.

### Features and Benefits

- Small compact design
- Single, dual or triple outputs
- New and improved mounting
- Bushing mount design is also available on some models
- Double line break
- Clockwise or counterclockwise rotation
- Variety of shaft lengths and configurations
- Push-To-Turn (PTT) or Non-Push-To-Turn (Non-PTT)

### Specifications

Part Numbers	Description	% Input at Low	Dial Shaft Type	Dial Shaft Length	Mounting Type	Voltage	Electrical Rating
M32314K (ANZ)	Energy Regulator Universal Kit Single Load with Pilot and Neutral Break	2% to 9% (45° arc)	Plastic D	14mm + 8mm Bushing	M10 Bushing	230/240V AC 15 Amps	100 to 3600 Watts
M55314K (ANZ)	Energy Regulator Universal Kit Single Load with Phase Break	2% to 9% (45° arc)	Metal Square	17.4mm + 8mm Bushing	M10 Bushing	230/240V AC 15 Amps	100 to 3600 Watts
M58314K (ANZ)	Energy Regulator Universal Kit Single Load with Isolated Pilot	2% to 9% (45° arc)	Metal Square	17.4mm + 8mm Bushing	M10 Bushing	230/240V AC 15 Amps	100 to 3600 Watts
M82314K (ANZ)	Energy Regulator Universal Kit Dual Load with Phase Break	2% to 9% (30° arc)	Metal Square	17.4mm + 8mm Bushing	M10 Bushing	230/240V AC 15 Amps	100 to 3600 Watts
MP101K (ANZ)	Energy Regulator Universal Kit Single Load with Pilot Switch	2% to 9% (45° arc)	Plastic D	14mm + 8mm Bushing	M10 Bushing	230/240V AC 15 Amps	100 to 3600 Watts

Part Numbers	Replaces	Factory Number
M32314K	INF-32314	MPA-101-M
M55314K	INF-55314	M3-158-M
M58314K	INF-58314	MS-158-M
M82314K	INF-82314	MD3-157-M

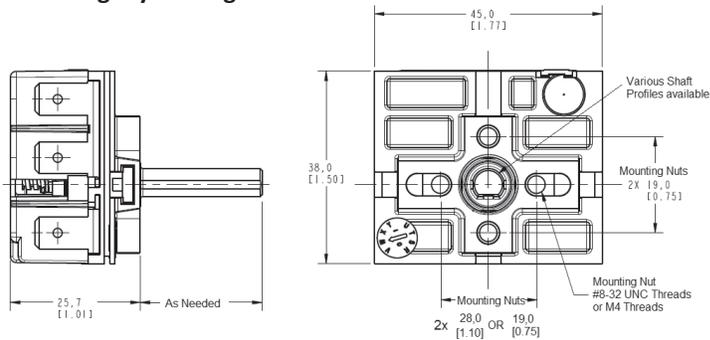
Part Numbers	Replaces	Factory Number
MP101K	NA	MP-101-M
M601	NA	MST-Z601-M
M602	NA	MSCT-Z601-M
M01	NA	MSA-V01-M



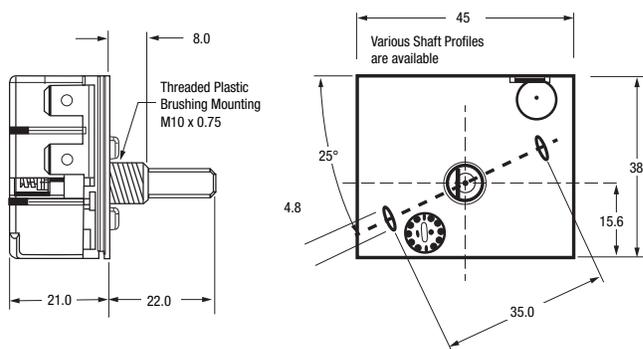


## Product Drawings

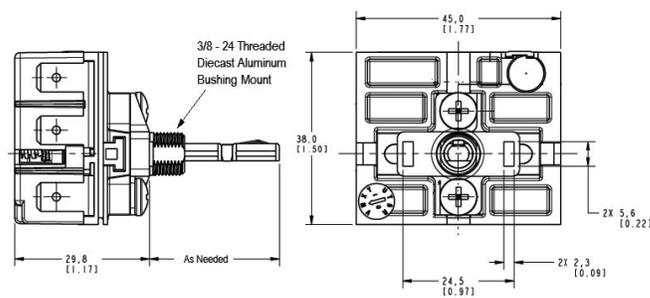
### Nut Mounting Style - Single and Dual



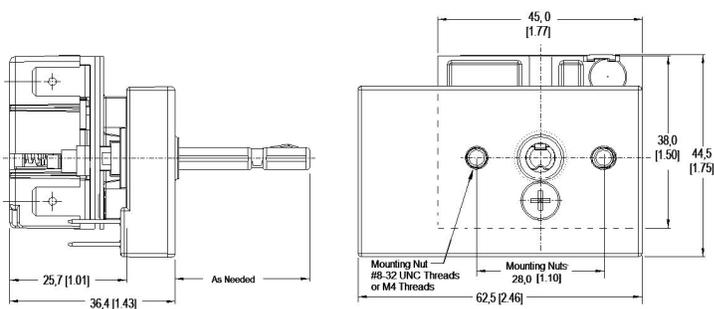
### Bushing Mount Style - Single and Dual



### Alternate Bushing Mount Style - Single and Dual



### Nut Mounting Style - Triple

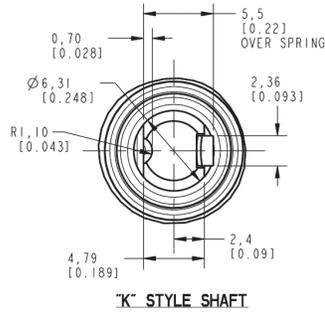
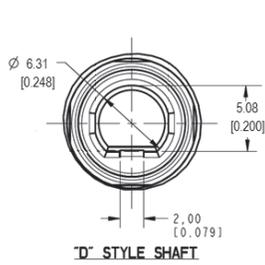


**1** Year  
Limited  
Warranty

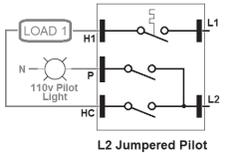
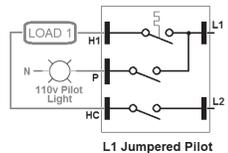
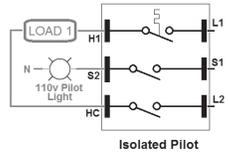
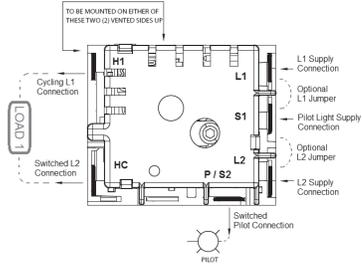


## Product Drawings

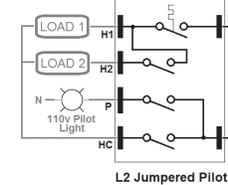
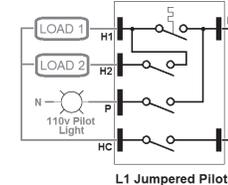
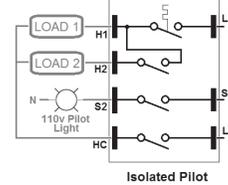
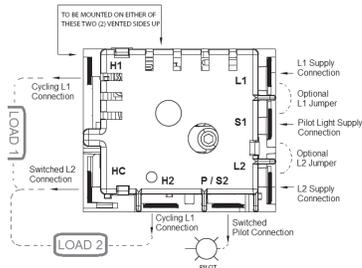
### Knob Shaft Styles



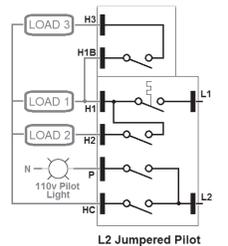
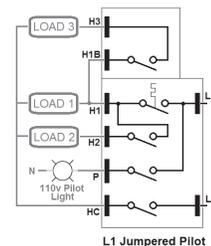
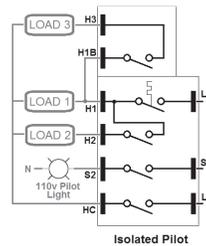
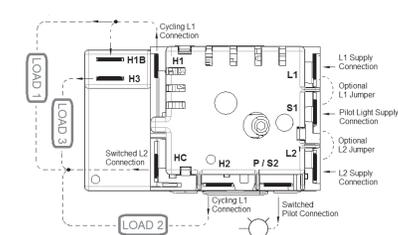
### Single Load



### Dual Load



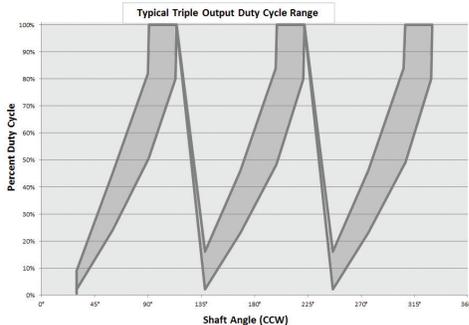
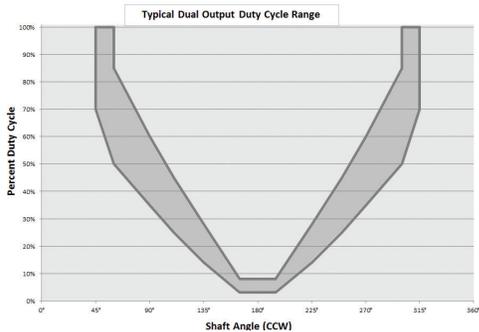
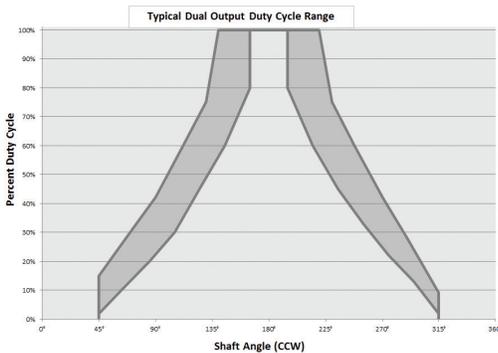
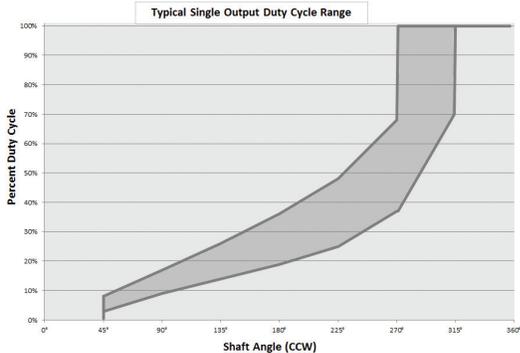
### Triple Load



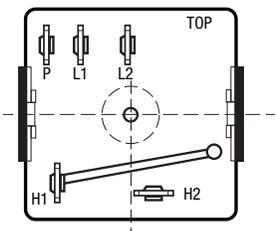


## Product Drawings

### Duty Cycle Output Curves

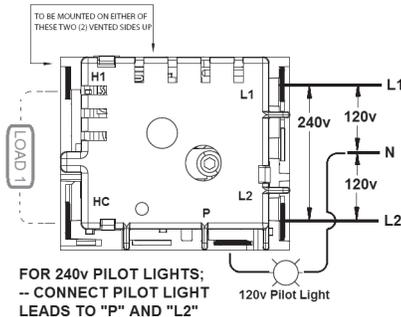


## Wiring Diagrams



- VSI Switch Series 5500 Terminal #
- L1 connect to
  - L2 connect to
  - P connect to
  - H1 connect to
  - H2 connect to

- M series Switch Series 5500 M Terminal #
- L1
  - L2
  - P
  - H1
  - HC





# COOKING

# Robertshaw®



5300-614



5300-401

## ELECTRIC THERMOSTATS

### 5300 Series

The Robertshaw® 5300 Series Electric Thermostat is a snap-acting, single pole single throw (SPST) type thermostat. Most thermostats use silver contacts and have heavy-duty terminals for durability and sustained accuracy. The snap-action mechanism is precise and reliable. This direct acting series of thermostats is suitable for the commercial cooking industry.

### Features and Benefits

- KN models are NAK filled diastats with temperature ranges up to 975°F (524°C)
- Rugged and compact design for versatility and long life
- Bulb and capillary available in copper, nickel plated copper and stainless steel (most models)
- Plastic coating available for protection against moisture, dust, etc. (most models)
- Dials of heat resistant plastic available
- RX millivolt models with hermetically sealed reed switch
- Stem flat in down position
- Ambient temperature 200°F (93°C)

### Specifications

Part Numbers	Description	Temperature Range	Capillary Length	Bulb Size	Stem Length	Mounting Bracket	Dial Type	Mechanical Differential	Stuffing Box	Electrical Rating
5300-041	RX-1 Model	60°F to 250°F	48"	3/8" x 4-1/2"	3/16"	#1, 1-3/4"	4-Way	8°F	NA	0.67 Amp @ 5V DC
5300-146	SJ Pilot Duty Model with Auxiliary Switch	100°F to 450°F	36"	3/16" x 11-1/8" Nickel	13/16"	#1, 1-3/4"	4-Way	12°F	NA	30 Amp @ 277V AC 20 Amp @ 480V AC 18 FLA, 72 LRA @ 250V AC 125 VA Pilot Duty at 120/277 Volts
5300-175	S Model	100°F to 325°F	36"	3/16" x 11-3/4" Nickel	13/16"	#1, 1-3/4"	NA	12°F	NA	30 Amp @ 277V AC 20 Amp @ 480V AC 18 FLA, 72 LRA @ 250V AC 125 VA Pilot Duty at 120/277 Volts
5300-219	SP Model	60°F to 240°F	36"	1/4" x 6-7/16" Copper	3/8"	#1, 1-3/4"	NA	8°F	NA	30 Amp @ 277V AC 20 Amp @ 480V AC 18 FLA, 72 LRA @ 250V AC 125 VA Pilot Duty at 120/277 Volts
5300-401	RX Millivolt Model with Hermetically Sealed Reed Switch	200°F to 400°F	36"	3/8" x 5-5/8" Nickel	13/16"	#1, 1-3/4"	4-Way	8°F	1/4" Nickel	0.67 Amp @ 5V DC





## Specifications - continued

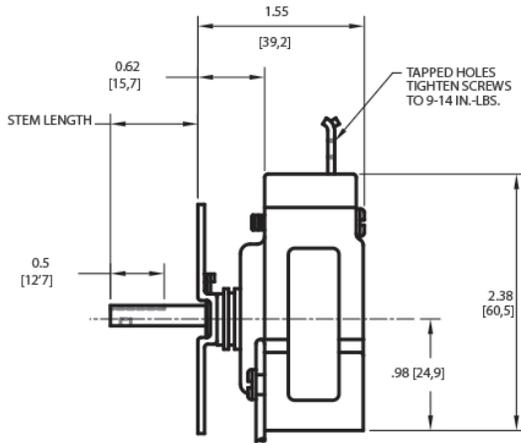
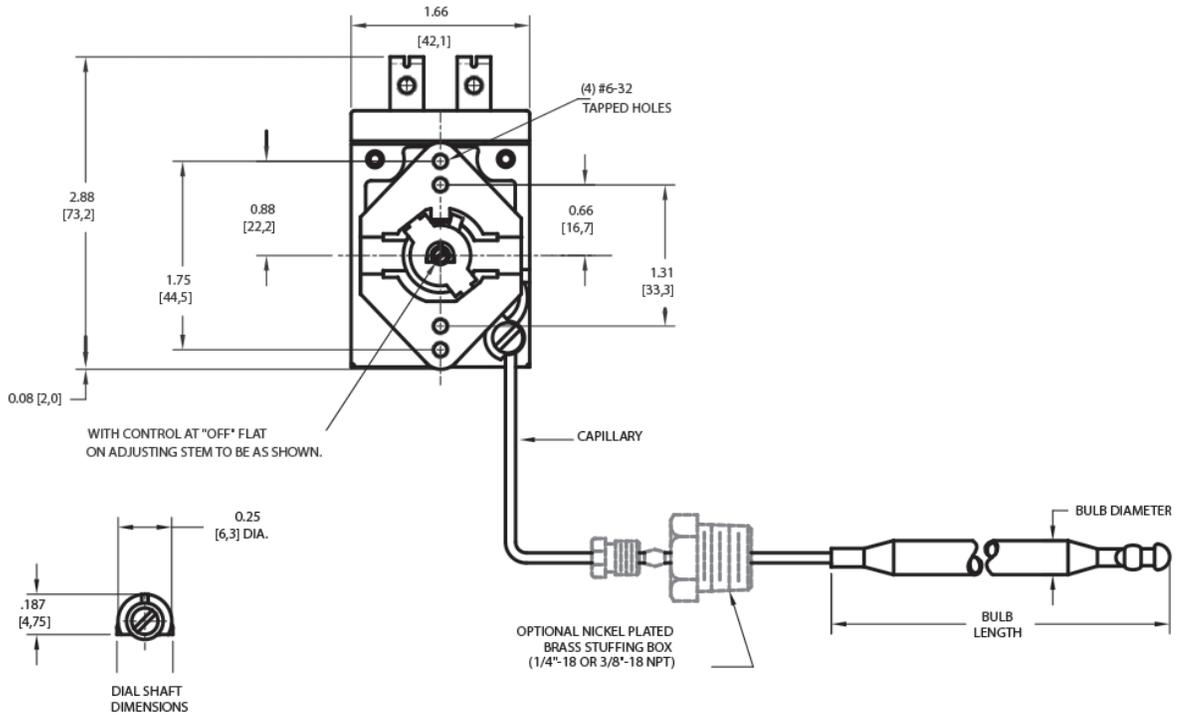
Part Numbers	Description	Temperature Range	Capillary Length	Bulb Size	Stem Length	Mounting Bracket	Dial Type	Mechanical Differential	Stuffing Box	Electrical Rating
5300-406	RX Millivolt Model with Hermetically Sealed Reed Switch	200°F to 375°F	36"	3/8" x 5-5/8" Nickel	13/16"	#1, 1-3/4"	4-Way	8°F	3/8" Nickel	0.67 Amp @ 5V DC
5300-502	KNP Model with 1-10 Dial (Wide)	250°F to 960°F	36"	5/32" x 8-3/4" Stainless Steel	1"	#5, 1-1/4"	4-Way	25°F	NA	27 Amp @ 208V AC 25 Amp @ 240V AC 22.5 Amp @ 277V AC 20 Amp @ 480V AC 125 VA Pilot Duty at 120/277 Volts
5300-612	SP Model Uni-Kit®	60°F to 250°F	60"	1/4" x 9-1/4" Copper	2" Kit	#6, Kit	4-Way	8°F	NA	30 Amp @ 277V AC 20 Amp @ 480V AC 18 FLA, 72 LRA @ 250V AC 125 VA Pilot Duty at 120/277 Volts
5300-614	SP Model Uni-Kit	60°F to 250°F	60"	3/8" x 4-1/2" Nickel	2" Kit	#6, Kit	4-Way	8°F	NA	30 Amp @ 277V AC 20 Amp @ 480V AC 18 FLA, 72 LRA @ 250V AC 125 VA Pilot Duty at 120/277 Volts
5300-618	SP Model Uni-Kit	100°F to 450°F	60"	3/16" x 11-1/8" Nickel	2" Kit	#6, Kit	4-Way	12°F	NA	30 Amp @ 277V AC 20 Amp @ 480V AC 18 FLA, 72 LRA @ 250V AC 125 VA Pilot Duty at 120/277 Volts
5300-641	SP Model Uni-Kit	200°F to 400°F	36"	5/16" x 7-1/2" Nickel	2" Kit	#6, Kit	4-Way	8°F	3/8" Nickel	30 Amp @ 277V AC 20 Amp @ 480V AC 18 FLA, 72 LRA @ 250V AC 125 VA Pilot Duty at 120/277 Volts
5300-651	SP Model Uni-Kit	175°F to 550°F	60"	3/16" x 11-5/8" Nickel	2" Kit	#6, Kit	4-Way	12°F	NA	30 Amp @ 277V AC 20 Amp @ 480V AC 18 FLA, 72 LRA @ 250V AC 125 VA Pilot Duty at 120/277 Volts
5300-671	SP Model Uni-Kit	300°F to 700°F	60"	3/16" x 12-1/4" Nickel	2" Kit	#6, Kit	4-Way	12°F	NA	30 Amp @ 277V AC 20 Amp @ 480V AC 18 FLA, 72 LRA @ 250V AC 125 VA Pilot Duty at 120/277 Volts
5300-711	KX Pilot Duty Model Dip Sealed	200°F to 400°F	36"	3/8" x 5-5/8" Nickel	13/16"	#1, 1-3/4"	4-Way	8°F	1/4" Nickel	50 VA Pilot Duty at 120 / 277 Volts
5300-735	KXP Pilot Duty Model Uni-Kit	175°F to 550°F	60"	3/16" x 11-5/8" Nickel	2" Kit	#6, Kit	4-Way	12°F	NA	50 VA Pilot Duty at 120 / 277 Volts
5300-766	KX Pilot Duty Model	200°F to 400°F	24"	5/16" x 5-5/8" Stainless Steel	13/16"	#1, 1-3/4"	4-Way	8°F	3/8" Nickel	50 VA Pilot Duty at 120 / 277 Volts





## Product Drawings

Product Dimensions - Dimensions are inches and [millimeters].





## ELECTRIC THERMOSTATS - LIMIT CONTROLS

### 5225 Series

The Robertshaw® 5225 Series Limit Control is designed for any appliance where temperature protection is needed. All 5225 Series controls are non-adjustable, factory calibrated, and feature negative biased power element diaphragms. The 5225 Series is a proven safety control for commercial and specialty applications. They are available in automatic or manual reset versions with temperature settings from 425°F to 600°F (218°C to 316°C).

### Features and Benefits

- Bulb and capillary assemblies available in nickel plated copper
- Available in manual reset or automatic operation
- Control function is designed to interrupt power in the appliance circuit at the calibrated temperature



5225-112

### Specifications

Part Numbers	Description	Fixed Temperature	Capillary Length	Bulb Size	Mounting Bracket	Stuffing Box
5225-009	LCH Manual Reset Limit Control	450°F	30"	5/16" x 3-5/8" Nickel	#1	NA
5225-010	LCC Automatic Reset Limit Control	450°F	60"	3/16" x 4-7/8" Nickel	#1	3/8"
5225-047	LCH Manual Reset Limit Control	450°F	24"	3/16" x 7-5/8" Nickel	#1	3/8"
5225-054	LCH Manual Reset Limit Control	440°F	30"	1/4" x 4-7/8" Nickel	#7	Panel Nut
5225-112	LCH Manual Reset Limit Control	450°F	30"	1/4" x 4-7/8" Nickel	#3	1/4"

Model	Description	UL Rating	CSA Rating	European
LCH	SPST - Break on Temperature Rise Manual Reset. Type M2*	30 A, 250V AC @ 125-480 V AC 35 VA PD @ 24 V, 60 Hz	30 A @ 125-480V AC	30 A @ 480V AC
LCC	SPDT - Make and / or Break on Temperature Rise. Automatic Reset	25 A, 250 VA @ 125-480 V, 60 Hz 35 A @ 24V AC	25 A, 250 V AC @ 125-480V AC 35 VA PD @ 24 V, 60 Hz	25 A @ 480V AC

\*M2 switch - trip free - will not recycle if reset button is depressed



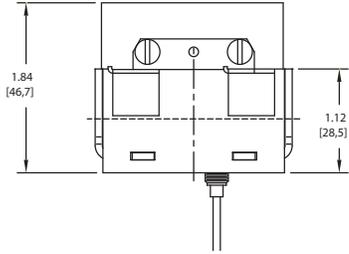


## Product Drawings

Product Dimensions - Dimensions are inches and [millimeters].

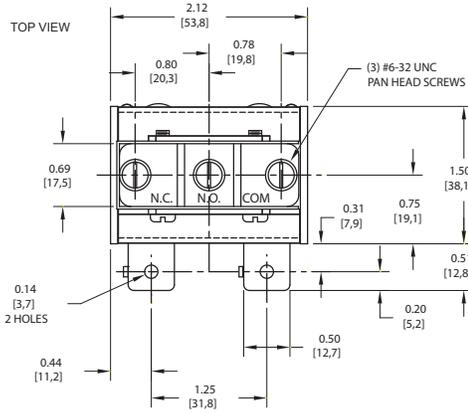
### MODEL LCC

FRONT VIEW

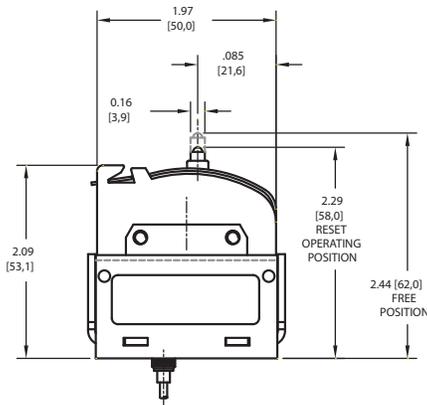


### MODEL LCC

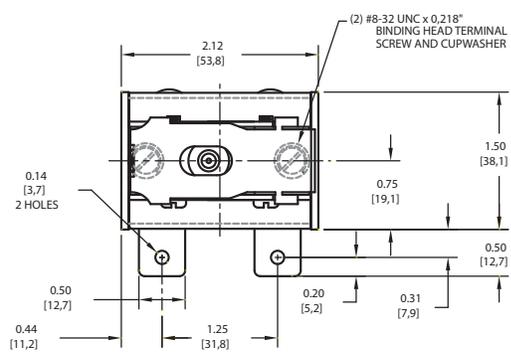
TOP VIEW



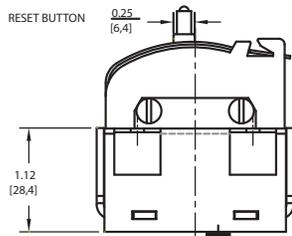
### MODEL LCH



### MODEL LCH



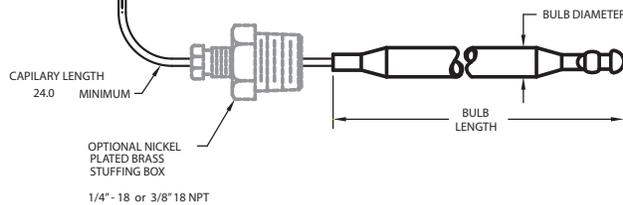
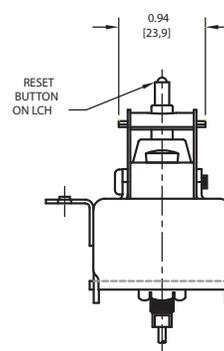
### MODEL LCH



### Panel Nut



### MODEL LCH

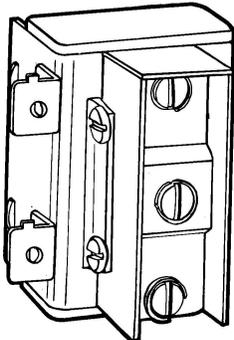




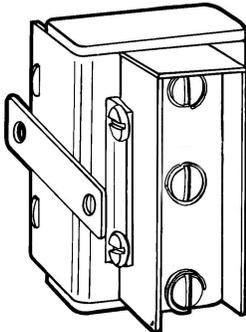
## Product Drawings

Mounting Bracket Types

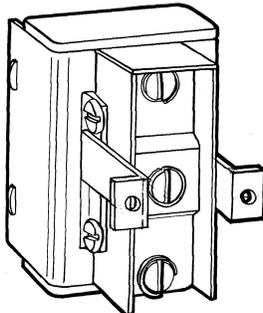
Type #1



Type #3



Type #7



*Robertshaw*<sup>®</sup>

**1** Year  
Limited  
Warranty





# Robertshaw®



5210-125

## ELECTRIC THERMOSTATS

### 5210 Series

The Robertshaw® 5210 Series Electric Thermostat is a direct acting, single pole, slow make and break type thermostat. Typical applications are for incubators, laboratory ovens, water baths, sterilizers, dishwashers, steam tables, scalding tanks and other equipment where a close temperature differential is required.

### Features and Benefits

- Temperature ranges to 550°F (288°C)
- Single pole, slow make and break design
- Very sensitive to temperature change
- Small temperature differential between make and break
- Fine silver contacts to assure consistent switch action and long life
- Rugged and compact design for versatility of application
- Bulb and capillary available in copper or nickel plated copper

### Specifications

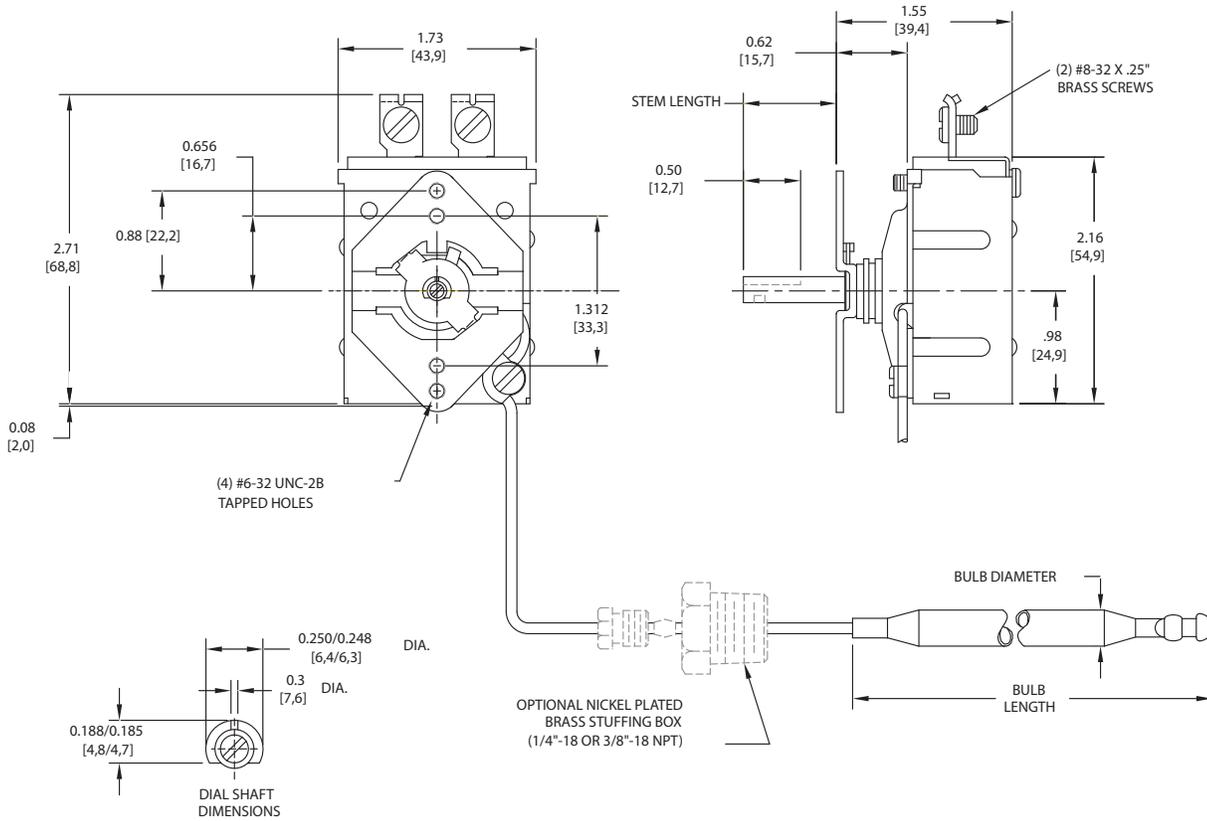
Part Numbers	Description	Dial Temperature Range	Ambient Temperature	Capillary Length	Bulb Size	Electrical Rating
5210-125	B-10 Commercial Direct Acting Thermostat	60°F to 200°F (15°C to 93°C)	32°F to 150°F (0°C to 60°C)	42"	3/16" x 15-3/8" Nickel	20 Amps @ 125V AC 15 Amps @ 250V AC 125VA PD @ 125V AC





## Product Drawings

Product Dimensions - Dimensions are inches and [millimeters].



*Robertshaw*<sup>®</sup>

**1** Year  
Limited  
Warranty



5000-851

## ELECTRIC THERMOSTATS

### 5000 Series

The Robertshaw® 5000 Series Electric Thermostat is a heavy-duty thermostat designed for use in harsh applications where precise temperature control is required. The control uses a double pole single throw (DPST) snap-action mechanism with a positive OFF switch. It is recommended for use on applications that require double pole operation and accurate temperature control.

### Features and Benefits

- DPST with positive OFF
- Mechanical snap-action is instantaneous, positive and non-fatiguing
- Reacts to exceedingly small movements of the diaphragms for very close temperature differential
- Diaphragm assembly features two stainless steel diaphragms electrically welded together
- Maximum sensitivity without over-stressing the metal
- Supplied with terminals mounted in four different positions
- Bulb and capillary available in copper, nickel plated copper, or stainless steel

### Specifications

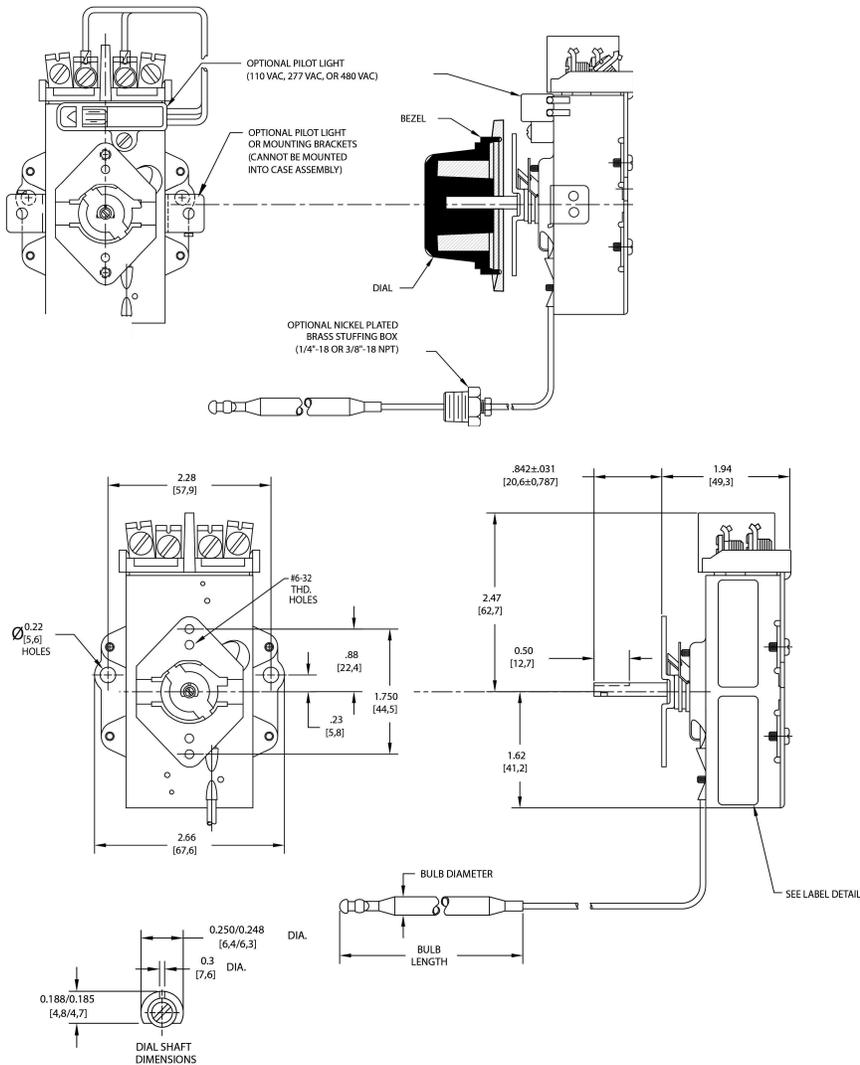
Part Numbers	Description	Dial Temperature Range	Capillary Length	Bulb Size	Dial Type	Mechanical Differential	Electrical Rating
5000-811	D1 & D18 Commercial Electric Thermostat with Pilot Light, 4-Way Bezel, Uni-Kit®	60°F to 250°F (15°C to 121°C)	60"	3/8" x 4-1/2"	4-Way	6°F (3°C)	120, 277V AC @ 30A 480V AC @ 10A 277V AC @ 250VA 125V AC @ 125VA
5000-851	D1 & D18 Commercial Electric Thermostat with Pilot Light, 4-Way Bezel, Uni-Kit	100°F to 550°F (38°C to 288°C)	60"	3/16" x 13" Nickel	4-Way	6°F (3°C)	120, 277V AC @ 30A 480V AC @ 10A 277V AC @ 250VA 125V AC @ 125VA
5210-124	B10 Commercial Electric Thermostat	60°F to 210°F (15°C to 98°C)	36"	3/16" x 15-3/8" Nickel	Consider 40-463 dial 60-250° if needed	2°F (-16°C)	20 Amp @ 120V AC Resistive Load 15 Amp @ 240V AC Resistive Load





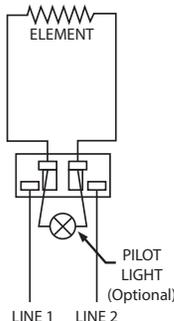
*Robertshaw*<sup>®</sup>

## Product Drawings

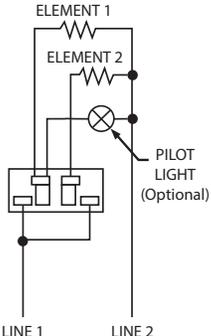


## Wiring Diagram

SINGLE ELEMENT  
DOUBLE POLE  
SINGLE PHASE



TWO ELEMENTS  
SINGLE POLE  
SINGLE PHASE





# COOKING

# Robertshaw®



4350-028



4590-705

## GAS THERMOSTATS

### 4350 Series

The Robertshaw® 4350 Series Gas Thermostat is a combination gas cock and by-pass type thermostat. It is available with both by-pass and pilot adjustments. With these thermostats, the gas is turned on and the temperature setting made with a single turn of the dial. The 4350 Series is available for a wide variety of applications, especially ranges and griddles.

### Features and Benefits

- Highly adaptable because of multiple orientations and number of outlets
- Mounted, via flange nipple, above or below the manifold
- Available with various temperature ranges
- Front adjustment for pilot and by-pass
- Modulating seat action
- Bulb and capillary available in copper, nickel plated copper and stainless steel

## Specifications

Part Numbers	Description	Max Inlet Pressure	Main Outlet Size	Main Outlet Position	Housing Rotated	Pilot Outlet	Flange Type	Capillary Length	Sensing Bulb	Capacity (Natural Gas)	Temperature Range
4350-015	BJWA Control for Ovens	0.5 PSI	1/4" Pipe	B	180°	Plug	Narrow	48"	3/16" x 11-3/16"	70,000 BTU/HR	250°F to 500°F (121°C to 260°C)
4350-027	BJWA Kit for Ovens	0.5 PSI	1/4" Pipe	A, B, C, D	No	Yes	Wide	48"	3/16" x 11-3/16"	70,000 BTU/HR	250°F to 550°F (121°C to 288°C)
4350-028	BJWA Kit for Griddles	0.5 PSI	1/4" Pipe	A, B, C, D	No	Yes	Wide	36"	3/16" x 8-5/8"	70,000 BTU/HR	150°F to 400°F (66°C to 205°C)
4350-029	BJWA Kit for Ovens	0.5 PSI	7/16" Tubing	C	No	Yes	Wide	48"	3/16" x 11-3/16"	70,000 BTU/HR	250°F to 550°F (121°C to 288°C)
4350-040	BJWA Control for Ovens	0.5 PSI	1/4" Pipe	D	90° Clockwise	Plug	Narrow	48"	3/16" x 11-3/16"	70,000 BTU/HR	250°F to 550°F (121°C to 288°C)
4350-127	BJWA Kit for Ovens	0.5 PSI	1/4" Pipe	A, B, C, D	180°	No	Wide	48"	3/16" x 11-3/16"	70,000 BTU/HR	250°F to 550°F (121°C to 288°C)
4350-128	BJWA Kit for Griddles	0.5 PSI	1/4" Pipe	A, B, C, D	180°	No	Wide	48"	3/16" x 8-5/8"	70,000 BTU/HR	150°F to 400°F (66°C to 205°C)

## Accessories

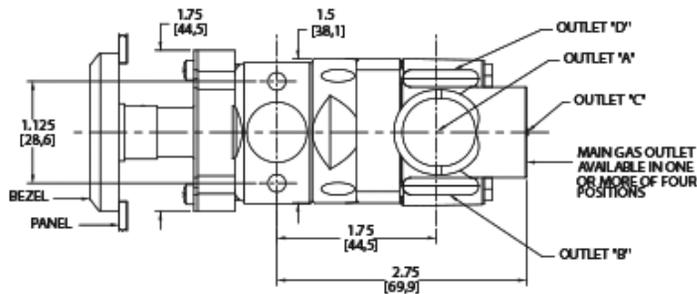
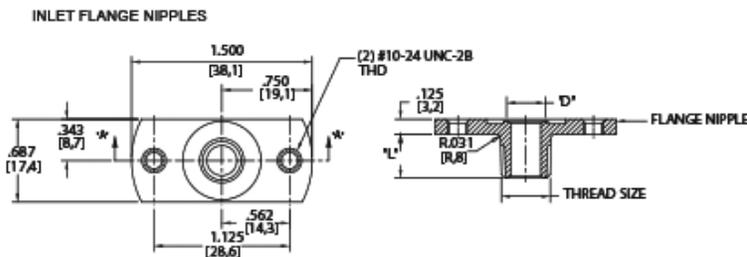
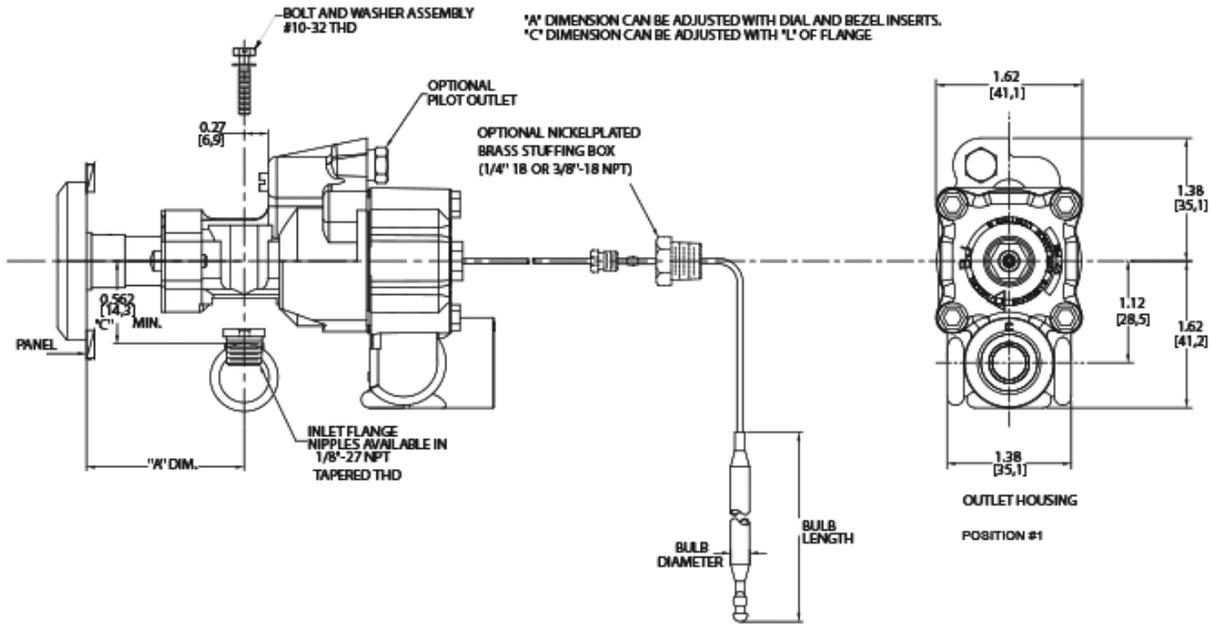
Part Numbers	Description
4590-705	BJ Stem Extension (Package of 6)





## Product Drawings

Product Dimensions - Dimensions are inches and [millimeters].





# COOKING

Robertshaw®



4290-008

## GAS THERMOSTATS

### 4290 Series

The Robertshaw® 4290 Series Gas Thermostat is a snap-acting hydraulic thermostat and used to provide temperature control by interrupting gas flow to the burner. The 4290 Series gas thermostat is available for a wide variety of applications including small ovens, griddles, brooders, warming cabinets, and fryers.

### Features and Benefits

- Capable up to 30,000 BTUs
- Available in various temperature ranges, with temperature control up to 600°F (316°C)
- Snap-acting from Off position to full gas flow
- Adjustable bypass key and bypass settings are optional
- Applicable to use with high capacity gas operated diaphragm valves (700-800 Series)
- Adapts to limited mounting space
- Bulb and capillary assemblies supplied in nickel plated copper or stainless steel
- Dials in heat resistant plastic are included
- Ambient temperature is 300°F (149°C)

## Specifications

Part Numbers	Description	Capillary Length	Bulb Size	Inlet Size	Outlet Size	Stuffing Box	Pilot Outlet	Stem Flat	Temperature Range
4290-006	GS Gas Snap-Action Hydraulic Control	30"	3/8" x 5-3/8" Nickel	1/4" Tubing	1/4" Tubing	1/4" Nickel	NA	Down	200°F to 410°F (93°C to 210°C)
4290-008	GS Gas Snap-Action Hydraulic Control	60"	3/8" x 4-1/2" Nickel	3/8" Pipe	3/8" Pipe	3/8" Nickel	NA	Down	60°F to 250°F (16°C to 121°C)
4290-020	GS Gas Snap-Action Hydraulic Control	36"	3/16" x 13" Nickel	1/4" Tubing	1/4" Tubing	NA	NA	Down	200°F to 550°F (93°C to 288°C)

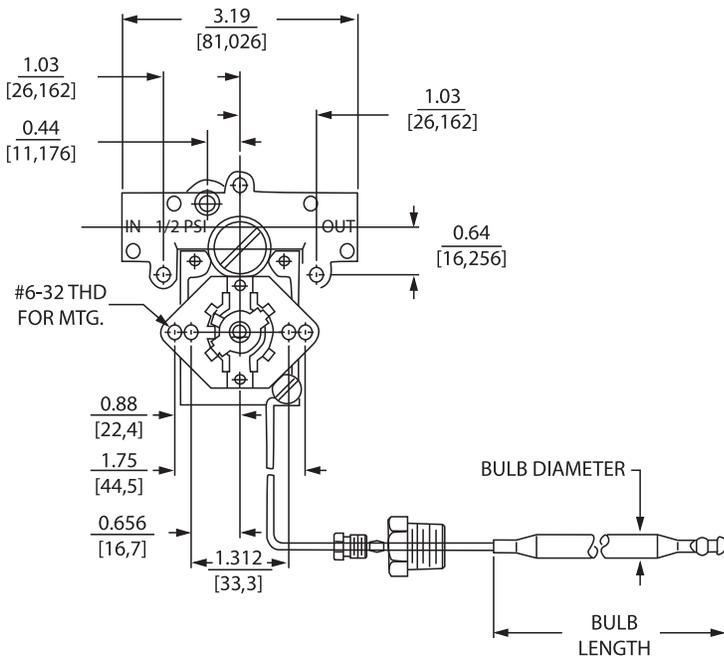




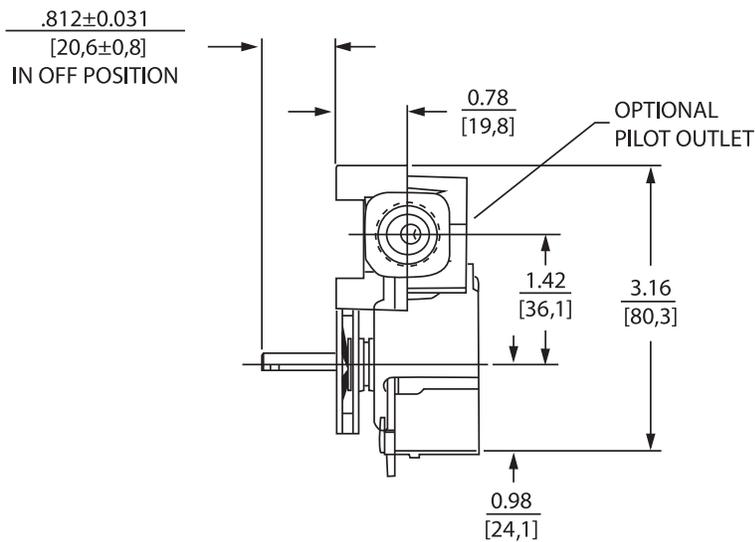
## Product Drawings

Product Dimensions - Dimensions are inches and [millimeters].

Front View



Right View





## GAS THERMOSTATS



4200-005  
Type #2 Body



4200-025  
Type #1 Body

### 4200 Series

The Robertshaw® 4200 Series Gas Thermostat is a heavy-duty, high capacity gas thermostat. These units are available with modulating only or with modulating snap-acting bypass. Both pilot and bypass adjustments are provided. Pilot outlets and customized settings are optional. They are available for a wide variety of applications such as deck ovens, convection ovens, baking ovens, and ranges.

### Features and Benefits

- Heat resistant materials and rugged design
- The pilot and bypass keys are accessible and the pilot and keys are slotted for easy adjustment from the front of the control
- Provides temperature control on most gas appliance systems
- Allows for low temperature control
- Modulates the main gas supply and controls the bypass gas with a snap under the same thermostatic action
- Bulb and capillary assemblies supplied in copper, nickel plated copper or steel
- 4-Way mounting position
- RoHS Compliant

### Specifications

Part Numbers	Description	Inlet Side "F"	Inlet Rear "H"	Outlet Side "E"	Outlet Rear "G"	Pilot Outlet	Capillary Length	Bulb Size	Temperature Range
4200-005	FDO Gas Thermostat, Body Type #2	1/2" Pipe	NA	1/2" Pipe	NA	Side	48"	3/16" x 14-3/4" Nickel	150°F to 550°F (66°C to 288°C)
4200-007	FDO Gas Thermostat Body Type #1	1/2" Pipe	NA	1/2" Pipe	NA	Side	48"	1/4" x 8-7/16" Nickel	150°F to 550°F (66°C to 288°C)
4200-011	FDTO Gas Thermostat, Body Type #2	1/2" Pipe	NA	1/2" Pipe	NA	Side	48"	3/16" x 14-3/4" Nickel	200°F to 550°F (93°C to 288°C)
4200-025	FDO Gas Thermostat Uni-Kit® Body Type #1	3/8" Pipe	3/8" Pipe	3/8" Pipe	3/8" Pipe	Side & Rear	54"	3/16" x 14-3/4" Nickel	150°F to 550°F (66°C to 288°C)
4200-026	FDTO Gas Thermostat Uni-Kit Body Type #1	3/8" Pipe	3/8" Pipe	3/8" Pipe	3/8" Pipe	Side & Rear	54"	3/16" x 14-3/4" Nickel	200°F to 550°F (93°C to 205°C)
4200-503	FDTH Gas Thermostat Body Type #1	1/2" Pipe	NA	1/2" Pipe	NA	Side	48"	3/16" x 15-3/8" Nickel	300°F to 650°F (149°C to 343°C)
4200-505	FDTH Gas Thermostat, Body Type #2	1/2" Pipe	NA	1/2" Pipe	NA	Side	48"	3/16" x 14-3/4" Nickel	300°F to 650°F (149°C to 343°C)
4200-508	FDH Gas Thermostat, Body Type #2	1/2" Pipe	NA	1/2" Pipe	NA	Side	48"	3/16" x 14-3/4" Nickel	300°F to 650°F (149°C to 343°C)

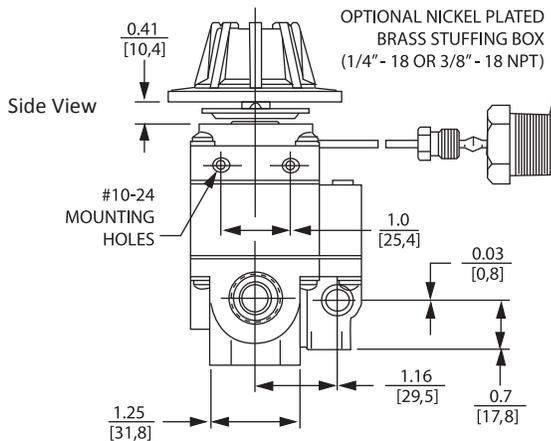
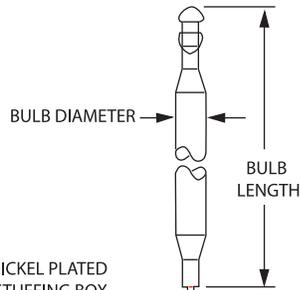
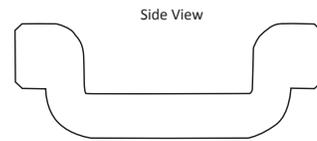
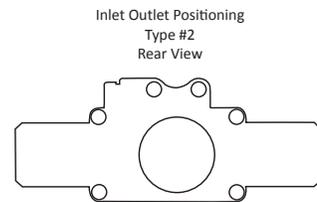
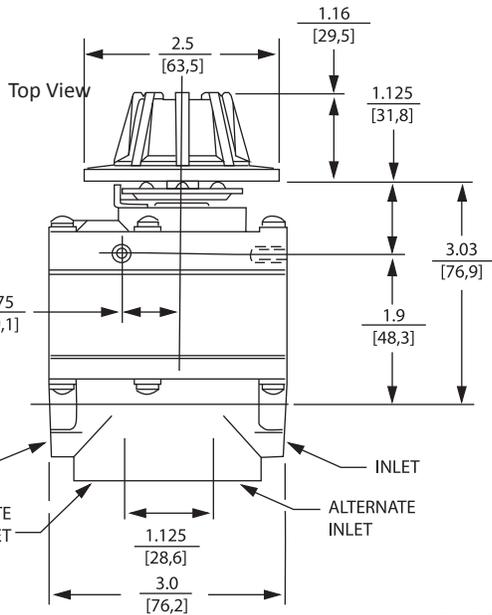
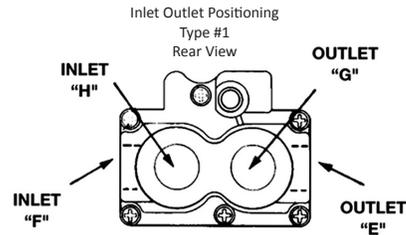
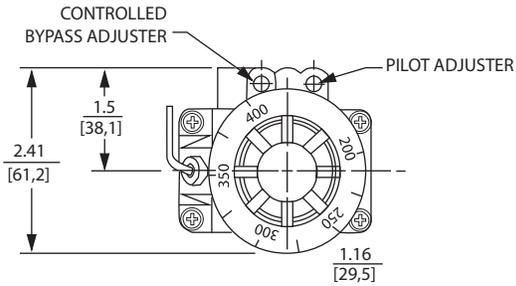




## Product Drawings

Product Dimensions - Dimensions are inches and [millimeters].

Front View



1 Year Limited Warranty



## GAS VALVES - BLEED CONTROL



700-886

### 700 Series

The Robertshaw® Unitrol® 700 Series Bleed Control Gas Valves combine a manual main and pilot gas valve, a separate automatic safety pilot valve, pilot adjustment valve, and a diaphragm valve. The regulated models also feature “straight line” gas pressure regulation. Robertshaw diaphragm gas valves are single function, and are excellent replacements for solenoid gas valves. Models are available with or without a gas cock and regulated or non-regulated. Standard features include pilot gas outlet, pilot gas filter and pilot adjustment key.

### Features and Benefits

- Normally closed solenoid
- Compact size with high flow rates
- Standard NEMA terminals
- Inlet filtered screen
- Various gas types: natural, manufactured, mixed, LP, and LP/air mixtures
- Multiple actuators available
- RoHS compliant

### Specifications

Part Numbers	Description	Capacity	Inlet Size	Outlet Size	Pressure Regulation	Reducer Bushings Included	Comments
700-803	Bleed Control Gas Valve	305,000 BTU	3/4"	3/4"	NA	NA	Can be used on regulated LP systems and is Thermocouple driven
700-804	Bleed Control Gas Valve	305,000 BTU	3/4"	3/4"	3.5" WC Natural Gas	NA	Has slow opening feature which can be removed and is Thermocouple driven
700-886	Bleed Control Gas Valve	305,000 BTU	3/4"	3/4"	3.5" WC Natural Gas	1/2" (x2)	Thermopile driven
700-887	Bleed Control Gas Valve	240,000 BTU	1/2"	1/2"	4.0" WC Natural Gas	NA	Thermopile driven

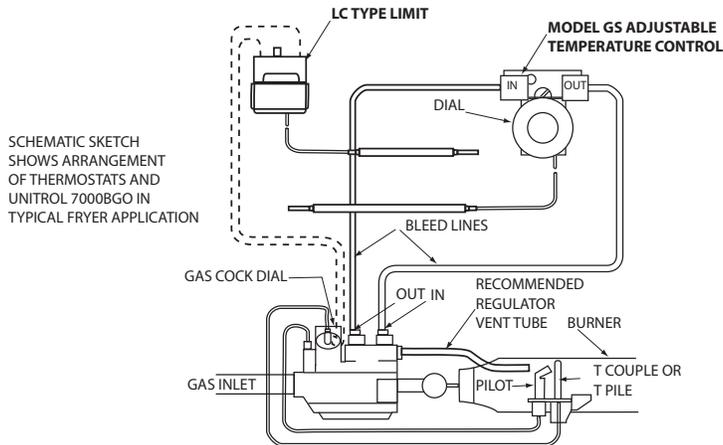
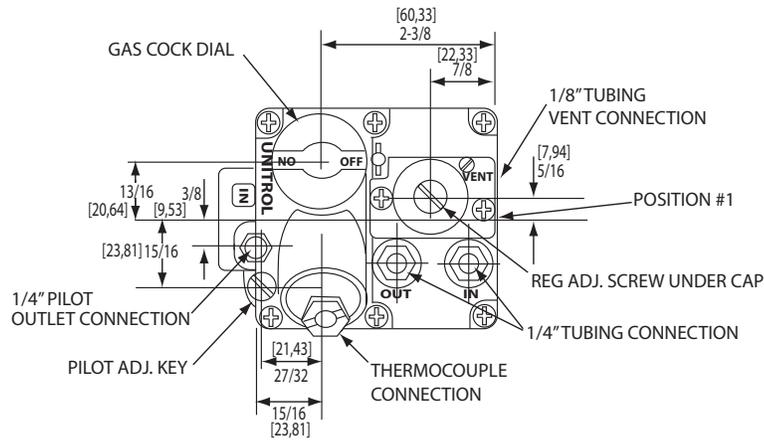
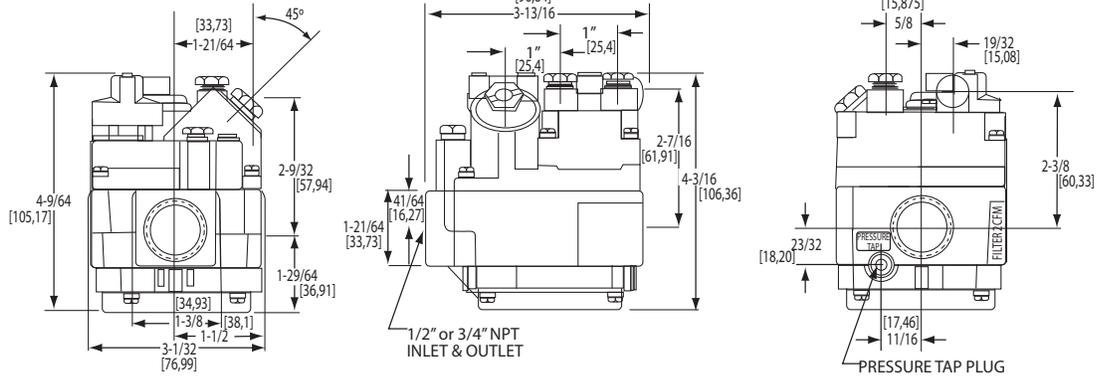




## Product Drawings

Product Dimensions - Dimensions are inches and [millimeters].

Drawings reflect 7000 GO bleed gas model.



**1** Year Limited Warranty



# Robertshaw®



4075-029



4075-200

## GAS VALVES - SOLENOID

### 4075 Series

The Robertshaw® 4075 Series Gas Solenoid is designed to control the flow of gas in cooking appliances. Both single FJT and dual FJTDO models are available for a wide variety of applications such as ovens, griddles and fryers.

### Features and Benefits

- Normally closed solenoid
- Multiple inlet/outlet configurations
- 1/8" side pilot outlets available
- Compact size with high flow rates
- Standard NEMA terminals
- Inlet filtered screen
- Gas types: natural, manufactured, fixed, LP and LP/air mixtures
- RoHS compliant
- AC rectification for silent operation

### Specifications

Part Numbers	Description	Inlet	Outlet	Pilot Outlet	Max Pressure	Capacity	Ambient Temperature	Electrical Rating	Comments
4075-029	FJT Single Gas Solenoid Valve	3/8" Pipe	3/8" Pipe	Left and Right	0.5 PSI	119,000 BTU	-40°F to 275°F (-40°C to 135°C)	24 / 120 / 240 Volts @ 50/60 Hz	Includes (2) 1/8" plugs
4075-200	FJTDO Dual Gas Solenoid Valve	3/8" Pipe	3/8" Pipe	NA	0.5 PSI	165,000 BTU both 110,000 BTU each	-40°F to 275°F (-40°C to 135°C)	24 / 120 / 240 Volts @ 50/60 Hz	0.10 Amp Coil

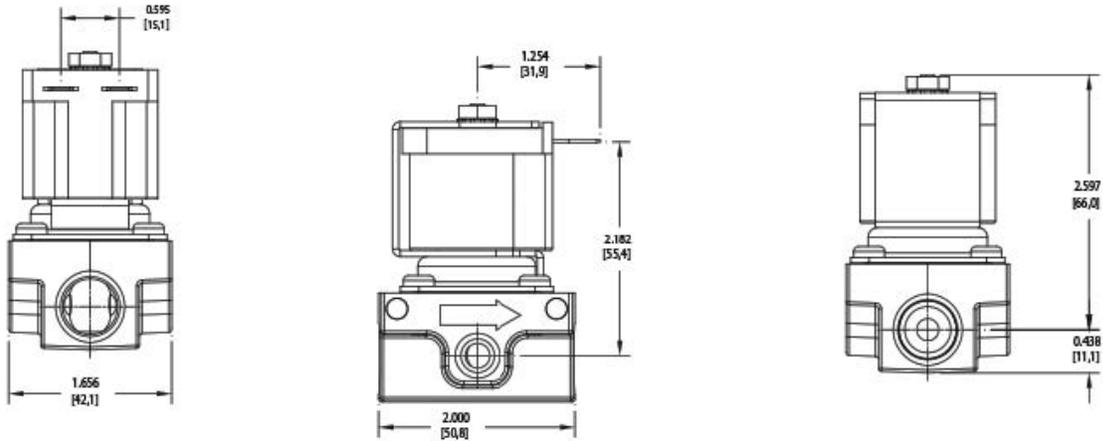




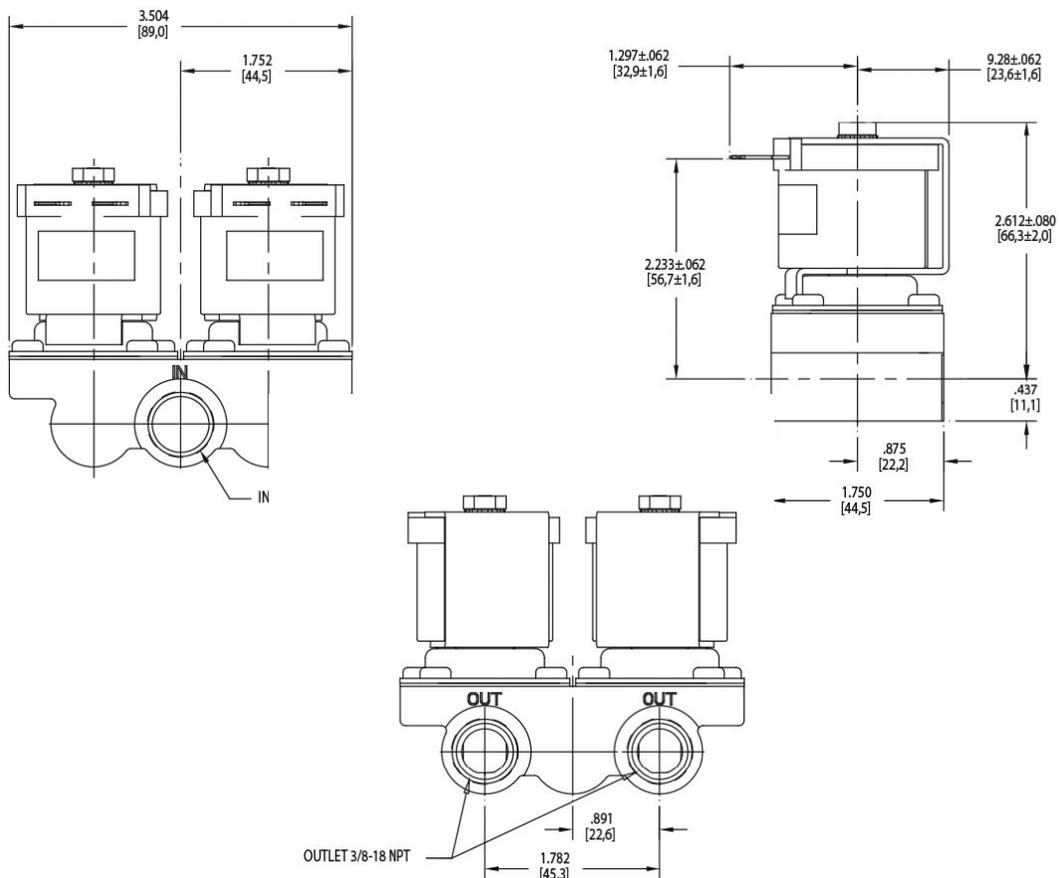
## Product Drawings

Product Dimensions - Dimensions are inches and [millimeters].

Single



Dual

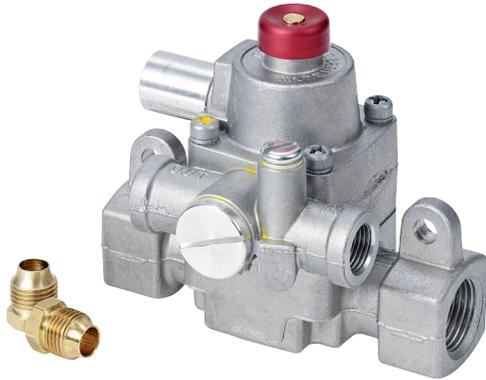


**1** Year  
Limited  
Warranty



# Robertshaw®

## GAS VALVES - THERMOMAGNETIC SAFETY



1720-004



1720-801

### 1720 Series

The Robertshaw® 1720 Series Thermomagnetic Safety Valve is a control used to cut off the flow of gas to the burner in the event of a pilot outage. The magnet assembly is energized by voltage generated by a thermocouple that is heated by the pilot flame. When this flame is extinguished, the thermocouple voltage decreases until a spring overcomes the magnetic force and closes off both the pilot and main gas. This control can be used for commercial and residential ovens, infrared heaters, chicken and pig brooders, recreational vehicle gas appliances and many more applications requiring automatic safety valves.

### Features and Benefits

- 300°F (149°C) ambient temperature rated and 350°F (177°C) versions available
- J models available with separate pilot inlet/outlet tube connections
- K models are pilot outlet only
- Compatible with other Robertshaw models such as the BJWA, FD, and GS series thermostats
- RoHS compliant

### Specifications

Part Numbers	Description	Body Inlet & Outlet	Head Pilot Inlet & Outlet	Ambient Temperature	Max Pressure
1720-004	TS11J Complete Magnet and Body Assembly	7/16" Tube	1/4" Tube	32°F to 300°F (0°C to 149°C)	0.5 PSI
1720-005	TS11J Complete Magnet and Body Assembly	1/4" Pipe	3/16" Tube	32°F to 300°F (0°C to 149°C)	0.5 PSI
1720-007	TS11J Complete Magnet and Body Assembly	1/2" Pipe	1/4" Tube	32°F to 300°F (0°C to 149°C)	0.5 PSI
1720-008	TS11J Complete Magnet and Body Assembly	1/4" Pipe	1/4" Tube	32°F to 300°F (0°C to 149°C)	0.5 PSI
1720-801	TS11J J Magnet Head Only - Inlet and Outlet	NA	Kit, 1/8" Pipe, 3/16" Tubing, 1/4" Tubing	32°F to 300°F (0°C to 149°C)	0.5 PSI
1720-802	TS11K K Magnet Head Only - Outlet Only	NA	Kit, 1/8" Pipe, 3/16" Tubing, 1/4" Tubing	32°F to 300°F (0°C to 149°C)	0.5 PSI

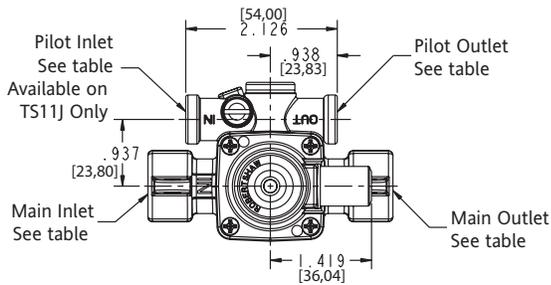




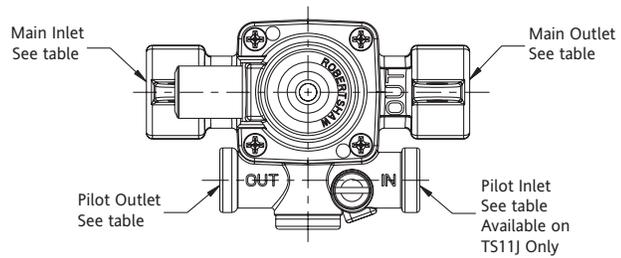
## Product Drawings

Product Dimensions - Dimensions are inches and [millimeters].

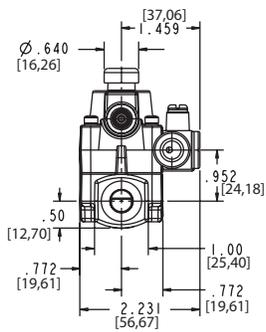
### Top



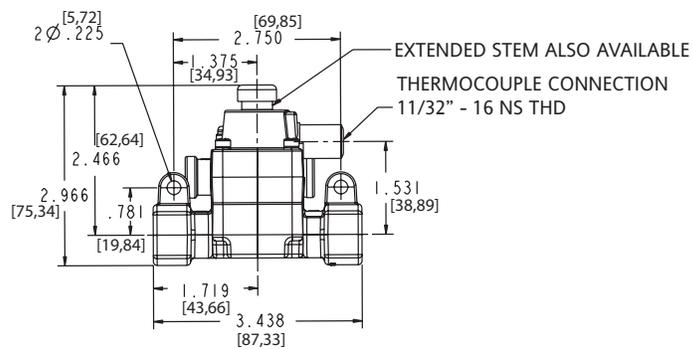
### Top (rotated 180°)



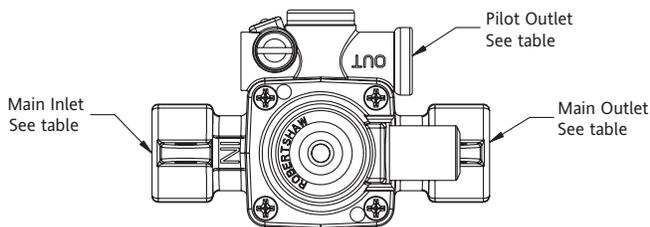
### Side



### Front



### K Model Top with No Pilot Inlet



**1** Year Limited Warranty





## OVEN SPARK IGNITION MODULES

### 41-500 Series

The Robertshaw® 41-521 is an 0+1 Oven Spark Ignition Module designed for oven re-ignition. A spark is generated for as long as the appropriate input terminal is energized.

### Features and Benefits

- Spark generator with 2,000,000 sparks
- Strong dielectric strength tested up to 1500 Volts RMS at 60 Hz for one second
- Spark frequency ranges from 1.0 to 5.0 Hz
- Humidity tested to 90% RH relative humidity for 48 hours
- AGA listed



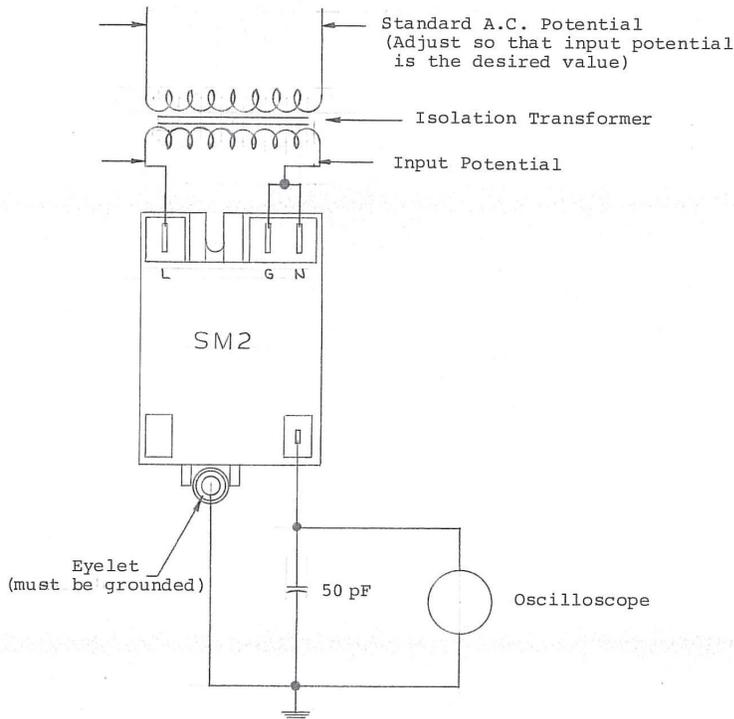
41-521

### Specifications

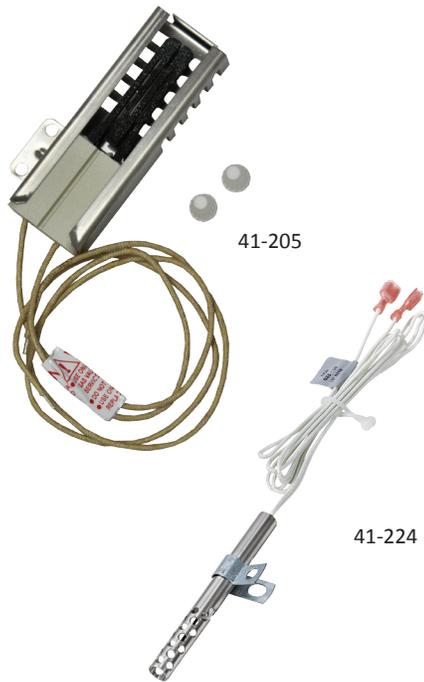
Part Numbers	Description	Spark Frequency	Spark Gap	Ambient Temperature	Electrical Rating
41-521	SM2 Electronic Re-Ignition Oven Spark Module	2.5 Hz to 4.5 Hz	1/8" max	32°F to 200°F (0°C to 93°C)	120V AC, 18 kV peak across 50 pF (picoFarad) capacitance load

### Product Drawings

Product Dimensions - Dimensions are inches and [millimeters].



**1** Year Limited Warranty



## HOT SURFACE IGNITORS

### 41-200 Series

The Robertshaw® 41-200 Series Hot Surface Ignitors are engineered to meet all your gas range and oven needs. These ignitors are used in the ranges of most major appliance original equipment manufactures. In addition, most ignitors are designed to match the Robertshaw bi-metal gas valves.

### Features and Benefits

- High physical and thermal strength
- Easy mounting
- Silent ignition
- Kits include two (2) porcelain nuts

### Specifications

Part Numbers	Description	Length A	Lead Length	Type	Electrical Rating
41-204	Hot Surface Ignitor	4-1/2"	14-1/2"	501A	120V AC, 3.2 to 3.6 Amps
41-205	Hot Surface Ignitor	3-1/2"	19"	501A	120V AC, 3.2 to 3.6 Amps
41-206	Hot Surface Ignitor, No Shield, 5 1/2" Ceramic	7-1/4"	8-3/8"	501	120V AC, 3.2 to 3.6 Amps
41-209	Hot Surface Ignitor with Plug Adaptor	3-1/2"	16-3/4"	501A	120V AC, 3.2 to 3.6 Amps
41-215	Hot Surface Ignitor	3-3/4"	19"	501A	120V AC, 3.2 to 3.6 Amps
41-216	Hot Surface Ignitor with Plug Adaptor	3-3/4"	10"	501A	120V AC, 3.2 to 3.6 Amps
41-224	Hot Surface Ignitor	NA	36"	401XM	120V AC, 1.4 to 2.1 Amps

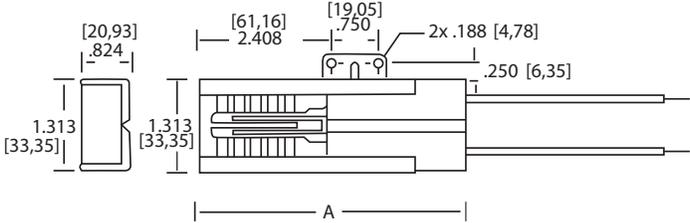


**Robertshaw**<sup>®</sup>

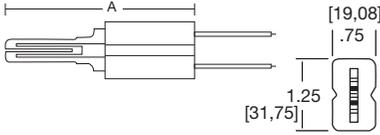
### Product Drawings

Product Dimensions - Dimensions are inches and [millimeters].

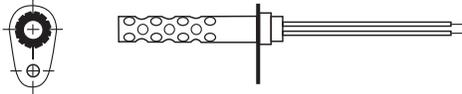
Type 501A



Type 501



Type 401 XM





Timers, are essential for the longevity and energy saving functionality of important equipment.

Tork® and Theben® electric timers offer versatility and unbeatable quality to control power and compressor defrost cycles for commercial and residential applications.

Electric Timers .....B2  
Electric Timers - Electronic .....B5  
Electric Timers - Electromechanical.....B6



# ENERGY





THE-0027AU

## ELECTRIC TIMERS

### THE Series

The Theben® Series Electric Timers offer synchronous 24 hour time switches with automatic On/Off control when operation is required at the same time every day, seven days a week.

### Features and Benefits

- Automatic operation for 24 Hour and 7 Day/24 Hour
- Dual Clock face 24 Hour or 7 day (THE-0029AU only)
- Basic defrost functions
- Air conditioning start/stop
- Removable pin setting
- Panel mount
- Screw terminals
- Control plant automatically
- One clock for multiple installations (THE-0029AU only)
- Maintain daily defrost times
- Enable commercial A/C function
- Ease of Set-Up
- Quick mount/replacement
- Secure connection

## Specifications

Part Numbers	Description	Contact Ratings	Automatic Operation	Operating Temperature Range	Enclosure	Switch	Electrical Rating
THE-0027AU	WF64B Analogue Time Switch Automatic Operation 24 Hour Time Switch Synchronous	16 Amps	Yes	14°F to 131°F (-10°C to 55°C)	Plastic	SPDT	240V AC
THE-0029AU	WF64C Analogue Time Switch Automatic Operation 24 Hour/7 Day Clock Display	16 Amps	Yes	14°F to 131°F (-10°C to 55°C)	Plastic	SPDT	240V AC

**1** Year  
Limited  
Warranty



## ELECTRIC TIMERS

### Electric Timers Series

The Theben® Series Electric Timers offer synchronous 24 hour time switches with automatic On-Off control when operation is required at the same time every day, seven days a week.

### Features and Benefits

- Automatic operation for 24 Hour and 7 Day/24 Hour
- Basic defrost functions
- Air conditioning start/stop
- Captive pin setting
- Din rail mount (1 module wide)
- Screw terminals
- Control plant automatically
- Maintain daily defrost times
- Enable commercial A/C function
- Quick set-up/No loss of pins
- Snap-on mounting on standard DIN rail
- Modern secure connection



THE-SUL180A

## Specifications

Part Numbers	Description	Temperature Range	Switch	Electrical Rating	Contact Ratings	Enclosure
THE-SUL180A	Analogue Time Switch	14°F to 131°F (-10°C to 55°C)	SPDT	240V AC	16 Amps	Plastic
THE-SYN161D	Analogue Time Switch	-4°F to 131°F (-20°C to 55°C)	SPDT	240V AC	16 Amps	Plastic





THETR608TOP2

## ELECTRIC TIMERS

### TOP2 Series

The Theben® TOP2 Series Digital Timers offer ease of setting through the “Text Orientated Programming Version 2” (TOP2).

### Features and Benefits

- Digital time switch with weekly program
- One channel
- DuoFix Spring terminals
- Text-oriented user guidance in display
- 56 memory locations
- Ten year power reserve (exchangeable lithium battery)
- On/Off switching times
- Switching pre-selection
- Permanent switching On/Off
- PIN coding
- Automatic summer/winter time changeover
- Interface for OBELISK top2 memory card (PC programming)

## Specifications

Part Numbers	Description	Programming	Contact	Temperature Range	Enclosure	Automatic Operation	Material	Switch	Voltage
THETR608TOP2	Digital Programmable Timer with Defrost Endurance	Weekly	Changeover contact	13°F to 131°F (-25°C to 55°)	1 modules DIN rail mount	Automatic/ Manual	High-Temperature resistant, self-extinguishing thermoplastic	16 Amps, 4 Amps	230-240V AC
THETR610TOP2	Time and Light Control Digital Time Switch	Weekly program, ON-OFF	Changeover contact	-22°F to 131°F (-30°C to 55°C)	2 Module Wide Din Rail Mount	Automatic/ Manual	High temperature resistant, self-extinguishing thermoplastic	SPDT, 16 Amps, 10 Amps	230-240V AC, 50-60 Hz

**1** Year Limited Warranty



## ELECTRIC TIMERS - ELECTRONIC

### E100B Series

The Tork® E100B series multipurpose 1 channel control comes with 120 - 277V AC input voltages for 24 hour programming. Standard enclosure for indoor and outdoor settings uses patented 40 Amp contacts. Applications include display lighting, security systems, HVAC, signs, sump pumps and ventilating fans. Tork Electric Timers are sold exclusively through Robertshaw to HVACR wholesalers.

### Features and Benefits

- Automatic input voltage detection without DIP switches
- LCD Display
- Simple programming with brief easy-to-follow instructions
- Power consumption: 6 watts minimum
- Daylight savings time is automatic (can be omitted)
- Manual override until the next regularly scheduled On or Off. Automatic operation then resumes or permanently if desired
- AM/PM clock format
- Power outage back-up with permanent schedule retention. Super-capacitor maintains real-time clock for 100 hours
- Includes load status and power failure indicators



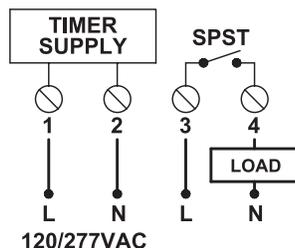
E101B

### Specifications

Part Numbers	Description	Contact Ratings	Scheduling	Setpoints	Operating Temperature	Enclosure	Switch	Voltage
E101B	24 Hour Electronic Timer	40 A General purpose 40 A Inductive 720 VA Pilot Duty 1HP (120V AC)	Same Everyday	20 with 1 minute minimums	-40°F to 149°F (-40°C to 65°C)	Nema 3R Plastic	SPST	120-277V AC
E103B	24 Hour Electronic Timer	40 A General purpose 40 A Inductive 720 VA Pilot Duty 1HP (120V AC)	Same Everyday	20 with 1 minute minimums	-40°F to 149°F (-40°C to 65°C)	Nema 3R Plastic	DPST	120-277V AC

### Product Drawings

E101B Series - Wiring Diagram



1 Year Limited Warranty



1102



P47

## ELECTRIC TIMERS - ELECTROMECHANICAL

### 1100 Series - 24 Hour Time Switches

The Tork® 1100 Series Electric Timers offer 24 hour time switches with automatic On-Off control when operation is required at the same time every day, seven days a week.

Applications include On-Off control of heating, air conditioning, display lighting, ventilating, pumps and fans.

Tork Electric Timers are sold exclusively through Robertshaw to HVACR wholesalers.

### Features and Benefits

- Heavy-duty synchronous, self-starting high torque timing motor
- Power consumption: 3 watts maximum
- Automatic operation for 24 hour timers with one pair of On-Off trippers supplied – accommodates up to 12 pairs
- Multilingual dial markings – English, French and Spanish
- Temporary manual override
- General purpose (NEMA 1) metal enclosure of deep-drawn steel, enamel coated and lockable hasp
- Combination 1/2" and 3/4" knockouts on both sides, bottom and back



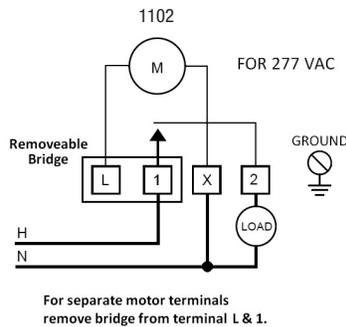
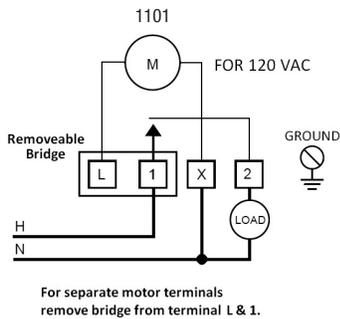


## Specifications

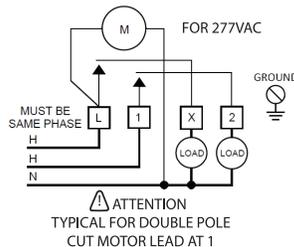
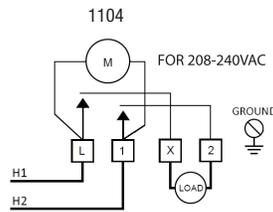
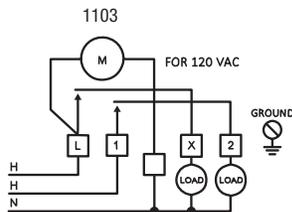
Part Numbers	Description	Contact Ratings	Automatic Operation	Operating Temperature	Enclosure	Switch	Voltage
1101B	24 Hour Electromechanical Timer	40 A Resistive 20 A Inductive 1000 VA Pilot Duty 2HP (24 FLA) 120V AC	Minimum ON 20 minutes; OFF 75 minutes	-40°F to 165°F (-40°C to 74°C)	Metal	SPST	120V AC
1102B	24 Hour Electromechanical Timer	40 A Resistive 20 A Inductive 1000 VA Pilot Duty 2HP (24 FLA) 120V AC	Minimum ON 20 minutes; OFF 75 minutes	-40°F to 165°F (-40°C to 74°C)	Metal	SPST	208-277V AC
1103B	24 Hour Electromechanical Timer	40 A Resistive 20 A Inductive 1000 VA Pilot Duty 2HP (24 FLA) 120V AC	Minimum ON 20 minutes; OFF 75 minutes	-40°F to 165°F (-40°C to 74°C)	Metal	DPST	120V AC
1104B	24 Hour Electromechanical Timer	40 A Resistive 20 A Inductive 1000 VA Pilot Duty 2HP (24 FLA) 120V AC 5HP 240V AC	Minimum ON 20 minutes; OFF 75 minutes	-40°F to 165°F (-40°C to 74°C)	Metal	DPST	208-277V AC
P47	Accessory trippers for 1100 Series Timers	NA	NA	NA	NA	NA	NA

## Product Drawings

### Single Pole - Wiring Diagrams



### Double Pole - Wiring Diagrams



1 Year Limited Warranty



W220

## ELECTRIC TIMERS - ELECTROMECHANICAL

### W Series - 7 Day Time Switches

The Tork® W Series - 7 day time switches offer the easiest and most accurate setting of any 7 day time switch through its unique combination of On-Off trippers, distinctive time indicator, and trigger action switch tripping mechanism.

Applications include On-Off control of heating, air conditioning, display lighting, ventilating, pumps and fans. Tork Electric Timers are sold exclusively through Robertshaw to HVACR wholesalers.

### Features and Benefits

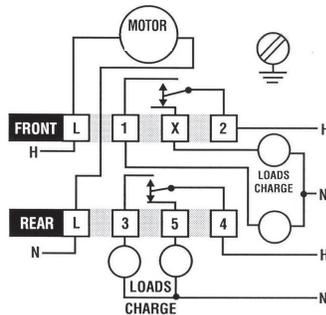
- Heavy-duty synchronous, self-starting high torque timing motor
- Power consumption: 3 watts maximum
- Keeps dial on time up to 24 hours during power outage
- Automatic operation with 7 day calendar dial accommodates up to 2 pairs of On-Off removable Trippers per day – 7 pairs are supplied
- Multilingual dial markings – English, French and Spanish
- General purpose (NEMA 1) metal enclosure of deep-drawn steel, enamel coated and lockable hasp

### Specifications

Part Numbers	Description	Contact Ratings	Automatic Operation	Operating Temperature	Enclosure	Switch	Voltage
W220	7 Day Electromechanical Timer	40 A Resistive 20 A Inductive 1000 VA Pilot Duty 2HP (24 FLA) 120V AC	Minimum ON 1 hour OFF 2 hours	-40°F to 165°F (-40°C to 74°C)	Metal	DPDT	120V AC

### Product Drawings

W220 (DPDT) - Wiring Diagram



LISTED  
Listed  
Product



1 Year  
Limited  
Warranty



## ELECTRIC TIMERS - ELECTROMECHANICAL

### TU40 Series - Universal 24 Hour Time Switches

The Tork® TU40 Series - Universal 24 hour time switches with multi-voltage options offer automatic On-Off control when operation is required at the same time every day, seven days a week.

Applications include On-Off control of heating, air conditioning, display lighting, ventilating, pumps, fans and security systems. Tork Electric Timers are sold exclusively through Robertshaw to HVACR wholesalers.

#### Features and Benefits

- Automatic input voltage detection without DIP switches
- LED indicators for load and power
- Includes On/Off/Auto switch
- Power consumption: 6 VA maximum
- Temporary manual override is standard
- Combination 1/2" and 3/4" knockouts on both sides, bottom and back
- Enclosure includes indoor/outdoor NEMA 3R plastic



TU40

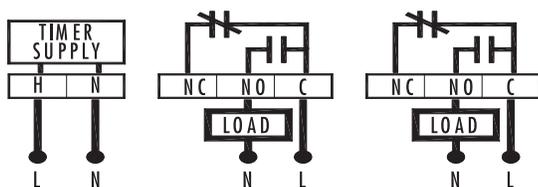
### Specifications

Part Numbers	Description	Contact Ratings (Normally Open)	Automatic Operation	Temperature Range	Enclosure	Switch	Voltage
TU40	24 Hour Electromechanical Timer	40 A Resistive 30 A Inductive 720 VA Pilot Duty 1HP 120V AC 2HP 240V AC	Minimum setting: 15 minutes	-31°F to 116°F (-35°C to 47°C)	Plastic	4 in 1 DPDT, SPST, SPDT, DPST	Universal Multi-Voltage 120/208-240/277V AC

### Product Drawings

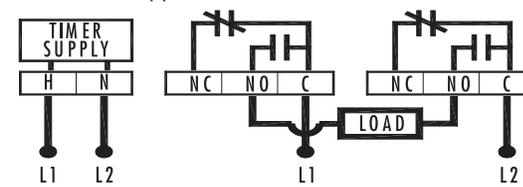
TU40 - 120/277V AC Application - Wiring Diagram

120/277VAC Application



TU40 - 208/240V AC Application - Wiring Diagram

208/240VAC Application



1 Year Limited Warranty



Heating, ventilation and air conditioning contractors value quality performance products, while consumers welcome dependable comfort. With Robertshaw® heating products, both are achievable while delivering productivity and environmentally responsible results. Robertshaw heating products offer kitted and universal solutions designed to replace hundreds of products.

Gas Valves.....C2  
 Water Heating Gas Valves .....C15  
 Electric Water Heating Thermostats.....C16  
 Heating Kits .....C18  
 Ignition Controls.....C21  
 Ignitors .....C30  
 Pilots.....C34  
 Thermocouples.....C36  
 Thermopiles.....C38  
 Air Pressure Sensing Switches .....C40  
 Heating Accessories.....C42



# HEATING





# HEATING

Robertshaw®

## GAS VALVES



700-059

### 700 Series - Pilot, Hot Surface and Direct Spark

The Robertshaw® 700 Series Universal Gas Valves are designed for intermittent pilot ignition applications. These universal models include all the necessary parts to adapt the valves to direct spark or hot surface applications. Each valve incorporates a manual valve, pilot valve, and a main gas pressure regulator (optional by model). These valves are designed for many residential and commercial applications such as central heating units, wall heaters, boilers and mobile home furnaces.

### Features and Benefits

- Universal models with pilot, hot surface and direct spark ignition systems
- Maximum inlet pressure 14" WC (0.5 PSI)
- Ambient temperature of -40°F to 175°F
- Standard NEMA terminals
- Inlet filtered screen
- Various gas types: natural, manufactured, mixed, LP, and LP/air mixtures
- Multiple actuators available
- RoHS compliant

### Specifications

Part Numbers	Description	Capacity	Inlet Size	Outlet Size	Pressure Regulator Setting	Electrical Rating	Comments
700-048	Universal Model	720,000 BTU	1"	1"	3.5" WC Natural Gas	24V AC @ 60 Hz	High capacity
700-049	Universal Model	300,000 BTU	1/2"	1/2"	3.0" WC Natural Gas	24V AC @ 60 Hz	Includes pilot plug
700-056	Universal Model	350,000 BTU	3/4"	3/4"	3.5" WC Natural Gas	24V AC @ 60 Hz	Straight-thru with slow opening feature for soft ignition. Can be field removed.
700-057	Universal Model	720,000 BTU	1"	1"	4.0" WC Natural Gas	24V AC @ 60 Hz	Straight-thru
700-059	Universal Model	720,000 BTU	1"	1"	4.0" WC Natural Gas	24V AC @ 60 Hz	Straight-thru with slow opening feature for soft ignition. Can be field removed.



1 Year Limited Warranty



## GAS VALVES

### 700 Series - Millivolt

The Robertshaw® 700 Series Millivolt Gas Valves are wall thermostat actuated combination controls which provide installation flexibility from furnaces to swimming pool applications. The complete line of 700-500 millivolt gas valves offers a wide range of replacements from small capacity 3/8" pipe to high capacity 1" pipe up to 720,000 BTU usage.

### Features and Benefits

- Gas cock dial marking Off - Pilot - On
- Pilot outlet 1/4" tubing
- Ambient temperature of -40°F to 175°F
- Terminal type combination screw/spade
- Maximum inlet pressure 14" WC (0.5 PSI)
- Standard NEMA terminals
- Inlet filtered screen
- Various gas types: natural, manufactured, mixed, LP, and LP/air mixtures
- RoHS compliant



### Specifications

Part Numbers	Description	Capacity	Inlet Size	Outlet Straight-Thru (FPT)	Outlet Side (FPT) With Plugs	Reducer Bushing (NPT)	Pressure Regulator Setting	Electrical Rating	Compatible with
700-501	Millivolt Nonregulated	100,000 BTU	1/2"	1/2"	1/2"	2	NA	250mV to 750mV	NA
700-502	Millivolt	100,000 BTU	1/2"	1/2"	1/2"	2	3.5" WC Natural Gas	250mV to 750mV	Coaxial and two lead thermopile
700-503	Millivolt	240,000 BTU	1/2"	3/4"	1/2"	1	NA	250mV to 750mV	NA
700-504	Millivolt	240,000 BTU	1/2"	3/4"	1/2"	1	3.5" WC Natural Gas	250mV to 750mV	Coaxial and two lead thermopile
700-505	Millivolt Nonregulated	300,000 BTU	3/4"	3/4"	Straight-thru	2	NA	250mV to 750mV	NA
700-506	Millivolt	300,000 BTU	3/4"	3/4"	Straight-thru	2	3.5" WC Natural Gas	250mV to 750mV	Coaxial and two lead thermopile
700-509	Millivolt	100,000 BTU	1/2"	1/2"	Straight-thru	2	4.0" WC Natural Gas	250mV to 750mV	Coaxial and two lead thermopile
700-511	Pool Heater	400,000 BTU	3/4"	3/4"	Straight-thru	2	Uni-Kit® Natural Gas	250mV to 750mV	Teledyne-Lars coaxial and two lead thermopile
700-515	Millivolt	485,000 BTU	3/4"	3/4"	Straight-thru	2	10.0" WC L.P. Gas	250mV to 750mV	NA
700-516	Millivolt	240,000 BTU	1/2"	1/2"	Straight-thru	NA	4.0" WC Natural Gas	250mV to 750mV	NA





# Robertshaw®



700-402

## GAS VALVES

### 700 Series - 24 Volt Combination

The Robertshaw® 700 Series 24 Volt Combination Gas Valves offer replacement flexibility. With capacities ranging to 720,000 BTU, three-position outlets and multi-positional capability, these combination gas valves offer unlimited replacement possibilities. The 24 Volt Uni-Kit® models are suitable for either natural or LP gas. The valve is factory set at 3.5" WC natural gas. A regulator cover plate is included to convert to LP gas.

### Features and Benefits

- Gas cock dial marking Off - Pilot - On
- Pilot outlet 1/4" tubing
- Ambient temperature of -40°F to 175°F
- Combination screw/spade terminal type
- Maximum inlet pressure 14" WC (0.5 PSI)
- Standard NEMA terminals
- Inlet filtered screen
- Various gas types: natural, manufactured, mixed, LP, and LP/air mixtures
- Multiple actuators available
- RoHS compliant

## Specifications

Part Numbers	Description	Capacity	Inlet Size	Outlet Size	Side Outlets	Pressure Regulator Setting	Electrical Rating	Comments
700-400	24 Volt Combination	240,000 BTU	1/2"	3/4"	Straight-thru	Uni-Kit® Natural Gas	24V AC @ 0.2 Amps, 12V DC @ 0.18 Amps	NA
700-402	24 Volt Combination	240,000 BTU	1/2"	3/4"	1/2"	Uni-Kit Natural Gas	24V AC @ 0.2 Amps, 12V DC @ 0.18 Amps	NA
700-406	24 Volt Combination	300,000 BTU	3/4"	3/4"	Straight-thru	Uni-Kit Natural Gas	24V AC @ 0.2 Amps, 12V DC @ 0.18 Amps	NA
700-409	24 Volt Combination	240,000 BTU	1/2"	1/2"	Straight-thru	3.5" WC Natural Gas	24V AC @ 0.2 Amps, 12V DC @ 0.18 Amps	Thermopile type safety magnet
700-426	24 Volt Combination	300,000 BTU	3/4"	3/4"	Straight-thru	3.5" WC Natural Gas	24V AC @ 0.2 Amps, 12V DC @ 0.18 Amps	Slow opening feature for soft ignition
700-442	24 Volt Combination	720,000 BTU	1"	1"	Straight-thru	3.5" WC Natural Gas	24V AC @ 0.2 Amps, 12V DC @ 0.18 Amps	Slow opening feature for soft ignition



1 Year Limited Warranty



## GAS VALVES

### 700 Series - Line Voltage

The Robertshaw® 700 Series Line Voltage Gas Valves offer the same replacement flexibility as the 24 Volt combination controls. Line Voltage models are available in 120 and 240 Volts AC. Features include three-position outlets, multi-positional capability and capacities ranging up to 720,000 BTU.

#### Features and Benefits

- Slotted safety magnet
- Gas cock dial marking Off - Pilot - On
- Ambient temperature of -40°F to 175°F
- Pilot outlet 1/4" tubing
- Cover type for conduit connection
- Inlet filtered screen
- RoHS compliant



700-454

### Specifications

Part Numbers	Description	Capacity	Inlet Size	Outlet Straight-Thru (FPT)	Outlet Side (FPT) With Plugs	Reducer Bushings Included (NPT) 3/4" x 1/2"	Pressure Regulator Setting	Lead Length	Electrical Rating
700-452	Line Voltage Valve	240,000 BTU	1/2"	3/4"	1/2"	1	3.5" WC Natural Gas	32"	120V AC @ 0.034 Amps
700-453	Line Voltage Valve	300,000 BTU	3/4"	3/4"	Straight-thru	2	None	32"	120V AC @ 0.034 Amps
700-454	Line Voltage Valve	300,000 BTU	3/4"	3/4"	Straight-thru	2	3.5" WC Natural Gas	32"	120V AC @ 0.034 Amps



1 Year Limited Warranty



Robertshaw®



700-513

## GAS VALVES

### 700 Series - Diaphragm/Solenoid

The Robertshaw® 700 Series Diaphragm/Solenoid Gas Valves are single function, diaphragm types and are excellent replacements for solenoid gas valves. Models are available with or without a gas cock, and in regulated or non-regulated configurations. Standard features include pilot outlet, pilot gas filter and pilot adjustment key. Valves can be mounted in any position except upside down. These valves do not have a safety magnet.

### Features and Benefits

- Pilot outlet 1/4" tubing
- Maximum inlet pressure 14" WC (0.5 PSI)
- Ambient temperature of -40°F to 175°F
- Standard NEMA terminals
- Inlet filtered screen
- Various gas types: natural, manufactured, mixed, LP, and LP/air mixtures
- Multiple actuators available
- RoHS compliant

## Specifications

Part Numbers	Description	Capacity	Inlet Size	Outlet Size	Side Outlets	Pressure Regulator Setting	Electrical Rating
700-422	24 Volt Diaphragm Solenoid	240,000 BTU	1/2"	3/4"	1/2"	3.5" WC Natural Gas	12V DC @ 0.18 Amps, 24V AC @ 0.2 Amps
700-513	Millivolt Diaphragm Solenoid without Gas Cock	240,000 BTU	1/2"	1/2"	Straight-thru	NA	250 - 750 mV



1 Year Limited Warranty



## GAS VALVES

### 700 Series - 2-Stage 24 Volt

The Robertshaw® 2-Stage 24 Volt Gas Valves - standing pilot as well as intermittent pilot models - feature reliability, performance, flexibility and easy installation all in one compact control. These valves feature a manual valve (gas cock), inlet/outlet screens, pilot gas filter, and pilot adjustment key. Models have a slotted automatic pilot safety magnet to provide gas shut-off in case of a pilot outage.

#### Features and Benefits

- Pilot outlet 1/4" tubing
- Terminal type 1/4" quick-connect
- Ambient temperature of -40°F to 175°F
- Maximum inlet pressure 14" WC (0.5 PSI)
- Standard NEMA terminals
- Inlet filtered screen
- Various gas types: natural, manufactured, mixed, LP, and LP/air mixtures
- RoHS compliant



700-064

## Specifications

Part Numbers	Description	Capacity	Inlet Size	Outlet Size	Reducer Bushing (NPT)	Pressure Regulator Setting	Electrical Rating	Comments
700-064	Universal 2-Stage	720,000 BTU	1"	1"	2	1.3" WC low-fire, 3.5" WC high-fire for Natural Gas, 2.8" WC low-fire, 11.0" WC high-fire for LP	24V AC @ 50/60 Hz, 0.2 Amps low-fire, 0.4 Amps high-fire	Slow opening feature for soft ignition. Can be field removed.



1 Year Limited Warranty



# Robertshaw®



700-205

## GAS VALVES

### 700 Series - Snap-Throttle Hydraulic

The Robertshaw® 700 Series Snap-Throttle Hydraulic Combination Gas Valves are thermostatically operated by a remote temperature sensing bulb. Models are available with single capillary or remote dial-in snap-action and snap-throttle types. Valves can be mounted in any position except upside down.

#### Features and Benefits

- Gas cock dial marking Off - Pilot - On
- Pilot outlet 1/4" tubing
- Ambient temperature of 32°F to 175°F
- Maximum inlet pressure 14" WC (0.5 PSI)
- Standard NEMA terminals
- Inlet filtered screen
- Various gas types: natural, manufactured, mixed, LP, and LP/air mixtures
- Multiple actuators available
- RoHS compliant

### Specifications

Part Numbers	Description	Capacity	Inlet Size	Outlet Side (FPT) With Plugs	Pressure Regulator Setting	Capillary Length	Bulb Outer Diameter	Bulb Length	Dial Temperature	Remote Temperature
700-204	Snap-Throttle Hydraulic	160,000 BTU	1/2"	1/2"	None	36"	1/4"	8"	58°F to 90°F	45°F to 95°F
700-205	Snap-Throttle Hydraulic	100,000 BTU	1/2"	1/2"	3.5" WC Natural Gas	36"	1/4"	8"	58°F to 90°F	45°F to 95°F



**1** Year Limited Warranty



## GAS VALVES

### 700 Series - Actuators

The Robertshaw® 700 Series Gas Valves are the industry standard with capacity ranges from 5,000 to 1,150,000 BTUs. Several actuator types are available depending upon the application such as 24 Volts, Line Voltage, Millivolt and Hydraulic.

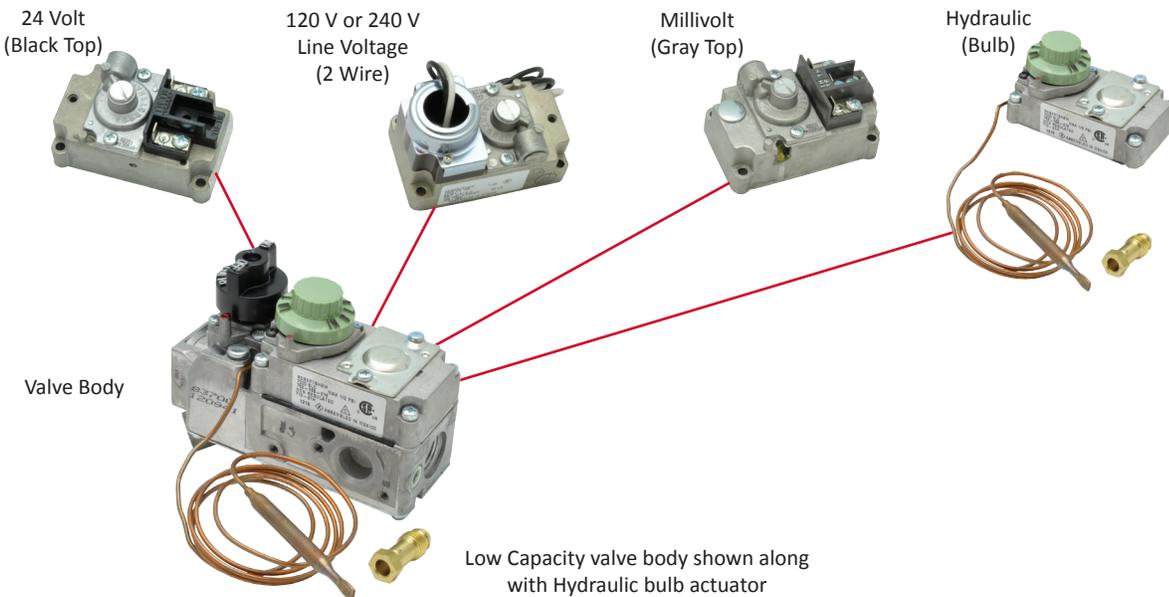


Standard 700 shown with Millivolt gray top actuator

### Specifications

Part Numbers	Description	Gas Valve Model	Pressure Regulator Setting	Ambient Temperature Rating	Thermostat Temperature Range	Electrical Rating	NEC
705-205	Hydraulic Actuator	7000STR-4	3.5" WC	32°F to 175°F (0°C to 80°C)	58°F to 90°F (14°C to 32°C) 36" Capillary	NA	NA
705-401	12V DC/24V AC Actuator	7000E	NR	-40°F to 175°F (-40°C to 80°C)	NA	12V DC, 0.18 Amps 24V AC, 0.2 Amps	Class 2
705-402	12V DC/24V AC Actuator	7000ER	3.5" WC	-40°F to 175°F (40°C to 80°C)	NA	12V DC, 0.18 Amps 24V AC, 0.2 Amps	Class 2
705-404	24V AC 2-Stage Actuator	7000ER2-4	Hi-Lo Adjustable 1.3" to 3.5" WC	-40°F to 175°F (-40°C to 80°C)	NA	24V AC, 0.2 Amps 2-Stage 24V AC, 0.4 Amps	Class 2
705-451	12V AC Actuator	7000E-120	NR	-40°F to 175°F (-40°C to 80°C)	NA	120V AC, 0.034 Amps	Class 1
705-452	12V AC Actuator	7000ER-120	3.5" WC	-40°F to 175°F (-40°C to 80°C)	NA	120V AC, 0.034 Amps	Class 1
705-461	24V AC Actuator	7000E-240	NR	-40°F to 175°F (-40°C to 80°C)	NA	240V AC, 0.017 Amps	Class 1
705-462	24V AC Actuator	7000ER-240	3.5" WC	-40°F to 175°F (-40°C to 80°C)	NA	240V AC, 0.017 Amps	Class 1

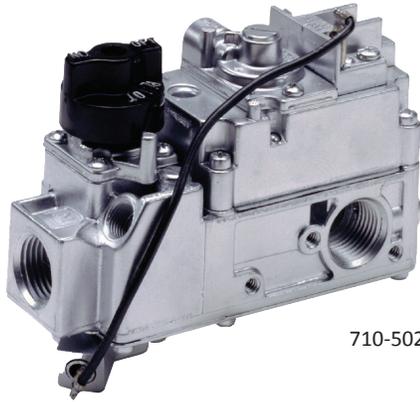
Note: All the above models are available in regulated (R), high/low (RB), convertible (RC) or non-regulated (NR).



**1** Year Limited Warranty



Robertshaw®



710-502

## GAS VALVES

### 710 Series - Low Capacity

The Robertshaw® 710 Series Low Capacity Gas Valves feature an extremely compact control designed for low capacity and limited space applications. Features include three-position outlets, multi-positional capability and component replaceability.

### Features and Benefits

- Low capacity with 3-13/16" H x 4-21/32" L x 1-29/32" W dimensions
- Gas cock dial marking Off - Pilot - On
- Ambient temperature of -40°F to 175°F
- Pilot outlet 1/4" tubing
- Maximum inlet pressure 14" WC (0.5 PSI)
- Standard NEMA terminals
- Inlet filtered screen
- Various gas types: natural, manufactured, mixed, LP, and LP/air mixtures
- Multiple actuators available
- RoHS compliant





## Specifications

Part Numbers	Description	Application	Capacity	Inlet Size	Outlet Size	Reducer Bushing (NPT)	Pressure Regulator Setting
710-203	Hydraulic Snap-Action Low Capacity	Recreational vehicles	70,000 BTU Natural Gas, 112,000 BTU LP	1/2"	1/2"	(2) 1/2" x 3/8"	NA
710-205	Hydraulic Snap-Action Low Capacity	Wall furnaces	70,000 BTU Natural Gas, 112,000 BTU LP	1/2"	1/2"	(2) 1/2" x 3/8"	3.5" WC Natural Gas
710-402	24 Volt Low Capacity	Wall furnaces	70,000 BTU	1/2"	1/2"	(2) 1/2" x 3/8"	3.5" WC Natural Gas
710-501	Millivolt Low Capacity	Space heaters	70,000 BTU	1/2"	1/2"	(2) 1/2" x 3/8"	NA
710-502	Millivolt Low Capacity	Space heaters	70,000 BTU	1/2"	1/2"	(2) 1/2" x 3/8"	3.5" WC Natural Gas
710-503	Millivolt Low Capacity	Fireplace control	70,000 BTU	1/2"	3/8"	NA	Hi-Lo Adjustable 1.7" to 3.5" WC Natural Gas
710-508	Millivolt Low Capacity	Fireplace control	70,000 BTU	3/8"	3/8" Straight-thru	NA	3.5" WC Natural Gas
710-511	Millivolt Low Capacity	Fireplace control	70,000 BTU	1/2"	3/8" Straight-thru	NA	Hi-Lo Adjustable 1.7" to 3.5" WC Natural Gas

## Specifications continued

Part Numbers	Capillary Length	Electrical Rating	Comments
710-203	36"	NA	Hydrophilic Valve
710-205	36"	NA	Hydrophilic Valve
710-402	NA	24V DC @ 0.2 Amps, 12V AC @ 0.18 Amps	Use standard thermocouple
710-501	NA	250mV to 750mV	Use two lead thermopiles only
710-502	NA	250mV to 750mV	Use two lead thermopiles only
710-503	NA	250mV to 750mV	Use two lead thermopiles only
710-508	NA	250mV to 750mV	Special dropout safety magnet to meet Canadian specifications used with quick-dropout pilot assembly 1819-100.
710-511	NA	250mV to 750mV	Special dropout safety magnet to meet Canadian specifications used with quick-dropout pilot assembly 1819-100. Use two lead thermopiles only.

**1** Year Limited Warranty



Robertshaw®



720-402

## GAS VALVES

### 720 Series - 24 Volt Dual

The Robertshaw® 720 Series 24 Volt Dual Gas Valve is a six-function gas valve incorporating a manual valve, safety shut-off magnet, dual automatic valves, main gas regulator, and pilot adjustment. Models are available with and without a pressure regulator. Uni-Kit® models are factory set at 3.5" WC for natural gas, but can be converted to LP by installing the regulator conversion kit included.

The wiring connections, manual selector and adjustments are easily accessible on top of the valve. With a 3-9/16" swing radius, the 720 Series lends itself well to replacing many OEM valves. Valve can be mounted in any position except upside down.

### Features and Benefits

- Gas cock dial marking Off - Pilot - On
- Pilot outlet 1/4" tubing
- Ambient temperature of -40°F to 175°F
- Combination screw/spade terminal type
- Maximum inlet pressure 14" WC (0.5 PSI)
- Standard NEMA terminals
- Inlet filtered screen
- Various gas types: natural, manufactured, mixed, LP, and LP/air mixtures
- Multiple actuators available
- RoHS compliant

## Specifications

Part Numbers	Description	Capacity	Inlet Size	Outlet Size	Side Outlets	Pressure Regulator Setting	Reducer Bushings Included (NPT) 3/4" x 1/2"	Reducer Bushings Included (NPT) 1/2" x 3/8"	Electrical Rating	Comments
720-400	24 Volt Dual	150,000 BTU	1/2"	3/4"	None	Uni-Kit® Natural Gas	1	1	24V AC, 0.5 Amps, 50/60 Hz	NA
720-402	24 Volt Dual	150,000 BTU	1/2"	3/4"	1/2" FPT with plugs	Uni-Kit Natural Gas	1	NA	24V AC, 0.5 Amps, 50/60 Hz	NA
720-406	24 Volt Dual	150,000 BTU	3/4"	3/4"	None	Uni-Kit Natural Gas	2	NA	24V AC, 0.5 Amps, 50/60 Hz	NA
720-472	24 Volt Dual	150,000 BTU	1/2"	1/2"	1/2" FPT with plugs	3.5" WC Natural or 11.0" LP Convertible	NA	1	24V AC, 0.5 Amps, 50/60 Hz	Step-opening to 40% of full flow within 30 seconds for mobile home
720-474	24 Volt Dual	150,000 BTU	1/2"	1/2"	1/2" FPT with plugs	3.5" WC Natural or 11.0" LP Convertible	NA	1	24V AC, 0.5 Amps, 50/60 Hz	Step-opening for mobile home



1 Year Limited Warranty



## GAS VALVES

### 720 Series - Lever Actuated

The Robertshaw® 720 Series Lever Actuated Gas Valves are designed for intermittent pilot ignition applications. This series incorporates a manual valve, pilot valve, dual automatic valves (2), and a main gas pressure regulator. Uni-Kit® models are factory set at 3.5" WC for natural gas, but can be converted to LP by installing the regulator conversion kit included. The 720 Series is designed for many residential applications such as central heating units, space heaters, wall heaters, boilers, and mobile home furnaces. This valve has a compact swing radius of only 3-9/16" to enable it to fit a wide range of OEM replacement applications.

### Features and Benefits

- Pilot outlet 1/4" tubing
- 1/4" quick connect terminal type
- Ambient temperature of -40°F to 175°F
- Maximum inlet pressure 14" WC (0.5 PSI)
- Standard NEMA terminals
- Rated as NEC Class 2
- Inlet filtered screen
- Various gas types: natural, manufactured, mixed, LP, and LP/air mixtures
- RoHS compliant



720-079

## Specifications

Part Numbers	Description	Capacity	Inlet Size	Outlet Size	Pressure Regulator Setting	Electrical Rating	Comments
720-070	Slow Opening Model	150,000 BTU	1/2"	3/4"	Uni-Kit® Natural Gas	24V AC , 50/60 Hz, 45 Amps, 5 Watts	Has slow-opening feature for soft ignition. Not normally used on hot surface applications
720-079	Universal Model	150,000 BTU	1/2"	3/4"	Uni-Kit Natural Gas	24V AC , 50/60 Hz, 45 Amps, 5 Watts	Use on surface, spark pilot or direct spark ignition



**1** Year Limited Warranty



# Robertshaw®



722-079

## GAS VALVES

### 722 Series - Low Capacity Dual

The Robertshaw® 722 Series Low Capacity Dual Gas Valve Uni-Kit® models are designed for a wide variety of intermittent pilot, direct spark or hot surface heating applications.

They incorporate dual automatic valves (redundant) that are pressure regulated and come factory set at 3.5" WC for natural gas. They can be converted to LP by installing the regulator conversion kit that is included.

### Features and Benefits

- Small, compact size, 3-9/16" swing radius, and 90° flanged outlet for side outlet applications allow for greater flexibility of installation
- Incorporates a manual selector valve (On-Off), dual automatic valves, main gas regulator and inlet/outlet pressure taps
- Easily accessible wiring connections, manual selector, and adjustments designed to replace many OEM valves
- Multi-positional and can be mounted in any position except upside down
- As a safety feature, special screws are used and replacement parts are not available to prevent unsafe attempts at repair

## Specifications

Part Numbers	Description	Capacity	Inlet Size	Outlet Size	Pressure Regulator Setting	Comments
722-051	Hot Surface and Direct Spark Low Capacity Dual	170,000 BTU	1/2"	1/2"	Uni-Kit® Natural Gas	Straight-thru
722-079	Universal Low Capacity Dual	170,000 BTU	1/2"	1/2"	Uni-Kit Natural Gas	Straight-thru, 1/2" flanged outlet adapts for side outlet applications



1 Year Limited Warranty



## WATER HEATING GAS VALVES

### 110 Series

The Robertshaw® 110 Series Water Heating Gas Valves are designed for universal replacement applications in water tanks. All models feature a built-in, non-cycling Energy Cut-Off (ECO) system to shut off all gas to the water heater in case of excessive water temperatures. The ECO is designed to detect over-temperature conditions and to open. Once opened, the control will not function and a new replacement will be required.

### Features and Benefits

- Models include 5-1/2" sensing element
- Various inlet size, outlet size, regulator settings and shank lengths
- Right hand or left hand threads
- Multiple BTU capacities available
- Domestic, commercial and recreational vehicle applications



110-202

### Specifications

Part Numbers	Description	Flow Setting	Inlet Size	Outlet Size	Shank Length	Pressure Regulator Setting	Temperature
110-202	Water Heater Thermostat Uni-Kit®	45,000	1/2" Pipe	1/2" Inverted Flare	1-3/8"	4.0" WC Natural Gas	160°F (71°C)
110-326	Water Heater Thermostat Uni-Kit	45,000	1/2" Pipe	1/2" Inverted Flare	1-3/8"	3.5" WC Natural Gas	160°F (71°C)
110-262	Water Heater Thermostat Uni-Kit	38,000	1/2" Pipe	1/2" Inverted Flare (Right Hand Threads)	1-3/8"	9" WC to 12" WC LP	160°F (71°C)
110-265	Water Heater Thermostat Uni-Kit	38,000	1/2" Pipe	1/2" Inverted Flare (Left Hand Threads)	1-3/8"	9" WC to 12" WC LP	160°F (71°C)



1 Year Limited Warranty



## ELECTRIC WATER HEATING THERMOSTATS

### ST Series

The Robertshaw® ST Series Electric Water Heating Thermostats are designed for replacement on domestic and commercial water heaters.

### Features and Benefits

- Automatic cycling
- High limit manual reset
- Compact design assures firm clamp to tank
- Snap-action operation controls
- Fast and easy wiring
- Adjustable temperature ranges



### Specifications

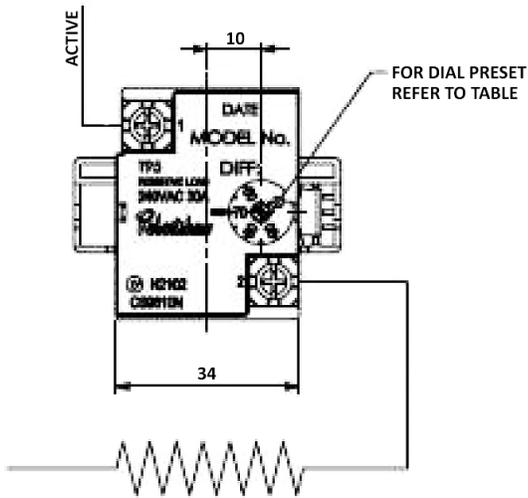
Part Numbers	Description	Replaces	Typical Application	Switch Type	Temperature Range	High Limit	Differential	Electrical Ratings	Power
ST10-80K (ANZ, EU)	Hot Water Surface Thermostat	EWT-1	Single	SPST	60°C to 80°C	NA	8°C (± 4°C)	240V AC 30 Amps	7200 Watts
ST10-90K (ANZ, EU)	Hot Water Surface Thermostat	EWT-1	Single	SPST	60°C to 90°C	NA	8°C (± 4°C)	240V AC 30 Amps	7200 Watts
ST12-70K (ANZ, EU)	Hot Water Surface Thermostat with High Limit	EWT-1L2	Single	SPST/DPST	50°C to 70°C	84°C ± 5°C	8°C (± 4°C)	240V AC 30 Amps	7200 Watts
ST12-80K (ANZ, EU)	Hot Water Surface Thermostat with High Limit	EWT-1L2	Single	SPST/DPST	60°C to 80°C	84°C ± 5°C	8°C (± 4°C)	240V AC 30 Amps	7200 Watts
ST13-70K (ANZ, EU)	Hot Water Surface Thermostat with High Limit	EWT-1L2S	Single	SPST/DPST	50°C to 70°C	84°C ± 5°C	8°C (± 4°C)	240V AC 30 Amps	7200 Watts
ST22-60K (ANZ, EU)	Hot Water Surface Thermostat with High Limit	EWT-2L2	Double /Off Peak*	SPDT/DPST	50°C to 70°C	84°C ± 5°C	8°C (± 4°C)	240V AC 30 Amps	7200 Watts
ST22-80K (ANZ, EU)	Hot Water Surface Thermostat with High Limit	EWT-2L2	Double /Off Peak*	SPDT/DPST	50°C to 70°C	84°C ± 5°C	8°C (± 4°C)	240V AC 30 Amps	7200 Watts

\* Off Peak power in Australia ST22 coupled to ST12 for two element system.

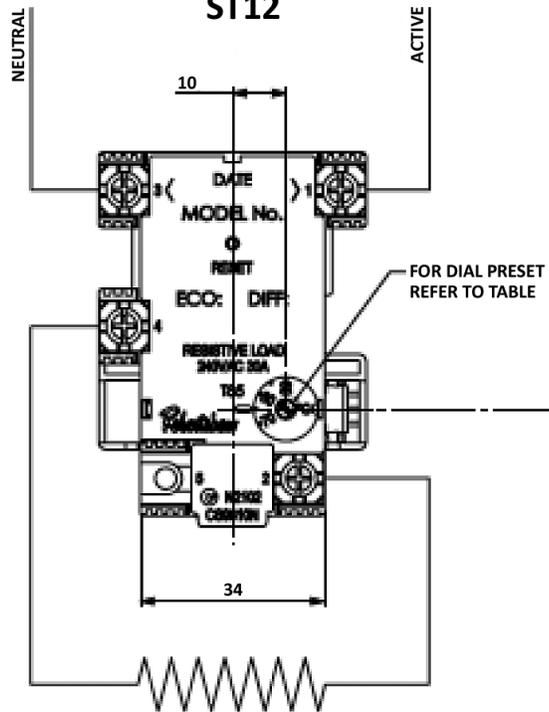


## Product Drawings

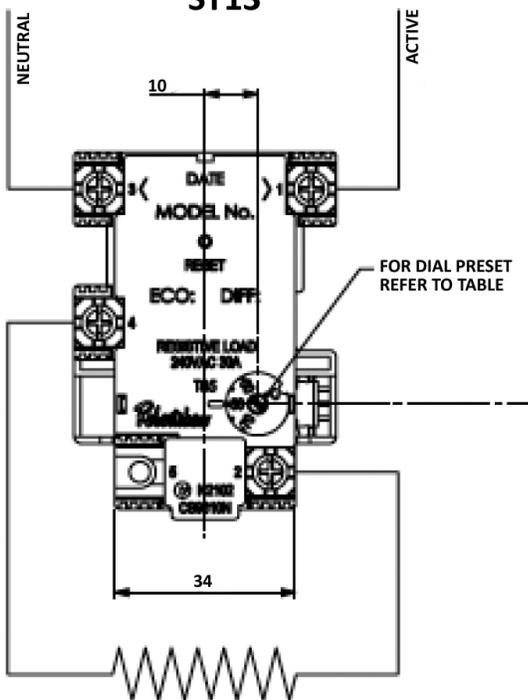
### ST10



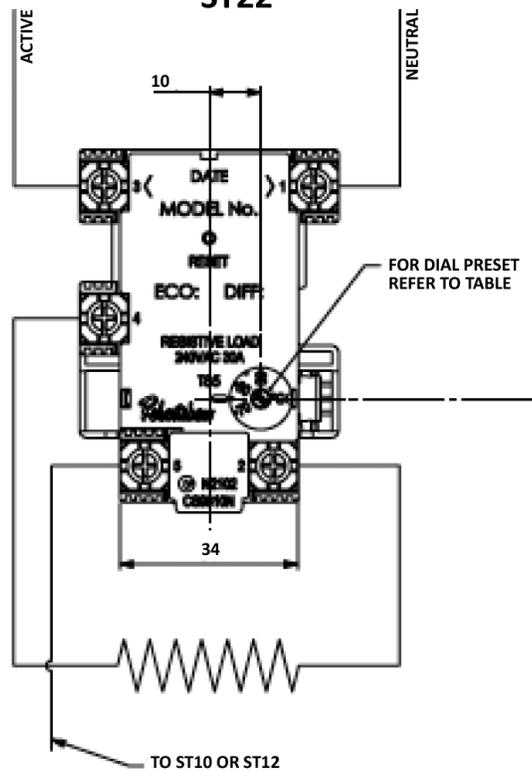
### ST12



### ST13



### ST22



*Robertshaw*<sup>®</sup>

**1** Year  
Limited  
Warranty



# HEATING

Robertshaw®



710-296

## HEATING KITS

### 710 Series - Millivolt Kit

The Robertshaw® 710-296 Millivolt Kit includes a low profile millivolt actuated gas valve, a pilot generator kit and an easy-to-use mechanical wall thermostat. The kit includes the Robertshaw gas valve cross reference pocket guide.

#### Features and Benefits

- Most common parts needed in retrofit millivolt applications
- Reduces inventory with most common parts
- Easy-to-select, use and install

### Specifications

Part Numbers	Description	Hood Type	Thermostat	Gas Valve
710-296	Millivolt Kit	1820-009 Pilot Kit	PS986-1R Thermostat	710-502 Low Profile

## HEATING KITS

### 712 Series - Pilot Kits

The Robertshaw® 712 Series Intermittent Pilot Ignition System Kit features flame rectification with solid-state logic and flame sensing to provide automatic sequencing that will ensure proper operation of an intermittent pilot ignition device. The 712 pilot ignition systems are available with one of four different gas valve types to fit a wide range of furnace applications.

Caution: Do not use on LP gas applications

#### Features and Benefits

- Quick and easy installation
- Complete in-depth instructions and trouble shooting information
- Used on natural gas systems only



712-017

### Specifications

Part Numbers	Description	Gas Valve	Inlet	Outlet	Capacity	Restart	Pressure Regulator Setting	Ignition Control
712-008	Intermittent Pilot Ignition System Kit	720-070	1/2"	3/4"	150,000 BTU	3 Try Lockout	Uni-Kit® Natural Gas	780-845 (Lockout)
712-016	Intermittent Pilot Ignition System Kit	700-056	3/4"	3/4"	350,000 BTU	Restart Nonlockout	3.5" Natural Gas	Nonlockout - Caution: Do not use on L.P. Gas Applications.
712-017	Intermittent Pilot Ignition System Kit	720-070	1/2"	3/4"	200,000 BTU	Nonlockout	3.5" WC Natural Gas Only	780-715 (Nonlockout)
712-022	Intermittent Pilot Ignition System Kit	722-079	1/2"	1/2"	170,000 BTU	Restart Nonlockout	Uni-Kit Natural Gas	780-715 (Nonlockout)

1 Year Limited Warranty



## HEATING KITS

### Hot Surface Uni-Kit360

The Robertshaw® Uni-Kit360 Heating Kit has you covered 360° with universal products all in one box for use with HSI (Hot Surface Ignition) gas systems. Kit includes the following:

- Universal gas valve
- Universal ignition control
- Universal nitride ignitor
- Universal flame sensor
- Universal air pressure sensing switch
- Gas valve cross reference pocket book, screwdriver and toolbag

### Features and Benefits

- Universal controls with the necessary parts included for most hot surface heating applications
- Reduces inventory with one easy-to-order SKU
- Trusted brand in heating controls for over 100 years



UNI-KIT360

## Specifications

Part Numbers	Description	Gas Valve	Inlet	Outlet	Capacity	Hot Surface Ignitor	Flame Pattern	Ignition Control	Air Sensing Switch
UNI-KIT360	Universal Hot Surface Heating Repair Kit	720-079	1/2"	3/4"	150,000 BTU	41-802N	10-760	IGM-283	2374-510

**1** Year Limited Warranty



1751-003

## HEATING KITS

### Regulator Kits

The Robertshaw® 1751 Series Add-on Pressure Regulator Kits are available for use on the following factory model types; 7000, 7010, 7100, 7200 and 7222. Each 1751 pressure regulator kit provides straight-line regulation and includes all the necessary parts including instructions to convert a specific factory model gas valve.

### Features and Benefits

- Converts natural gas to LP and vice versa
- Not for use with hydraulic models which cannot be field converted
- Includes all necessary parts for easy regulation conversion

## Specifications

Part Numbers	Description	Suitable For	Series	Regulator Type	Adjustable WC Pressure Low/High
1751-003	Add-On Pressure Regulator Kit	Natural Gas	700 & 710 Series (Models 7000 & 7000LC)	3.5" WC Natural Gas	3" / 7"
1751-013	Add-On Pressure Regulator Kit	LP	700 & 710 Series (Models 7000 & 7000LC)	11.0" WC LP Gas	8" / 12"
1751-021	Add-On Pressure Regulator Kit	LP	700 & 710 Series (Models 7000 & 7000LC)	Hi-Low Adjustable Output LP Gas	2.7" / 11"

**1** Year Limited Warranty



## IGNITION CONTROLS

### 780 Series - Pilot Controls

The Robertshaw® 780 Series Pilot Controls feature flame rectification with solid-state logic and flame sensing to provide automatic sequencing that will ensure proper operation of an intermittent pilot ignition device. When the thermostat calls for heat, the 780 series control simultaneously initiates ignition sparking and opens the pilot valve portion of the gas valve. Pilot flame recognition stops ignition sparking and opens the main valve portion of the gas valve. Pilot burner flame is continuously monitored at a synchronous frequency for the duration of the heating cycle. Should the pilot flame fail during the heating cycle, the control will shut off the main valve until the pilot flame is established.

The Robertshaw 780-845 lockout ignition control provides 90 seconds of spark, followed by a six minute time delay (purge) between ignition attempts. If the pilot flame is not sensed after three tries, the control goes into a one-hour lockout period. At the end of the lockout period, if the demand for heat is still present, the unit will repeat the three tries for ignition.

### Features and Benefits

- Reduces truck stock inventory, saving space and money
- Easy-to-install with complete in-depth installation instructions
- Pilot and main valves draw 1 Amp at 0.5 power factor
- Combined load at 1.5 Amps at 0.4 power factor
- 95% relative humidity noncondensing at 104°F



780-715

## Specifications

Part Numbers	Description	Spark Rate	Flame Sense Current	Max Total Current Load	Flame Failure Re-Ignition Time	Thermostat Anticipator Setting	Safety Lockout Timing	Temperature Range	Transformer	Input Voltage
780-715	Intermittent Pilot - Nonlockout	3 to 4 per second	0.7mA DC @ 25°C	1.5 Amps	0.8 seconds	0.7 Amps	NA	-40°F to 175°F	24V AC, 20 VA	24V AC @ 50/60 Hz
780-735	Intermittent Pilot - Lockout	3 to 4 per second	0.7mA DC @ 25°C	1.5 Amps	0.8 seconds	0.7 Amps	NA	-40°F to 175°F	24V AC, 20 VA	24V AC @ 50/60 Hz
780-845	Intermittent Pilot - Lockout	4 to 15 per second	0.7mA DC @ 25°C	1.5 Amps	2 seconds	0.7 Amps	90 seconds	-40°F to 175°F	24V AC, 20 VA	24V AC @ 50/60 Hz



1 Year Limited Warranty



780-001

## IGNITION CONTROLS

### 780 Series - Pilot Controls Uni-Kits

The Robertshaw® 780 Series Pilot Controls Uni-Kits® feature a flame sense circuit that will work equally well on a one rod (local sense) or a two rod (remote sense) application. The automatic recycle features assure that, in the event of flame failure, main gas is disabled and the spark repetition sequence is restarted until pilot gas is ignited. Only after pilot ignition has been re-established can main gas be returned to the burner.

The Robertshaw lockout version kits include the capability to shut off all gas to the furnace, should pilot ignition fail to occur after a predetermined time period. The 780-002 provides three tries for ignition. Each ignition period is 90 seconds followed by a six minute time delay between ignition attempts. If the pilot flame is not sensed after three tries, the unit goes into lockout and must be reset at the thermostat.

### Features and Benefits

- Replaces one rod and/or two rod systems
- Reduces truck stock inventory, saving space and money
- Includes vent damper adapter assembly
- Easy-to-install with complete in-depth installation instructions
- Pilot and main valves draw 1 Amp at 0.5 power factor
- Combined load at 1.5 Amps at 0.4 power factor
- 95% relative humidity noncondensing at 104°F

## Specifications

Part Numbers	Description	Spark Rate	Flame Sense Current	Max Total Current Load	Flame Failure Re-Ignition Time	Thermostat Anticipator Setting	Temperature Range	Transformer	Input Voltage
780-001	Gas ignition control - nonlockout	3 to 4 per second	0.7mA DC @ 25°C	1.5 Amps	0.8 seconds	0.7 Amps	-40°F to 175°F	24V AC, 20 VA	24V AC @ 50/60 Hz
780-002	Gas ignition control - lockout	3 to 4 per second	0.7mA DC @ 25°C	1.5 Amps	0.8 seconds	0.7 Amps	-40°F to 175°F	24V AC, 20 VA	24V AC @ 50/60 Hz

**1** Year Limited Warranty



## IGNITION CONTROLS

### 780 Series - Hot Surface Controls

The Robertshaw® 780 Series Hot Surface Controls are designed for use on gas fired systems. The system acts on a demand for heat by a switch or thermostat to supply power to the ignition control. On non pre-purge models, the ignitor will be energized immediately and remain on for either of two optional selected ignitor heat-up times: approximately 17 or 34 seconds. For models with the prepurge option, there is a time delay equal to the heat-up time selected before the ignitor is energized. At the end of the ignitor heat-up time, the gas valve is opened supplying gas to the main burner. After several seconds, the ignitor is turned off and the sensor is energized. As long as flame is sensed, the system continues to operate.

### Features and Benefits

- Reduces truck stock inventory, saving space and money
- Easy-to-install with complete in-depth installation instructions
- Molded-in terminal barriers between terminals
- Models available for local and remote sense application
- Mounting screw provides a positive ground connection
- Small compact size provides no hassle installation
- Main valve current is 1.5 Amps at 24V AC
- 95% relative humidity noncondensing at 104°F



780-785

## Specifications

Part Numbers	Description	Valve Trial Time	Supply Voltage	Ignition Attempts	Pre-Purge Timer	Ignitor Warm-Up Timer	Sensor Type	Max Ignitor Current	Thermostat Anticipator Setting	Temperature Range
780-783	Hot Surface Ignition Control	8 seconds	120V AC	3	34 seconds	34 seconds	Local	5 Amps	0.1 Amps	-40°F to 176°F
780-785	Hot Surface Ignition Control	6 seconds	120V AC	3	NA	34 seconds	Local	5 Amps	0.1 Amps	-40°F to 176°F
780-790	Hot Surface Ignition Control	4 seconds	120V AC	1	NA	17 seconds	Local	5 Amps	0.1 Amps	-40°F to 176°F

## Specifications continued

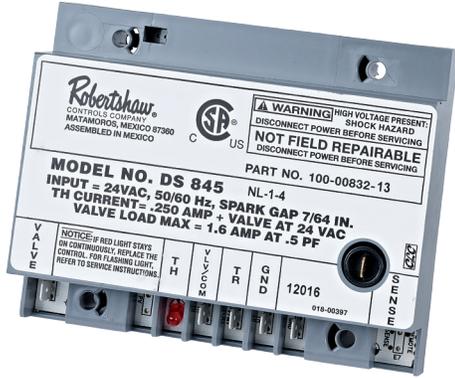
Part Numbers	Input Voltage	Supply Voltage
780-783	24V AC @ 50/60 Hz	120, 208/240, 277V AC
780-785	24V AC @ 50/60 Hz	120, 208/240, 277V AC
780-790	24V AC @ 50/60 Hz	120, 208/240, 277V AC



1 Year Limited Warranty



# Robertshaw®



780-502

## IGNITION CONTROLS

### 780 Series - Direct Spark Controls

The Robertshaw® 780 Series Direct Spark Controls are applicable to commercial cooking equipment, gas fired heating, and water heating systems of many types. The system acts on a demand for heat by a switch or thermostat to open the gas valve. At the same time, the 780 series ignition control supplies a spark to the electrode which ignites the gas. After the gas is lit, an electronic circuit proves the presence of flame using flame rectification. When the thermostat is satisfied, the gas valve will be closed to shut off the main burner gas.

### Features and Benefits

- Replaces one rod and/or two rod systems
- Reduces truck stock inventory, saving space and money
- Easy-to-install with complete in-depth installation instructions

## Specifications

Part Numbers	Description	Type	Supply Voltage	Ignition Attempts	Valve Trial Time
780-502	Direct Spark Ignition Controls	Non Pre-Purge, Enclosed	24V AC	1	4 seconds
780-511	Direct Spark Ignition Controls	Pre-Purge, Remote, Enclosed, 1/4 Q.C.	24V AC	3	7 seconds



**1** Year  
Limited  
Warranty



## IGNITION CONTROLS

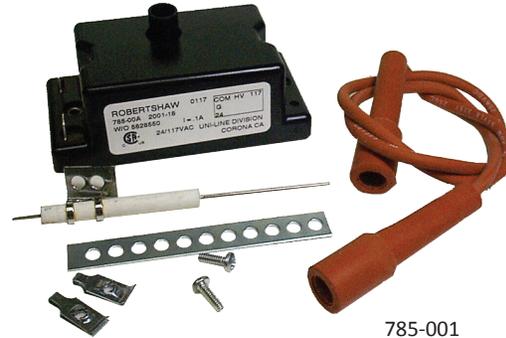
### 785 Series - Automatic Pilot Relight Kits

The Robertshaw® 785 Series Automatic Pilot Relight Kits are designed for use on rooftop heating equipment, water heaters, boilers, space heaters, unit heaters, dryers, and other commercial, industrial, and residential appliances where the problem of pilot outage may occur. It should only be applied to those systems which already incorporate the necessary pilot-safety control system.

#### Features and Benefits

Kit Includes:

- Ignitor assembly
- Mounting bracket



785-001

### Specifications

Part Numbers	Description	Spark Gap	Temperature Range	High Voltage Output	Electrical Rating
785-001	Pilot Relight Kit	1/8"	-40°F to 185°F	15kV	24/120V AC, 0.1 Amp

*Robertshaw*<sup>®</sup>



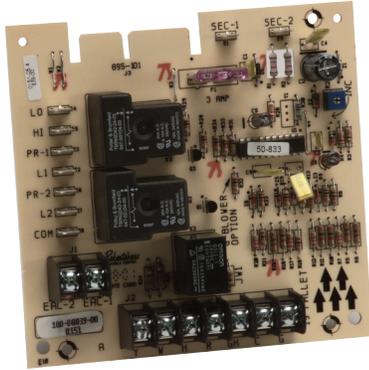
**1** Year  
Limited  
Warranty





# HEATING

Robertshaw®



695-101

## IGNITION CONTROLS

### 695 Series - Fan Control

The Robertshaw® 695-101 Series Fan Control is a solid state control designed and engineered for the replacement market. It replaces the Carrier / BDP Gas Furnace Control Center that has been used in new equipment for many years. This control center is an exact replacement. No modification to the original wiring or to the appliance sheet metal is required.

### Features and Benefits

- Easy-to-install with complete in-depth installation instructions
- 95% relative humidity non-condensing at 50°C
- Reduces truck stock inventory, saving space and money

## Specifications

Part Numbers	Description	Cool Off Time	Heat Off Time (Adjustable)	Temperature Range	Control Voltage	Input Voltage
695-101	Replacement Circuit Board for Fan Control Centers	90 seconds	80 to 240 seconds	-40°F to 176°F	18 - 30V AC	120V AC @ 60 Hz



1 Year Limited Warranty



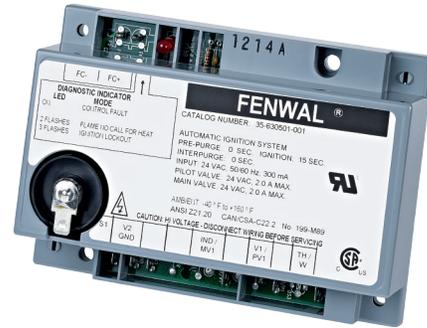
## IGNITION CONTROLS

### 35 Series - Fenwal® Intermittent Pilot Controls

The Fenwal 35 Series Pilot Controls are a 24V AC intermittent pilot ignition control. The microprocessor circuit design provides precise, repeatable timing and operating sequences. The on-board diagnostics with LED output provide assistance with troubleshooting to ensure safe and efficient operation.

#### Features and Benefits

- Quick connect terminals for easy connection
- Easy-to-install with complete in-depth installation instructions
- Pilot valve draws 2.0 Amps maximum
- Main valve draws 2.0 Amps maximum
- Gray enclosure (Noryl N-190) of fire retardant plastic
- Reduces truck stock inventory, saving space and money



35-630501-001

## Specifications

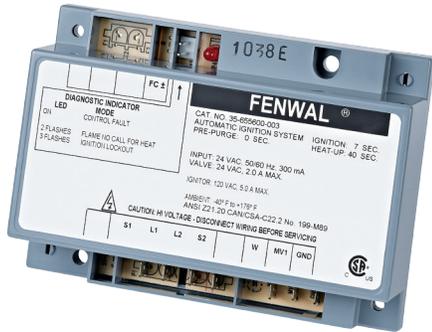
Part Numbers	Description	Flame Sense Method	Auto Reset	Ignition Tries Before Lockout	Trial For Ignition	Pre-Purge	Inter-Purge	Gas Valve Rating (Main and Pilot)	Control Voltage	Electrical Rating
35-630501-001	Intermittent Pilot Ignition Control	Remote	No	1	15	0 seconds	0 seconds	2.0 Amps @ 24V AC	18 - 30V AC	24V AC @ 300mA



1 Year Limited Warranty



# HEATING



35-655800-003

## IGNITION CONTROLS

### 35 Series - Fenwal® Hot Surface Controls

The Fenwal 35 Series Hot Surface Controls are designed to perform many gas-fired 24V AC appliance functions in a single control, resulting in lower system costs. This series monitors the demand for heat, ignites and maintains the flame during heating, and provides diagnostic support.

The on-board diagnostics with LED output provide assistance with troubleshooting and ensures safe and efficient burner operation. The microprocessor circuit design provides precise, repeatable timing sequences for ignition and pre-purge and inter-purge times, as well as multiple tries for ignition.

### Features and Benefits

- Edge connector type for easy connection
- Easy-to-install with complete in-depth installation instructions
- Gray enclosure (Noryl N-190) of fire retardant plastic
- Reduces truck stock inventory, saving space and money

## Specifications

Part Numbers	Description	Flame Sense Method	Auto Restart	Ignition Tries Before Lockout	Trial for Ignition	Pre-Purge	Inter-Purge	Hot Surface Ignitor	Gas Valve Rating	Control Voltage	Electrical Rating
35-655800-003	Hot Surface Ignition Control, Field Selectable Line Voltage Capability	Local / Remote	Yes	1	7	0 seconds	0 seconds	40 second Heat Up, 120/240V AC, 5 Amps Max	2.0 Amps @ 24V AC	18 - 30V AC 50/60 Hz	24V AC @ 300mA, 120 or 240V AC (L1 and L2 only)
35-655801-013	Hot Surface Ignition Control, Field Selectable Line Voltage Capability	Local / Remote	Yes	3	7	0 seconds	15 seconds	40 second Heat Up, 120/240V AC, 5 Amps Max	2.0 Amps @ 24V AC	18 - 30V AC 50/60 Hz	24V AC @ 300mA, 120 or 240V AC (L1 and L2 only)



1 Year Limited Warranty



## IGNITION CONTROLS

### 35 Series - Fenwal® Direct Spark Controls

The Fenwal 35 Series Direct Spark Ignition Controls utilize a microprocessor to continually analyze and control the proper operation of the gas burner.

The microprocessor circuit design provides precise, repeatable timing sequences for ignition times and purge times, one hour automatic reset and flame sensing during pre-purge.

The 35 Series includes on-board diagnostics with LED output to provide assistance with troubleshooting, and to ensure safe and efficient burner operation.

#### Features and Benefits

- Various connection and construction types available
- Easy-to-install with complete in-depth installation instructions
- Gray enclosure (where applicable Noryl N-190) of fire retardant plastic
- Reduces truck stock inventory, saving space and money



35-605606-223

## Specifications

Part Numbers	Description	Flame Sense Method	Auto Reset	Ignition Tries Before Lockout	Trial For Ignition	Pre-Purge	Inter-Purge	Connection	Construction	Gas Valve Rating	Control Voltage	Electrical Rating
35-605606-111	Direct Spark Ignition Control	Remote	Yes	3	4	15	15	Edge Connector	Gray Noryl	2.0 Amps @ 24V AC	18 - 30V AC, 50/60 Hz	24V AC @ 300mA
35-605606-223	Direct Spark Ignition Control	Remote	Yes	3	7	30	30	Edge Connector	Gray Noryl	2.0 Amps @ 24V AC	18 - 30V AC, 50/60 Hz	24V AC @ 300mA
35-704600-005	Direct Spark Ignition Control	Local	No	1	10	0	0	Quick Connect Terminals	Open Board	1.5 Amps @ 120V AC	102 to 138V AC, 50/60 Hz	120V AC @ 350mA



1 Year Limited Warranty





41-401

## IGNITORS

### Carbide Series

The Robertshaw® Carbide Series Hot Surface Ignitors deliver dependable ignition in heating systems of every description: furnaces, boilers, rooftop heaters, infrared burners, unit heaters, water heaters, and many other types of HVAC equipment.

### Features and Benefits

- Made from high-purity recrystallized silicon carbide (Crystar™) which combines physical and thermal strength with stable electrical properties
- Designed to reach ignition temperature(s) within 17 seconds
- Have 18-gauge nickel chrome lead wires embedded and metalized in place for maximum holding strength and electrical conductivity
- Manufactured with lead wires enclosed in a special high-temperature fiberglass insulation providing electrical protection
- Operate at 120V AC. Some modules are rated for 208/240V input, however, the voltage to the ignitor is stepped down to 120V AC

## Specifications

Part Numbers	Description	Ceramic Block Style	Lead Wire Length	Terminal Connector Type	Comments
41-401	Hot Surface Carbide Ignitors	A	4-1/2"	A	Includes a gasket
41-402	Hot Surface Carbide Ignitors	B	19"	NA	
41-403	Hot Surface Carbide Ignitors	C	5-1/2"	NA	
41-404	Hot Surface Carbide Ignitors	C	4-1/2"	D	Includes special mounting adaptors
41-405	Hot Surface Carbide Ignitors	D	5-1/2"	NA	
41-406	Hot Surface Carbide Ignitors	E	10-1/2"	NA	Includes a gasket
41-407	Hot Surface Carbide Ignitors	C	4-1/2"	B	
41-408	Hot Surface Carbide Ignitors	B	5"	C	
41-409	Hot Surface Carbide Ignitors	C	4-1/2"	D	
41-410	Hot Surface Carbide Ignitors	B	4-1/2"	B	
41-411	Hot Surface Carbide Ignitors	B	4-1/2"	C	Includes special mounting adaptors
41-412	Hot Surface Carbide Ignitors	F	5-1/4"	D	
41-414	Hot Surface Carbide Ignitors	F	5-1/4"	D	Includes special mounting adaptors
41-418	Hot Surface Carbide Ignitors	B	5-1/4"	C	Includes bracket
41-419	Hot Surface Carbide Ignitors	G	5"	D	



41-402



41-403



41-404



41-405



41-406



41-407



41-408



41-409



41-410



41-411



41-412



41-414

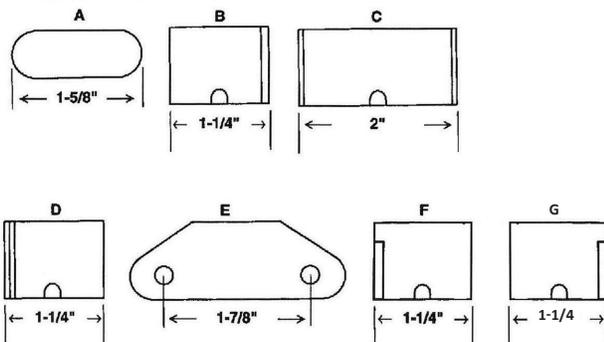


41-418

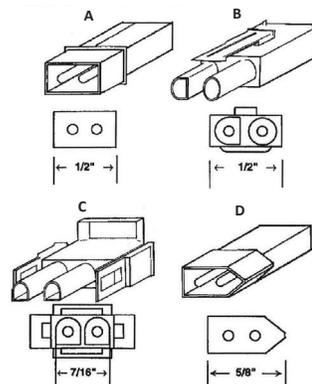


41-419

### Ceramic Block Styles



### Terminal Block Styles





## IGNITORS

### Hot Surface Mini-Ignitor Series

The Robertshaw® 41-600 Series Hot Surface Mini-Ignitors deliver dependable ignition in all heating systems. The mini-ignitor's three-second heat-up time, in combination with its small size, have been embraced by gas furnace OEMs.

### Features and Benefits

- Engineered for easy handling, simple installation and trouble-free operation
- Made of a unique, non-porous, high strength material
- Operates at 120V AC



### Specifications

Part Numbers	Description	Ceramic Block Style	Replaces
41-602	Hot Surface Furnace Mini-Ignitor	None	Amana 20165702 White Rodgers 767A-378
41-604	Hot Surface Furnace Mini-Ignitor	4"	Armstrong #44744-2
41-605	Hot Surface Furnace Mini-Ignitor	2.5"	York Conversion Kit #473-20937-001

**1** Year  
Limited  
Warranty



## IGNITORS

### Universal Ignitor Series

The Robertshaw® Universal Ignitors are the perfect truck stock item. All universal ignitors replace over 130 ignitors currently used in the field. To allow for universal applications, mounting brackets and hardware are included.

Robertshaw Universal Ignitors are recommended for operating voltage of 120V AC. Two models are available. The 41-802N is the best model available with the highest level of durability. The 41-803 offers good durability.

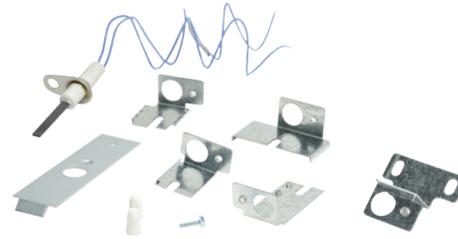
### Features and Benefits

#### 41-802N

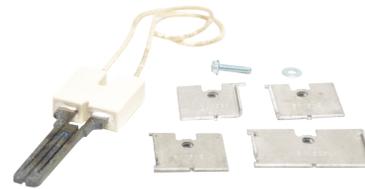
- The ultimate in silicon nitride with technology from Kyocera™ for the best durability
- Flat blade heating element for best heat dissipation

#### 41-803

- High density silicon carbide for good physical strength and durability
- Flat blade heating element for best heat dissipation



41-802N



41-803

## Specifications

Part Numbers	Description	Heating Element	Warranty Duration
41-802N	Universal Hot Surface Ignitor	Flat blade	3 years
41-803	Universal Hot Surface Ignitor	Flat blade	1 year

**1** Year  
Limited  
Warranty

**3** Year  
Limited  
Warranty





1820-009



1830-490

## PILOTS

### 1820 and 1830 Series

The Robertshaw® 1820 Series Pilot Uni-Kit® models are designed to replace hard-to-find ITT-General PG9 type pilots. A special 1/4" tubing adaptor is typically provided with nut and ball sleeve. Uni-Kits are available with and without a 32" [810mm] thermopile.

The 1830 Series Pilot Uni-Kit models are designed to be used with all Robertshaw and most competitive thermocouples. Uni-Kit models include an adaptor that converts a threaded thermocouple/thermopile model 2CH to a snap-in thermocouple type, model 2C.

### Features and Benefits

- Many flame pattern types available
- Thermocouple or thermopile options
- Spark electrode available
- Horizontal or vertical gas inlet
- Several mounting bracket types available
- Aerated pilots with non-linting characteristics

## Specifications

Part Numbers	Description	Hood Type	Mounting Bracket Type	Flame Pattern Type	Lead Lengths	Includes
1800-100	9B Replacement Pilot Uni-Kit®	NA	NA	NA	NA	Orifices
1830-702	9B Replacement Pilot Uni-Kit®	STD	NA	NA	NA	Orifices
1830-113	9B Replacement Pilot Uni-Kit®	180 STD	NA	NA	NA	Orifices
1820-009	PG9 Replacement Pilot Uni-Kit®	NA	NA	90° Right Hand	36"	1950-532 Thermopile and Orifices
1820-019	PG9 Replacement Pilot Uni-Kit	NA	NA	90° Left Hand	36"	1950-532 Thermopile and Orifices
1830-001	2CH & 2C Incinerator-Target Pilot Uni-Kit	2	6	Standard	NA	Orifices
1830-210	2CH & 2C Incinerator-Target Pilot Uni-Kit	2	2	Standard	NA	Orifices
1830-489	2CH & 2C Incinerator-Target Pilot Uni-Kit	6	6	3-Way	NA	Orifices
1830-490	2CH & 2C Incinerator-Target Pilot Uni-Kit	6	6	3-Way	NA	Orifices
1830-491	2CH & 2C Incinerator-Target Pilot Uni-Kit	6	6	3-Way	NA	Orifices



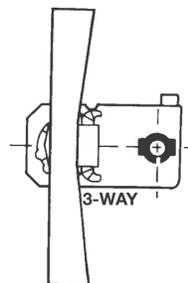
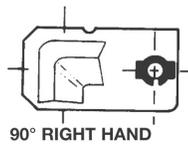
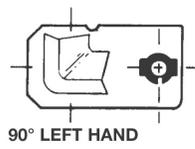
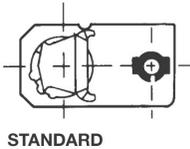
## Hood Type



## Mounting Bracket Type



## Flame Pattern Type





1980-030

## THERMOCOUPLES

### 1900 Series

The Robertshaw® 1900 Series Thermocouples include either a special low-mass or quick dropout thermocouple. It is usually found on applications that require an oxygen depletion system on the thermo safety. It is also found on many LP gas applications that require a quick dropout of the thermo safety if there is a loss of pilot flame.

**⚠ ATTENTION:** The 1960-027 has standard thermocouple threads, and WILL NOT fit applications with metric threads.

The Robertshaw 1970 Series Uni-Couple® design allows for installation to virtually all pilot burners. The versatile zip nut may be pushed, pulled or threaded onto the thermocouple's rolled threads for proper positioning in every application.

The Robertshaw 1980 Series Snap-Fit Thermocouples offer easy installation into the majority of pilot burners. They are manufactured without complicated adaptors, but with extra insulation that the brass sheath provides under high ambient temperatures.

### Features and Benefits

- Easy burner installation with attached threaded nut
- Stainless steel outer jacket for long life and resistance to heat blistering
- Combination of copper and nickel alloys for good electrical conductivity
- Mica washer to insulate from shorting conditions
- Tinnerman clip included
- Various lengths available for multiple applications

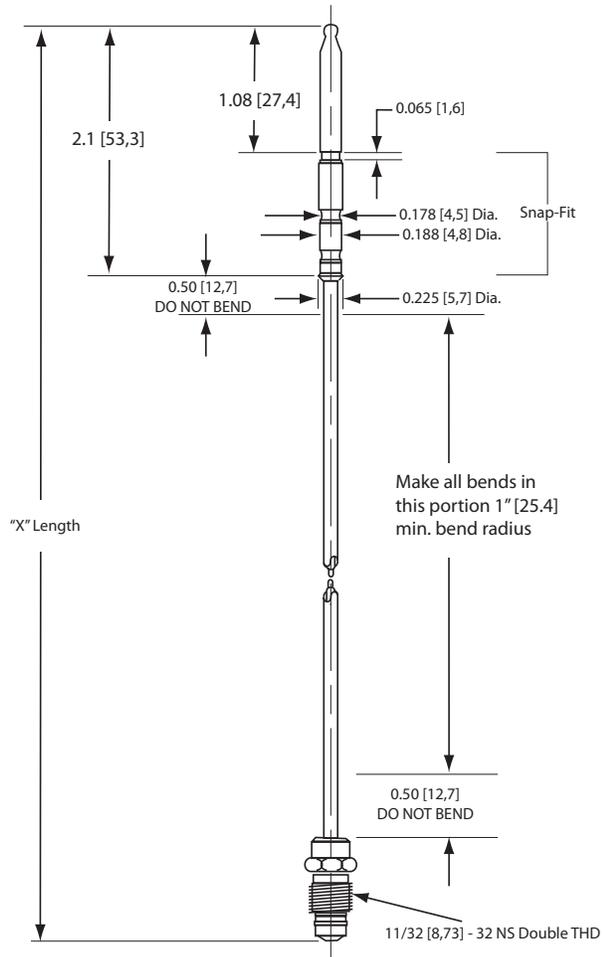
## Specifications

Part Numbers	Description	"X" Length
1960-027	Low Mass Thermocouple	27"
1970-018	Uni-Couple® 20 to 30 Millivolts	18"
1970-024	Uni-Couple 20 to 30 Millivolts	24"
1970-036	Uni-Couple 20 to 30 Millivolts	36"
1980-018	Snap-Fit Thermocouple	18"
1980-024	Snap-Fit Thermocouple	24"
1980-030	Snap-Fit Thermocouple	30"
1980-036	Snap-Fit Thermocouple	36"
1980-048	Snap-Fit Thermocouple	48"
1980-060	Snap-Fit Thermocouple	60"
1980-072	Snap-Fit Thermocouple	72"
1980-818 (CAN)	Snap-Fit Thermocouple	18"
1980-824 (CAN)	Snap-Fit Thermocouple	24"
1980-830 (CAN)	Snap-Fit Thermocouple	30"
1980-836 (CAN)	Snap-Fit Thermocouple	36"



## Product Drawings

### 1980 Series





1950-001



1951-001

## THERMOPILES

### 1950 and 1951 Series

The Robertshaw® 1950 and 1951 Series Thermopiles lead the industry for gas appliance applications. Their primary function is to ensure a standing pilot light is operative so that on a call for heat, the main burner gas will be properly ignited. Thermopiles are placed in gas applications to detect the existence of a flame for safety purposes by shutting off the potential gas flow to a burner.

A thermopile is the assembly of many thermocouples to increase the millivolt output.

Robertshaw thermopiles have two types of connections: coaxial and two-wire spade connectors. The 1950 Series Thermopiles, also known as TP-75, are two-wire spade connectors. The 1951 Series Thermopiles, also known as CP-2 (250 to 750 millivolts), are coaxial connectors. The 1950 and 1951 Series Thermopiles (pilot generators) are designed for use on self-powered gas control systems. They can be used to replace similar competitive devices.

### Features and Benefits

- Easy burner installation with attached threaded nut
- Stainless steel outer jacket for long life and resistance to heat blistering
- Combination of copper and nickel alloys for good electrical conductivity
- Mica washer to insulate from shorting conditions
- Tinnerman clip included
- Various lengths available for multiple applications

## Specifications

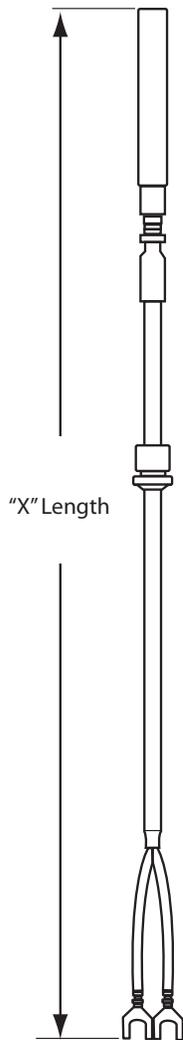
Part Numbers	Description	"X" Length	Includes	Connection Type	Open Circuit Output
1950-001	Thermopile	36"	PG9 Pilot Adaptor	Two Lead	250-750 mV
1950-002	Thermopile	48"	NA	Two Lead	250-750 mV
1950-532	Thermopile	36"	NA	Two Lead	250-750 mV
1951-001	Thermopile	36"	PG9 Pilot Adaptor	Coaxial	250-750 mV
1951-536	Thermopile	36"	NA	Coaxial	250-750 mV



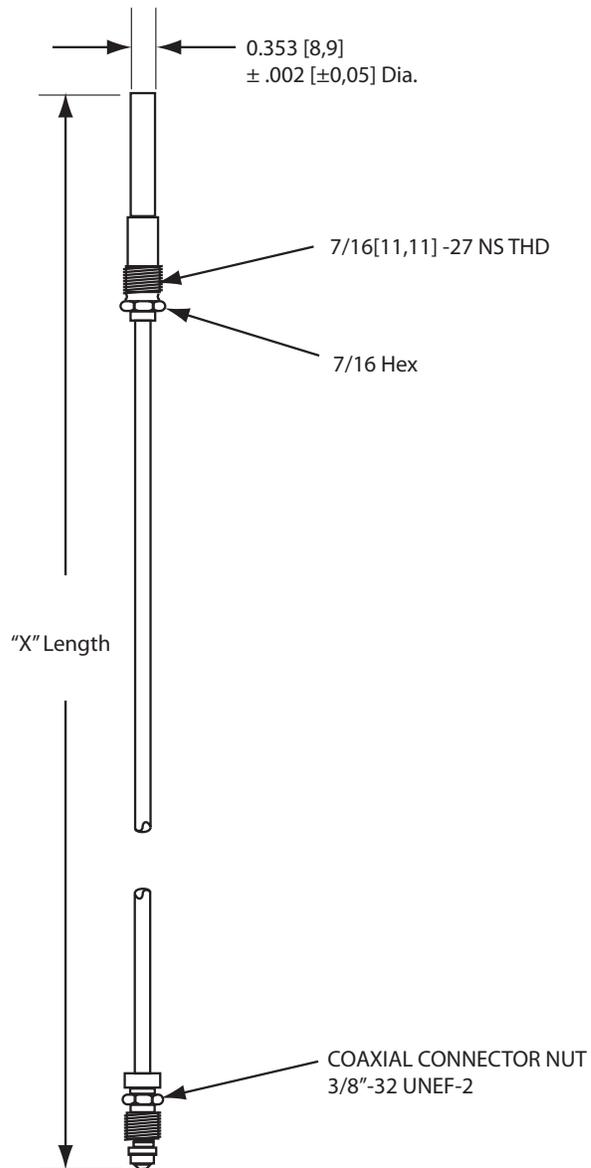


## Product Drawings

1950 Series



1951 Series





# Robertshaw®

## AIR PRESSURE SENSING SWITCHES



2374-510



10-650

### 2374 Series - Universal

The Robertshaw® 2374-510 Air Pressure Sensing Switch has a glass-filled polycarbonate housing containing a sensing diaphragm and an integral snap-acting switch with three male 90° quick-connect terminals. The switch can sense positive, negative or differential air pressure. The field adjustable set point range of this switch is 0.10" WC to 10.0" WC. Using the switch accessories contained in this kit, the switch can be applied to a wide variety of residential and light commercial HVAC applications.

#### 2374-510 Kit Contents:

- Air pressure sensing switch
- Calibration springs (5 options)
- Orifice flows (4 options)
- Mounting brackets (2 options)
- Calibration tool (hex wrench)

The Robertshaw 10-650 Sensing Probe Kit provides a simple, practical and standardized approach to sampling air for HVAC air pressure sensing applications. This convenient kit includes a seven inch universal air sample probe suitable for both static and impact applications. The included mounting flange is efficiently installed using the (2) 6# x 3/8" type 25 tap screws. The mounting flange locks the air sample probe in place via a 6# x 1/4" slotted set screw, providing a standard method of controlling the insertion depth of the air sample probe into the air stream. Three feet of clear vinyl tubing is included in the kit for connecting the air sample probe to the air switch. Also provided is a slip-on adaptor for use with an installed air switch equipped with a compression style air sample line connector.

#### 10-650 Kit Contents:

- Universal 7" probe
- Mounting flange
- Flange-locking screw set
- 3' vinyl tubing
- Slip-on adaptor

### Specifications

Part Numbers	Description	Switch	Set Point Range	Temperature Range	Connection	Electrical Rating
2374-510	Universal Air Pressure Sensing Switch	SPDT	0.10" to 10.0" WC	-40°F to 190°F (-40°C to 88°C)	Silver Contacts	1/10 Hp @ 120 to 277V AC; 28VA Pilot Duty @ 24V AC; 125VA Pilot Duty @ 120V AC; 5 Amps @ 24, 120, 277V AC
10-650	Sensing Probe Kit with 7" Probe	NA	NA	-40°F to 190°F (-40°C to 88°C)	3/16" Flexible Rubber Tubing	NA



1 Year Limited Warranty



## AIR PRESSURE SENSING SWITCHES

### 2374 Series - Adjustable

The Robertshaw® 2374 Series Adjustable Air Sensing Switches are designed to replace a wide variety of air sensing switches found in residential and light commercial applications including furnaces, electronic air cleaners and humidifiers. Two models are currently available with adjustable ranges. Both models are provided with an SPDT switch that can be actuated by positive or negative pressure or by pressure differential. Highly accurate, these switches are practically insensitive to temperature change with an operating temperature range of -40°F to 190°F (-40°C to 88°C). Each switch includes mounting hardware and an adjustment tool for easy installation and calibration.

### Features and Benefits

- Field adjustable control set point
- Air sample line connectors will accept 1/8", 1/4" or 3/8" tubing
- Electrical connection is 1/4" spade
- Vertical operating mounting position for diaphragm
- UL File Number MH6213, CSA File Number LR18754



2374-495

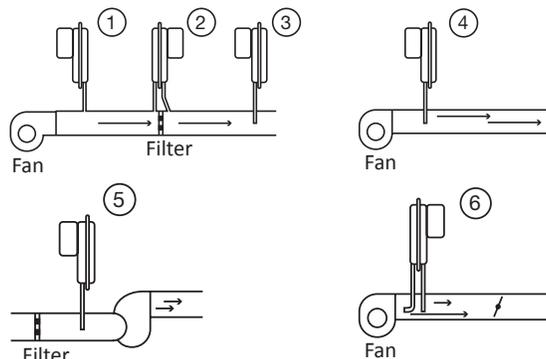
## Specifications

Part Numbers	Description	Switch	Set Point Range	Maximum Pressure	Temperature Range	Electrical Rating
2374-495	Adjustable Air Sensing Switch	SPDT	0.25" to 1.0" WC	0.5 PSI	-40°F to 190°F (-40°C to 88°C)	5 Amps @ 120-277V AC, 5 Amps @ 28V DC, 1 Amp Pilot Duty 120 VA
2374-498	Adjustable Air Sensing Switch	SPDT	1.00" to 4.0" WC	0.5 PSI	-40°F to 190°F (-40°C to 88°C)	5 Amps @ 120-277V AC, 5 Amps @ 28V DC, 1 Amp Pilot Duty 120 VA
2374-499	Adjustable Air Sensing Switch	SPDT	0.05" to 12" WC	0.5 PSI	-40°F to 190°F (-40°C to 88°C)	5 Amps @ 120-277V AC, 5 Amps @ 28V DC, 1 Amp Pilot Duty 120 VA

## Typical Applications For Sensing Switch and Sensing Probe Kit

1	Positive static pressure increases as the filter gets dirty.
2*	Differential across filter changes as filter gets dirty.
3	Flow is reduced as filter gets dirty.
4	Fan operation or air flow with little or no static pressure.
5	Negative pressure increases as the filter gets dirty.
6*	Fan operation and true air flow with varying amounts of static pressure. Probes must be perpendicular to the air flow.

\* Applications use two (2) Sensing Probe Kits



2 Year Limited Warranty



## HEATING ACCESSORIES



### Flame Sensors

The Robertshaw® Flame Sensor Assembly and Replacement Sensors have high temperature Kanthol sensor rods that will withstand 1800°F (982°C). The sensor rod is 4" long and can be cut and bent to match an original unit. Excellent replacement for most manufacturers' flame sensors.

### Features and Benefits

- Includes 30" of Teflon® insulated lead wire with a 482°F (250°C) rating
- Connects to a 1/4" quick connect terminal

### Specifications

Part Numbers	Description	Comments
10-227	Replacement S1 Sensor	S1 Sensor has 1/4" quick connect terminal
10-681	Flame Sensor	NA
10-760	Flame Sensor Assembly	Full assembly

## HEATING ACCESSORIES



### Universal Pilot Ignitor Sensor

The Robertshaw® Universal Pilot Mounting Ignitor Sensor is primarily used with the 712 series intermittent pilot ignition Uni-Kit®. This ignitor and sensor assembly includes mounting bracket, mounting hardware and 24" lead.

### Features and Benefits

- Includes all necessary parts for installation
- Quick replacement parts

1751-729

### Specifications

Part Numbers	Description	Length	Comments
1751-729	Universal Pilot Mounting Ignitor Sensor	24"	Includes ignitor/sensor assembly, mounting bracket and hardware
1751-749	Universal Pilot Mounting Ignitor Sensor	72"	Includes ignitor/sensor assembly, mounting bracket and hardware

**1** Year Limited Warranty



## HEATING ACCESSORIES

### Pilot Orifices

The Robertshaw® Pilot Orifices are used as replacement parts in Robertshaw 1820 and 1830 type pilots.

### Features and Benefits

- Compatible with 1820, 1830 (2C, 2CH, 2S, 2SH) Pilots
- Orifice can fit into 3/16" or 1/4" tubing



10-021

### Specifications

Part Numbers	Description	Type Gas	Tube Size	Orifice Size
10-021	Pilot Orifice for Heating or Cooking	Natural Gas	3/16" or 1/4"	0.018"
10-066	Pilot Orifice for Heating or Cooking	Natural Gas	3/16"	0.018"
10-067	Pilot Orifice for Heating or Cooking	LP	3/16"	0.010"
10-114	Pilot Orifice for Heating or Cooking	LP	3/16" or 1/4"	0.010"
10-166	Pilot Orifice for Heating or Cooking	LP	1/4"	0.011"
10-168	Pilot Orifice for Heating or Cooking	Natural Gas	1/4"	0.018"
10-209	Pilot Orifice for Heating or Cooking	Natural Gas	3/16" or 1/4"	0.026"
10-210	Pilot Orifice for Heating or Cooking	LP	3/16" or 1/4"	0.016"

## HEATING ACCESSORIES

### Tubing

The Robertshaw® aluminum tubing is versatile for all your replacement needs. It comes in a full range of sizes in 50 and 5 foot lengths.

### Features and Benefits

- Aluminum tubing meets ASTM Standard #483
- Uses a 1435 alloy with a 0.035 wall thickness
- Tubing is rated at 90 PSI with an 11,000 tensile, 9500 yield and a 25% elongation



11-193

### Specifications

Part Numbers	Description	Length	Diameter Size
11-193	Aluminum Tubing	50'	1/4"
11-195	Aluminum Tubing	50'	3/8"
11-293	Aluminum Tubing with Fittings	5'	1/4"



# HEATING

Robertshaw®



1751-012

## HEATING ACCESSORIES

### Dial - Gas

The Robertshaw® line of replacement gas dials for gas valves come in many colors with various options. More selections can be viewed at [www.robertshaw.com](http://www.robertshaw.com).

### Features and Benefits

- Replacement dial for use with Unitrol® 7000 gas valves
- Beige color with On, Off and Pilot selections
- Not for use with 700 Series Pilot Ignition gas valves

### Specifications

Part Numbers	Description
1751-012	Beige knob dial

1 Year Limited Warranty



## HEATING ACCESSORIES

### 4590 Series - Breakaway Ferrules

The Robertshaw® 4590 Series Breakaway Ferrules are used for attaching tubing to gas valves. Applications include heating, cooking and water heating.

#### Features and Benefits

- One breakaway ferrule part replaces the need for an additional nut
- Sold in multiple quantities for convenience
- Screw machined brass fittings for quality performance



### Specifications

Part Numbers	Description	Size	Quantity
4590-065	Breakaway Ferrules For Venting	1/8" Tubing	Package of 15
4590-067	Breakaway Ferrules	3/16" Tubing	Package of 15
4590-069	Breakaway Ferrules	1/4" Tubing	Package of 15
4590-071	Breakaway Ferrules	3/8" Tubing	Package of 6
4590-170	Male Compression Nut and Ball Sleeves	1/4" to 3/16" Reducer	Package of 12
4590-816	Extended Breakaway Ferrules	1/4" Extended	Package of 15



Installers prefer a vast selection of quality solutions for commercial refrigeration applications while requiring intuitive installation set-up and dependable performance.

The Ranco® and Paragon® brands are trusted in commercial refrigeration for ease-of-use, performance, reliability and innovation.

Defrost Timers - Auto Voltage ..... D2

Defrost Timers - Electromechanical..... D8

Defrost Timers - Electronic ..... D12

Defrost Modules..... D16

Residential Defrost Timers ..... D17

Electronic Controls ..... D18

Temperature Controls - Cold Controls ..... D20

Temperature Controls - Specialty Applications..... D24

Lube Oil Controls ..... D27

Temperature Controls - Wide Range ..... D28

Pressure Controls ..... D30

Refrigeration Accessories ..... D35

Reversing Valves ..... D36

Copper Products..... D38

Reversing Valves - Solenoid Coils..... D40

Low Temperature Limit Controls ..... D41

AKO Electronic Controls..... D42

AKO Accessories ..... D47



# REFRIGERATION





# REFRIGERATION

**PARAGON®**



8145-AV

## Replacement Information

Supco	Grasslin/Intermatic	Precision	Paragon
S804100	G8045-00	6041-0	8041-00
S804120	G8045-20	6045-0	8041-20
S804500	G8145-00	6045-20	8043-00
S804520	G8145-20	6141-0	8043-20
S814100	DTAV40	6141-20	8045-00
S814120	DTAV40IM	6145-20	8045-20
S814500	DTAV40M		8046-00
S814520			8046-20
			8047-00
			8047-20
			8141-00
			8141-20
			8143-00
			8143-20
			8145-00
			8145-20
			8243-20
			8245-20
			8247-20

## Specifications

Part Numbers	Description
8145-AV	Auto Voltage Defrost Timer in Metal Casing
8145-AV-M	Auto Voltage Defrost Timer Mechanism Only

## DEFROST TIMERS - AUTO VOLTAGE

### 8000 Series

The Paragon® 8000 Series Auto Voltage Defrost Timer is designed for commercial freezers and refrigerators. Paragon Defrost Controls have provided reliable automatic defrost capability for decades. They accommodate various types of defrost systems including electric defrost heaters, hot gas, and compressor off cycle.

This all-in-one auto voltage defrost timer replaces over 40 competitive voltage-specific mechanical defrost timers, eliminating the need for a separate short cycle timer and single-phase voltage monitor. The 8145-AV will become a mainstay in any contractor's truck. The 8145-AV reduces installation time, and minimizes the number of SKUs to stock.

### Features and Benefits

- Replaces over 40 competitive models
- Auto voltage automatically adjusts for 120-277V AC
- Compressor contacts 3HP
- Heater/fan contacts 2HP
- LED indicators for defrost and refrigeration cycles
- Built-in permanent housing protects components from damage
- Mounts into existing enclosures, no tools required
- Real-time clock face for easy accurate settings
- Defrost times programmable in 15-minute intervals with captive trippers
- Heavy-duty steel enclosure with knockouts (on the bottom, back and side) and hasp
- Mechanism only model available 8145-AV-M

### Ratings Terminal 3 and 5

40A	Resistive	120-277V AC
3HP	Motor	240V AC
1.5HP	Motor	120V AC
720VA	Pilot Duty	120-240V AC

### Ratings Terminal F and 2

30A	Resistive	120-277V AC
2HP	Motor	240V AC
1/4HP	Motor	120V AC
290VA	Pilot Duty	120-240V AC

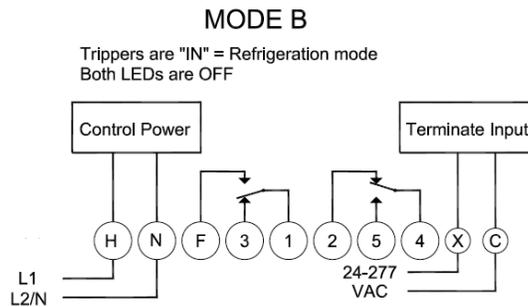
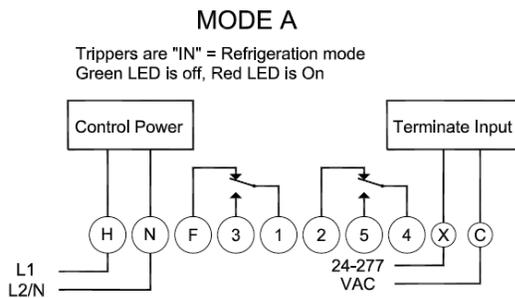




## Product Drawings

### 8145-AV

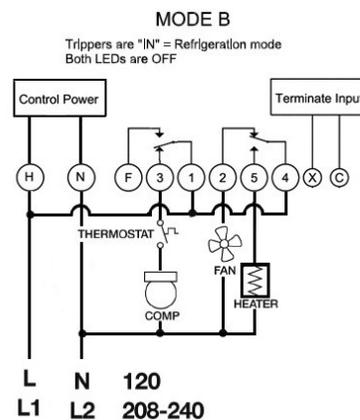
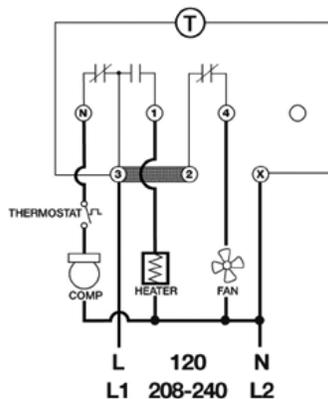
NO Contacts (Terminals 3 & 5)			NC Contacts (Terminals F & 2)		
40A	Resistive	120-240V AC (or 277V AC)	30A	Resistive	120-240V AC (or 277V AC)
3HP	Motor	240V AC	2HP	Motor	240V AC
1.5HP	Motor	120V AC	1/4HP	Motor	120V AC
720VA	Pilot Duty	120-240V AC	290VA	Pilot Duty	120-240V AC



Applying power (24-277V AC) between Terminate Input terminals "X" and "C" causes the unit to return to Refrigeration Mode. If the Terminate input voltage is removed while the trippers are ON, the unit remains in the Refrigeration Mode. The unit remains in Refrigeration until both the Terminate input voltage is removed and the trippers cycle OFF then ON again.

### 8041-00 and 8041-20

Electric Heat Defrosting



8145-AV	H (L/L1)	N (N/L2)	F	3 COMP	1 (L/L1)	2 FAN	5 HEATER	4 (L/L1)	X	C
8041-00	3 (L/L1)	X (N/L2)	N	3 (L/L1)	4	1	3 (L/L1)			
DTAV40	3 (L/L1)	X (N/L2)	4	2 (L/L1)	N	1	3 (L/L1)			

**1** Year  
Limited  
Warranty



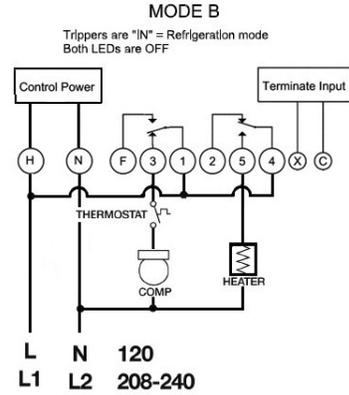
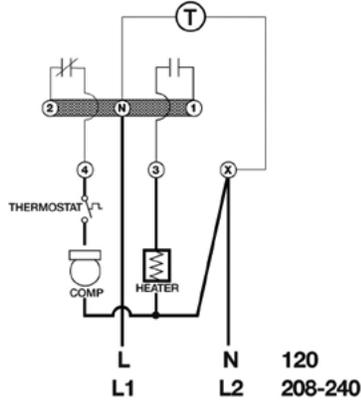
# REFRIGERATION

**PARAGON®**

## Product Drawings

### 8045-00 and 8045-20

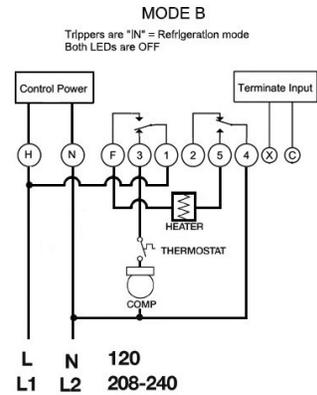
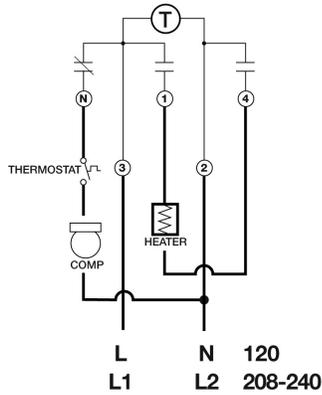
Electric Heat Defrosting



8145-AV	H (L/L1)	N (N/L2)	F	3 COMP	1 (L/L1)	2	5 HEATER	4 (L/L1)	X	C
8045-00	N (L/L1)	X (N/L2)		4	N (L/L1)		3	N (L/L1)		
8045-20										
DTAV40	1-N (L1)	X (L2)		4	1-N (L1)		3	2 (L1)		

### 8047-00 and 8047-20

Electric Heat Defrosting



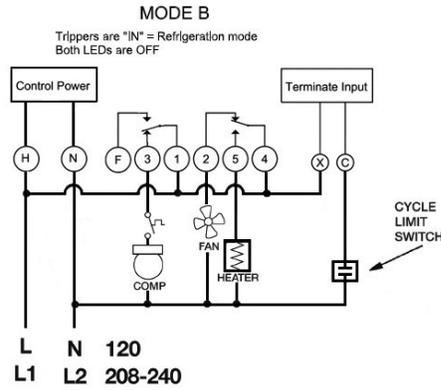
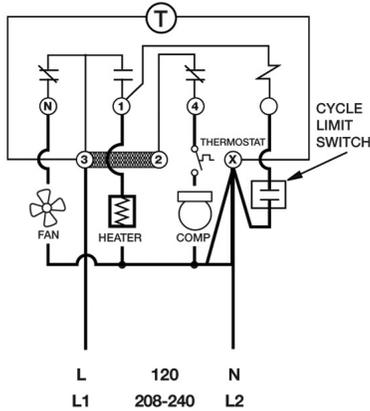
8145-AV	H (L/L1)	N (N/L2)	F	3 COMP	1 (L/L1)	2	5 HEATER	4 (N/L2)	X	C
8047-00	3 (L/L1)	2 (N/L2)	1 HEATER	N COMP	3 (L/L1)		4 HEATER	2 (N/L2)		
8047-20										
DTAV40	3 (L/L1)	2 (N/L2)	1 HEATER	N COMP	3 (L/L1)		4 HEATER	2 (N/L2)		



## Product Drawings

### 8141-00 and 8141-20

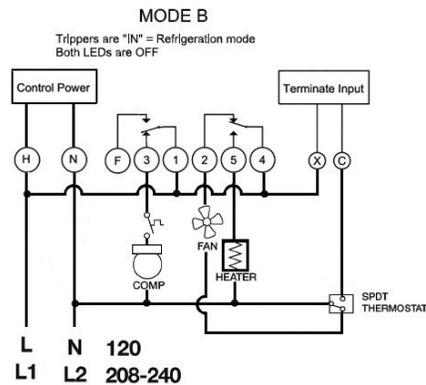
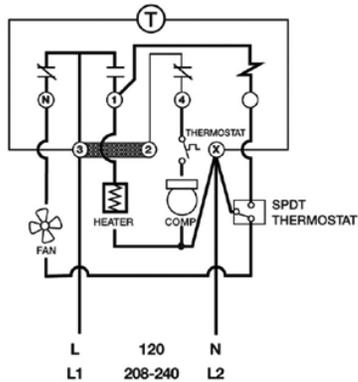
Electric Heat Defrosting (Cycle Limit Switch)



8145-AV	H (L/L1)	N (N/L2)	F	3 COMP	1 (L/L1)	2 FAN	5 HEATER	4 (L/L1)	X (L/L1)	C LIMIT
8141-00	3 (L/L1)	X (N/L2)		4 COMP	3 (L/L1)	N FAN	1 HEATER	3 (L/L1)	3 (L/L1)	INPUT LIMIT
8141-20										

### 8141-00 and 8141-20

Electric Heat Defrosting (SPDT Thermostat)



8145-AV	H (L/L1)	N (N/L2)	F	3 COMP	1 (L/L1)	2 FAN	5 HEATER	4 (L/L1)	X (L/L1)	C SPDT
8141-00	3 (L/L1)	X (N/L2)		4 COMP	3 (L/L1)	N FAN	1 HEATER	3 (L/L1)	3 (L/L1)	INPUT SPDT
DTAV40	3 (L/L1)	X (N/L2)		4 COMP	2 (L/L1)	N FAN	1 HEATER	3 (L/L1)	3 (L/L1)	INPUT SPDT



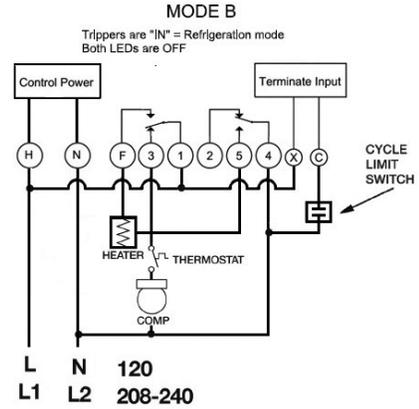
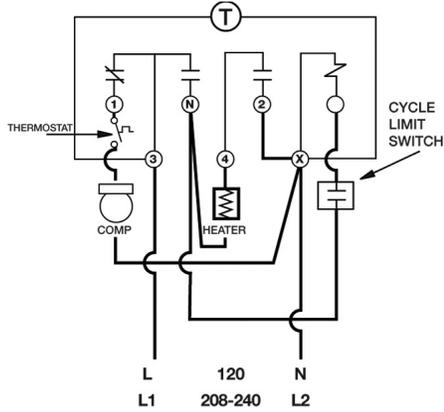
# REFRIGERATION

**PARAGON®**

## Product Drawings

### 8143-00 and 8143-20

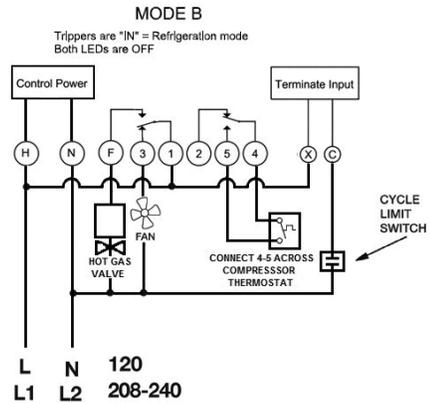
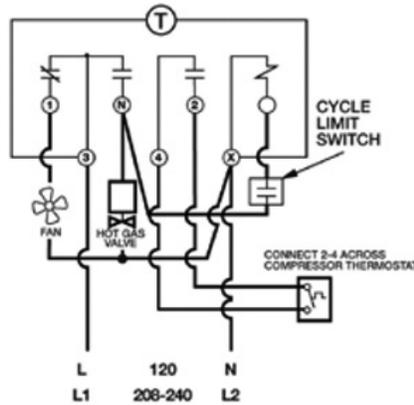
Electric Heat Defrosting (Cycle Limit Switch)



8145-AV	H (L/L1)	N (N/L2)	F HEATER	3 COMP	1 (L/L1)	2	5 HEATER	4 (N/L2)	X (L/L1)	C LIMIT
8143-00	3 (L/L1)	X (N/L2)	N HEATER	1 COMP	3 (L/L1)		4 HEATER	X (N/L2)	3 (L/L1)	INPUT LIMIT
DTAV40	3 (L/L1)	X (N/L2)	N HEATER	1 VALVE	3 (L/L1)		4 HEATER	2 (N/L2)	3 (L/L1)	INPUT STAT

### 8143-00 and 8143-20

Hot Gas Defrosting (Cycle Limit Switch)



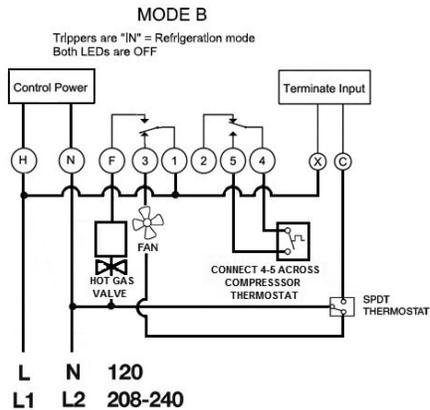
8145-AV	H (L/L1)	N (N/L2)	F H GAS	3 FAN	1 (L/L1)	2	5 TSTAT	4 TSTAT	X (L/L1)	C LIMIT
8143-00	3 (L/L1)	X (N/L2)	N H GAS	1 FAN	3 (L/L1)		2 TSTAT	4 TSTAT	3 (L/L1)	INPUT LIMIT



## Product Drawings

### 8143-00 and 8143-20

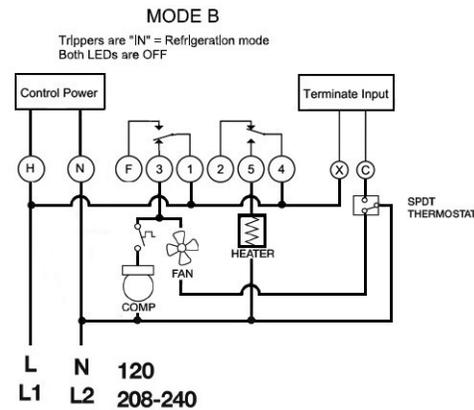
Hot Gas Defrosting (SPDT Thermostat)



8145-AV	H (L/L1)	N (N/L2)	F H GAS	3 FAN	1 (L/L1)	2	5 TSTAT	4 TSTAT	X (L/L1)	C SPDT
DTAV40	3 (L/L1)	X (N/L2)	N H GAS	1 FAN	3 (L/L1)		2 TSTAT	4 TSTAT	3 (L/L1)	INPUT SPDT

### 8145-00 and 8145-20

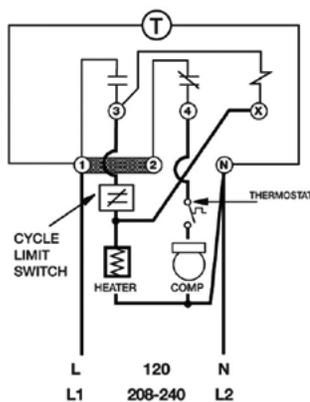
Electric Heat Defrosting (SPDT Thermostat)



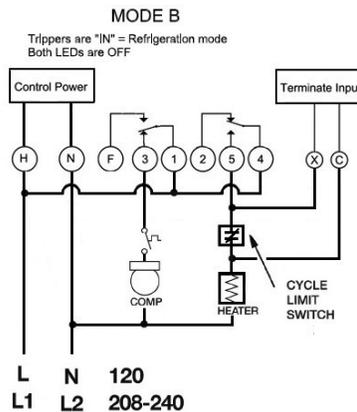
8145-AV	H (L/L1)	N (N/L2)	F COMP FAN	3 (L/L1)	1 (L/L1)	2	5 HEAT- ER	4 (L/L1)	X (L/L1)	C SPDT
DTAV40	1 (L/L1)	N (N/L2)	4 COMP FAN	2 (L/L1)		3 HEAT- ER	1 (L/L1)	1 (L/L1)	1 (L/L1)	X SPDT

### 8145-00 and 8145-20

Electric Heat Defrosting (Cycle Limit Switch)



8145-AV	H (L/L1)	N (N/L2)	F	3 COMP	1 (L/L1)	2	5 LIMIT	4 (L/L1)	X 5/LIMIT	C HEATER/ LIMIT
8145-00 8145-20	1 (L/L1)	N (N/L2)		4 COMP	1 (L/L1)		3 LIMIT	1 (L/L1)		X HEATER/ LIMIT





# REFRIGERATION

**PARAGON®**

## DEFROST TIMERS - ELECTROMECHANICAL



8045-00



8245-20

### 8000 Series

The Paragon® 8000 Series Commercial Defrost Controls are designed for commercial freezers and refrigerators to provide automatic defrost capability. They accommodate various types of defrost systems including electric defrost heaters, hot gas, and compressor off cycle.

### Features and Benefits

- Time initiated; temperature, pressure or time terminated models available
- High-amp switch contacts: 40 amps, 2 HP
- Positive slider bar switch design assures positive electrical contact and wipes the contact surface of contaminants
- Temperature or pressure terminated models are designed for defrost termination using an external temperature or pressure device
- Safety back-up – mechanical time-driven defrost termination
- Heavy-duty synchronous design drive motor
- Choice of three contact arrangements
- Adjustable frequency of defrost initiation from 1 to 6 cycles per day with a minimum of 4 hours between successive operations
- Adjustable back-up defrost termination from 4 to 110 minutes in 2 minute increments
- Heavy-duty steel enclosure with knockouts (on the bottom, back and sides) and hasp and staple padlock
- All 8240 models have an adjustable cut-in pressure dial calibrated from 36-110 pounds for R12, R22, R502





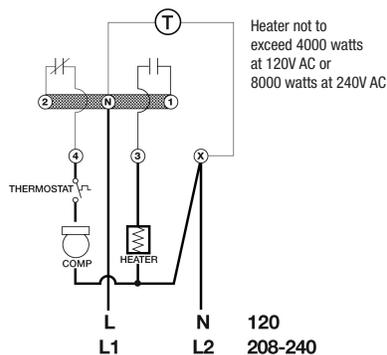
## Specifications

Part Numbers	Description	Switch Arrangement Contacts 2-4	Switch Arrangement Contacts 1-3	Switch Arrangement Contacts 3-N	Termination Type	Electrical Rating
8041-00	Electric Heat	Closed	Open	Closed	Time	120V AC 60 Hz
8045-00	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Time	120V AC 60 Hz
8045-20	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Time	208-240V AC 60 Hz
8045-21	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Time	208-240V AC 50 Hz
8141-00	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	Closed	Temperature or Pressure	120V AC 60 Hz
8141-20	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	Closed	Temperature or Pressure	208-240V AC 60 Hz
8145-00	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Temperature or Pressure	120V AC 60 Hz
8145-20	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Temperature or Pressure	208-240V AC 60 Hz
8145-20M	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Temperature or Pressure	208-240V AC 60 Hz
8145-21	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Temperature or Pressure	208-240V AC 50 Hz
8145-20B	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Temperature or Pressure	208-240V AC 60 Hz
8245-21	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Pressure	208-240V AC 50 Hz
8245-20	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Pressure	208-240V AC 60 Hz
D81-8145-00EX (ANZ, EU, MEX, SA)	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Temperature or Pressure	120V AC 60 Hz
D81-8145-20EX (ANZ, EU, MEX, SA)	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Temperature or Pressure	208-240V AC 60 Hz
D81-8145-21EX (ANZ, EU, MEX, SA)	Electric Heat, Hot Gas or Compressor Shutdown	Closed	Open	None	Temperature or Pressure	208-240V AC 50 Hz

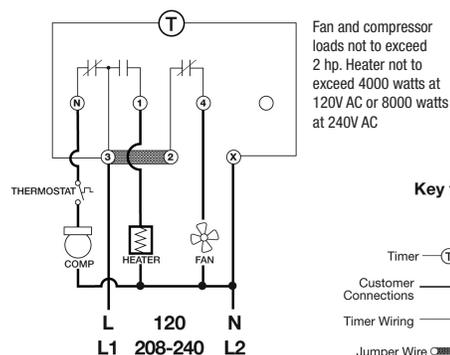
## Product Drawings

### Electric Heat Defrosting

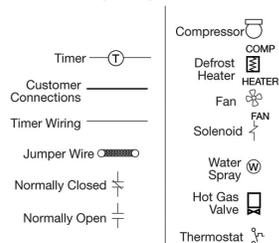
Models 8045-00 and 8045-20 -  
Wiring Diagram



Models 8041-00 and 8041-20 -  
Wiring Diagram



#### Key to Symbols





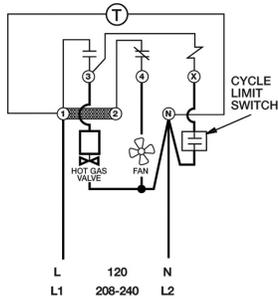
# REFRIGERATION

**PARAGON**

## Product Drawings

### Hot Gas Defrosting

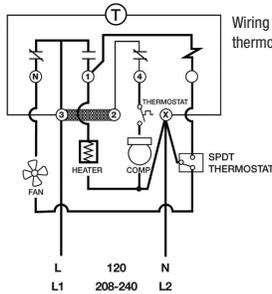
Models 8145-00, 8145-20, E357-00, D81-8145-ZIEX Wiring Diagram



Wiring using 120V or 240V single phase line with compressor thermostat closed during defrost.

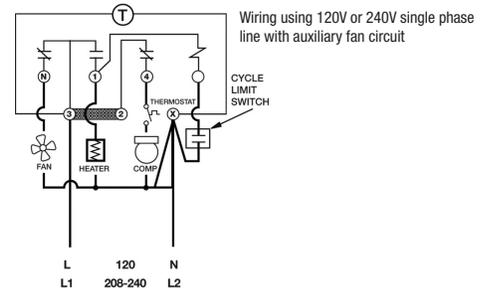
### Electric Heat Defrosting

Models 8141-00 and 8141-20 - Wiring Diagram



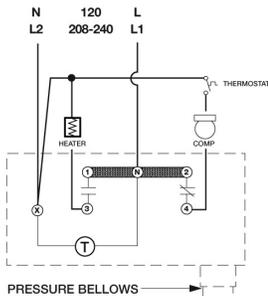
Wiring using differential of SPDT thermostat to delay fan after defrosting

Models 8141-00, 8141-20 - Wiring Diagram



Wiring using 120V or 240V single phase line with auxiliary fan circuit

Models 8245-00 and 8245-20 - Wiring Diagram



Wiring for electric heat system without magnetic starter

Key to Symbols			
Timer	T	Compressor	COMP
Customer Connections		Defrost Heater	HEATER
Timer Wiring		Fan	FAN
Jumper Wire		Solenoid	
Normally Closed		Water Spray	
Normally Open		Hot Gas Valve	
		Thermostat	



## DEFROST TIMERS - ELECTROMECHANICAL

### 632 Series

The Paragon® 632 Series Defrost Timers provide an adjustable cycle, time initiated, with one to 8 On/Off operations daily with a minimum of three hours between operations.

### Features and Benefits

- Adjustable delay or pump down cycle
- Drain or fan delay cycle adjustable
- Defrost initiation and length adjustable



632-20

**PARAGON®**

## Specifications

Part Numbers	Description	Switch Rating	Enclosure	Adjustable Defrost Initiation	Adjustable Delay or Pump Down Cycle	Adjustable Drain or Fan Delay Cycle	Adjustable Length of Defrost	Sequence Switching	High Pressure (Open High) Cut-Out	Electrical Rating
632-00	Defrost Timer	120-240V AC, 10 Amps, 245 VA Switches 2-4 and 3-4 carry 1/2 HP rating	Heavy-Duty Steel	1-8 cycles per day; minimum 3 hours between successive cycles	0-30 minutes; 3 minute graduation: for stopping fans, reducing refrigerant pressure, or hot gas pump down cycle	3-15 minutes; 3 minute graduation	3-45 minutes; 3 minute graduation	2 NO 2 NC	4.75 (2.2)	120V AC
632-20	Defrost Timer	120-240V AC, 10 Amps, 245 VA Switches 2-4 and 3-4 carry 1/2 HP rating	Heavy-Duty Steel	1-8 cycles per day; minimum 3 hours between successive cycles	0-30 minutes; 3 minute graduation: for stopping fans, reducing refrigerant pressure, or hot gas pump down cycle	3-15 minutes; 3 minute graduation	3-45 minutes; 3 minute graduation	2 NO 2 NC	4.75 (2.2)	240V AC
632-21	Defrost Timer	120-240V AC, 10 Amps, 245 VA Switches 2-4 and 3-4 carry 1/2 HP rating	Heavy-Duty Steel	1-8 cycles per day; minimum 3 hours between successive cycles	0-30 minutes; 3 minute graduation: for stopping fans, reducing refrigerant pressure, or hot gas pump down cycle	3-15 minutes; 3 minute graduation	3-45 minutes; 3 minute graduation	2 NO 2 NC	4.75 (2.2)	240V AC



**1** Year Limited Warranty



# REFRIGERATION

**PARAGON**

## DEFROST TIMERS - ELECTRONIC



9045-00



9045-00M

### 9000 Series

The Paragon® 9045-00 and 9145-00 Universal Defrost Timers (UDT) are the only multi-voltage defrost timers engineered to industry refrigeration standards.

Designed to withstand the most rigorous refrigeration applications, this control offers a real-time clock and 100 hours of power loss protection for both time and defrost schedules. Mechanism-only models also are available to fit in standard defrost timer enclosures.

### Features and Benefits

- Certified to UL873 standard for temperature-indicating and regulating equipment
- Wires directly to 120V AC, 208V AC or 240V AC power sources without jumpers or switches
- Rated to 30,000 cycles for refrigeration controllers with switches
- Easy programming, easy set-up, set time, set defrost start and defrost end
- Initiate 15 minute manual defrost
- 100 hours of power loss protection for both time and defrost schedule
- Real-time clock
- Lighted display shows defrost start time and duration
- System status indicators





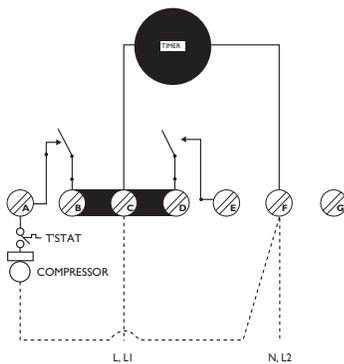
## Specifications

Part Numbers	Description	Relay Switch	Initiation Type	Termination Type	Voltage
9045-00	Universal Defrost Timer	SPST	Time	Time	120-208-240V AC
9045-00M	Mechanism Only	SPST	Time	Time	120-208-240V AC
9145-00	Universal Defrost Timer	SPDT	Time	Time, Temp or Pressure	120-208-240V AC
9145-00M	Mechanism Only	SPDT	Time	Time, Temp or Pressure	120-208-240V AC

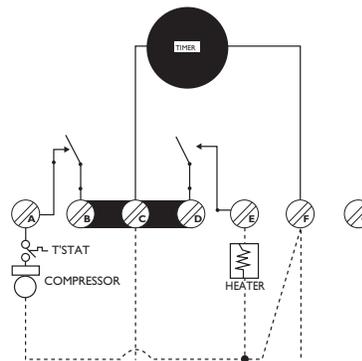
9045 Terminal Data	A	B	C	D	E	F	G
Relay Contact	SPST #1 NC Contact	SPST #1 Common Contact	L1 Power in to Timer	SPST #2 No Contact	SPST #2 Common Contact	L2/N Power in to timer	No Connection
Relay Rating	30 A resistive @ 120 to 240V AC 1 HP @ 120V AC, 2 HP @ 208 to 240V AC			30 A resistive @ 120 to 240V AC 1 HP @ 120V AC, 2 HP @ 208 to 240V AC			
Device Connections	Compressor (Typical)			Defrost Device (Typical)			Defrost Termination Switch

9145 Terminal Data	A	B	C	D	E	F	G
Relay Contact	SPDT NC Contact	SPDT NO Contact	SPDT Common Contact	SPST NO Contact	SPST Common Contact	L2/N Power in to timer	Defrost Termination Device Input L2/N side
Relay Rating	15 A resistive @ 120 to 240V AC 1/4 HP @ 120V AC, 1/2 HP @ 208 to 240V AC	30 A resistive @ 120 to 240V AC 1 HP @ 120V AC, 2 HP @ 208 to 240V AC			30 A resistive @ 120 to 240V AC 1 HP @ 120V AC, 2 HP @ 208 to 240V AC		
Device Connections	Fan (Typical) Compressor (Optional)	Defrost Device (Typical)	L1 Power to Timer and to Defrost Termination Device		Compressor (Typical) Fan (Optional)		Defrost Termination Switch

## Product Drawings



9045 AIR DEFROST - Time Initiated  
Time Terminated - Wiring Diagram



9045 ELECTRIC DEFROST - Time Initiated  
Time Terminated - Wiring Diagram

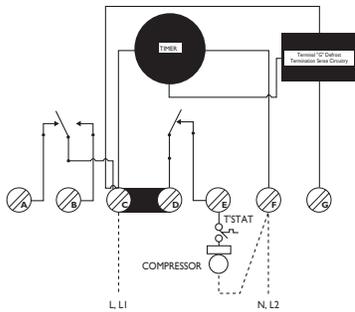
1 Year  
Limited  
Warranty



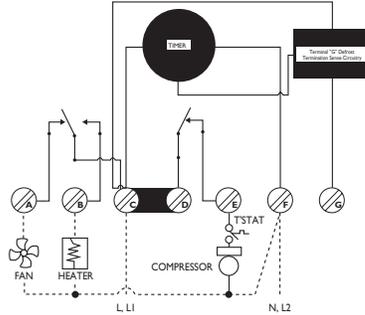
# REFRIGERATION

**PARAGON**

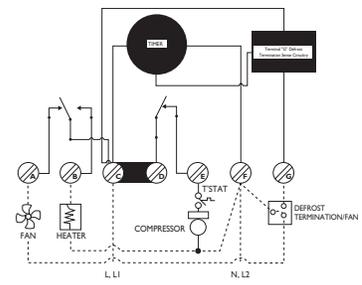
## Product Drawings



9145 AIR DEFROST - Time Initiated  
Time Terminated - Wiring Diagram



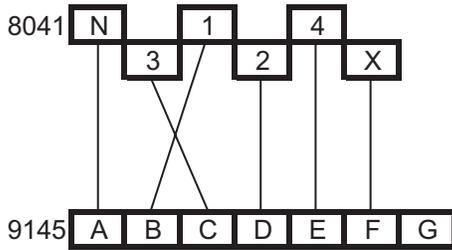
9145 ELECTRIC DEFROST - Time Initiated  
Time Terminated - Wiring Diagram



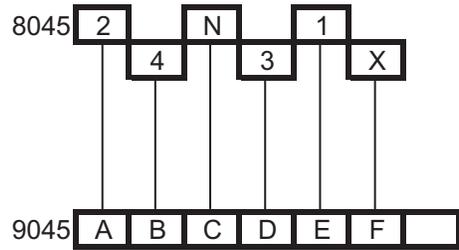
9145 ELECTRIC DEFROST - Time Initiated  
Temperature Terminated - Wiring Diagram

## Conversion Diagrams for Paragon Mechanical Controls

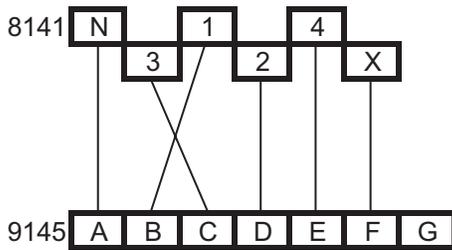
### Convert 8041 to 9145



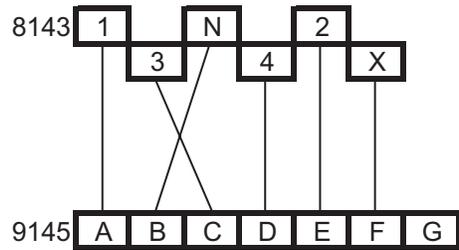
### Convert 8045 to 9045



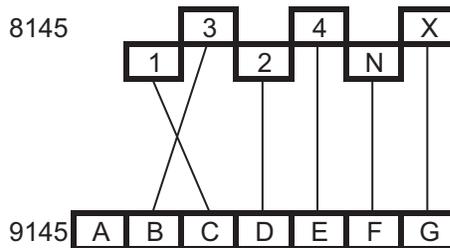
### Convert 8141 to 9145



### Convert 8143 to 9145



### Convert 8145 to 9145





## DEFROST TIMERS - ELECTRONIC

### ERC-2 Series

The Paragon® ERC-2 Electronic Refrigeration Control is a microprocessor-based electronic controller designed to manage both the temperature and the defrost functions of a commercial refrigeration unit.

### Features and Benefits

- Real-time clock for defrost control
- Integrated control
- Temperature control function
- 4 relay outputs 120-240V AC @ 50/60 Hz
- Compressor
- Evaporator fan
- Alarm
- Digital display module
- Keypad programming
- Two temperature sensors (supplied)
- Refrigeration cycle
- Safe mode operation
- Continues operation based on performance average in the event sensor fails
- Power failure recovery
- All settings retained in memory
- Time-of-day carried over for 100 hours



ERC2-212111-370

## Specifications

Part Numbers	Description	Case Type	Temperature Sensor	Defrost Cycles	Temperature Range	Electrical Rating
ERC2-212111-370	ERC-2 Electronic Control with integrated display	NEMA 1	NTC thermistor	1 to 8 per day or 1 every 48 hours	-40°F to 60°F (-40°C to 16°C)	120/208/240V AC (+10, -15%), 50/60 Hz

## Output Relay Rating

	120V AC	208V AC	240V AC
<b>Compressor: SPST</b>			
Horsepower Rating (HP)	1	1.5	2
FLA/LRA	16/96	12/72	12/72
Pilot Duty (VA)	470	470	470
<b>Defrost: SPST NO</b>			
Resistive Amps	16	16	16
Horsepower Rating (HP)	1/2	3/4	1
Pilot Duty (VA)	470	470	470
<b>Evaporator Fan: SPST NC</b>			
Resistive Amps	16	16	16
Horsepower Rating (HP)	1/2	3/4	1
FLA/LRA	10/59	8/48	8/48
Pilot Duty (VA)	470	470	470
<b>Alarms: SPST NO</b>			
Resistive Amps	5	5	5
Pilot Duty (VA)	240	240	240

**PARAGON®**



**1** Year Limited Warranty



# REFRIGERATION

**PARAGON**<sup>®</sup>

## DEFROST MODULES



RM Series

### RM Series

The Paragon<sup>®</sup> RM Series includes program and motor modules. Defrost initiation is adjustable from 1-12 operations per circuit, per day; minimum 2 hours required between successive operations. Mechanical defrost termination is adjustable from 6-106 minutes in one-minute increments. Solenoid termination is optional. Instantaneous transfer if solenoid is energized at time of defrost initiation. Two SPDT snap switches per module. 3/16" male push-on switch terminals. Switch rating: 10 Amps, 1/3 HP, 120-240V AC; 345 VA pilot duty.

### Features and Benefits

- Extra trippers, part number X-7248 (12 per bag)
- UL Listed and CSA Approved

## Specifications

Part Numbers	Description	Circuit	Hour	High Pressure (Open High) Cut-Out	Comments	Electrical Rating
A877-20	RM Series Program Module	Circuit Module	Even Hour	1 (0.5)	With solenoid	208-240V AC, 60 Hz
A878-20	RM Series Motor Module	NA	Drive Module	1 (0.5)	NA	208-240V AC, 60 Hz



**1** Year Limited Warranty



**1** Year  
Limited  
Warranty

## RESIDENTIAL DEFROST TIMERS

### Domestic Defrost Timers

The Paragon® 1401 Series Defrost Timers are a synchronous motor control that activates an internal SPDT switch to actuate a defrost heater in a refrigerator. These heavy-duty 15 Amp Paragon timers are used by OEM manufacturers to replace both the older classic design timers and the new OEM versions.

### Features and Benefits

- Bulk quantities must be ordered in multiples of 12
- Quiet - synchronous design provides extremely quiet operation
- Position freedom - timer can be mounted in various locations
- Interchangeability - standard mounting allows use in all applications
- Double insulated - requires no earth grounding
- RoHS compliant



A1401-00

## Specifications

Part Numbers	Description	Bulk Quantity	Timing	Electrical Rating
A1401-00	Defrost Timer in Refrigerator	12	6 hours 21 minutes	120V AC 60 Hz 15 Amp 1/2 HP
B1401-00	Defrost Timer in Refrigerator	12	8 hours 20 minutes	120V AC 60 Hz 15 Amp 1/2 HP
G1401-00	Defrost Timer in Refrigerator	12	6 hours 25 minutes	120V AC 60 Hz 15 Amp 1/2 HP
A1401-20	Defrost Timer in Refrigerator	12	6 hours 21 minutes	240V AC 60 Hz 8 Amp 1/2 HP
B1401-20	Defrost Timer in Refrigerator	12	8 hours 20 minutes	240V AC 60 Hz 8 Amp 1/2 HP
G1401-20	Defrost Timer in Refrigerator	12	6 hours 25 minutes	240V AC 60 Hz 8 Amp 1/2 HP
A1401-21	Defrost Timer in Refrigerator	12	6 hours 21 minutes	240V AC 50 Hz 8 Amp 1/2 HP
B1401-21	Defrost Timer in Refrigerator	12	8 hours 20 minutes	240V AC 50 Hz 8 Amp 1/2 HP
G1401-21	Defrost Timer in Refrigerator	12	6 hours 25 minutes	240V AC 50 Hz 8 Amp 1/2 HP
NK-2001-21	Defrost Timer in Refrigerator	NA	8 hours 7 minutes	208-240V AC 50 Hz 8 Amp 1/2 HP



# REFRIGERATION

**RANCO**



ETC-111000-000

## ELECTRONIC CONTROLS

### ETC Series

The Ranco® ETC Series Electronic Temperature Control offers a full-featured electronic replacement for electrical-mechanical temperature controls used in many commercial refrigeration applications. With its wide temperature range, one and two stage capability, selectable heating/cooling modes and multi-voltage input, the ETC is designed to provide application flexibility. Models available include 120/208/240V AC and 24V AC.

### Features and Benefits

- Wide temperature range -30°F to 220°F (-34,4°C to 104,4°C)
- Wide differential adjustment 1°F to 30°F (-17°C to -1°C)
- LCD read-out for sensor temperature, control settings, and relay status
- High Amp output relay (FLA 16 Amps @ 120V AC and 8 Amps @ 208/240V AC) single stage
- EEPROM memory retains control settings during power outages
- Keypad lockout to prevent end-user alteration of settings
- 8 foot lead with sensor is extendable up to 400 feet using 18 or 22-gauge thermostat wire
- Easy 4-step set-up
- Heavy-duty relay is 1 HP rated
- Selectable °F or °C heating/cooling modes
- Single and two stage models
- NEMA 1 case and cover
- NEMA 4X models available
- White backlight on display
- Sensor rated IP67 for dust and water (<1m) resistance





## Specifications

Part Numbers	Description	Number of Stages	Enclosure Type	Temperature Range	Differential Range	Electrical Rating	0 to 10 Volt Output
ETC-111000-000	Electronic Temperature Control	One	NEMA 1	-30°F to 220°F (-34°C to 104°C)	1°F to 30°F (1°C to 16°C)	120/208/240V AC	No
ETC-111100-000	Electronic Temperature Control	One	NEMA 1	-30°F to 220°F (-34°C to 104°C)	1°F to 30°F (1°C to 16°C)	120/208/240 V AC	No
ETC-112000-000	Electronic Temperature Control	One	NEMA 1	-30°F to 220°F (-34°C to 104°C)	1°F to 30°F (1°C to 16°C)	24V AC	No
ETC-141000-000	Electronic Temperature Control	One	NEMA 4X	-30°F to 220°F (-34°C to 104°C)	1°F to 30°F (1°C to 16°C)	120/208/240 V AC	No
ETC-211000-000	Electronic Temperature Control	Two	NEMA 1	-30°F to 220°F (-34°C to 104°C)	1°F to 30°F (1°C to 16°C)	120/208/240 V AC	No
ETC-212000-000	Electronic Temperature Control	Two	NEMA 1	-30°F to 220°F (-34°C to 104°C)	1°F to 30°F (1°C to 16°C)	24V AC	No
ETC-241000-000	Electronic Temperature Control	Two	NEMA 4X	-30°F to 220°F (-34°C to 104°C)	1°F to 30°F (1°C to 16°C)	120/208/240 V AC	No
1309007-044	Thermistor Sensor, 2" long x 1/4" diameter with 8' #22 AWG cable	NA	NA	NA	NA	NA	NA

## Relay Electrical Ratings

Single Stage Models			Two Stage Models	
120V AC	208/240V AC	NO Contact	120V AC	208/240V AC
16 Amps	8 Amps	Full-load Amps	9.8 Amps	4.9 Amps
96 Amps	48 Amps	Locked Rotor Amps	58.8 Amps	29.4 Amps
15 Amps	8 Amps	Resistive Amps	9.8 Amps	4.9 Amps
1 HP	1 HP	Horsepower	1/2 HP	1/2 HP
120V AC	208/240V AC	NC Contact	120V AC	208/240V AC
5.8 Amps	2.9 Amps	Full-load Amps	5.8 Amps	2.9 Amps
34.8 Amps	17.4 Amps	Locked Rotor Amps	34.8 Amps	17.4 Amps
5.8 Amps	2.9 Amps	Resistive Amps	5.8 Amps	2.9 Amps
1/4 HP	1/4 HP	Horsepower	1/4 HP	1/4 HP

**1** Year  
Limited  
Warranty



# REFRIGERATION

**RANCO**

## TEMPERATURE CONTROLS - COLD CONTROLS



A12-1560

### A12 and 9531 Series - Constant Cut-in

The Ranco® A12 and 9531 Series Constant Cut-in Temperature Controls are designed to switch electrical components of refrigeration systems in response to sensed temperatures.

#### Features and Benefits

- Laser-welded stainless steel bellows
- Fixed or adjustable temperature settings
- High-amperage contacts
- Pneumatic action provided by vapor-filled capillary or capillary with bulb sensing elements
- Constant On or Off positions available
- Choice of mounting brackets, adjustment ranges and cams, and slotted or flattened shafts
- Standard 1/4" quick-connect terminals with optional screw terminals

### Specifications

Part Numbers	Description	Cold Off	Normal Off	Warm Off	Cut-In	Capillary Length
A12-1506	Constant Cut-In Control	9°F	15°F	22°F	38°F	39" x 3/8" x 1-3/8"
A12-1560	Constant Cut-In Control	19°F	24°F	29°F	38°F	72"
A12-700	Constant Cut-In Control	11.5°F	18°F	26°F	37°F	84"
A12-701	Constant Cut-In Control	15°F	23.5°F	31°F	41°F	84"
9531N195	Constant Cut-In Control with Pigtail	5°F	NA	29°F	40°F	58.5"
9531N320	Constant Cut-In Control	11°F	16°F	21°F	40°F	20.5"
9531N395 (MEX, SA)	Constant Cut-In Control with Pigtail	12°F	19°F	25°F	38°F	48.5"
9531N251	Constant Cut-In Control	14°F	18°F	22°F	40°F	42.5"
9531N388	Constant Cut-In Control with Pigtail	15.8°F	20°F	26.6°F	37°F	33.5"

**CRUS**  
Recognized  
Component

**1** Year  
Limited  
Warranty

D20



## TEMPERATURE CONTROLS - COLD CONTROLS

### A22, A30 and 9530 Series - Constant Differentials

The Ranco® A22, A30 and 9530 Series Constant Differential Temperature Controls are designed to switch electrical components of refrigeration systems in response to sensed temperatures.

#### Features and Benefits

- Laser-welded stainless steel bellows
- Fixed or adjustable temperature settings
- High-amperage contacts
- Pneumatic action provided by vapor-filled capillary or capillary with bulb sensing elements
- Constant On or Off positions available
- Choice of mounting brackets, adjustment ranges and cams, and slotted or flatted shafts
- Standard 1/4" quick-connect terminals with optional screw terminals



A30-2210

### Specifications

Part Numbers	Description	Switch	Off Position	Cold Off	Cold On	Normal Off	Normal On	Warm On	Differential	Capillary Length
A22-391	Adaptable Constant Differential Control	SPDT	No	11°F	19°F	27°F	35°F	51°F	8°F	66"
A22-1112	Adaptable Constant Differential Control	SPST	No	25°F	30°F	34°F	39°F	44°F	5°F	72"
A22-1129	Ice Bin Level and Harvest Control	SPDT	NA	NA	NA	35°F	51°F	NA	6°F	48"
A30-180	Adaptable Constant Differential Control	SPST	Yes	-4°F	9°F	9°F	22°F	38°F	13°F	42"
A30-182	Constant Differential Control	SPST	Yes	-6°F	NA	3°F	20°F	44°F	17°F	42"
A30-260	Adaptable Constant Differential Control	SPST	Yes	0.5°F	5.5°F	16°F	22°F	30°F	6°F	72"
A30-261	Adaptable Constant Differential Control	SPST	Yes	32°F	38°F	NA	NA	61°F	6°F	84"
A30-262	Adaptable Constant Differential Control	SPST	Yes	3°F	15°F	20°F	32°F	43°F	12°F	84"
A30-263	Adaptable Constant Differential Control	SPST	Yes	0.5°F	23°F	11°F	33.5°F	47°F	22.5°F	84"
A30-301	Adaptable Constant Differential Control	SPST	No	-24°F	NA	-3°F	5.5°F	20.5°F	8.5°F	84"
A30-313	Constant Differential Control	SPST	Yes	-20°F	NA	-10°F	-2°F	21°F	8°F	42"
A30-2209	Constant Differential Control with Dial	SPST	Yes	35°F	NA	36.5°F	44.5°F	46°F	8°F	48"
A30-2210	Constant Differential Control with Dial	SPST	Yes	30°F	NA	32°F	40°F	42°F	8°F	48"
A30-2311	Fixed	SPST	NA	NA	NA	30°F	56°F	NA	26°F	30"
9530N814	Constant Differential Control with Dial	SPST	Yes	12°F	NA	16°F	40°F	43°F	24°F	30"



**1** Year  
Limited  
Warranty



# REFRIGERATION

**RANCO**

## TEMPERATURE CONTROLS - COLD CONTROLS



K12L-1529-002

### K Series

The Ranco® K Controls are used all over the globe to control the temperature in commercial and domestic refrigeration, air conditioning and heating applications. Typical uses include refrigerators, freezers, bottle and liquid coolers, and refrigerator display cases.

### Features and Benefits

- Compact size
- Standard mounting configurations
- Constant/fixed differential
- SPST close-on-rise switching
- Various capillary lengths

### Specifications

Part Numbers	Description	Country of Origin	Switch	Cold Cut-In	Cold Cut-Out	Normal Cut-Out	Warm Cut-In	Warm Cut-Out	Constant Cut-In	Capillary Length
K12L-1529-002	Cold Control International Models	Czech Republic	SPST	NA	-8.3°C	-4.7°C	NA	-0.8°C	5.5°C	2130mm
K50P-1125-001	Cold Control International Models	Czech Republic	SPST	-9°C	-18°C	NA	9°C	NA	NA	1200mm
K50P-1126-001	Cold Control International Models	Czech Republic	SPST	-18°C	-24°C	NA	-9°C	NA	NA	1200mm
K50P-1127-001	Cold Control International Models	Czech Republic	SPST	5°C	2°C	NA	13°C	NA	NA	1200mm
K50P-6063-001	Cold Control International Models	Czech Republic	SPST	5°C	-6°C	NA	11°C	NA	NA	1200mm
K50Q-1125-001	Cold Control International Models	China	SPST	-9°C	-18°C	NA	9°C	NA	NA	1200mm
K50Q-1126-001	Cold Control International Models	China	SPST	-18°C	-24°C	NA	-9°C	NA	NA	1200mm
K50Q-1127-001	Cold Control International Models	China	SPST	5°C	2°C	NA	13°C	NA	NA	1200mm
K50P1110005 (EU)	Cold Controls International Models	Czech Republic	SPST	-14.5°C	-23°C	NA	2°C	-3.4°C	NA	1200mm
K50P1115002 (EU)	Cold Controls International Models	Czech Republic	SPST	4°C	1.5°C	NA	11°C	8.9°C	NA	2000mm
K52L4510001 (EU)	Cold Controls International Models	Czech Republic	SPST	3.5°C	-16.5°C	NA	3.5°C	-3.5°C	NA	1000mm
K59H2840001 (EU)	Cold Controls International Models	Czech Republic	SPST	2.3°C	-25.4°C	NA	2.3°C	-15.8°C	NA	900mm
K59L1821000 (EU)	Cold Controls International Models	Czech Republic	SPST	2.5°C	-25°C	NA	2.5°C	-15.5°C	NA	900mm

**1** Year Limited Warranty



## TEMPERATURE CONTROLS - COLD CONTROLS

### Varifix® Series

The Ranco® Varifix International Cold Controls are designed for fast and easy service replacements. They are available for both refrigerator and freezer applications.

### Features and Benefits

- Trusted brand
- Capillary is crimped and sealed for maximum reliability
- High level of performance
- Complete kit includes all necessary hardware



VT9

### Specifications

Part Numbers	Description	Application	Normal Cut-Out	Normal Cut-In	Capillary Length
VA-2 (ANZ)	Cold Control	Absorption Refrigerator	-18°C	-14.5°C	2000mm
VA200000000 (EU)	Cold Control	Absorption Refrigerator	-18°C	-14.5°C	2000mm
VB7 (ANZ)	Cold Control	Bottle or Beverage Cooler and Frost Free Refrigerator	3°C	7°C	1200mm
VB700000000 (EU)	Cold Control	Bottle or Beverage Cooler and Frost Free Refrigerator	3°C	7°C	1200mm
VC1 (ANZ)	Cold Control	Refrigerator / Manual Defrost	-14.5°C	-5°C	1200mm
VC100000000 (EU)	Cold Control	Refrigerator / Manual Defrost	-14.5°C	-5°C	1200mm
VF3 (ANZ)	Cold Control	Freezer and Ice Cream Cabinet	-24°C	-16°C	2000mm
VF300000000	Cold Control	Freezer and Ice Cream Cabinet	-24°C	-16°C	2000mm
VR-6 (ANZ)	Cold Control	Freezer with Reverse Thermostat	-34°C	-16.5°C	1999mm
VR-600000000 (EU)	Cold Control	Freezer with Reverse Thermostat	-34°C	-16.5°C	1999mm
VS-5 (ANZ)	Cold Control	Freezer with Standard Signal Thermostat	-34°C	-16.5°C	2000mm
VS-500000000 (EU)	Cold Control	Freezer with Standard Signal Thermostat	-34°C	-16.5°C	2000mm
VT9 (ANZ)	Cold Control	Refrigerator Auto Defrost	-18.5°C	33.5°C	1200mm
VT900000000 (EU)	Cold Control	Refrigerator Auto Defrost	-18.5°C	33.5°C	1200mm
VX0 (ANZ)	Cold Control	Larder Refrigerator	-15°C	-5°C	1999mm
VX000000000 (EU)	Cold Control	Larder Refrigerator	-15°C	-5°C	1999mm
VL1 (ANZ)	Cold Control	Compressor Refrigerator	NA	NA	1200mm
VL100000000 (EU)	Cold Control	Compressor Refrigerator	NA	NA	1200mm
VL2 (ANZ)	Cold Control	Absorption Refrigerator	NA	NA	2000mm
VL200000000 (EU)	Cold Control	Absorption Refrigerator	NA	NA	2000mm
VL3 (ANZ)	Cold Control	Freezer and Ice Cream Cabinets	NA	NA	2000mm
VL300000000 (EU)	Cold Control	Freezer and Ice Cream Cabinets	NA	NA	2000mm
VL4 (ANZ)	Cold Control	Push Button Defrost Refrigerator	NA	NA	1200mm
VL400000000 (EU)	Cold Control	Push Button Defrost Refrigerator	NA	NA	1200mm
VL5 (ANZ)	Cold Control	Freezer Standard Signal	NA	NA	2000mm
VL500000000 (EU)	Cold Control	Freezer Standard Signal	NA	NA	2000mm
VL7 (ANZ)	Cold Control	Bottle Cooler	NA	NA	1200mm
VL700000000 (EU)	Cold Control	Bottle Cooler	NA	NA	1200mm
VL9 (ANZ)	Cold Control	Larder Refrigerator / 2 Door Cabinet	NA	NA	1200mm
VL900000000 (EU)	Cold Control	Larder Refrigerator / 2 Door Cabinet	NA	NA	1200mm
VP4 (ANZ)	Cold Control	Push Button Defrost Refrigerator	NA	NA	1200mm
VP400000000 (EU)	Cold Control	Push Button Defrost Refrigerator	NA	NA	1200mm
VP4A (EU)	Cold Control	Push Button Defrost Refrigerator	NA	NA	1200mm
VP4A0000000 (EU)	Cold Control	Push Button Defrost Refrigerator	NA	NA	1200mm
VT93 (ANZ)	Cold Control	Long Capillary Version of VL9	NA	NA	3000mm
VT930000000 (EU)	Cold Control	Long Capillary Version of VL9	NA	NA	3000mm

**1** Year  
Limited  
Warranty



# REFRIGERATION

**RANCO**

## TEMPERATURE CONTROLS - SPECIALTY APPLICATIONS



C12-5010

### Heat/Cool

The Ranco® Heat / Cool Controls replace many OEM controls which govern the on/off compressor function. Heat and cool controls are found on room air conditioners such as packaged terminal, room and through-the-wall heat and cool units.

### Features and Benefits

- Fixed or adjustable temperature settings
- Laser-welded stainless steel sensing elements
- Narrower differentials attainable
- C12 can be used for cool only units or heat/cool units when used with a separate changeover switch
- C17 has two SPDT electrically isolated switches, calibrated at different set points and differentials
- Two stage SPDT switches are staged 3.5°F

### Specifications

Part Numbers	Description	Application	Switch	Temperature Range	Differential	Capillary	Sensing Element
C12-5010	Single Stage Heat / Cool Control	Packaged Terminal, Room and Through-the-Wall Heat / Cool Units	SPDT	60°F to 98°F	3°F	36"	3/8" x 9" Bulb
C17-100	Two Stage Heat / Cool Control	Packaged Terminal, Room and Through-the-Wall Heat / Cool Units	2 SPDT	71°F to 101°F (Cooling), 64°F to 94°F (Heating)	3.5°F	26"	3/8 x 8-9/16" Bulb

**1** Year  
Limited  
Warranty



## TEMPERATURE CONTROLS - SPECIALTY APPLICATIONS

### Heat Pump Controls

The Ranco® Heat Pump Controls provide accurate control of temperature and defrost for heat pumps.

The C12-2001 control is an adjustable resistance heat thermostat used to turn on heat in response to outdoor temperature.

The E15-2601 provides field-adjustable timer control for de-icing of heat pump outdoor coils.

Interlock prevents more than one defrost cycle per time period and temperature must be 28°F or lower to start.

### Features and Benefits

- Laser-welded stainless steel sensing elements
- Narrower differentials attainable
- Defrost includes field selectable defrost cycles



C12-2001

### Specifications

Part Numbers	Description	Application	Switch	Temperature Range	Timing	Differential	Capillary Length	Sensing Element
C12-2001	Resistance Heat Lockout Thermostat	Heat Pump Controls	SPDT	-1°F to 59°F	NA	5°F	30"	3/8" x 6" Bulb
E15-2601	Timer-Initiated Heat Pump De-Ice Control	Heat Pump Controls	SPDT	Adjustable 55°F to 78°F	Field Selectable: 30, 45, or 90 Minutes	NA	60"	5/16" x 5-1/16" Bulb



# REFRIGERATION

**RANCO**

## TEMPERATURE CONTROLS - SPECIALTY APPLICATIONS



F25-107

### F Series - Fan Control

The Ranco® Fan Controls terminate defrost, and delay the evaporator fan operation on electric heat, hot gas and reverse cycle commercial refrigeration systems.

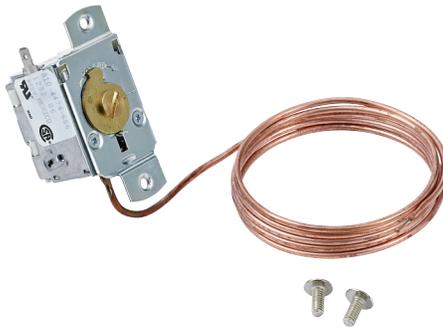
### Features and Benefits

- Prevents warm, moist air from being circulated into the refrigerated space
- Remote bulb sensing
- Factory-fixed low event for fan delay

### Specifications

Part Numbers	Description	Application	Switch	Fan On	Defrost Termination Range	Capillary Length	Sensing Element
F25-107	Defrost Termination / Fan Delay Control	Beverage / Reach-in Medium Temperature	SPDT	20°F Fixed	40°F to 75°F (5°C to 24°C)	60"	3/8" X 4" Cross Ambient Bulb

## TEMPERATURE CONTROLS - SPECIALTY APPLICATIONS



K-3001

### Water Cooler Control

The Ranco® Water Cooler Control is designed as a universal replacement for water and beverage cooler applications.

### Features and Benefits

- Small, compact design
- Laser-welded bellows for reliability
- Computer calibrated
- Patented switch for high performance
- Screwdriver adjustment

### Specifications

Part Numbers	Description	Application	Cold Off	Normal Off	Normal On	Warm On	Differential	Capillary Length
K-3001	Direct Replacement Water Cooler Control	Ice Equipment, Thermal Storage and Water Cooler Controls	37°F	46°F	53°F	61°F	7°F	48"

**1** Year Limited Warranty



## LUBE OIL CONTROLS

### P30 Series

The Ranco® P30 Series Lube Oil Protection Controls guard pressure-lubricated refrigeration compressors against major damage due to loss of oil pressure.

This control utilizes the built-in P30 Time Delay Switch to start timing when oil pressure drops below operating requirements.

The timer is designed not only to track oil pressure recovery within a set period, but also to alert the control circuit to open and stop the compressor when the recovery period is exceeded.

These controls also feature replaceable time delay modules, Super Cap® capillary protection system and front-located captive cover screw.

### Features and Benefits

- Alarm circuit standard
- Ambient temperature compensated
- Super Cap® capillary protection system
- High impact, non-conductive cover
- Field replaceable switch module
- Manual reset
- Industry standard circuitry and terminal identification



P30-5826

## Specifications

Part Numbers	Description	Pressure Connection Lube and Suction	Time Delay	Pressure Range	Electrical Rating
P30-3601	Lube Oil Protection Control	36" Capillary with Flare Nut	60 seconds	8-60 PSI Adjustable	120V AC or 240V AC, Pilot Duty 720VA
P30-3701	Lube Oil Protection Control	36" Capillary with Flare Nut	90 seconds	8-60 PSI Adjustable	120V AC or 240V AC, Pilot Duty 720VA
P30-3702	Lube Oil Protection Control	Male Connection 7/16" 20 UNF for a 1/4" Female Flare	90 seconds	8-60 PSI Adjustable	120V AC or 240V AC, Pilot Duty 720VA
P30-3801	Lube Oil Protection Control	36" Capillary with Flare Nut	120 seconds	8-60 PSI Adjustable	120V AC or 240V AC, Pilot Duty 720VA
P30-5826	Lube Oil Protection Control	36" Capillary with Flare Nut	120 seconds	9 PSID Fixed	120V AC or 240V AC, Pilot Duty 720VA
P30-5839	Lube Oil Protection Control	Male Connection 7/16" 20 UNF for a 1/4" Female Flare	120 seconds	9 PSID Fixed	120V AC or 240V AC, Pilot Duty 720VA
P30-5848	Lube Oil Protection Control	Male Connection 7/16" 20 UNF for a 1/4" Female Flare	120 seconds	9 PSID Fixed	120V AC or 240V AC, Pilot Duty 720VA



**1** Year Limited Warranty



# REFRIGERATION

**RANCO**



O10-1409  
with Coil Capillary



O10-1418  
with Air Coil

## TEMPERATURE CONTROLS - WIDE RANGE

### O Series

The Ranco® Wide Range O Series Temperature Controls provide a wide selection of controls customized to allow users exact adjustments within manufacturers' limits.

The Ranco O Series features heavy-duty plated steel frames, non-conductive covers with front-located captive cover screws, raised screw terminals for fully accessible wiring, and large easy-to-read scales.

Recognizing the need for flexibility in design of refrigeration equipment, these controls offer a wide selection for such products as self-contained refrigerators, freezers, coolers, walk-in units, and refrigeration display cases.

### Features and Benefits

- Maximum adjustment accuracy with 7 revolution range adjustment screws
- NEMA 1 enclosure with non-conductive cover
- Universal mounting and compact design
- Laser-welded bellows for extended life
- Wide range adjustable differential

### The O60 Series have these additional features:

- 10 times setting sensitivity of most other wide range controls (O60 series only)
- Gas-filled, nonposition-sensitive bulb (O60 series only)



**UL** US  
LISTED  
Listed  
Product

**RA** US  
Recognized  
Component



## Specifications

Part Numbers	Description	Switch	Temperature Range	Differential	Capillary Length	Bulb
010-1408	Low Temperature Control	SPST	-15°F to 40°F	3°F to 20°F	72"	Remote
010-1409	Medium Temperature Control	SPST	0°F to 55°F	3°F to 20°F	72"	Remote
010-1410	High Temperature Control	SPST	25°F to 75°F	3°F to 20°F	72"	Remote
010-1416	Medium Temperature Control	SPST	0°F to 55°F	3°F to 20°F	72"	Cross Ambient
010-1418	Medium Temperature Control	SPST	0°F to 55°F	3°F to 20°F	Air Coil	Remote
060-100	Extra Low-Wide Range Temperature Control	SPDT	-35°F to 95°F	4°F to 50°F	96"	3/8" x 6" Cross Ambient
016-641 or 016-6930 (ANZ)	Extra Low-Wide Range Temperature Control	SPDT	-34°C to 34°C	4°C to 25°C	1.8m	Cross Ambient
016-639 or 016-6950 (ANZ)	Extra Low-Wide Range Temperature Control	SPDT	-35°C to -7°C	1.7°C to 12°C	2m	Coiled
016-636 or 016-6951 (ANZ)	Extra Low-Wide Range Temperature Control	SPDT	-18°C to 13°C	1.7°C to 12°C	2m	Coiled
016-637 or 016-6954 (ANZ)	Extra Low-Wide Range Temperature Control	SPDT	-5°C to 25°C	1.7°C to 12°C	2m	Coiled
016-640 or 016-6980 (ANZ)	Extra Low-Wide Range Temperature Control	SPDT	-18°C to 13°C	1.7°C to 12°C	1.8m	Cross Ambient
016-642 or 016-6981 (ANZ)	Extra Low-Wide Range Temperature Control	SPDT	-5°C to 25°C	1.7°C to 12°C	1.8m	Cross Ambient
016-643 or 016-8900 (ANZ)	Extra Low-Wide Range Temperature Control	SPDT	-18°C to 13°C	4°C to 25°C	2m	Coiled

**1** Year Limited Warranty



# REFRIGERATION

**RANCO**



O10-1402

## PRESSURE CONTROLS

### O Series - Single Low Pressure Controls

The Ranco® O Series Single Low Pressure Controls offer a variety of pressure ranges and switch action to provide maximum application flexibility.

#### Features and Benefits

- Controls available for most refrigerant types
- High-amp rated switch (SPST) design (O10-1402/O10-1483)
- Super Cap® capillary vibration protection system
- Non-conductive front cover with captive screw
- Adjustable differential and range
- Easy-to-read scale plate
- Vibration cone (absorbs and reduces vibration away from brazed joint)
- Low mass copper alloy capillary tube (reduces capillary stress caused by equipment vibration)

#### The O16-624 control has additional features:

- Compatible with refrigerants 134A, 401A, 401B, 402A, 402B, 403A, 403B and 404A
- Originally designed for use with obsolete refrigerants R12, R22, R500 and R502

## Specifications

Part Numbers	Description	Reset	Switch	Pressure Range PSI (bar)	Differential PSI (bar)	Pressure Connection	Capillary Length Inches (meters)	Replaces
O10-1402	Low Pressure Control	Auto	SPST	12" Hg to 50 (0.4 to 3.5)	5 to 35 (0.3 to 2.4)	1/4" SAE Flare Nut	36" (0.9m)	
O10-1483	Low Pressure Control	Auto	SPST	10" Hg to 100 (0.3 to 7)	10 to 40 (1 to 3)	1/4" SAE Flare Nut	36" (0.9m)	
O16-107	Low Pressure Control	Auto	SPDT	10" Hg to 100 (0.3 to 7)	10 to 40 (1 to 3)	Male Flare	NA	Johnstone P70AB-1
O16-527	Low Pressure Control	Auto	SPDT	10" Hg to 100 (0.3 to 7)	10 to 40 (1 to 3)	1/4" SAE Flare Nut	36" (0.9m)	
O16-528	Low Pressure Control	Auto	SPDT	10" Hg to 100 (0.3 to 7)	10 to 40 (1 to 3)	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	O16-H6703-101
O16-8706 (ANZ)	Low Pressure Control	Auto	SPDT	-33 to 700 kPa	68 to 275 kPa	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	O16-528
O16-8713 (ANZ)	Low Pressure Control	Auto	SPDT	-33 to 700 kPa	68 to 275 kPa	1/4" SAE Flare Nut	36" (0.9m)	O16-529
O16-624	Low Pressure Control	Auto	SPST	12" Hg to 80 (0.4 to 5.5)	5 to 38 (0.3 to 2.6)	1/4" SAE Flare Nut	36" (0.9m)	
O16-638	Low Pressure Control	Manual	SPDT	10" Hg to 100 (0.3 to 7)	9 (0.6) Fixed	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	O16-H6705-101
O16-8705 (ANZ)	Low Pressure Control	Manual	SPDT	-33 to 700 kPa	60 kPa Fixed	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	O16-638



**UL**  
LISTED  
Listed Product

**RA**  
US  
Recognized Component

**1** Year  
Limited  
Warranty

D30



## PRESSURE CONTROLS

### O Series - Single High Pressure Controls

The Ranco® O Series Single High Pressure Controls offer a variety of pressure ranges and switch action to provide maximum application flexibility.

#### Features and Benefits

- NEMA 1 enclosure with non-conductive cover
- Front-located captive cover screw
- Large, easy-to-read scale plate
- Super Cap® capillary protection system
- Universal mounting and compact design
- Screw terminals are raised and fully accessible for easy wiring
- Laser-welded bellows for extended life
- Heavy-duty plated steel frame
- Suitable for R12, R22, and R502 applications



O16-108

### Specifications

Part Numbers	Description	Reset	Switch	Pressure Range PSI (bar)	Differential PSI (bar)	Pressure Connection	Capillary Length Inches (meters)	Replaces
010-2054	Single High Pressure Control	Auto	SPST	100 to 400 (7 to 27)	40 to 150 (3 to 10)	1/4" SAE Flare Nut	36" (0.9m)	
016-108	Single High Pressure Control	Auto	SPDT	100 to 400 (7 to 27)	40 to 150 (3 to 10)	1/4" SAE Flare Nut	36" (0.9m)	
016-200	Single High Pressure Control	Manual	SPDT	150 to 450 (10 to 31)	40 (3) Fixed	1/4" SAE Flare Nut	48" (1.2m)	
020-7006	Single High Pressure Control	Auto	DPST	100 to 400 (7 to 27)	40 to 150 (3 to 10)	1/4" SAE Flare Nut	36" (0.9m)	
016-530	Single High Pressure Control	Auto	SPDT	100 to 400 (7 to 27)	40 to 150 (3 to 10)	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	016-H6750-101
016-8750 (ANZ)	Single High Pressure Control	Auto	SPDT	700 to 2800 kPa	275 to 1000 kPa	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	016-530
016-531	Single High Pressure Control	Manual	SPDT	150 to 450 (10 to 31)	40 (3) Fixed	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	016-H6751-101
016-8751 (ANZ)	Single High Pressure Control	Manual	SPDT	1000 to 3100 kPa	276 kPa Fixed	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	016-531



UL LISTED  
Listed Product

Recognized Component

1 Year Limited Warranty



# REFRIGERATION

**RANCO**



O12-1506

## PRESSURE CONTROLS

### O Series - Dual Pressure

The Ranco® Dual Pressure Controls combine the functions of a single high-pressure limit control and a single low-pressure control in one unit with a single pole, single throw (SPST) switch.

### Features and Benefits

- Convertible feature allows selection of manual or reset function when operating at high pressure (O12-4833/O12-4834)
- A wide range of high-pressure manual or automatic reset controls can be replaced (O12-4833 or O12-4834)
- A high-pressure limit is combined with suction pressure sensing to provide temperature control and/or pumpdown
- High-limit adjustment screw
- Low-pressure differential and range adjusting screws
- Selector screw for manual or automatic
- Reset button
- Low-pressure scale plate
- High-impact plastic cover with center mount screw
- High-pressure scale plate
- Super Cap® capillary protection system
- Color-coded for easy identification of pressure line
- High-side capillary flare nut (silver)
- Low-side capillary flare nut (brass)



**UL** US  
LISTED  
Listed  
Product

**RA** US  
Recognized  
Component

D32



## Specifications

Part Numbers	Description	Switch	Low Reset	Low Cut-In PSI (bar)	Low Differential PSI (bar)	High Reset	High Cut-Out PSI (bar)	High Differential PSI (bar)	Pressure Connection	Capillary Length Inches (meters)	Replaces
012-1502	Dual Pressure Control	SPST	Auto	12" Hg to 50 (0.4 to 3.5)	5 to 35 (0.3 to 2.4)	Auto	150 to 450 (10 to 31)	70 (5) Fixed	1/4" SAE Flare Nut	36" (0.9m)	
012-1506	Dual Pressure Control	SPST	Auto	12" Hg to 50 (0.4 to 3.5)	5 to 35 (0.3 to 2.4)	Auto	100 to 250 (7 to 17)	50 (3.5) Fixed	1/4" SAE Flare Nut	36" (0.9m)	
012-1549	Dual Pressure Control	SPST	Auto	10" Hg to 100 (0.3 to 7)	10 to 40 (1 to 3)	Auto	150 to 450 (10 to 31)	70 (5) Fixed	1/4" SAE Flare Nut	36" (0.9m)	
012-4154	Dual Pressure Control	SPST	Manual	10" Hg to 100 (0.3 to 7)	10 (1) Fixed	Manual	150 to 450 (10 to 31)	70 (5) Fixed	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	017-H6703-101 017-H4703-101
017-8703 (ANZ)	Dual Pressure Control	SPDT	Manual	-33 to 700 kPa	60 kPa Fixed	Manual	1000 to 3000 kPa	480 kPa Fixed	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	012-4154
012-4833	Dual Pressure Control	SPST	Auto	12" Hg to 50 (0.4 to 3.5)	5 to 35 (0.3 to 2.4)	Convertible	150 to 450 (10 to 31)	70 (5) Fixed	1/4" SAE Flare Nut	48" (1.2m)	
012-4834	Dual Pressure Control	SPST	Auto	10" Hg to 100 (0.3 to 7)	10 to 40 (1 to 3)	Convertible	150 to 450 (10 to 31)	70 (5) Fixed	1/4" SAE Flare Nut	48" (1.2m)	
012-4860	Dual Pressure Control	SPST	Auto	10" Hg to 100 (0.3 to 7)	10 to 40 (1 to 3)	Convertible	150 to 450 (10 to 31)	70 (5) Fixed	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	017-H4705-101 017-H6705-101
017-8705 (ANZ)	Dual Pressure Control	SPST	Auto	-33 to 700 kPa	68 to 275 kPa	Convertible	1000 to 3000 kPa	480 kPa Fixed	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	012-4860
012-4900	Dual Pressure Control	SPST	Auto	10" Hg to 100 (0.3 to 7)	10 to 40 (1 to 3)	Auto	150 to 450 (10 to 31)	70 (5) Fixed	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	017-H6701-101
017-8701 (ANZ)	Dual Pressure Control	SPST	Auto	-33 to 700 kPa	100 to 300 kPa	Auto	1000 to 3000 kPa	480 kPa Fixed	Male Connection 7/16" - 20 UNF for a 1/4" Female Flare	NA	012-4900
012-4902	Dual Pressure Control	SPST	Auto	10" Hg to 100 (0.3 to 7)	10 to 40 (1 to 3)	Auto	145 to 435 (10 to 30)	70 (5) Fixed	1/4" SAE Flare Nut	36" (0.9m)	017-8711
017-8711 (ANZ)	Dual Pressure Control	SPST	Auto	-33 to 700 kPa	68 to 275 kPa	Auto	1000 to 3000 kPa	480 kPa Fixed	1/4" SAE Flare Nut	36" (0.9m)	012-4902

**1** Year Limited Warranty



# REFRIGERATION

**RANCO**

## PRESSURE CONTROLS



### O Series - Ice Bank Control

The Ranco® O Series Ice Bank Control is suitable for soft drink dispensers, drink vending machines and ice builders for thermal storage. Uses a special water-filled bulb and transmission fluid to control ice thickness in applications utilizing a refrigerated water bath with ice bank reserve capacity.

### Specifications

Part Numbers	Description	Switch	Cut-In	Cut-Out	Temperature	Capillary Length	Sensing Element
018-100	Ice Bank Control	SPST	34.5°F	27.5°F	Fixed 32°F	76"	Bulb

**1** Year  
Limited  
Warranty

D34



## REFRIGERATION ACCESSORIES

### Refrigerant Hoses

The Ranco® refrigerant hose is a heavy-duty hose designed for critical applications such as commercial refrigeration.

Made of Teflon® tubing and surrounded by a braided 304 stainless steel wire, the hose is designed to resist breakage from compressor vibration.

### Features and Benefits

- Hose inner diameter - 3/16"
- Hose outer diameter - 5/16"
- Maximum operating pressure - 3,000 PSI
- Minimum burst pressure - 12,000 PSI
- Minimum bend radius - 2"
- Vacuum - 28" Hg



1290132-A24



1290132-A36

### Specifications

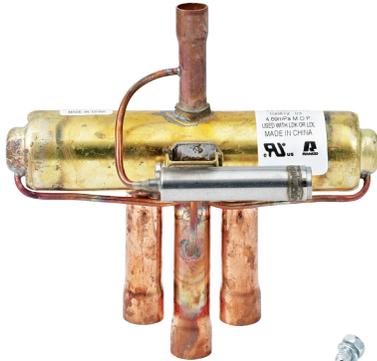
Part Numbers	Description	Hose Length	Fittings (1/4 SAE)
1290132-A24	Refrigerant Hose	24"	One straight and one 90° elbow. Both ends have 7/16" - 20 Female Flare Connector
1290132-A36	Refrigerant Hose	36"	One straight and one 90° elbow. Both ends have 7/16" - 20 Female Flare Connector



# REFRIGERATION

**RANCO**

## REVERSING VALVES



V2-408060-170

### V Series

The Ranco® 4-Way Reversing Valves are designed for heat pump applications such as window-type, unitary and split systems.

They are the key component to provide heating and cooling from the heat pump system by reversing the flow direction of the refrigerant.

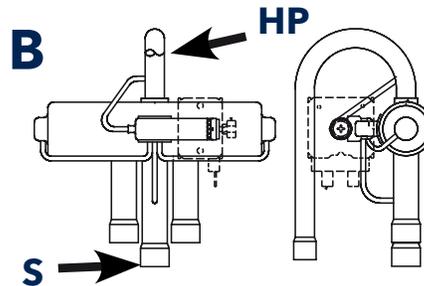
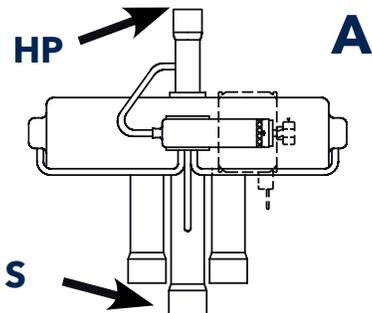
These solenoid operated valves are slide type with a 4-way pilot valve, and operate under the full pressure of the heat pump system.

Note: Solenoid coils are not included.

### Specifications

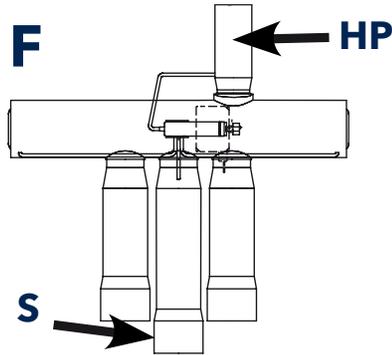
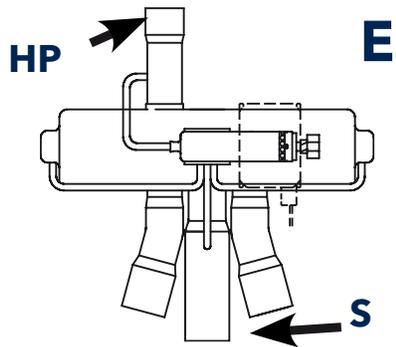
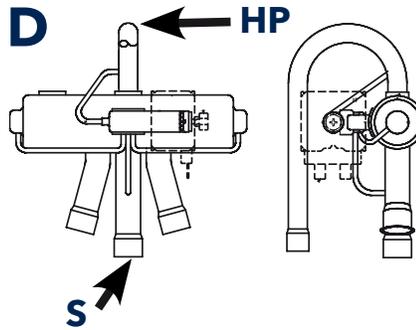
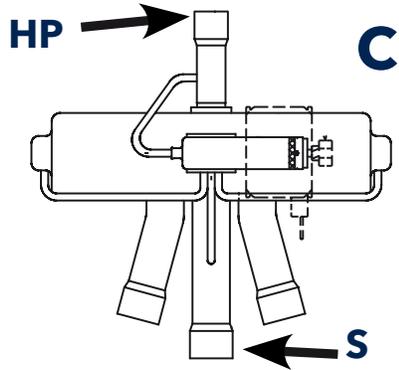
Part Numbers	Description	Capacity Nominal	Capacity R-22	Capacity R-410A	Tube Size Suction	Tube Size Discharge	Style
V2-408060-170	4-Way Reversing Valve	1 ton	0.75 to 2.0 tons	0.9 to 2.2 tons	1/2"	3/8"	A
V2-408060-270	4-Way Reversing Valve	2 tons	0.75 to 2.0 tons	0.9 to 2.2 tons	1/2"	3/8"	B
V2-410060-470	4-Way Reversing Valve	2 tons	1.0 to 2.5 tons	1.3 to 2.5 tons	5/8"	3/8"	D
V2-4100F0-370	4-Way Reversing Valve	2 tons	1.0 to 2.5 tons	1.3 to 2.5 tons	5/8"	3/8" Outer Diameter	C
V3-410080-770	4-Way Reversing Valve	3 tons	1.0 to 2.8 tons	1.3 to 3.1 tons	5/8"	1/2"	E
V3-412080-870	4-Way Reversing Valve	3 tons	1.0 to 3.0 tons	1.3 to 3.5 tons	3/4"	1/2"	E
V6-412080-170	4-Way Reversing Valve	6 tons	1.0 to 5.5 tons	1.3 to 6.7 tons	3/4"	1/2"	A
V6-414080-170	4-Way Reversing Valve	6 tons	1.0 to 5.5 tons	1.3 to 6.7 tons	7/8"	1/2"	A
V10-414080-170	4-Way Reversing Valve	10 tons	3.0 to 9.9 tons	3.8 to 11.9 tons	7/8"	1/2"	A
V10-418140-170	4-Way Reversing Valve	10 tons	3.0 to 11.2 tons	3.8 to 13.5 tons	1-1/8"	7/8"	A
V12-4220T0-270	4-Way Reversing Valve	12 tons	6.0 to 14.0 tons	6.3 to 16.8 tons	1-3/8"	1-1/8" Outer Diameter	F

### Product Drawings





## Product Drawings



Legend
HP: High Pressure
S: Suction

**R**  
**R**  
**A**  
**N**  
**G**  
**O**

**1** Year  
Limited  
Warranty

D37



## COPPER PRODUCTS

### Copper Products

The Ranco® CT Series Capillary Tubes, the DF Series Drier Filters and the ST Series Strainers are designed for copper replacement on air conditioning and commercial refrigeration installations.

The Copper Capillary Tubes are used in air conditioning systems with small capacity (split and window) equipment. They are used along with expansion elements to create pressure drops in the coolant circuit to balance the thermodynamic of these units. Capillary tubes are available in individual packages of 10' (3 meters) lengths with various inner diameters (ID) sizes.

The Copper Drier Filters are used in refrigerators, freezers and air conditioners to filter impurities and residual moisture in the refrigeration system to avoid damage to the compressor.

The Copper Strainer Filters are copper spun and designed to trap particulates found within refrigerant systems. Various inlet and outlet sizes are available with stainless steel mesh.

### Features and Benefits

- Quality and Engineering Excellence
  - Experts on copper processes for over 50 years
  - Bending, end forming, collaring, swaging, cold drawing, brazing, burr free cutting, bright annealing and stamping
- Trusted brand for over 100 years
- Fast delivery
- Many sizes available



## Specifications

### Capillary Tubes

Part Numbers	Description	Inner Diameter	Length
24-001U	Copper Capillary Tube	0.031" (0,79mm)	10' (3m)
24-013U	Copper Capillary Tube	0.036" (0,91mm)	10' (3m)
24-002U	Copper Capillary Tube	0.042" (1,07mm)	10' (3m)
24-003U	Copper Capillary Tube	0.050" (1,27mm)	10' (3m)
24-018U	Copper Capillary Tube	0.064" (1,63mm)	10' (3m)
24-005U	Copper Capillary Tube	0.070" (1,80mm)	10' (3m)
24-010U	Copper Capillary Tube	0.080" (2,03mm)	10' (3m)

### Drier Filters

Part Numbers	Description	Body	Length	Input Inner Diameter	Output Inner Diameter
13-135	Copper Drier Filter Without Thread	3/4" (19,05mm)	4.80" (122mm)	1/4" (6,35mm)	3/32" (2,35mm)
28-082	Copper Drier Filter With Thread	3/4" (19,05mm)	4.60" (117mm)	5/16" (7,94mm)	1/8" (3,18mm)
28-096	Copper Drier Filter With Thread and Capillary	1" (25,40mm)	3.94" (100mm)	1/4" (6,35mm)	3/16" (4,76mm)
28-097	Copper Drier Filter With Thread	1" (25,40mm)	3.94" (100mm)	1/4" (6,35mm)	3/16" (4,76mm)
28-106	Copper Drier Filter With Thread and Capillary	3/4" (19,05mm)	3.94" (100mm)	1/4" (6,35mm)	3/16" (4,76mm)
28-107	Copper Drier Filter With Thread	3/4" (19,05mm)	3.94" (100mm)	1/4" (6,35mm)	3/16" (4,76mm)
28-130	Copper Drier Filter With Thread	3/4" (19,05mm)	4.33" (110mm)	1/4" (6,35mm)	3/16" (4,76mm)
28-132	Copper Drier Filter With Thread	1" (25,40mm)	4.53" (115mm)	1/4" (6,35mm)	3/16" (4,76mm)
28-088	Copper Drier Filter With Capillary	3/4" (19,05mm)	2-3/4" (70mm)	1/4" (6,35mm)	3/16" (4,76mm)
28-108	Copper Drier Filter	3/4" (19,05mm)	2-3/4" (70mm)	1/4" (6,35mm)	3/16" (4,76mm)

### Strainer Filters

Part Numbers	Description	Body	Length	Input Inner Diameter	Output Inner Diameter
14-014	Copper Strainer Filter	3/4" (19,05mm)	2-3/4" (70mm)	1/4" (6,35mm)	2-1/8" (54mm)
14-015	Copper Strainer Filter	3/4" (19,05mm)	2-3/4" (70mm)	3/8" (9,53mm)	3-1/8" (80mm)
14-016	Copper Strainer Filter	3/4" (19,05mm)	2-3/4" (70mm)	1/4" (6,35mm)	1-3/16" (30mm)





# REFRIGERATION

**RANCO**

## REVERSING VALVES - SOLENOID COILS



LDK-110000-070

### LDK Series

The Ranco® LDK Series Solenoid Coils are designed for use with current production (Generation 4) V0, V1, V2, V3, V6, V10 and V12 Ranco 4-way Reversing Valves.

These color-coded, encapsulated, continuous duty, moisture resistant electro-magnetic coils are designed to operate the pilot valve that controls these reversing valves.

A W29 wiring harness with 48" leads is included with the solenoid coil.

### Features and Benefits

- Epoxy encapsulated
- Continuous duty
- Moisture resistant magnetic coils
- Includes wiring harness

### Specifications

Part Numbers	Description	Color Code	Lead Length	Electrical Rating	Power
LDK-110000-070	Solenoid Coils for Reversing Valves	Red	48"	24V AC	5 Watts at 50 Hz, 4 Watts at 60 Hz
LDK-310000-070	Solenoid Coils for Reversing Valves	Black	48"	120V AC	5 Watts at 50 Hz, 4 Watts at 60 Hz
LDK-410000-070	Solenoid Coils for Reversing Valves	Green	48"	208/240V AC	5 Watts at 50 Hz, 4 Watts at 60 Hz

**1** Year Limited Warranty

D40



## LOW TEMPERATURE LIMIT CONTROLS

### Evaporator Low Temperature Limit Controls

The Ranco® PS2703-022 is designed to be an evaporator coil low temperature limit. If the PS2703-022 attached to the suction line of the evaporator coil wired in series with Y connection to the compressor, it's normal closed contact will shut down the refrigeration compressor when it senses the evaporator coil freezing up. The PS2703-022 has a preformed clip attached to secure it to the evaporator suction line.

### Features and Benefits

- Low temperature
- Performed clip
- Normally closed contact



PS2703-022

## Specifications

Part Numbers	Description	Factory Part Number
PS2703-022	Evaporator Low Temperature Limit Control	ECL-35

**1** Year  
Limited  
Warranty

D41



# REFRIGERATION

# AKO

## AKO ELECTRONIC CONTROLS



AKO-D14112



AKO-D14123

### 1510 Series

The AKO 1510 Series Temperature Controller is a family of electronic controllers engineered to manage various refrigeration and cooking commercial applications. With its wide temperature range, NTC and PTC probe inputs, and ambient storage humidity range, the AKO 1510 Series can be used in commercial refrigeration display cases, incubators and even vehicles.

This series has intelligent menus and easy browsing for quick and intuitive configurations. Key shortcuts provide direct access to the most common functions to speed up typical operations. Plus, AKO's proprietary algorithms are tested to achieve greater energy efficiency.

In addition, HACCP and installation status information is stored in memory to help maintain the control settings.

### Features and Benefits

- Maximum flexibility, with a large number of electronic, mechanical and appearance combinations
- Built-in universal power supply for installation anywhere in the world
- Copy Card accessory – copies configuration from one controller to another
- Configurable PTC/NTC temperature sensor inputs
- Ability to integrate Modbus communications
- Standard panel format with white display (in addition to monochrome green and blue)
- One-relay controller up to 2 HP with 5mm terminals for all inputs and outputs
- Automated processes for the configuration, calibration and verification of the entire controller in approximately 20 minutes





# AKO

## Specifications

Part Numbers	Description	Electrical Rating	Temperature Range	Defrost Cycles	Display Dimensions	Switch
AKO-D14112	Medium Temperature Controller	12/24V AC	-58°F to 212°F (-50°C to 150°C)	Compressor shutdown	Panel cut-out dimensions 71mm x 29mm; Front panel dimensions 79mm x 38mm	1 Compressor Relay SPDT 16 Amp max
AKO-D14120	Medium Temperature Controller	120V AC	-58°F to 212°F (-50°C to 150°C)	Compressor shutdown	Panel cut-out dimensions 71mm x 29mm; Front panel dimensions 79mm x 38mm	1 Compressor Relay SPDT 16 Amp max
AKO-D14123	Medium Temperature Controller	230V AC	-58°F to 212°F (-50°C to 150°C)	Compressor shutdown	Panel cut-out dimensions 71mm x 29mm; Front panel dimensions 79mm x 38mm	1 Compressor Relay SPDT 16 Amp max
AKO-D14123-2	Medium Temperature Controller	230V AC	-58°F to 212°F (-50°C to 150°C)	Compressor shutdown	Panel cut-out dimensions 71mm x 29mm; Front panel dimensions 79mm x 38mm	1 Compressor Relay SPDT 2CV
AKO-D14223	Medium Temperature Controller	230V AC	-58°F to 212°F (-50°C to 150°C)	Compressor shutdown	Panel cut-out dimensions 71mm x 29mm; Front panel dimensions 79mm x 38mm	2 Compressor Relay SPDT 16 Amp max; 1 Auxiliary Relay SPDT 8 Amp max
AKO-D14320	Medium Temperature Controller	120V AC	-58°F to 212°F (-50°C to 150°C)	Compressor shutdown	Panel cut-out dimensions 71mm x 29mm; Front panel dimensions 79mm x 38mm	3 Compressor Relays SPDT 16 Amp max; 1 Auxiliary Relay SPDT 8 Amp max; 1 Fan Relay SPST 6 Amp max
AKO-D14323	Low Temperature Controller	230V AC	-58°F to 212°F (-50°C to 150°C)	Compressor shutdown	Panel cut-out dimensions 71mm x 29mm; Front panel dimensions 79mm x 38mm	3 Compressor Relays SPDT 16 Amp max; 2 Auxiliary Relay SPDT 8 Amp max; 1 Fan Relay SPST 6 Amp max

**1** Year  
Limited  
Warranty





# REFRIGERATION

# AKO



## AKO ELECTRONIC CONTROLS

### 1535 Series

The AKO 1535 Series Temperature Controller is a versatile electronic control engineered to manage various refrigeration and cooking commercial applications. With its wide temperature range, NTC and PTC probe inputs, and ambient storage humidity range, the AKO 1535 Series can be used in ovens, industrial panels, and electrical panels for refrigeration applications.

This series has intelligent menus and easy browsing for quick and intuitive configurations. Key shortcuts provide direct access to the most common functions to speed up typical operations. Plus, AKO's proprietary algorithms are tested to achieve greater energy efficiency.

In addition, HACCP and installation status information is stored in memory to help maintain the control settings.

The 1580 Series AKO Copy Card Device for AKO Refrigeration Temperature and Compressor Controllers is an easy to use plug-in tool to copy digital controllers parameters device to device. This device allows an installer to quickly load pre-programmed settings. Maximum operating temperature is 14°F to 122°F (-10°C to 50°C).

### Features and Benefits

- Maximum flexibility, with a large number of electronic, mechanical and appearance combinations
- Built-in universal power supply for installation anywhere in the world
- Copy Card accessory – copies configuration from one controller to another
- Configurable PTC/NTC temperature sensor inputs
- Ability to integrate Modbus communications
- Standard panel format with white display (in addition to monochrome green and blue)
- Two outputs allow the controller to be used as a stage plus alarm
- Automated processes for the configuration, calibration and verification of the entire controller in approximately 20 minutes

### Specifications

Part Numbers	Description	Electrical Rating	Temperature Range	Defrost Cycles	Display Dimensions	Switch
AKO-15490	Electronic Control	100V AC to 240V AC	-58°F to 212°F (-50°C to 150°C) Pt100 probe -99.9°C to 850°C; Thermocouple J -99.9°C to 800°C Thermocouple K -99.9°C to 1370°C	Compressor shutdown	48mm x 48mm	R1 SPST Relay 6 Amp (250V) R2 SPDT Relay 5 Amp (250V)
AKO-D14918	Copy Card	NA	NA	NA	NA	NA

**1** Year Limited Warranty



## AKO ELECTRONIC CONTROLS

### Cam Regis Series

The AKO Temperature and Humidity Data Logger is designed for industrial and commercial refrigeration installations requiring a high degree of accuracy over a broad temperature range. Installation is simple through the set-up wizard tool and text menus in multiple languages plus on-screen help.

### Features and Benefits

- Large, bright graphic display
- Five input logger with five NTC probes
- Quick print button
- Internal memory up to three years with a recording frequency of 15 minutes
- Recording interval of 5, 15 or 30 minutes available



AKO-15752

## Specifications

Part Numbers	Description	Accuracy	Temperature Range	Switch	Electrical Rating
AKO-15752	Temperature and Humidity Data Logger	+/-34°F (+/-1°C)	-238°F to 1094°F (-150°C to 590°C)	Two relays, SPDT, 8 Amps, 250V AC	100V AC to 240V AC

**1** Year  
Limited  
Warranty



# REFRIGERATION

# AKO

## AKO ELECTRONIC CONTROLS



AKO-80025

### Thermometer Series

The AKO Thermometer Series is ideal for monitoring the temperature in a variety of refrigeration and heating applications for industrial and commercial displays.

### Features and Benefits

- Easy to read LCD display
- Extensive temperature range
- High degree of accuracy
- Probe up to three meters long

### Specifications

Part Numbers	Description	Length	Temperature Range	Power
AKO-80025	Thermometer	1.8"H x 1.3"W x .55"D	-58°F to 158°F (-50°C to 70°C)	Battery power, 1.5 Volts

**1** Year  
Limited  
Warranty

D46



## AKO ACCESSORIES

### Probes

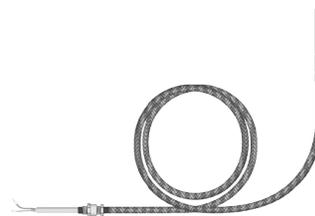
The AKO Probe Series are designed to cover a range of temperatures. PTC, NTC, and Pt100 probes are available in a variety of lengths.



AKO-14901



AKO-15601  
AKO-15602



AKO-155801

### Specifications

Part Numbers	Description	Length	Temperature Range
AKO-14901	NTC Probe Sensor	4' 11"	23°F to 212°F (-5°C to 100°F)
AKO-155801	PTC Probe	4' 11"	23°F to 212°F (-5°C to 100°F)
AKO-15601	J Probe	9' 10"	32°F to 1112°F (0°C to 600°C)
AKO-15602	K Probe	9' 10"	32°F to 1112°F (0°C to 600°C)

**1** Year  
Limited  
Warranty



Installers need a manufacturer who can deliver specialized controls for unique applications. Uni-Line® offers a variety of specialized controls designed to integrate seamlessly into almost any system.

Heating Cables.....	E2
Universal Air Conditioning Control Board and Remote Control ....	E3
Mini-Tek Liquid Level Detectors .....	E4
Smoke Alarms.....	E6
Carbon Monoxide Alarms.....	E8
Smoke and Carbon Monoxide Combination Alarms.....	E10
Merchandising Kits.....	E12



# SPECIALTY





## HEATING CABLES



AKO-5LT1-TJ

### AKO Heating Cables Series

AKO Heating Cables Series are built with quality tinned copper to provide accurate heating performance. AKO-5LT1-TJ and AKO-5LT2-TJ self-regulating heating cables are suitable for freeze protection and process temperature control, up to 150°F (65°C). They may be applied on metal or plastic surfaces. The modified polyolefin over jacket is appropriate when the heating cable is exposed to aqueous inorganic chemicals. The heat cables are approved for use in ordinary and hazardous areas. The cables can be cut to size using the AKO-LT-ICPE sizing kit.

### Features and Benefits

- Tinned copper protective braid
- Outer and Inner insulator
- Timer On/Off
- Typical Application are freeze protection, chemical and petrochemical industries, pipe heating, vessel and tanks

### Specifications

Part Numbers	Description	Voltage	Temperature	T-Rating	Nominal Output
AKO-5LT1-TJ	Low Temperature Heating Cable for Freeze Protection	120V AC	150°F (65°C)	T5	5 Watts/ft. at 50°F (5 Watts/m at 20°C)
AKO-5LT2-TJ	Low Temperature Heating Cable for Freeze Protection	230V AC	150°F (65°C)	T6	5 Watts/ft. at 50°F (5 Watts/m at 20°C)
AKO-LT-ICPE	Sizing Kit with 1 Direct Connection and 1 Termination Kit	NA	NA	NA	NA

1 Year Limited Warranty



## UNIVERSAL AIR CONDITIONING CONTROL BOARD AND REMOTE

### Universal Air Conditioning Split Control Board and Universal Remote Control

The Ranco® Universal Air Conditioning Split Control Board Kit replaces many OEM control boards. The Ranco Universal Remote Control replaces over 1,000 different OEM remote controls for air conditioners.

#### Features and Benefits

- Three minutes protecting delay to restart compressor
- Mode: Auto, Cool, Dry, Fan and Heat
- Periodical defrost in heat mode
- Wind direction control
- Fan: high, medium and low
- Timer On / Off
- Keypad lock / unlock
- Sleep function
- Suitable for all kinds of air conditioners (URC)
- 2 configuration modes: Manual and automatic (URC)
- Easy to set-up (URC)



UBV03221-01

### Specifications

Part Numbers	Dimensions	Weight	Electrical Rating	Power
UBV03221-01	1.6"H x 6.9"W x 5.3"D	15.0 ounces	220V AC	NA
UCV-118-01	5.25"H x 1.97"W x 0.95"D	2.1 ounces	NA	2 AAA batteries required. (Not included)

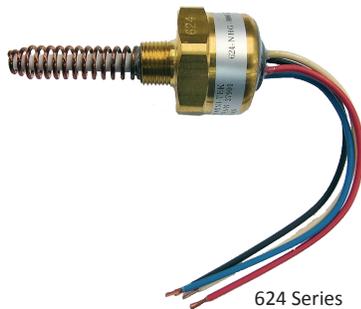
**1** Year Limited Warranty



Robertshaw®



613 Series



624 Series

## MINI-TEK LIQUID LEVEL DETECTORS

### Mini-Tek Liquid Level Detector Series

The Robertshaw® Mini-Tek Liquid Level Detector is used to detect the levels of liquids in major diesel engines. The Robertshaw Mini-Tek operates on the electrostatic or “capacitance” sensing principle. The probe portion of the unit, extending into the liquid, produces a change in electrical “capacitance” when liquid displaces the air immediately surrounding the probe. The Robertshaw Mini-Tek detector will provide warning when liquid levels reach approximately 50% of capacity. This provides time to take action before damage is done to the engine. The Robertshaw Mini-Tek comes in three different models. Model 613 Coolant level Detector, 614 hydraulic oil or fuel detector, Model 624 Motor or gear fuel or oil detector.

### Features and Benefits

- Voltage protected
- Rugged construction
- All solid state with no moving parts
- Reverse polarity protection
- Self-test capability



## Specifications

Part Numbers	Description	Model	Alarm Mode	Load Configuration	Time Delay	Terminal Configuration
613-NHU-0000-B	Liquid Level Detector	613	High Liquid Level	Ungrounded	None	B
613-NHU-TD07-B	Liquid Level Detector	613	High Liquid Level	Ungrounded	7 seconds	B
613-NLG-TD12-CXC	Liquid Level Detector	613	Low Liquid Level	Grounded	12 seconds	C
613-NLU-0000-0	Liquid Level Detector	613	Low Liquid Level	Ungrounded	None	0
613-NLU-0000-B	Liquid Level Detector	613	Low Liquid Level	Ungrounded	None	B
613-NLU-TD07-B	Liquid Level Detector	613	Low Liquid Level	Ungrounded	7 seconds	B
613-NLU-TD12-C	Liquid Level Detector	613	Low Liquid Level	Ungrounded	12 seconds	C
614-NHG-0000-C	Liquid Level Detector	614	High Liquid Level	Grounded	None	C
614-NLG-0000-C	Liquid Level Detector	614	Low Liquid Level	Grounded	None	C
614-NLG-TD07-B	Liquid Level Detector	614	Low Liquid Level	Grounded	7 seconds	B
624-NHG-0000-C	Liquid Level Detector	624	High Liquid Level	Grounded	None	C
624-NHU-0000-C	Liquid Level Detector	624	Low Liquid Level	Ungrounded	None	C
624-NLG-0000-B	Liquid Level Detector	624	Low Liquid Level	Grounded	None	B
624-NLU-0000-B	Liquid Level Detector	624	Low Liquid Level	Ungrounded	None	B
624-NLU-TD12-C	Liquid Level Detector	624	Low Liquid Level	Ungrounded	12 seconds	C

## Terminal Configurations

Designation	Description
0	Three Spade Terminals; +, SIG, TEST (no isolation)
B	Four Spade Terminals; +, SIG, TEST (DC isolation is provided between the body and circuit)
C	Four Wire Leads ***#16 AWG; +, SIG, TEST (DC isolation is provided between the body and circuit)

**1** Year  
Limited  
Warranty





21010064

## SMOKE ALARMS

### Smoke Alarm Series

The Kidde P3010 Series Smoke Alarm models are sealed-in lithium battery devices available with either photoelectric or ionization sensing technology. Photoelectric sensing alarms are designed to detect visible particles (associated with smoldering fires) sooner than ionization alarms. Ionization sensing alarms are designed to detect invisible fire particles (associated with flaming fires) sooner than photoelectric alarms. This series includes models for living areas, bedrooms, and hallways. All models offer worry-free features to make installation easy and to help users aware of replacement requirements.

### Features and Benefits

- Sealed-In Lithium Battery – Sealed-in lithium power supply to reduce the need for battery replacement over the 10 year life of the alarm
- Alarm automatically activates when attached to the mounting bracket
- Rapidly flashing LED alerts user if the alarm has sounded since the last time the test/reset button was used
- Test/Hush Button tests alarm circuitry and activates Hush features
- Smart Hush™ – Button to temporarily silence nuisance alarm for approximately 10 minutes and will not allow hush mode unless the unit is in alarm mode
- End of life warning - Alarm chirps every 30 seconds to indicate the unit is in need of replacement

- End of Life Hush® - Alarm can be silenced three days at a time up to 30 days to allow for alarm replacement at a more convenient time

### Three models offer additional features:

- Uni-Line® Part 21010067 / Kidde Model P3010B: Bedroom model with Voice Alarm - Unit announces "Fire! Fire!" in addition to the loud 85dB beeps when smoke or fire is detected
- Uni-Line Part 21010069 / Kidde Model P3010H: Hallway model with Safety Light - Super-bright LEDs provide lighted escape path in addition to the loud 85dB beeps when smoke or fire is detected
- Uni-Line Part 21010407 / Kidde Model i12010S: Hardwired Interconnect model - Ionization Sensing Technology. 360° Tamper Resistance Mounting Plate





## Specifications

Part Numbers	Factory Number	Description	Humidity Range	Power	Sensor Type	Size	Standard LED	Temperature Range
21010064	P3010L	Smoke Alarm	10%-85% non-condensing relative humidity (RH)	Sealed Lithium Battery	Photoelectric	5.22" in diameter x 1.6" depth	Red LED blinks in conjunction with the alarm sound	40°F to 100°F (4.4°C to 37.8°C)
21010067	P3010B	Smoke Alarm	10%-85% non-condensing relative humidity (RH)	Sealed Lithium Battery	Photoelectric	5.22" in diameter x 1.6" depth	Red LED blinks in conjunction with the alarm sound	40°F to 100°F (4.4°C to 37.8°C)
21010069	P3010H	Smoke Alarm	10%-85% non-condensing relative humidity (RH)	Sealed Lithium Battery	Photoelectric	5.22" in diameter x 1.6" depth	Red LED blinks in conjunction with the alarm sound	40°F to 100°F (4.4°C to 37.8°C)
21010407	i120105	Smoke Alarm AC Powered	10%-85% non-condensing relative humidity (RH)	120V AC Sealed Lithium Battery Back-up	Ionization	5.22" diameter x 1.6" depth	Red LED blinks in conjunction with the alarm sound	40°F to 100°F (4.4°C to 37.8°C)



**10** Year Limited Warranty



21010073

## CARBON MONOXIDE ALARMS

### Carbon Monoxide Alarm Series

The Kidde P3010 Series Carbon Monoxide (CO) Alarms are sealed-in lithium battery devices that use electrochemical sensing technology to monitor CO levels. Each alarm automatically activates when it is attached to the mounting bracket, eliminating the need for pull tags or switches to activate the alarm. At the end of alarm life, the unit will chirp, indicating the alarm is in need of replacement.

The Kidde KN-COB Series Carbon Monoxide Alarms are available as battery operated devices or AC powered plug-in units with battery back-up.

These alarms are suitable for all living areas. In addition, they offer worry-free features to make installation easy, and to help users be aware of replacement requirements.

### Features and Benefits - all models

- Test/Reset Button tests the unit for proper operation and resets the Carbon Monoxide Alarm
- Loud 85 decibel alarm alerts of deadly CO gas
- Low Battery Hush – Silences low battery chirp warning for up to 12 hours in order to maintain protection without having to replace the batteries at an inconvenient time

#### Each model offers additional features:

#### Uni-Line Part 21010075 / Kidde Model C3010-D: Digital Display Model

- Event Memory – If the unit has detected CO concentrations of 100 PPM (parts per million) or greater, the green LED will flash every 10 seconds
- Digital display shows CO level in PPM and updates digital reading every 15 seconds to monitor changes
- Peak level memory displays the highest CO concentration measured since the last reset

#### Uni-Line Part 21010073 / Kidde Model C3010

- Red LED flashes every 60 seconds to alert that a high level of carbon monoxide has been detected within the last 14 days

#### Uni-Line Part 21025788 / Kidde Model KN-COB-LP2: Battery Operated Model

#### Uni-Line Part 21025761 / Kidde Model KN-COB-DP2: Alarm AC Powered Plug-In with Battery Back-up

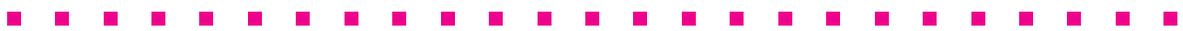
- Two AA Battery Back-up provides continuous protection even during power outages
- Event Memory – If the unit has detected CO concentrations of 100PPM or greater, the green LED will flash every 10 seconds
- Low battery signal alerts user when the batteries need to be replaced
- Tamper Resist feature can be activated to cause unit to go into alarm if it has been unplugged or has come loose from the outlet (Uni-Line Part 21025761 only)
- Battery Pull Tab eliminates battery installation time (Uni-Line Part 21025761 only)





## Specifications

Part Numbers	Factory Number	Description	Humidity Range	Power	Sensor Type	Size	Standard LEDs	Temperature Range
21010073	C3010	Carbon Monoxide Alarm	10%-95% non-condensing relative humidity (RH)	Sealed Lithium Battery	Electrochemical	4.5"L x 2.75" H x 1.5"D	LED Lights - Green for normal operation, Red for alarm, Amber for Error	40°F to 100°F (4.4°C to 37.8°C)
21010075	C3010-D	Carbon Monoxide Alarm with Digital display	10%-95% non-condensing relative humidity (RH)	Sealed Lithium Battery	Electrochemical	4.5"L x 2.75" H x 1.5"D	LED Lights - Green for normal operation, Red for alarm, Amber for Error	40°F to 100°F (4.4°C to 37.8°C)
21025761	KN-COB-DP2	AC Powered Carbon Monoxide Alarm with Battery Back-Up	10%-95% non-condensing relative humidity (RH)	120V AC, 60 Hz, 60mA max; 2-AA battery back-up	Electrochemical	2.75"W x 4.5"H x 1.5"D	Two LEDs : Red - Illuminates when in alarm mode. Green - AC power is present, normal operation.	40°F to 100°F (4.4°C to 37.8°C)
21025788	KN-COB-LP2	Battery Powered Carbon Monoxide Alarm	10%-95% non-condensing relative humidity (RH)	2 AA Batteries	Electrochemical	4.5"L x 2.75" H x 1.5"D	Two LEDs : Red - Illuminates when in alarm mode. Green - AC power is present, normal operation.	40°F to 100°F (4.4°C to 37.8°C)





21010071

## SMOKE AND CARBON MONOXIDE COMBINATION ALARMS

### Smoke and Carbon Monoxide Combination Alarm Series

The Kidde Smoke and Carbon Monoxide (CO) Combination Alarm Series are devices that use smoke and CO sensing technologies together to detect fires and to monitor CO levels. Each alarm automatically activates when it is attached to the mounting bracket, eliminating the need for pull tags or switches to activate the alarm. At the end of alarm life, the unit will chirp, indicating the alarm is in need of replacement.

### Features and Benefits

#### Three models offer additional features:

- Photoelectric sensor smoke alarms contain advanced photoelectric sensing technology that may detect visible particles (associated with smoldering fires) sooner than ionization alarms that detect less visible fire particles like those produced by flaming fires
- Electrochemical CO sensor
- Rapidly flashing LED alerts user if the alarm has sounded since the last time the test/reset button was used
- Smart Hush™ temporarily silences nuisance alarms for approximately nine (9) minutes and will not allow hush mode unless the unit is in alarm mode
- Test/Hush Button tests alarm circuitry and activates Hush features
- Alarm chirps every 30 seconds to indicate the unit is in need of replacement
- End of Life Hush® indication can be silenced three days at a time up to 30 days to allow for alarm replacement at a more convenient time

#### Uni-Line Part 21010408 / Kidde Model i12010SCO: AC Wired-in with Sealed-in Lithium Battery Back-up

- Ionization sensor smoke alarm contains advanced ionization sensor which is more likely to detect smaller, less visible fire particles like those produced by flaming fires sooner than photoelectric sensors that detect visible particles like those produced by smoldering fires
- Electrochemical CO sensor
- Verbally announces "FIRE!" or "WARNING! CARBON MONOXIDE" to help distinguish between threats
- Interconnects with up to 24 Kidde devices (of which 18 can be initiating)
- Smart Hush™ temporarily silences nuisance alarms for approximately nine (9) minutes and will not allow hush mode unless the unit is in alarm mode
- Announces "CARBON MONOXIDE PREVIOUSLY DETECTED" if alarm has detected CO level of 100 PPM or higher since it was last reset.





## Specifications

Part Numbers	Factory Number	Description	Humidity Range	Power	Sensor Type	Size	Standard LEDs	Temperature Range
21010071	P3010K-CO	Smoke and Carbon Monoxide Combination Alarm	10%-85% non-condensing relative humidity (RH)	Sealed Lithium Battery	Smoke: Photoelectric CO: Electrochemical	5.22" diameter x 1.6" depth	Red LED blinks in conjunction with the alarm sound	40°F to 100°F (4.4°C to 37.8°C)
21010408	i12010SCO	Smoke and Carbon Monoxide Combination Alarm AC Powered with Sealed Lithium Battery Back-up	10%-95% non-condensing relative humidity (RH)	120V AC 60Hz, 45mA max per alarm; Sealed Lithium Battery	Smoke: Ionization CO: Electrochemical	5.5" diameter x 1.75" depth	LED Lights- Green for normal operation, Red for alarm	40°F to 100°F (4.4°C to 37.8°C)



**10** Year Limited Warranty

E11



# Robertshaw®



## HEATING MERCHANDISING KIT

### Robertshaw Universal Parts Center Merchandising Display Series

The Robertshaw® Universal Parts Center Merchandising Display is a high-quality, semi-permanent, two-sided display designed to maximize floor space and entice additional purchases. Each kit comes fully loaded with popular heating products, helpful literature and full-color graphics.

#### Features and Benefits

- Eye-catching display ships fully loaded and ready to roll on to the showroom floor
- Quick and simple way to increase your floor space
- High quality, semi-permanent, two-sided floor display features casters for easy movement
- Display features colorful signage, all new Robertshaw packaging and helpful cross reference tools for contractors
- Merchandiser will stimulate interest and entice additional purchases
- Minimal floor space with maximum sales opportunities

### Specifications

Part Numbers	Description
UPC-RS-H (NA)	Robertshaw Universal Parts Center Merchandising Display

### UPC-RS-H Kit includes the following products:

2 Pilot Uni-Kits 1820-009

2 Pilot Uni-Kits 1820-019

5 Flame Sensors 10-760

5 Tubing with Fittings 11-293

2 Hot Surface Carbide Ignitors 41-402

2 Hot Surface Carbide Ignitors 41-408

2 Hot Surface Carbide Ignitors 41-409

2 Hot Surface Carbide Ignitors 41-411

1 Hot Surface Carbide Ignitor 41-401

1 Hot Surface Carbide Ignitor 41-404

1 Hot Surface Carbide Ignitor 41-412

1 Hot Surface Carbide Ignitor 41-410

5 Thermopiles 1950-001

2 Thermocouples 1970-024

2 Snap-Fit Thermocouples 1980-024

2 Pilot Uni-Kits 1830-001

2 Water Valves IMV-576

1 Extended Breakaway Ferrules 4590-816

1 Pilot Control Module 780-845

1 Hot Surface Control Module 780-785

1 Hot Surface Control Module 780-783

1 Pilot Control Module 780-715

1 Direct Control Module 780-502

25 Literature pieces - Robertshaw Gas Valve Cross Reference 150-2320

25 Literature pieces - Robertshaw Universal Heating Cross Reference 150-2130F





## REFRIGERATION MERCHANDISING KIT

### Ranco Universal Parts Center Merchandising Display Series

The Ranco® Universal Parts Center Merchandising Display is a high-quality, semi-permanent, two-sided display designed to maximize floor space and entice additional purchases. Each kit comes fully loaded with popular refrigeration products, helpful literature and full-color graphics.

#### Features and Benefits

- Eye-catching display ships fully loaded and ready to roll on to the showroom floor
- Quick and simple way to increase your floor space
- High quality, semi-permanent, two sided floor display features casters for easy movement
- Display features colorful signage, all new Ranco packaging and helpful tools for contractors
- Merchandiser will stimulate interest and entice additional purchases
- Minimal floor space with maximum sales opportunities

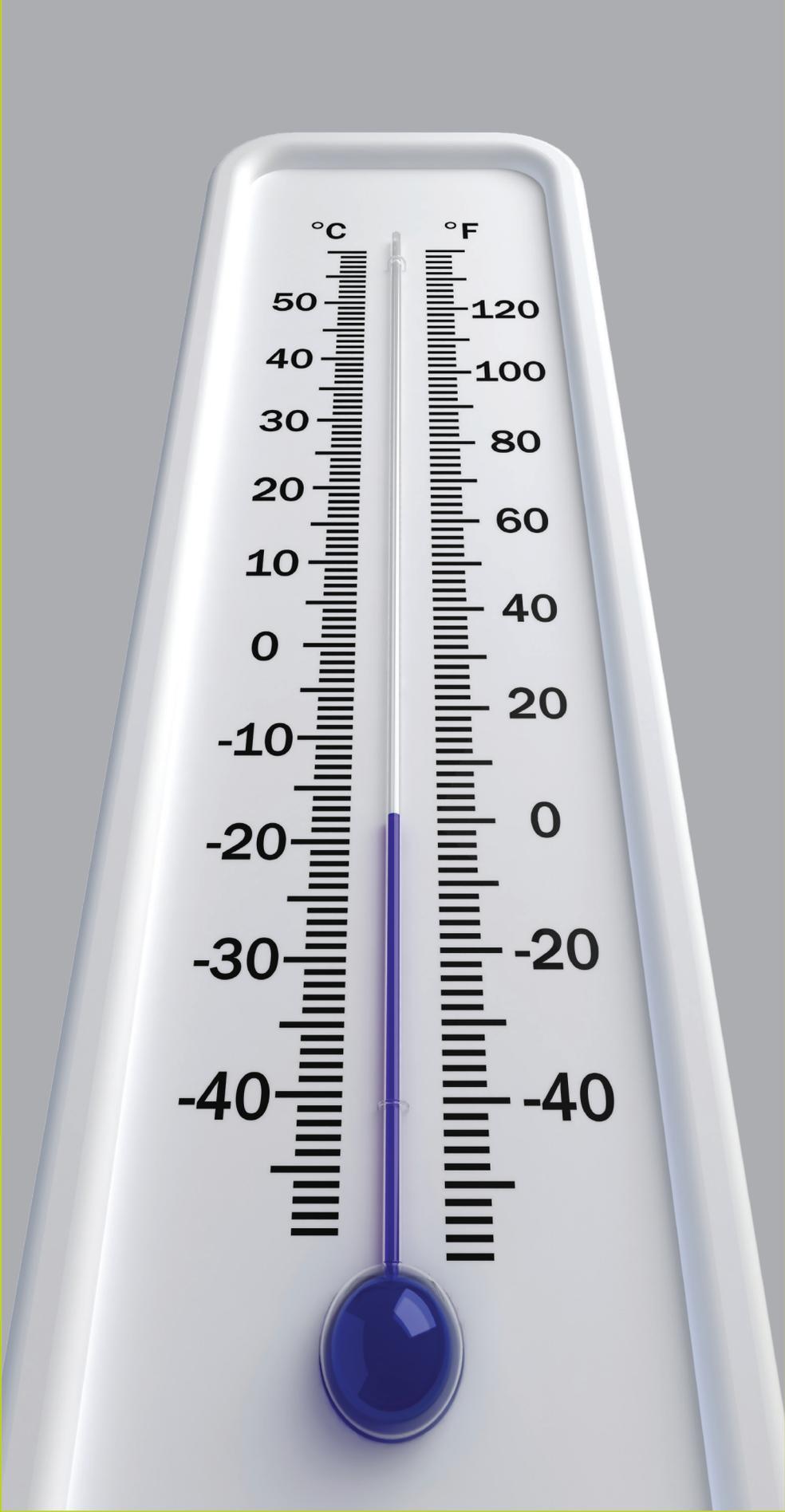


### Specifications

Part Numbers	Description
UPC-RC-C (NA)	Ranco Universal Parts Center Merchandising Display

### UPC-RC-C Kit includes the following products:

- |  |   |
|--|---|
| 2 Single Low Pressure Controls O10-1483              | 1 Constant Differential Temperature Control A30-301               |
| 1 Single Low Pressure Control O10-1402               | 1 Refrigerant Hose 1290132-A24                                    |
| 2 Single High Pressure Controls O10-2054             | 1 Reversing Valve V2-408060-170                                   |
| 1 Single High Pressure Control O16-108               | 1 Reversing Valve 24V Solenoid Coil LDK-110000-070                |
| 1 Dual Pressure Control O12-4834                     | 1 Solenoid Valve 1068UL/3S  |
| 1 Dual Pressure Control O12-1549                     | 1 Solenoid Valve Coil - 120V 9105/RA4                             |
| 1 Lube Oil Protection Control P30-5826               | 1 Solenoid Valve Connector 9150UL/R02                             |
| 2 Electronic Temperature Controls ETC-111000-000     | 1 Moisture Indicator 3940/3                                       |
| 1 Wide Range Temperature Control O10-1409            | 1 Solid Core Filter Drier 4303/3S                                 |
| 2 Constant Cut-in Temperature Controls A12-701       | 25 Literature pieces - Ranco Pressure Temperature Chart 150-2428C |
| 2 Constant Cut-in Temperature Controls A12-700       |   |
| 1 Constant Cut-in Temperature Control A12-1560       |   |
| 1 Constant Differential Temperature Control A30-2210 |   |
| 1 Constant Differential Temperature Control A30-261  |   |



Contractors appreciate smooth HVAC installations while consumers look for a fine balance between temperature comfort and energy savings.

The SmartSense® and PerfectSense™ by Uni-Line® wall thermostats, zoning and accessories are Simply the SMART Choice™ for flexible, easy to use and install, residential and commercial heating and air conditioning controls. Wall thermostats also deliver intuitive, feature-rich and efficient solutions for homeowners and commercial customers.

Smart Programmable Thermostats .....	F2
Smart Touchscreen Thermostats .....	F4
Smart Commercial Thermostats .....	F10
PerfectSense Non-Programmable Thermostats .....	F12
PerfectSense Programmable Thermostats .....	F14
PerfectSense Touchscreen Thermostats .....	F16
PerfectSense Mechanical Thermostats .....	F20
Accessories – SmartSense .....	F24
Accessories – PerfectSense .....	F26
Accessories – Thermostats .....	F27



# WALL THERMOSTATS





# WALL THERMOSTATS

SMART SENSE®



SMART 2000

## SMART PROGRAMMABLE THERMOSTATS

### Smart 2000 Series

The SmartSense® SMART 2000 Digital Programmable Thermostat is a versatile, feature rich control for optimum commercial and residential comfort. Easy-to-use and install, this thermostat works with many sensors and module options.

This installer friendly thermostat is designed for many heating and cooling applications. These applications include heat pump systems, auxiliary and emergency heating, gas and oil systems with add-on cooling. Features include multiple heating and cooling stages for optimal control, and single or three fan speeds depending on equipment needs.

The SMART 2000 is manufactured with default settings to reduce installation time. These settings include temperature scale (F or C), clock scale (12 or 24 hours), high and low balance points, DIP switch settings, and more. All settings are changed easily. Distributed by Uni-Line®, SmartSense thermostats are Simply The SMART Choice™.

### Features and Benefits

- 3 Heat / 2 cool
- Single or three fan speeds
- Replaces almost all 24V AC thermostats
- Wi-fi and remote sensor options
- Auto season changeover
- Selectable programmable or manual mode
- 7 day programmable - four events
- Heat/cool or heat pump (O/B) logic
- Add-on and emergency heat control
- High and low balance points
- Keyboard and/or temperature lockout
- Programmable occupancy sensor inputs
- Adaptive recovery (optimized start)
- Smart fan logic for commercial control
- PIN protected menus (installer PIN)
- Outside air temperature display
- 24V AC powered with memory back-up
- Volt free (clean contact) relays to 158°F (-40°C to 70°C)

# WALL THERMOSTATS



SMART SENSE

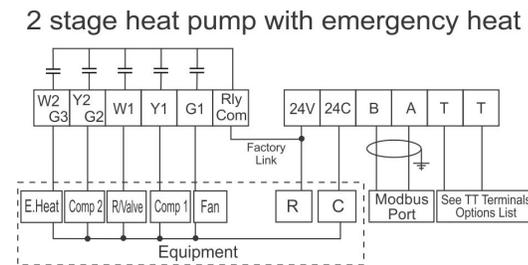
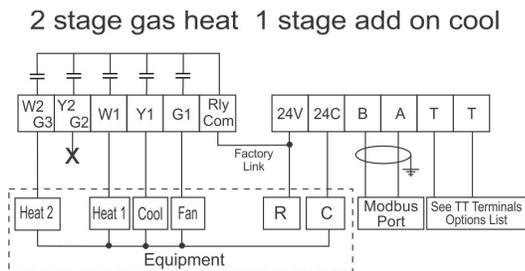
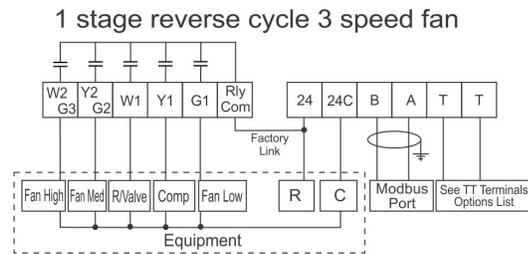
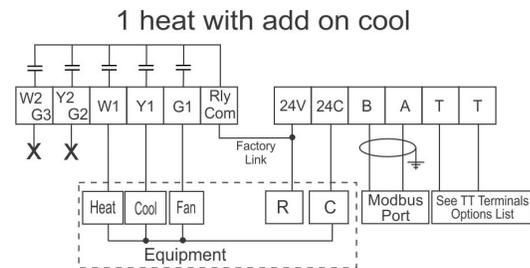
## Specifications

Part Number	SMART 2000
Power	24V AC +/- 15% 50/60 Hz
Relay Outputs	5 Relays - Fan Low/Med/Hi/Heat/Cool
Backlight	Blue
Backlight Life	3,000 hours to half brightness
Operating Temperature	32°F to 122°F (0°C to 50°C)
Operating RH	0 - 95% (Noncondensing)
Relay Voltage	24V AC @ 1 Amp Max
Communications	Modbus
Size	4.5" x 4" x 1" (113mm x 103mm x 23mm)

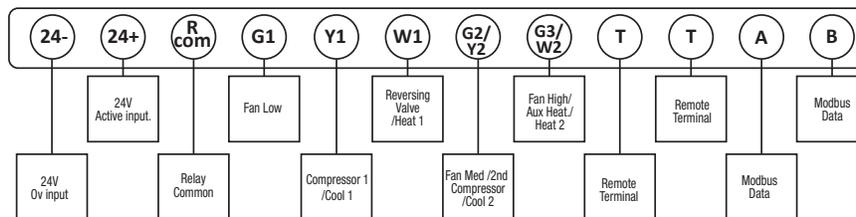
## Switch Functions

Switch	Off	On
Sw1 – Fan Speed	1 Speed Fan (2 Heat/2 Cool)	3 speed Fan (1 Heat/1 Cool)
Sw2 – Equipment Type	Heat/Cool	Heat Pump (O/B terminals)
Sw3 – Stages	1 Stage	2 Stages
Sw4 – Reversing Valve If Sw2 = ON – Heat Pump	Energize in cool (O)	Energize in heat (B)
Sw4 – Fan mode If Sw2= OFF – Heat/Cool	Fan Control by Heater (HG)	Fan Control by Thermostat (HE)
Sw5 – Anti-Cycle Timer	Off	4 Minutes
Sw6 – Operation	Manual Thermostat	Programmable Thermostat
Sw7 – Minimum Run	2 Minutes	6 Minutes
Sw8 – Program Type If Sw6 = ON – Programmable	Commercial Program	Residential Program
Sw8 – Setpoints If Sw6 = OFF – Manual	Single Setpoint	Two Setpoints

## Wiring Diagrams



## Terminal Designations



**5** Year Limited Warranty



# WALL THERMOSTATS

SMARTSENSE®



SMART 1000

## SMART TOUCHSCREEN THERMOSTATS

### Smart 1000 Series

The SmartSense® SMART 1000 Touchscreen Thermostat is a feature-rich thermostat that can be battery powered or 24V AC common wired to the HVAC equipment. Easy-to-use and install, this thermostat is ideally suited for use in residential or light commercial applications.

This installer friendly thermostat is designed for many heating and cooling applications, including heat pump systems, auxiliary and emergency heating, gas and oil systems. It has multiple heating and cooling stages for optimal control.

The SMART 1000 is manufactured with default settings to reduce installation time. These settings include temperature scale (F or C), clock scale (12 or 24 hours), high and low balance points, DIP switch settings, and more. All settings are changed easily. Distributed by Uni-Line®, SmartSense Thermostats are Simply The SMART Choice™.

### Features and Benefits

- 7 day programmable, 2 or 4 events per day
- Multi-stage up to 3 heat / 2 cool
- Programmable or non-programmable
- Manual or auto changeover
- Adaptive recovery
- Indoor and outdoor sensor options
- Keypad lockout
- Temperature averaging (with optional indoor sensors)
- Outdoor temperature display (with optional outdoor sensor)
- Short cycle protection

# WALL THERMOSTATS



SMART SENSE®

## Specifications

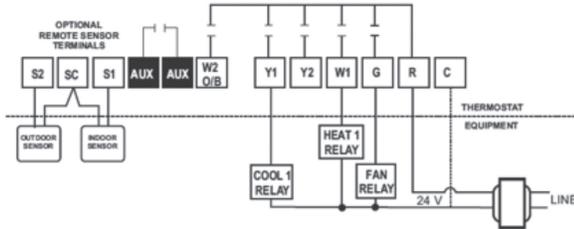
Part Number	SMART 1000
Power	Hardwired 20-30V AC 50/60 Hz or Battery Powered (2) AA 1.5 V
Relay Rating	24V AC @ 1 Amp maximum per relay
Operating Temperature	0°F to 149°F (0°C to 65°C)
Operating RH	0-95% RH (noncondensing)
Storage Temperature	0°F to 149°F (0°C to 65°C)
Backlight	Blue LED
Short Cycle Delay	4 minutes
Setpoint Range	Heating 41°F to 120°F (5°C - 49°C) Cooling 43°F to 122°F (6°C - 50°C)
Size	5.51" X 3.74" X 1.38" (140mm x 95mm x 35mm)
LCD Display Size	1.13" X 2.36" (105mm x 60mm)

## Switch Functions

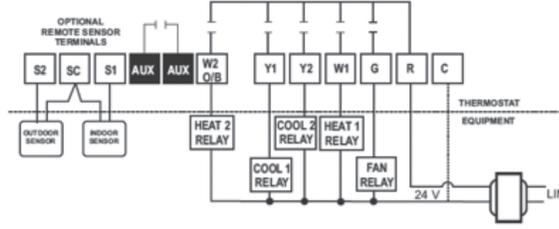
System Switch Functions	Off	On
Switch 1 - Equipment Type	Heat / Cool (Default)	For heat pump equipment
Switch 2 - Fan or Reversing Valve When Switch 1 is OFF (Heat Cool Mode) When Switch 1 is ON (Heat Pump Mode)	Gas Heat - Heater controls fan (Default) Heat pump 'O' reversing valve in cool	Electric Heat - Thermostat calls fan with heat Heat pump 'B' reversing valve in heat
Switch 3 - Equipment Stages	1 heat / cool gas / electric or 2 heat / 1 cool heat pump	2 heat / 2 cool gas / electric or 3 heat / 2 cool heat pump
Switch 4 - Fossil Fuel Mode	Conventional heat pump equipment (Default)	Fossil fuel equipment (Used in the USA mostly)

## Product Drawings

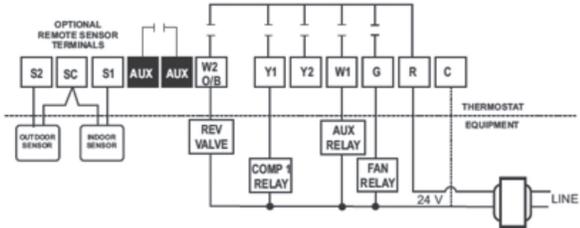
1 HEAT/1 COOL (GAS)



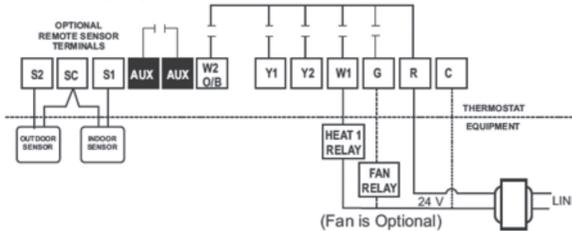
2 HEAT/2 COOL (GAS)



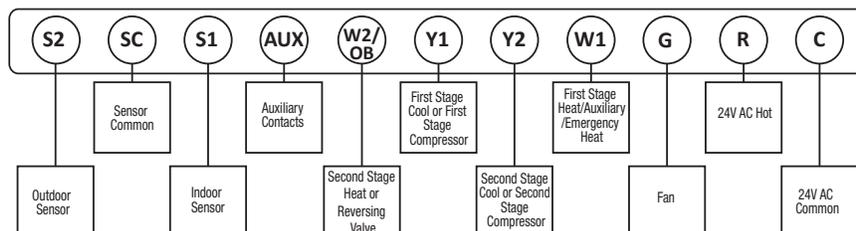
2 HEAT/1 COOL (HEAT PUMP)



HEAT ONLY (GAS)



## Terminal Designations



**5** Year Limited Warranty



# WALL THERMOSTATS

SMARTSENSE®



SMART 3000

## SMART TOUCHSCREEN THERMOSTATS

### Smart 3000 Series

The SmartSense® SMART 3000 Touchscreen Thermostat provides a total solution for heating and cooling control for residential and commercial hospitality applications. This thermostat is equally capable of controlling a small HVAC system in a retirement home as it is at controlling a sophisticated air handling system in a large building. The SMART 3000 is easy-to-use and install, and can be combined with multiple sensors and module options to extend its capabilities.

The SMART 3000 thermostat's options begin with an occupancy module to minimize energy usage while maximizing the comfort level in multiple room installations like hotel rooms or apartment complexes. This module is designed to take inputs from a variety of sources such as PIR (Passive InfraRed) movement detectors as well as window and door detectors to determine comfort level requirements.

Additional options include the SmartSense family of sensors which offer the choice of averaging, outdoor/duct, override, adjustable and wireless sensors. An outside door station display module extends the capability of the SMART 3000 further by providing guests with the ability to post a request for housekeeping or a Do Not Disturb notice. Plus, the SMART 3000 has built-in sophisticated communication protocols such as Modbus.

The SMART 3000 is pre-programmed with default settings such as a temperature scale (F or C degrees), high and low balance points, DIP switch settings, and more. All settings are changed easily. Distributed by Uni-Line®, SmartSense thermostats are Simply The SMART Choice™.

### Features and Benefits

- 1 Heat / 1 cool
- Intuitive operation
- Touchscreen with bright white backlight
- Single or three fan speed control
- Easy-to-use commercial applications
- Wi-fi, remote and occupancy sensor options
- Passive InfraRed (PIR), door and window inputs
- Relay and 0-10V equipment control logic outputs
- Heat/cool or heat pump (O/B) logic
- Integrated modbus communications
- Integrated temperature sensor
- Door bell function
- Extensive Installer Options Menu
  - Temperature control limits
  - Auto off timer
  - Deadband adjustment
  - Fan purge period
  - Backlight level
- 24V AC powered with memory back-up
- Volt free (clean contact) relays to 158°F (-40°C to 70°C)

# WALL THERMOSTATS



SMART SENSE®

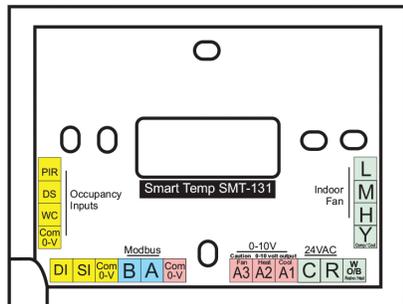
## Specifications

Part Number	SMART 3000
Power	24V AC +/- 20% 50/60 Hz
Relay Outputs	5 Relays - Fan Low/Med/Hi/ Heat/Cool
Analog Outputs	Heat/Cool Fan
Touch Method	"XY" Resistive
Backlight Life	40,000 hours to half brightness
Operating Temperature	23°F to 77°F (-5°C to 50°C)
Operating RH	0 - 95% (Noncondensing)
Relay Voltage	24V AC @ 1 Amp Max
0-10V Outputs	5mA Max
Sensor Accuracy	+/-1°F at 77°F (+/1°C at 25°C)
Timer Accuracy	+/-2.5 minutes per year
Communications	Modbus RTU 4.8/9.6/19.2/38.4k
Size	4.44" x 4.05" x 0.98" (113mm X 103mm X 26mm)

## Switch Functions

Switch	Function	On	Off
Sw1	Indoor Fan Mode	3 Fan Speeds	1 Fan Speed
Sw2	Equipment Type	Heat Pump	Heat Cool
Sw3	HP Mode (Sw2 = ON) HC Mode (Sw2 = OFF)	Rev Valve Heat (B) HE - Fan With Heat Thermostat Controlled	Rev Valve Cool (O) HG - Heater Fan control by Heater
Sw4	2 / 4 Pipe Mode	2 Pipe Mode	4 Pipe Mode
Sw5	Comp Protection Delay	5 Minute Anti Cycle	Immediate Compressor Start
Sw6	Not Used		
Sw7	Ventilation Mode	Permitted	Not Permitted
Sw8	Door Station (Optional)	Fitted	Door Station Not Used

## Terminal Wiring



### Yellow Ancillary Inputs

- PIR PIR Movement Detector.
- DS Door Switch
- WC Window Contact
- DI Digital Input (Selectable Functions)
- SI Sensor input (Selectable Functions)
- Com 0-10 Common Reference

### Blue Modbus

- B Data B
- A Data A

### Pink 0-10 Volt Outputs

- A3 Fan Digital Fan Control
- A2 Heat Heat Valve Control
- A1 Cool Cool Valve Control
- Com 0-10 Common Reference

### Green Equipment Relays

- L Low Fan Speed
- M Medium Fan Speed
- H High Fan Speed
- Y Cool (or Compressor)
- W O/B Heat (or Reversing Valve)
- R Control Active 24+
- C Control Common 24-

## HVAC System Capabilities



**5** Year Limited Warranty



# WALL THERMOSTATS

SMARTsense®



SMART 5000

## SMART TOUCHSCREEN THERMOSTATS

### Smart 5000 Series

The SmartSense® SMART 5000 Wi-Fi Touchscreen Programmable Thermostat is a 7-Day programmable thermostat that provides universal system compatibility, precise comfort control, and easy programming. Temperature and humidity level can be viewed in the dark on the large clear display with backlight. The sleek design is perfect for any home or business application.

The SMART 5000 thermostat provides temperature control for gas, oil, and electric powered systems as well as heat pumps for up to three heat, two cool systems. It can be used as a 7-day programmable thermostat with 2 or 4 events per day or as a non-programmable thermostat. With features like adaptive recovery, customizable temperature setpoints, and humidity control, SmartSense thermostats incorporate sought after features for any application.

The SMART 5000 has built-in Wi-Fi to remotely monitor and control the heating and cooling system in a home or business. A heating and cooling system can be accessed from any mobile device or laptop wherever Wi-Fi is available. Distributed by Uni-Line®, SmartSense Thermostats are Simply the SMART Choice™.

### Features and Benefits

- Wi-Fi touchscreen
- 7 Day programmable, 2 or 4 events per day
- Multi-stage up to 3 Heat / 2 Cool
- Easy menu-driven programming
- Manual or auto changeover
- Customizable temperature setpoints
- Adaptive recovery
- Humidity control (when coupled with remote outdoor sensor)
- Short cycle protection
- Keypad lockout
- Programmable or Non-programmable

# WALL THERMOSTATS

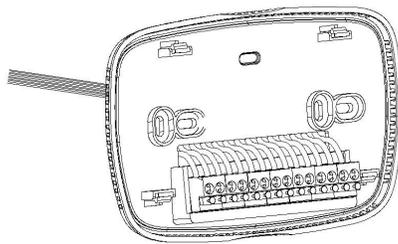


SMART SENSE®

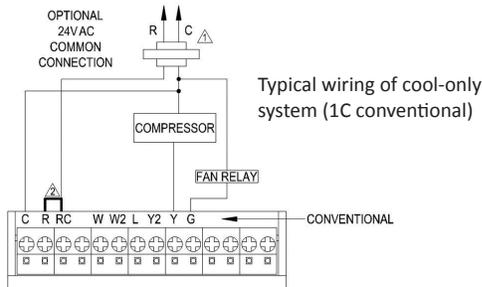
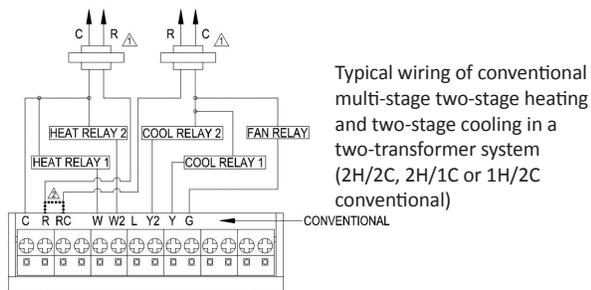
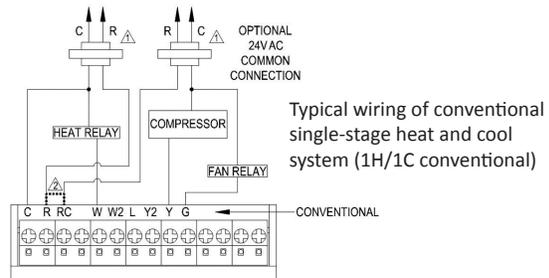
## Specifications

Part Number	SMART 5000
Power	24V AC 50/60 Hz
Relay Rating	24V AC @ 1 Amp maximum per relay
Operating Temperature	32°F to 120°F (0°C to 49°C)
Operation RH	0-95% RH (Non-condensing)
Storage Temperature	-30°F to 150°F (-34°C to 65°C)
Backlight	Blue LED
Short Cycle Delay	5 minutes
Setpoint Range	Heating: 40°F to 90°F (4°C to 32°C) Cooling: 50°F to 99°F (10°C to 37°C)
Size	6.09" X 4.16" X 1.26" (154.74mm x 105.58mm x 32.75mm)

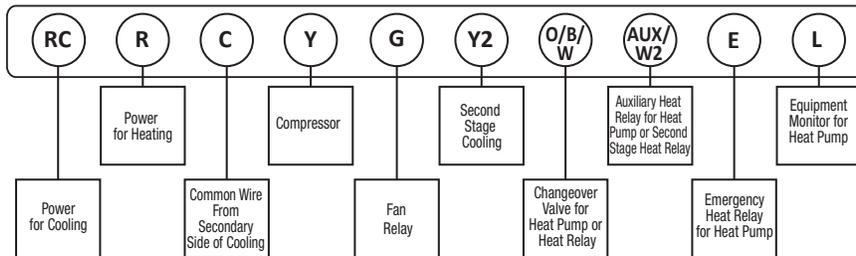
## Wiring Diagrams



Inserting wires in terminal block



## Terminal Designations





# WALL THERMOSTATS

SMART SENSE®



SMART 4000

## SMART COMMERCIAL THERMOSTATS

### Smart 4000 Series

The SmartSense® SMART 4000 Commercial HVAC Controller Thermostat provides a total solution for heating and cooling control, especially in commercial panel builder applications. This multistage thermostat is equally capable of controlling a small HVAC system as it is at controlling a sophisticated air handling system in a large building. The SMART 4000 is DIN rail mounted making it easy-to-install and use for a variety of applications.

The SMART 4000 thermostat offers unmatched flexibility to meet the toughest installation requirements. The versatile input and output options for the SMART 4000 are designed to help minimize energy usage while maximizing comfort. The thermostat includes practical communication protocols such as Modbus which is especially useful for interfacing with PLCs (Programmable Logic Controllers).

The SMART 4000 is pre-programmed with default settings such as temperature scale (F or C degrees), DIP switch settings, and more. All settings are changed easily. Distributed by Uni-Line®, SmartSense thermostats are Simply The SMART Choice™.

### Features and Benefits

- Up to 4 stages
- Intuitive operation
- Manual / 7 day / 365 day operation
- After hours run timer
- 18 to 270 V AC powered
- Five dedicated HVAC equipment control relays
- Volt free relays outputs for fan (10A max)
- 0 to 10V assignable outputs
- Integrated modbus communications
- Bright green backlight
- Wi-fi, remote and occupancy sensor options
- Enthalpy based economy function with sensor
- Digital / analog inputs and outputs with library of functions
- Economy cooling function
- Relay and 0-10V equipment control logic outputs
- Compressor lead-lag function
- Heat / cool or heat pump (O/B) logic

# WALL THERMOSTATS



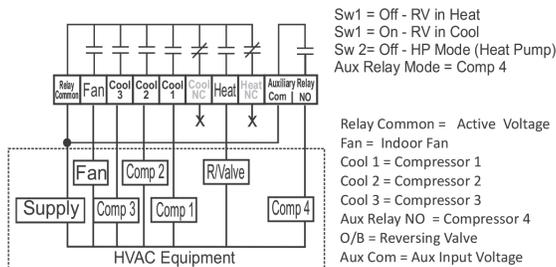
SMART SENSE®

## Specifications

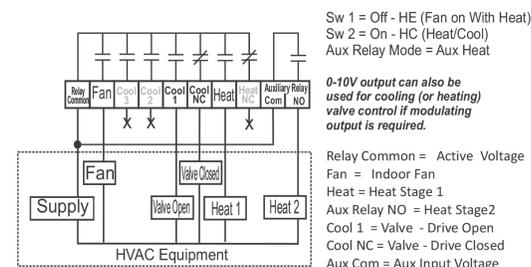
Part Number	SMART 4000
Power	24/120/240V AC +/- 15% 50/60 Hz
Relays	Fan 10A Max All Others 5A Max
Operating Temperature	32°F to 122°F (0°C to 50°C)
Operating RH	0 - 95% (Noncondensing)
Storage Temperature	32°F to 150°F (0°C to 65°C)
Control Range	32°F to 122°F (0°C to 50°C)
Maximum Equipment Stages	4 Compressors (HC Mode = 2 Heat 3 Cool)
Anti Cycle Timer	Off, 2, 3, 4 or 5 Minutes (Installer Adjustable)
After Hours Timer	Off to 12 Hours (Installer Adjustable)
Memory Type	Non Volatile 128K
Clock	12/24 Hour 7 Day with 365 Day Calendar Back-up Battery for Clock (CR1220)
Back-up Battery	4 to 6 years
Life Holiday Events	30 - (Perpetual and/or Self Expiring)
0 - 10V Output	10mA Max Each
Digital Input	Volt Free
0 - 10V Input	Max Voltage 17V DC
Room and Outside Air Sensor	10K NTC Type II (2 Wire Screened)
Communicating Sensor	4 Wire - 1312' (400m) with control function 10K NTC Type II / RH 10 - 98% RH 2%
Optional RF Sensor	2xAAA Batteries 18 Mth Life 10K NTC Type II Range - 492' (150m) Open Air 130' (40m Indoors Typical) Frequency 433MHz - 2 Way With Error Checking
Communications	Modbus RTU Baud Rate 4.8/9.6/19.2K
LCD	1.25" x 5.2" (32 x 132mm) Graphical - LED Backlight
Size	4.3" x 4.3" x 2.6" (110mm x 110mm x 65mm) 4.3" x 7.1" x 2.6" (110mm x 180mm x 65mm) with terminal covers fitted

## Wiring Diagrams

### Typical 4 Stage Heat Pump



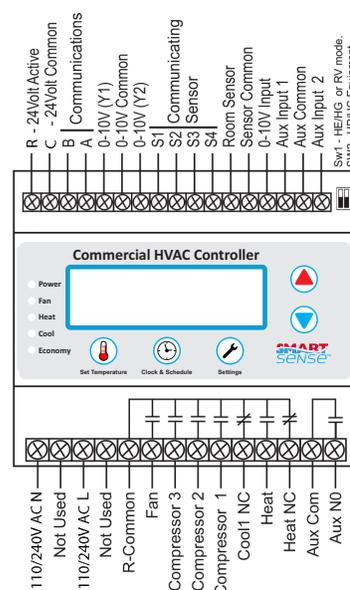
### Typical Chilled Water With Electric Heat



## Installer Options

- Some of the features and functions of the SMART 4000 can be adjusted as an installer are listed below:
- Keyboard locks and temperature control limits
- After Hours Run Period - 0 to 12 hours
- Individual Compressor Control and Staging 1°F to 9°F (0.5°C to 5°C)
- With Smart Upstage
- Compressor Timing - Minimum Run Time and Anti Cycle Protection
- Communications Settings - Address, Speed and Parity
- Auxiliary Relay Functions
  - Economy Output
  - Hi or Low Temperature Alarm
  - Heat, Cool or Economy Running Indication
- 2 Analog (0-10V) Outputs each
  - Inside or Outside Economy Damper Control
  - Heating or Cooling Valve Control
  - Capacity Control for Digital Scrolls
- 2 Auxiliary (Digital) Inputs each
  - Fire and Fault - Normally Open or Closed Logic on Fault
  - Force On / Off or Initiate/Cancel After Hours Timer
  - Force Ventilation
  - If Economy Mode Active

## Board Layout

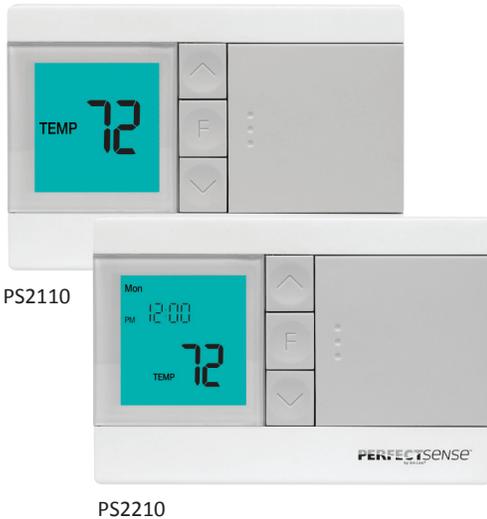


**5** Year Limited Warranty



# WALL THERMOSTATS

PERFECTSENSE™



PS2110

PS2210

## PERFECTSENSE NON-PROGRAMMABLE THERMOSTATS

### PS2000 Series

The PerfectSense™ PS2000 thermostat series is the perfect choice when it comes to non-programmable temperature control.

With the comfort, convenience, and efficiency features that homeowners and contractors want, the PS2000 series provides value-packed thermostats for an economical price.

All PS2000 thermostats are fully compatible with all standard 24V AC heating and cooling systems. Additional compatibility with multi-stage and heat pump systems are available in the PS2210 model.

Add in easy installation, expert technical service, and quality you can depend on, the PerfectSense™ PS2000 thermostat series is the perfect choice in temperature control.

### Features and Benefits

- Multi-Stage 2 heat / 1 cool – PS2210 only
- Bigger brighter backlight
- Adjustable temperature differential
- Worry-free memory retention – PS2210 only
- Filter Monitor
- Low temperature freeze protection – PS2110 only
- Automatic compressor short cycle protection
- O and B terminals
- Zone system compatible
- Quick wire terminal block

# WALL THERMOSTATS

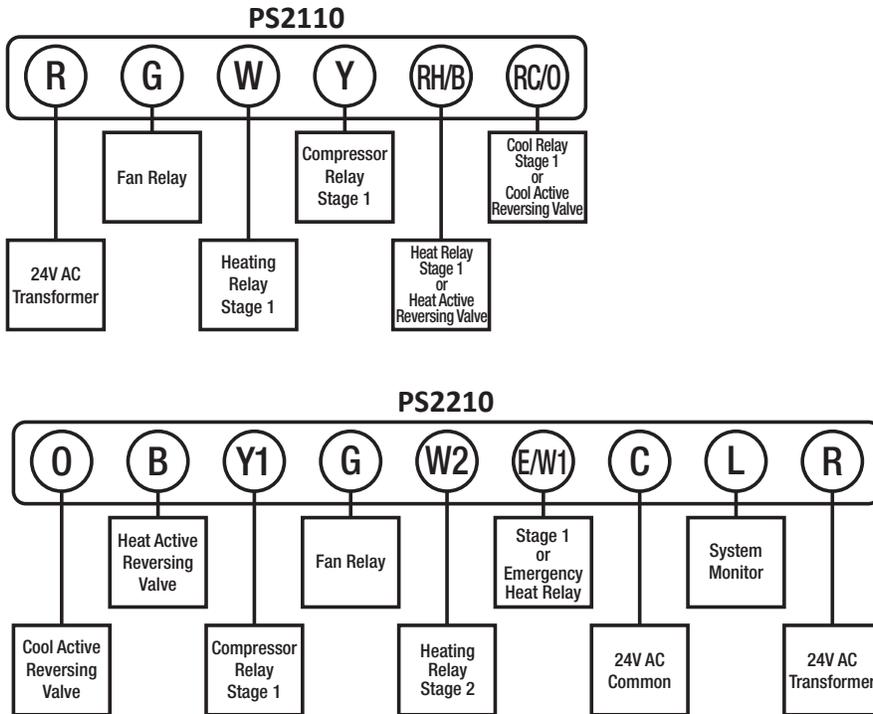


PERFECTSENSE™

## Specifications

Part Numbers	PS2110	PS2210
Electrical Rating	24V AC (18-30V AC) 1 Amp maximum load per terminal 3 Amp total maximum load (all terminals combined)	24V AC (18-30V AC) 1 Amp maximum load per terminal 3 Amp total maximum load (all terminals combined)
Application	1 Heat / 1 Cool	Multi-Stage 2 Heat / 1 Cool
Temperature Control Range	45°F to 95°F (7°C to 35°C)	45°F to 95°F (7°C to 35°C)
Accuracy	± 1°F (± 0.5°C)	± 1°F (± 0.5°C)
Power	3.0V DC (2 AA alkaline batteries included)	24V AC with battery back-up (2 AA alkaline batteries included)
System Configurations	Single stage electric, gas, oil or millivolt heating or heating/cooling systems including single stage heat pump systems	Multi-stage electric, gas or oil heating or heating/cooling systems including multi-stage heat pump systems
Terminations	R, G, W, Y, RH/B, RC/O	O, B, Y1, G, W2, E/W1, C, L, R
Product Weight	11.2 oz.	11.2 oz.

## Product Drawings

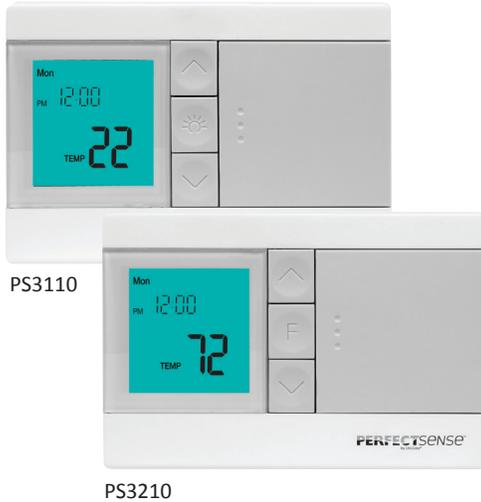


**2** Year  
Limited  
Warranty



# WALL THERMOSTATS

PERFECTsense™



PS3110

PS3210

## PERFECTSENSE PROGRAMMABLE THERMOSTATS

### PS3000 Series

The PerfectSense™ PS3000 thermostat series is the perfect choice when it comes to programmable temperature control that can help reduce energy costs up to 25%.

With the comfort, convenience, and efficiency features that homeowners and contractors want, the PS3000 series provides custom program options in value-packed thermostats for an economical price.

All PS3000 thermostats are fully compatible with all standard 24V AC heating and cooling systems. The PS3210 offers additional compatibility with single and multi-stage gas/electric furnaces and heat pump systems.

Add in easy installation, expert technical service, and quality you can depend on, the PerfectSense™ PS3000 thermostat series is the perfect choice in temperature control.

### Features and Benefits

- 5 - 2 day programming
- Multi-stage 2 heat / 1 cool – PS3210 only
- Bigger brighter backlight
- Adjustable temperature differential
- Worry-free memory retention – PS3210 only
- Filter monitor
- Low temperature freeze protection – PS3110 only
- Automatic compressor short cycle protection
- Temporary program override
- Quick wire terminal block

# WALL THERMOSTATS

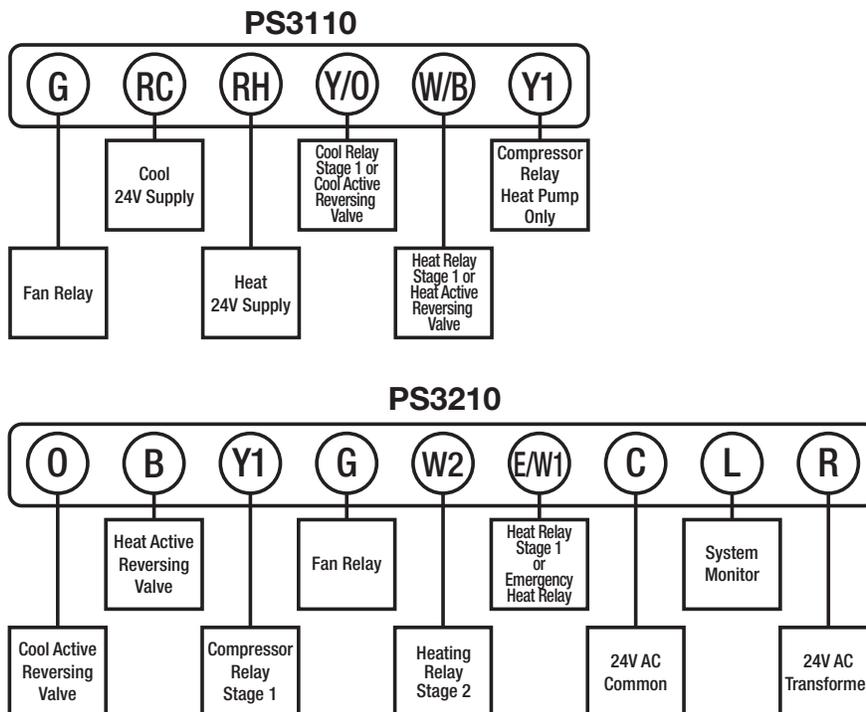


PERFECTSENSE™

## Specifications

Part Numbers	PS3110	PS3210
Electrical Rating	24V AC (18-30V AC) 1 Amp maximum load per terminal 3 Amp total maximum load (all terminals combined)	24V AC (18-30V AC) 1 Amp maximum load per terminal 3 Amp total maximum load (all terminals combined)
Application	1 Heat / 1 Cool	Multi-Stage 2 Heat / 1 Cool
Temperature Control Range	45°F to 95°F (7°C to 35°C)	45°F to 95°F (7°C to 35°C)
Accuracy	± 1°F (± 0.5°C)	± 1°F (± 0.5°C)
Power	3.0V DC (2 AA alkaline batteries included)	24V AC with battery back-up (2 AA alkaline batteries included)
System Configurations	Single stage electric, gas, oil or millivolt heating or heating/cooling systems including single stage heat pump systems	Multi-stage electric, gas or oil heating or heating/cooling systems including multi-stage heat pump systems
Terminations	G, RC, RH, Y/O, W/B, Y1	O, B, Y1, G, W2, E/W1, C, L, R
Product Weight	11.2 oz.	11.2 oz.

## Product Drawings



**2** Year  
Limited  
Warranty



# WALL THERMOSTATS

PERFECTsense™



PS4000

## PERFECTSENSE TOUCHSCREEN PROGRAMMABLE THERMOSTATS

### PS4000 Series

The PerfectSense™ PS4000 Touchscreen Programmable Thermostat is a feature-rich comfort control with universal system compatibility. Easy-to-use and install, the PS4000 has a large backlit touchscreen display requested by homeowners and contractors.

This installer-friendly thermostat is designed for 1 heat / 1 cool systems and can be programmed for 2 or 4 events daily. In addition, it offers Wake, Day, Evening, and Sleep settings giving you precise and affordable comfort. Applications include gas, oil, millivolt, electric and heat pump as well as dual fuel units. The PS4000 is powered by 24V AC common wire or two AA batteries.

With a beautiful design, easy installation, and quality you can depend on, the PerfectSense PS4000 Touchscreen thermostat is the perfect choice in temperature control.

### Features and Benefits

- 7 day programmable, 2 or 4 events per day
- 1 Heat / 1 Cool
- Touchscreen with large backlit display
- Manual or auto changeover
- Adaptive recovery
- Indoor and outdoor sensor options
- Programmable fan option
- Filter change indicator
- 5 minute compressor delay protection
- Keypad lockout
- Clock display

# WALL THERMOSTATS

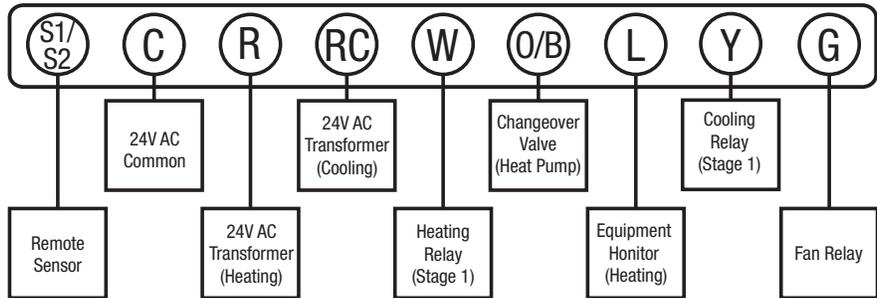


PERFECTSENSE™

## Specifications

Part Numbers	PS4000
Temperature Range	Heating: 40°F to 90°F (4°C to 32°C) Cooling: 50°F to 99°F (10°C to 37°C)
Operating Temperature	32°F to 120°F (0°C to 49°C)
Electrical Rating	W Heating Terminal 20 – 30V AC, 1 Amp max, 50/60 Hz
	W Heating (Power pile) 750 mV DC, 100 mAmp max, 50/60 Hz
	Y Cooling 20 – 30V AC, 1 Amp max, 50/60 Hz
	G Fan 20 – 30V AC, 1 Amp max, 50/60 Hz

## Product Drawings



**5** Year Limited Warranty





# WALL THERMOSTATS

PERFECTsense™



PS5000

## PERFECTSENSE TOUCHSCREEN PROGRAMMABLE THERMOSTATS

### PS5000 Series

The PerfectSense™ PS5000 Touchscreen Programmable Thermostat is a feature-rich comfort control with universal system compatibility. Easy-to-use and install, the PS5000 has a large backlit touchscreen display requested by homeowners and contractors.

This installer-friendly thermostat is designed for 3 heat / 2 cool systems and can be programmed for 2 or 4 events daily. In addition, it offers Wake, Day, Evening, and Sleep settings giving you precise and affordable comfort. Applications include gas, oil, millivolt, electric and heat pump as well as dual fuel units. The PS5000 is powered by 24V AC common wire or two AA batteries.

With a beautiful design, easy installation, and quality you can depend on, the PerfectSense PS5000 Touchscreen thermostat is the perfect choice in temperature control.

### Features and Benefits

- 7 day programmable, 2 or 4 events per day
- 3 Heat / 2 Cool
- Touchscreen with large backlit display
- Manual or auto changeover
- Adaptive recovery
- Indoor and outdoor sensor options
- Programmable fan option
- Filter change indicator
- 5 minute compressor delay protection
- Keypad lockout
- Clock display

# WALL THERMOSTATS

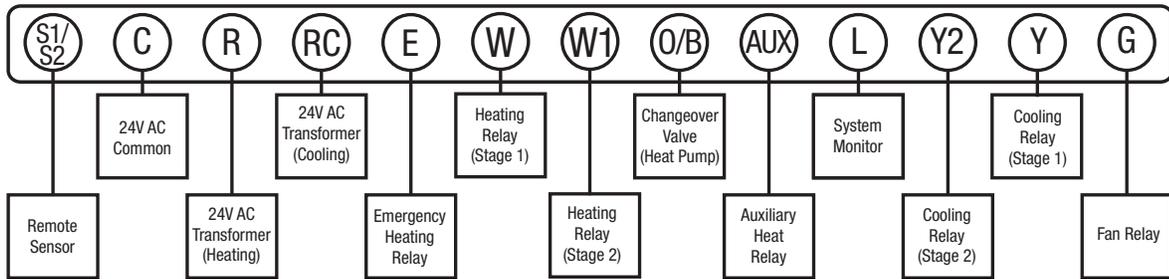


PERFECTSENSE™

## Specifications

Part Numbers	PS5000
Temperature Range	Heating: 40°F to 90°F (4°C to 32°C) Cooling: 50°F to 99°F (10°C to 37°C)
Operating Temperature	32°F to 120°F (0°C to 49°C)
Electrical Rating	W Heating Terminal 20 – 30V AC, 1 Amp max, 50/60 Hz
	W Heating (Power pile) 750 mV DC, 100 mAmp max, 50/60 Hz
	Y Cooling 20 – 30V AC, 1 Amp max, 50/60 Hz
	G Fan 20 – 30V AC, 1 Amp max, 50/60 Hz

## Product Drawings



**5** Year Limited Warranty





# WALL THERMOSTATS

PERFECTsense™



PS984-1R

## PERFECTSENSE MECHANICAL THERMOSTATS

### PS900 Series

The PerfectSense™ PS900 Series Mechanical Thermostats are a simple two-piece design, so you save time at installation. The large display offers accurate room temperature measurement. Wall plates are available to mask any unsightly marks left by previous thermostats. Install it with confidence.

### Features and Benefits

- Accurate room temperature
- Adjustable heat anticipator
- No sub-base required speeds installation
- Mercury-free means no leveling or special disposal required
- J-box compatible
- Positive off switch assured shutdown of HVAC system
- Fixed cooling anticipation (on PS984-1R, PS988-1R only)
- Dual temperature scale in Fahrenheit and Celsius

# WALL THERMOSTATS



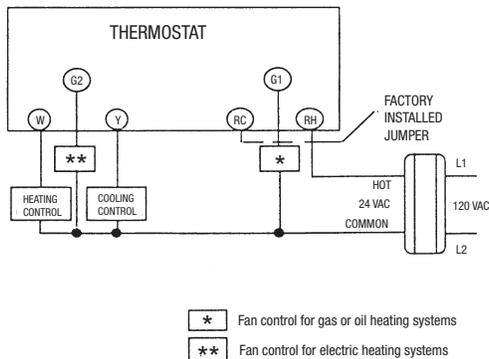
PERFECTSENSE™

## Specifications

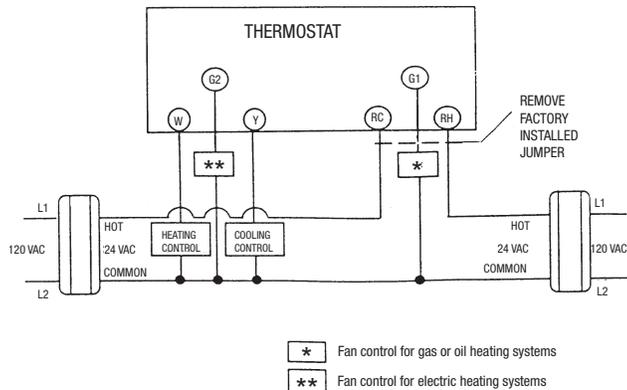
Part Numbers	PS984-1R	PS986-1R	PS988-1R
Electrical Rating	24V AC (24-30V AC) and 250-750 mV 1.5 Amp maximum load (all terminals combined)	24V AC (24-30V AC) and 250-750 mV 1.5 Amp maximum load (all terminals combined)	24V AC (24-30V AC) and 250-750 mV 1.5 Amp maximum load (all terminals combined)
Application	24V AC, Cool Only	24V AC, Heat Only	24V AC, 1 Heat/1 Cool
Temperature Range	50°F to 90°F (10°C to 30°C)	50°F to 90°F (10°C to 30°C)	50°F to 90°F (10°C to 30°C)
Accuracy	± 2°F	± 2°F	± 2°F
Adjustable Heat Anticipation	0.1 to 1.2 Amp	0.1 to 1.2 Amp	0.1 to 1.2 Amp
Power Consumption	Less than 1 mA @ 24V AC	Less than 1 mA @ 24V AC	Less than 1 mA @ 24V AC
Switch Action	Reed Switch	Reed Switch	Reed Switch
Terminations	Y, G, R	W, R	W, G, Y, Rc, Rh

## Product Drawings

One Transformer - Models PS986-1R, PS988-1R



Two Transformers - Models PS988-1R



**1** Year  
Limited  
Warranty



# WALL THERMOSTATS

PERFECTSENSE™



PS801

## PERFECTSENSE MECHANICAL THERMOSTATS

### PS800 Series

The PerfectSense™ PS800 Series Line Voltage Thermostats offer performance and accuracy in an easy to install, low voltage control with models available for 120/208/240/277 Volts. The PS800 Series is J-Box compatible allowing it to be mounted directly to a 2" x 4" vertical electrical outlet box to speed up installation time. The simple modern design mounts flush to the wall, with a large knob for easy temperature adjustments. These universal replacements can be used to retrofit most existing electric heat thermostats. With models for heating which include single-line break and double-line break as well as single-line break cooling, there is a PS800 Series Thermostat for every application.

### Features and Benefits

- Bimetal temperature sensing for improved thermal performance
- Both °F and °C control dials included
- Single or Double Pole Available
- J-Box compatible speeds up installation by mounting directly to an electrical outlet box
- Universal replacement to retrofit most existing electric heat thermostats
- Fixed cooling anticipation (on PS984-1R, PS988-1R only)
- Dual temperature scale in Fahrenheit and Celsius

# WALL THERMOSTATS



PERFECTSENSE™

## Specifications

PS801	Heating, SPST Switch Action
PS802	Heating, DPST Switch Action
PS803	Cooling, SPST Switch Action
Electrical Rating	120-277V AC
Temperature Range	41°F to 90°F (5°C to 32°C)
Accuracy	±3°F (1.6°C)
Maximum Power	2640W @ 120V AC (22A) 4576W @ 208V AC (22A) 5280W @ 240V AC (22A) 4986W @ 277V AC (22A)
Sensing Element	Bi-metal mechanical

## Replacement Information

Robertshaw*	801, 802, 803A
White-Rodgers*	1A65-641, 1A66-641
Honeywell*	T498A1810, T498A1778, T410A1013, T4398A1021, T498B1553, T498B1512, T410B1004, T4398B1029

\*Verify specific application requirements before substitution.





# WALL THERMOSTATS

SMARTSENSE®



SMART-R-01V  
SMART-R-02



SMART-R-03



SMART-R-05



SMART-R-06



SMART-M-04



SMART-R-01H

## ACCESSORIES - SMARTSENSE

### SmartSense Sensor and Module Series

The SmartSense® by Uni-Line® SMART Accessory Series offer many application options to suit a variety of installation needs. Remote sensors allow the thermostat to monitor temperature or humidity in more than one room of your home or business, or to monitor the outdoor temperature. Adding remote sensors provides a simple way to increase the efficiency of your heating and cooling system, as well as added comfort.

Remote Modules can provide more control of HVAC systems. The use of a Wi-Fi module through a smart phone or internet connection allows settings to be changed at anytime from any location. The remote Hospitality Occupancy Outdoor Module is designed for hotel applications.

### Features and Benefits

- Quality thermistors used for NTC probes
- Unshielded cables may be used up to 131 feet (40m)
- Non polarity dependent TT terminals for all sensors
- Most compatible with SmartSense thermostats including the SMART 1000, SMART 2000, SMART 3000, and SMART 4000
- Thermostats auto detect connection of sensor(s)
- Averaging feature available with DIP switch (SMART-R-02 only)
- After Hours feature available (SMART-R-02, SMART-R-05 and SMART-R-06 only)
  - After hours feature allows the HVAC program to continue for an additional period pre-set by the installer
- Four wire sensor available with relative humidity (SMART 4000 only)
- Wi-Fi module sold separately (App/SSID: SmartSense by Uni-Line)
- Built in doorbell function and "make room" or "do not disturb" status signals (SMART-R-01V only)

# WALL THERMOSTATS



SMART SENSE®

## Specifications

### Sensors

Part Numbers	Description	Compatible with
SMART-R-01V	Remote 4-wire Sensor for HVAC Controller with Relative Humidity - No Display	SMART 4000 Only
SMART-R-02	Remote Averaging / After Hours Sensor	SMART 1000, SMART 2000, SMART 3000, SMART 4000
SMART-R-03	Remote Outdoor / Duct Sensor	SMART 1000, SMART 2000, SMART 3000, SMART 4000
SMART-R-05	Remote Adjustable / After Hours Sensor	SMART 1000, SMART 2000, SMART 3000, SMART 4000
SMART-R-06	Remote Wireless RF / After Hours Sensor includes Transmitter and Receiver	SMART 1000, SMART 2000, SMART 3000, SMART 4000

### Modules

Part Numbers	Description	Compatible with
SMART-M-04	Wireless Wi-Fi Module	SMART 2000, SMART 3000, SMART 4000
SMART-R-01H	Remote Hospitality Occupancy Outdoor Module	SMART 3000

## Wiring Diagrams

Diagram 1

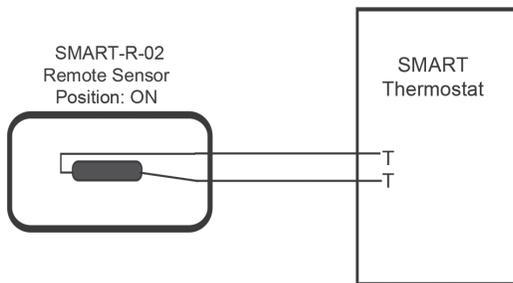


Diagram 2

Two Sensor Averaging

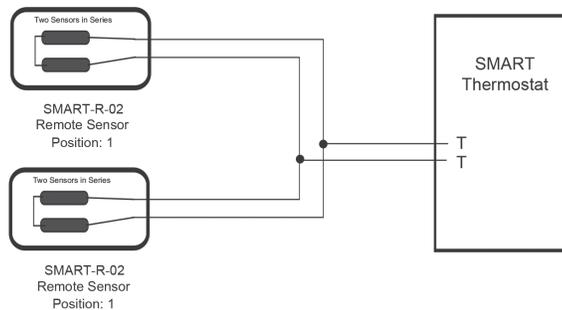


Diagram 3

Three Sensor Averaging

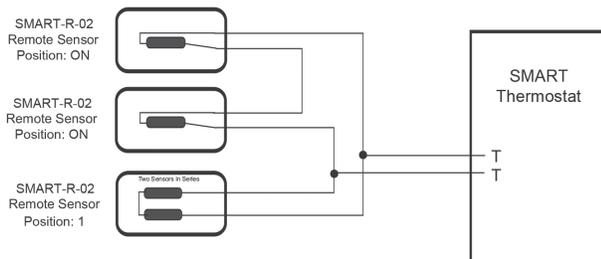
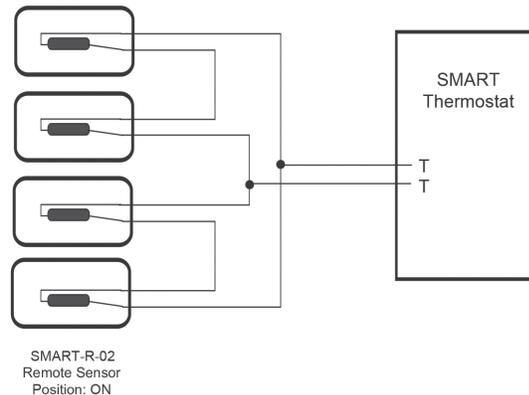


Diagram 4

Four Sensor Averaging



5 Year Limited Warranty



# WALL THERMOSTATS

PERFECTSENSE™

## ACCESSORIES - PERFECTSENSE



PS-R-02



PS-R-01

### PerfectSense Sensor Series

The PerfectSense™ Sensor Series is designed to sense temperature at a remote location and send this information to the PerfectSense Thermostats. These sensors can be used with the PS4000 and PS5000 thermostat models, and can be used as a stand alone sensor or as part of an averaging network. Once a sensor is connected to the thermostat, the thermostat's built-in sensor is no longer used. The thermostat's installer set-up should be modified to tell the thermostat that remote indoor or outdoor temperature sensor(s) have been used. The temperature reading on the thermostat's display will be the remote sensor(s) temperature location(s).

### Features and Benefits

- Operating Temperature: -40°F to 170°F (-40°C to 80°C)
- Sensor Accuracy: +/- 1.5°F at 77°F (+/- 1°C at 25°C)
- Operating Relative Humidity: 5% to 95% non-condensing
- White Finish

## Specifications

Part Numbers	Description	Sensor Accuracy	Operating Temperature	Dimensions
PS-R-01	Outdoor Temperature Sensor	+/- 1.5°F	-40°F to 170°F (-40°C to 80°C)	9.84' (3m)
PS-R-02	Indoor Temperature Sensor	+/- 1.5°F	-40°F to 170°F (-40°C to 80°C)	2.95" H x 2.17" W x 1.5" D (75mm H x 55mm W x 38mm D)

5 Year Limited Warranty



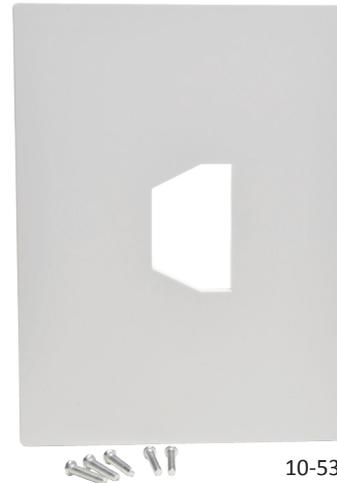
## ACCESSORIES - THERMOSTATS

### Thermostat Cover Plate

The Uni-Line® 10-531A Thermostat Cover Plate is ideal to mount to a 2" x 4" junction box or to mount directly to the drywall to cover marks left from an old thermostat, eliminating the need to repaint or apply new wallpaper. The durable plastic wall plate comes in white with mounting screws. The Uni-Line Thermostat Cover Plate can be used with SmartSense® and PerfectSense™ thermostats, as well as many other thermostat brands on the market.

### Features and Benefits

- Durable, sturdy white cover plate
- Kit includes mounting screws
- J-Box compatible



10-531A

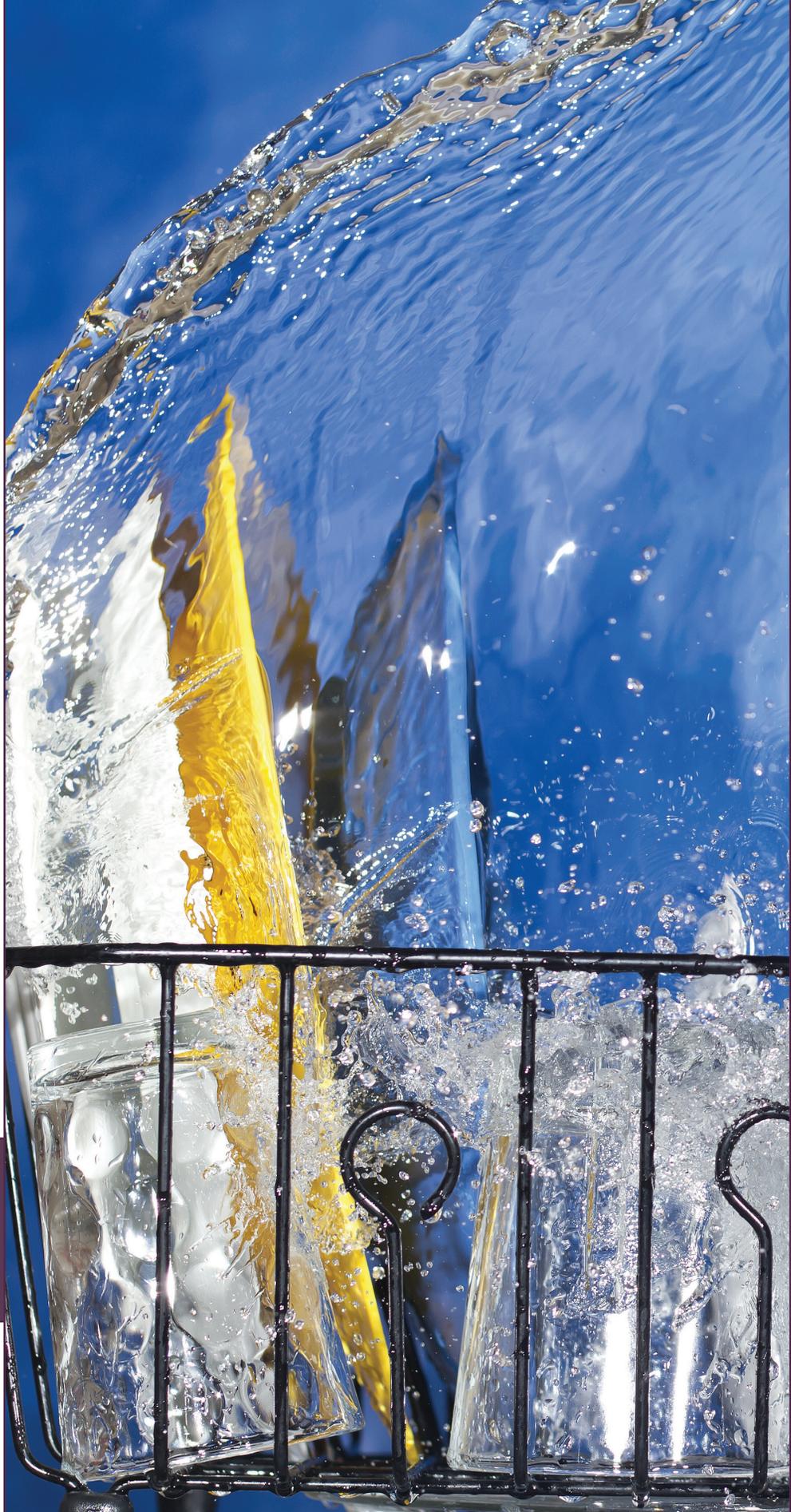
### Specifications

Part Numbers	Description	Size
10-531A	White Thermostat Cover Plate	7" x 5.25"

**UNI-LINE**®

**1** Year  
Limited  
Warranty

F27



Water valves are critical to the efficient operation of a variety of residential and commercial appliances.

Robertshaw® water valves are the industry standard for all applications. Whether single, dual or general purpose water valves are needed for refrigeration, laundry, dishwashing or small appliances, Robertshaw produces the products trusted by the leading global appliance manufacturers.

Mixing Water Valves.....	G2
Single Solenoid Water Valves .....	G8
Dual Water Valves .....	G14
Direct Acting Solenoid Water Valves .....	G18
Gravity-Fed Dump Water Valves.....	G20
General Purpose Water Valves .....	G22



# WATER VALVES





# WATER VALVES

Robertshaw®



CW-164

## MIXING WATER VALVES

### E-1, E-2 and E-2T Series

The Robertshaw® E-1, E-2 and E-2T Mixing Water Valve Series is designed for laundry clotheswasher applications. The E-1 models are non-regulated, the E-2 models have flow control in the outlet, and the E-2T models have an additional thermistor added for temperature monitoring.

### Features and Benefits

- Pilot-operated diaphragm provides high flow capacity with minimum power requirements
- Compact design compared to predecessor valves to allow more flexibility for applications
- Flange mounting with screw boss is molded into the body for ease of installation
- Design uses a staked coil L frame with drawn pole sleeves to eliminate loose or missing pole pieces
- Improved coil bobbin design reduces problems
- Slow closing operators reduce water hammer and extend valve life
- Spin-weld assembly minimizes problems caused by loose or missing screws
- Suitable for applications using liquids up to 160°F (71°C)
- Quiet operation
- Stainless steel inlet screens with 60 x 60 mesh (60 holes/inch in both x and y directions)

### Replacement Information

Part Numbers	Replaces	Factory Number
CW-001	GE 189D1664G001, Whirlpool 13X86, Whirlpool 13X10024, 175D2937P001	K-76249
CW-164	Whirlpool 3952164	K-69046
CW-333	Whirlpool 22004333	K-76103
CW-346	Whirlpool 3979346	K-75161
CW-347	Whirlpool 3979347	K-75398
CW-349	Whirlpool W10337349	K-77684-2
CW-400	Electrolux 134211400	K-75712
CW-402	Alliance 201402	K-72626
CW-468	Alliance 201468	K-75933
CW-471	Whirlpool 461970229471	K-76422
CW-551	Whirlpool 461970201551	K-74969
CW-600	Electrolux 134890600	K-76755
CW-673	Whirlpool 3955673	K-75180
CW-751	Whirlpool 8540751	K-75806
CW-932	Maytag 35-6693, Maytag 21001932	K-76373
CW-E2	Whirlpool 3952163	K-72633



# WATER VALVES



*Robertshaw*<sup>®</sup>

## Specifications

Part Numbers	Description	Flow Rate	Inlet	Outlet	Operating Pressure	Terminals	Body Material	Thermistor	Electrical Rating	Power
CW-001	Laundry Valve	4 GPM to 7.3 GPM	3/4" 11.5 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	NA	120V AC 60 Hz	5 Watts
CW-164	Residential Clotheswasher Mixing Water Valve E-1	1.0 GPM to 6.0 GPM	3/4" 11.5 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	NA	120V AC 60 Hz	5 Watts
CW-333	Laundry Valve	2 GPM to 8.2 GPM	3/4" 11.5 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	NA	120V AC 60 Hz	5 Watts
CW-346	Laundry Valve with thermistor	2 GPM to 2.8 GPM	3/4" 11.5 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	50K Ohms at 25°C	120V AC 60 Hz	5 Watts
CW-347	Residential Clotheswasher Mixing Water Valve E-2T	1.0 GPM to 6.0 GPM	3/4" 11.5 NHT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	50K Ohms at 25°C	120V AC 60 Hz	5 Watts
CW-349	Laundry Valve	8 GPM	3/4" 11.5 NHT	1/2" ID Hose	21 PSI to 120 PSI	1/4" Male	Polypro	NA	120V AC 60 Hz	5 Watts
CW-400	Residential Clotheswasher Mixing Water Valve E-1	1.8 GPM to 14.6 GPM	3/4" 11.5 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	NA	120V AC 50/60 Hz	5 Watts
CW-402	Laundry Valve	11 GPM	3/4" 11.5 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	NA	120V AC 60 Hz	5 Watts
CW-468	Laundry Valve	2.4 GPM to 4.5 GPM	3/4" 11.5 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	NA	120V AC 60 Hz	5 Watts
CW-471	Residential Clotheswasher Mixing Water Valve E-2	1.69 GPM to 2.54 GPM	3/4" 11.5 NHT	3/8" ID Hose	7.5 PSI to 147 PSI	1/4" Male	Polypro	NA	120V AC 50/60 Hz	5 Watts
CW-551	Residential Clotheswasher Mixing Water Valve E-2	1.69 GPM to 2.54 GPM	3/4" 11.5 NHT	3/8" ID Hose	7.5 PSI to 147 PSI	1/4" Male	Polypro	NA	120V AC 60 Hz	5 Watts
CW-600	Laundry Valve with thermistor	1.3 GPM to 14.6 GPM	3/4" 11.5 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	50K Ohms at 25°C	120V AC 60 Hz	5 Watts
CW-673	Laundry Valve	1.9 GPM to 3.5 GPM	3/4" 11.5 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	NA	120V AC 60 Hz	5 Watts
CW-751	Laundry Valve	0.8 GPM to 2.2 GPM	3/4" 11.5 NHT	1/2" ID Hose	14.5 PSI to 145 PSI	RAST 2.5	Polypro	NA	120V AC 60 Hz	5 Watts
CW-932	Laundry Valve	2.5 GPM to 3.8 GPM	3/4" 11.5 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	NA	120V AC 60 Hz	5 Watts
CW-E2	Laundry Valve	2.2 GPM	3/4" 11.5 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	NA	120V AC 60 Hz	5 Watts

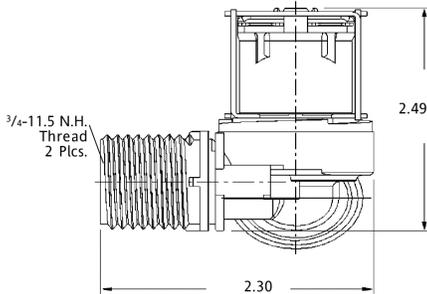
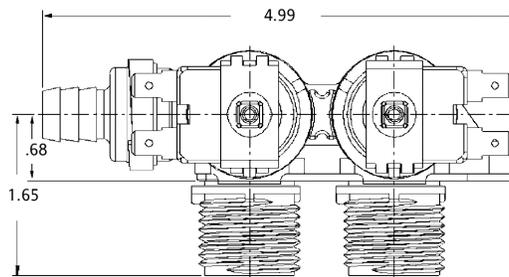
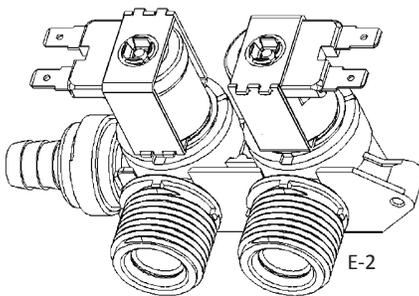
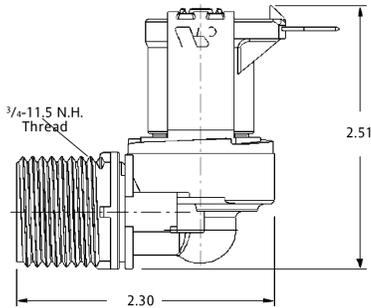
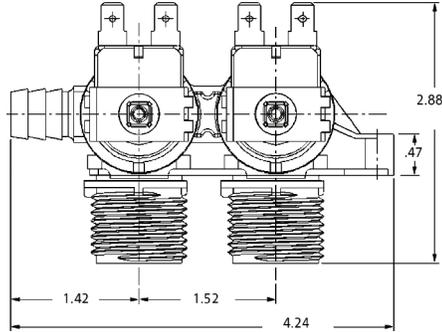
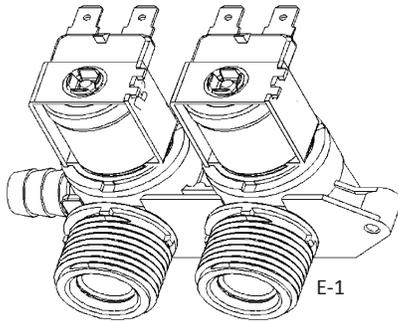




# WATER VALVES

Robertshaw®

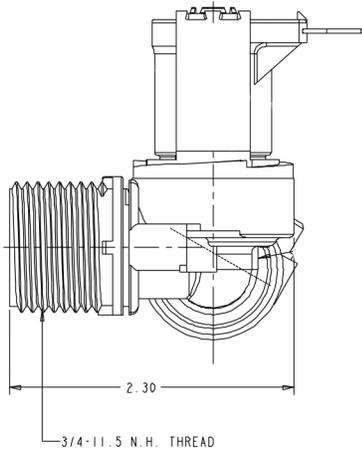
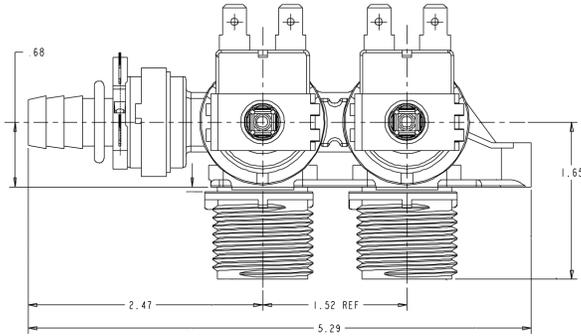
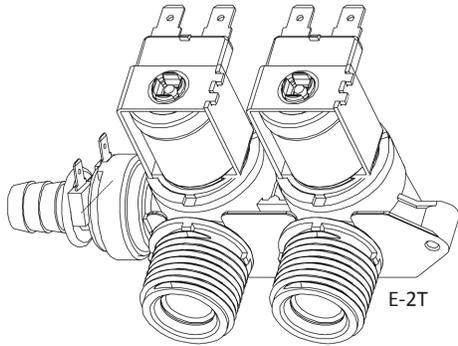
## Product Drawings



# WATER VALVES



## Product Drawings



Robertshaw®



# WATER VALVES

Robertshaw®



CW-300

## MIXING WATER VALVES

### N-51 Series

The Robertshaw® N-51 Mixing Water Valve Series is designed for laundry clotheswasher applications where flow control is required.

### Features and Benefits

- Dual solenoid valve with a pilot-operated diaphragm that provides high flow capacity with minimum power requirements
- Encapsulated coil provides high mechanical and dielectric strength, and is moisture resistant
- Unique diaphragm design reduces unwanted particles from entering the armature area
- Armature is designed with clearances to minimize jamming due to foreign materials
- Bodies are made of polypro which provides high resistance to corrosion and mineral deposits
- Suitable for applications using water at temperatures up to 160°F (71°C)
- Water hammer suppression
- Includes stainless steel inlet screens with 50 x 40 mesh (50 x 40 holes/inch in both x and y directions)

### Replacement Information

Part Numbers	Replaces	Factory Number
CW-300	Electrolux	K-67914
CW-531	GE WH00X531	K-66575
CW-1300	Electrolux 131461300	K-62464

### Specifications

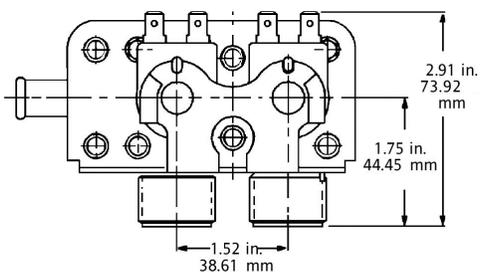
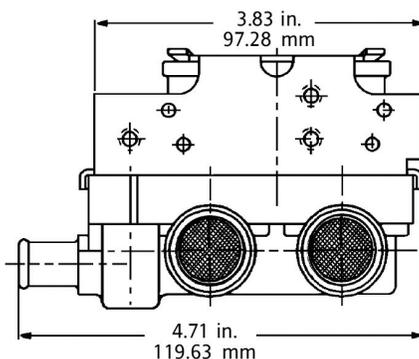
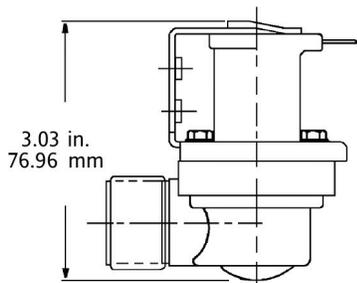
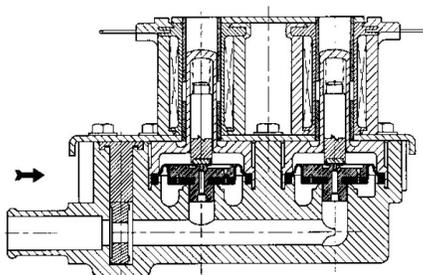
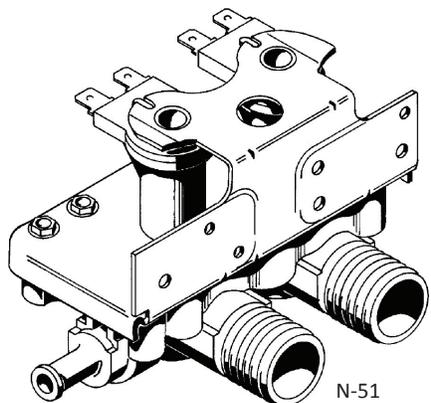
Part Numbers	Description	Flow Rate	Inlet	Outlet	Operating Pressure	Terminals	Body Material	Electrical Rating	Power
CW-300	Residential Clotheswasher Mixing Water Valve N-51	3.0 GPM to 14.6 GPM	3/4" 11 NHT	1/2" ID Hose	30 PSI to 120 PSI	Plain Brass	Polypro (Brown)	120V AC 60 Hz	10 Watts
CW-531	Laundry Valve	5 GPM to 7.5 GPM	3/4" 11.5 NHT	.375 ID Hose	30 PSI to 175 PSI	1/4" Male	Polypro	120V AC 60 Hz	10 Watts
CW-1300	Laundry Valve	4.5 GPM to 6.2 GPM	3/4" 11.5 NHT	1/2" ID Hose	30 PSI to 120 PSI	1/4" Male	Polypro	230 V AC 50/60 Hz	7 Watts



# WATER VALVES



## Product Drawings



*Robertshaw*<sup>®</sup>

**1** Year  
Limited  
Warranty



# WATER VALVES

Robertshaw®



IMV-1304

## SINGLE SOLENOID WATER VALVES

### S-30 Series

The Robertshaw® S-30 Water Valve Series is designed for low flow applications in residential refrigerator icemakers, commercial ice machines, dishwashers, energy-conserving plumbing and heating applications.

### Features and Benefits

- Single solenoid valve with a pilot-operated diaphragm provides high flow capacity with minimum power requirements
- Encapsulated coil provides high mechanical and dielectric strength, and is moisture resistant
- Unique diaphragm design reduces unwanted particles from entering the armature area
- Armature is designed with clearances which minimize the possibility of jamming due to foreign materials
- Bodies are made of polypro which provides high resistance to corrosion and mineral deposits
- Suitable for applications using water at temperatures up to 160°F (71°C)

### Replacement Information

Part Numbers	Replaces	Factory Number
CB-104	Grindmaster 61104	K-63310-28
IMV-529	Star - Wells Manufacturing 46529	K-63315-18
IMV-604	Scotsman 12-1646-04	K-63314-12
IMV-605	Scotsman 12-1646-05	K-63314-13
IMV-865	Hoshizaki 4A086501	K-63310-21
IMV-1304	Scotsman 12231304	K-63916-9
IMV-3404	Scotsman 12-1434-04	K-63314-14

### Specifications

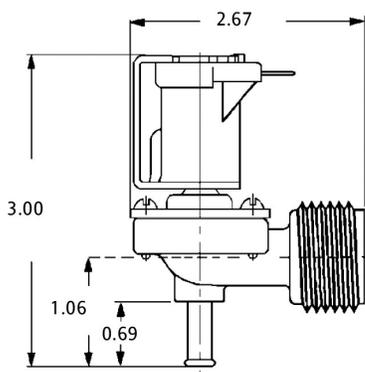
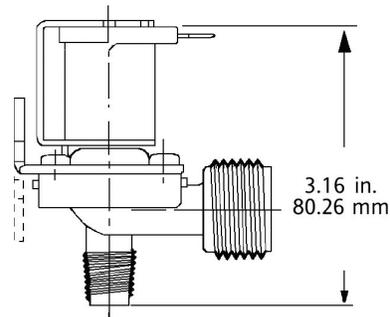
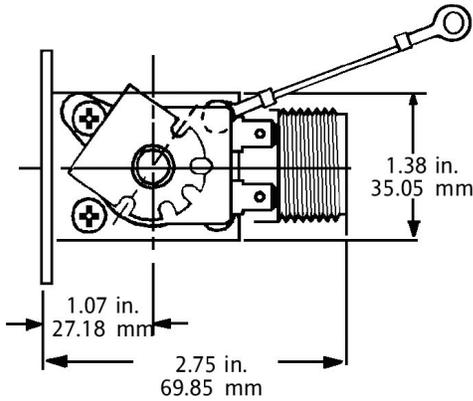
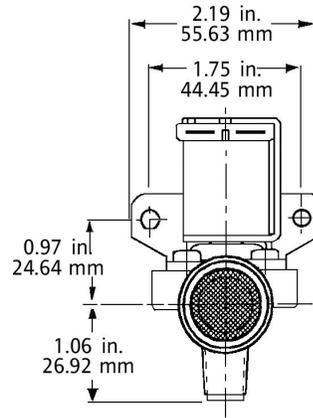
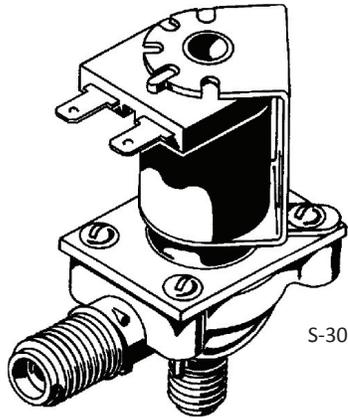
Part Numbers	Description	Flow Rate	Inlet	Outlet	Operating Pressure	Terminals	Body Material	Electrical Rating	Power
CB-104	Laundry Valve	1 GPM	3/4" 11.5 NHT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	10 Watts
IMV-529	Commercial Ice Machine Water Valve S-30	0.75 GPM	3/4" 11 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	240V AC 50/60 Hz	10 Watts
IMV-604	Laundry Valve	1 GPM	1/4" 18 NPT	1/4" 18 NPT	20 PSI to 120 PSI	1/4" Male	Polypro	240V AC 60 Hz	10 Watts
IMV-605	Laundry Valve	1 GPM	1/4" 18 NPT	1/4" 18 NPT	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	10 Watts
IMV-865	Commercial Ice Machine Water Valve S-30	0.75 GPM	3/4" 11 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	24V AC 50/60 Hz	7 Watts
IMV-1304	Commercial Ice Machine Water Valve S-30	0.75 GPM	3/4" 11 NHT	1/2" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 50/60 Hz	10 Watts
IMV-3404	Laundry Valve	.5 GPM	1/4" 18 NPT	1/4" 18 NPT	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	10 Watts



# WATER VALVES



## Product Drawings



(120V Valve Shown)

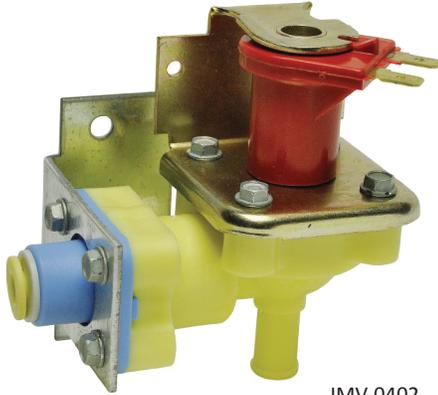
Robertshaw®

1 Year  
Limited  
Warranty



# WATER VALVES

Robertshaw®



IMV-0402

## SINGLE SOLENOID WATER VALVES

### S-53 Series

The Robertshaw® S-53 Water Valve Series is a single solenoid valve for dishwashing machines and commercial icemakers. The S-53 features the design combination of a brass inlet fitting and a mounting bracket, which allows direct connection to the supply plumbing without applying torque to the valve body.

### Features and Benefits

- Pilot-operated diaphragm provides high flow capacity with minimum power requirements
- Unique diaphragm design reduces unwanted particles from entering the armature area
- Armature is designed with clearances which minimize the possibility of jamming due to foreign materials
- Bodies are made of polypro to withstand a variety of harsh water conditions
- Suitable for applications using water at temperatures up to 160°F (71°C)

### Replacement Information

Part Numbers	Replaces	Factory Number
DW-721	GE WD00X721	K-56869-8
IMV-003	Manitowoc 2400003	K-74118-13
IMV-0400	Manitowoc 400	K-76167-8
IMV-0402	Manitowoc 000000402	K-76167-10
IMV-202	Scotsman 12-2922-02	K-74118-28
IMV-373	Manitowoc 373	K-76167-4
IMV-399	Manitowoc 399	K-76167-7
IMV-2201	Scotsman 12292201	K-74118-27

### Specification

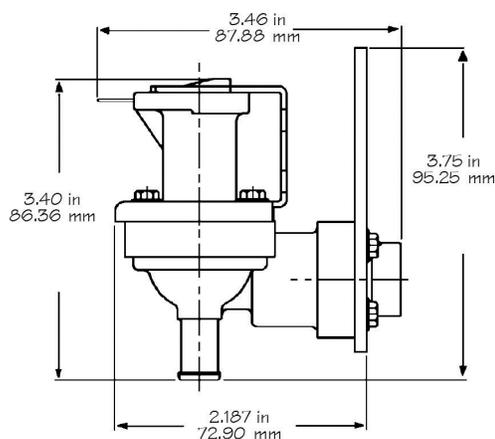
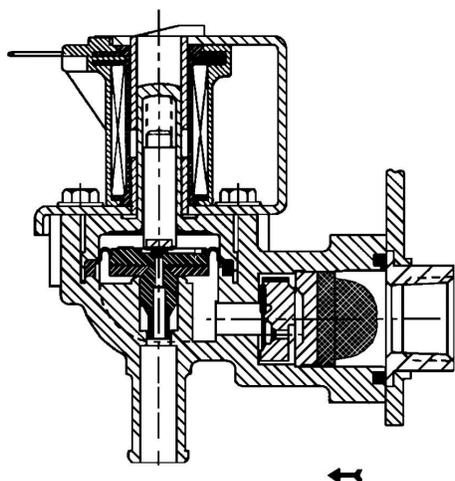
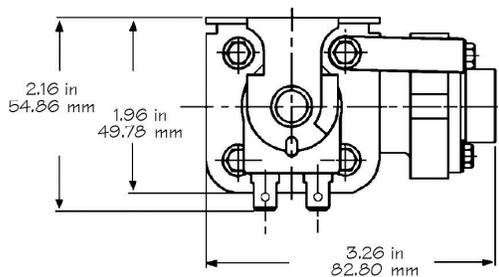
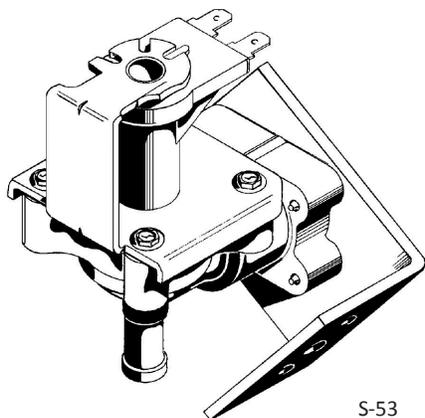
Part Numbers	Description	Flow Rate	Inlet	Outlet	Operating Pressure	Terminals	Body Material	Electrical Rating	Power
DW-721	Residential Dishwasher Water Valve S-53	1.55 GPM to 2.05 GPM	3/8" 18 FNPT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	10 Watts
IMV-003	Commercial Ice Machine Water Valve S-53	1.7 GPM	3/8" 18 FNPT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	10 Watts
IMV-0400	Commercial Ice Machine Water Valve S-53	0.50 GPM	1/4" quick connect	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	240 V AC 50/60 Hz	10 Watts
IMV-0402	Commercial Ice Machine Water Valve S-53	0.75 GPM to 3.00 GPM	3/8" 18 FNPT	3/8" ID Hose (Yellow)	20 PSI to 120 PSI	1/4" Male	Polypro	240V AC 50/60 Hz	10 Watts
IMV-202	Commercial Ice Machine Water Valve S-53	1.25 GPM	3/8" 18 FNPT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	230 V AC 50/60 Hz	10 Watts
IMV-373	Commercial Ice Machine Water Valve S-53	1.7 GPM	1/4" quick connect	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	240 V AC 50/60 Hz	10 Watts
IMV-399	Commercial Ice Machine Water Valve S-53	0.50 GPM	1/4" quick connect	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	10 Watts
IMV-2201	Commercial Ice Machine Water Valve S-53	1.25 GPM	3/8" 18 FNPT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 50/60 Hz	10 Watts



# WATER VALVES



## Product Drawings



*Robertshaw*<sup>®</sup>

**1** Year  
Limited  
Warranty



# WATER VALVES

Robertshaw®



DW-003

## SINGLE SOLENOID WATER VALVES

### S-101 Series

The Robertshaw® S-101 Water Valve Series is a single solenoid valve for dishwashing machines and coffee brewers.

### Features and Benefits

- Pilot-operated diaphragm provides high flow capacity with minimum power requirements
- Encapsulated coil provides high mechanical and dielectric strength, and is moisture resistant
- Bodies are made of polypro to withstand a variety of harsh water conditions
- Suitable for applications using water at temperatures up to 160°F (71°C)

### Replacement Information

Part Numbers	Replaces	Factory Number
CB-826	Wilbur Curtis WC826L	K-78117
DW-003	GE Parts 165D5792G001	K-78325
DW-101	Electrolux 154476101	K-76076-1
DW-249	Maytag 6918249	K-75634
DW-345	Whirlpool 8283345	K-74396
DW-534	Whirlpool 6920534	K-76466

### Specifications

Part Numbers	Description	Flow Rate	Inlet	Outlet	Operating Pressure	Terminals	Body Material	Electrical Rating	Power
CB-826	Commercial Coffee Brewer Water Valve S-101	1.00 GPM to 1.30 GPM	3/8" 18 NPT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro (Gray)	120V AC 50/60 Hz	5 Watts
DW-003	Residential Dishwasher Water Valve S-101	1.55 GPM to 2.05 GPM	3/8" 18 NPT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro (Blue)	120V AC 60 Hz	5 Watts
DW-101	Residential Dishwasher Water Valve S-101	0.83 GPM	3/8" 18 NPT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro (White)	120V AC 50/60 Hz	5 Watts
DW-249	Residential Dishwasher Water Valve S-53	1.13 GPM	3/8" 18 FNPT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	5 Watts
DW-345	Residential Dishwasher Water Valve S-101	1.08 GPM	3/8" 18 NPT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 50/60 Hz	5 Watts
DW-534	Residential Dishwasher Water Valve S-101	1.13 GPM	3/8" 18 NPT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 50/60 Hz	5 Watts

RoHS

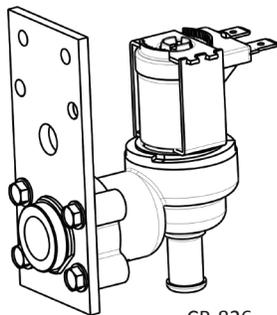


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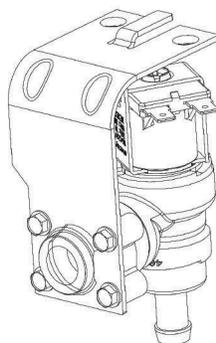
# WATER VALVES



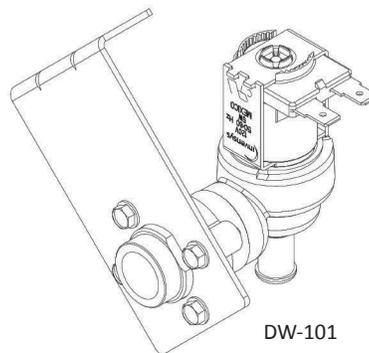
## Product Drawings



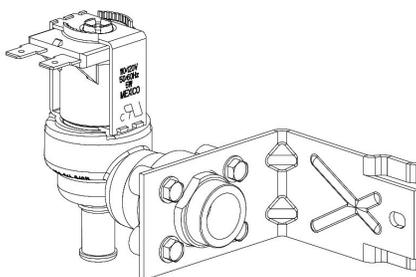
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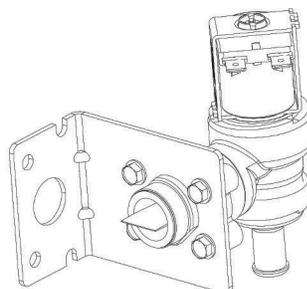
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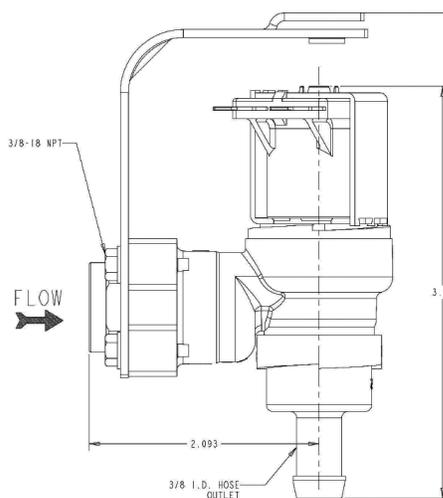
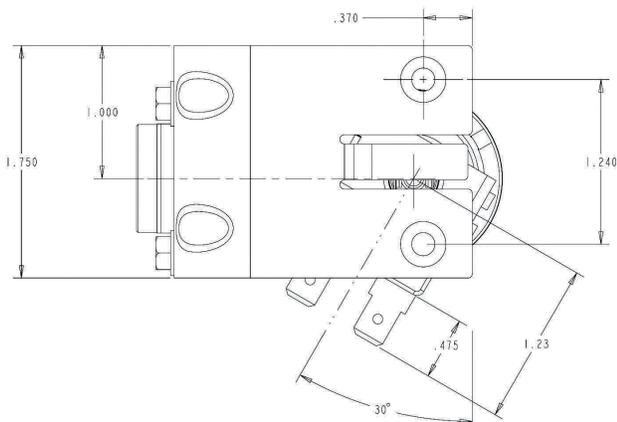
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DW-345



DW-534



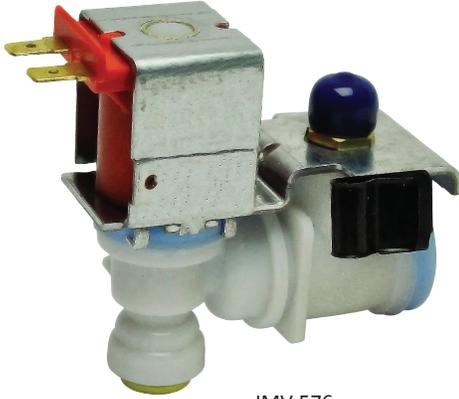
**Robertshaw**<sup>®</sup>

**1** Year  
Limited  
Warranty



# WATER VALVES

Robertshaw®



IMV-576

## DUAL WATER VALVES

### S-86 and N-86 Series

The Robertshaw® S-86 Single and N-86 Dual Water Valve Series are automatic icemaker valves for residential refrigerator icemakers. Both valve models feature an inlet fitting which connects directly to ¼" (6.35mm) tubing without an additional adaptor. The N-86 valve allows individual control of water flow through two outlets by using a single inlet for water to the door and for water to fill the icemaker.

### Features and Benefits

- Direct acting armature provides high flow capacity with minimum power requirements
- Encapsulated coil provides high mechanical and dielectric strength, and is moisture resistant
- Unique armature and seat design reduce unwanted particles from entering the armature area
- Armature is designed with clearances which minimize the possibility of jamming due to foreign materials
- Bodies are made of polypro which provides high resistance to corrosion and mineral deposits
- Suitable for applications using water at temperatures up to 160°F (71°C)

## Replacement Information

Part Numbers	Replaces	Factory Number
IMV-114	Whirlpool 12544114 Whirlpool 67005154	K-75985
IMV-124	Whirlpool 12544124	K-77198
IMV-201	Electrolux 40493201	K-74945
IMV-322	Whirlpool 12956102 Whirlpool 67006322	K-76376
IMV-494	Whirlpool 2210494	K-75973
IMV-542	Whirlpool 2188542	K-74982
IMV-576	Whirlpool 2315576	K-78186
IMV-696	Whirlpool W10312696	K-77623
IMV-701	Electrolux 218859701	K-75425
IMV-708	Whirlpool 2188708	K-75717
IMV-716	Whirlpool 10219716	K-77205
IMV-782	Whirlpool 2188782	K-75978
IMV-990	Whirlpool W10342318 Whirlpool 10498990	K-77999
IMV-2401	Electrolux 218832401	K-75423
IMV-8100	Whirlpool 10238100	K-77473



# WATER VALVES



*Robertshaw*<sup>®</sup>

## Specifications

Part Numbers	Description	Flow Rate	Inlet	Outlet	Operating Pressure	Terminals	Body Material	Electrical Rating	Power
IMV-114	Residential Ice Machine Water Valve N-86 Dual	115-154 CC in 7.5 seconds, 40-80 CC per second	5/16" quick connect	1/4" quick connect, 5/16" quick connect	20 PSI to 120 PSI	1/4" Male 3/16" Male	Polypro	120V AC 60 Hz	35 Watts 20 Watts
IMV-124	Residential Ice Machine Water Valve N-86 Dual	115-154 CC in 7.5 seconds, 40-80 cc per second	5/16" quick connect	1/4" quick connect, 5/16" quick connect"	20 PSI to 120 PSI	1/4" Male 3/16" Male	Polypro	120V AC 60 Hz	35 Watts 20 Watts
IMV-201	Residential Ice Machine Water Valve S-86	140 CC in 7.5 seconds	7/16" 24 UNS	7/16" 20 UNF	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	35 Watts
IMV-322	Residential Ice Machine Water Valve N-86 Dual Inline	115-154 CC in 7.5 seconds, 40-80 CC per second	5/16" quick connect	1/4" quick connect, 5/16" quick connect	20 PSI to 120 PSI	1/4" Male 3/16" Male	Polypro	120V AC 60 Hz	35 Watts 20 Watts
IMV-494	Residential Ice Machine Water Valve S-86	0.06 GPM to 0.60 GPM	1/4" flare, loxit or compression	7/16" 20 UNF	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	35 Watts
IMV-542	Residential Ice Machine Water Valve N-86 Dual	113-141 CC in 7.5 seconds, 24-58 CC per second	7/16" 20 UNF	7/16" 20 UNF, 1/2" 20 UNF	20 PSI to 120 PSI	1/4" Male 3/16" Male	Polypro	120V AC 60 Hz	35 Watts 20 Watts
IMV-576	Residential Ice Machine Water Valve S-86	0.06 GPM to 0.60 GPM	1/4" flare, loxit or compression	7/16" 20 UNF	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	35 Watts
IMV-696	Residential Ice Machine Water Valve N-86 Dual Inline	70 CC in 7.5 seconds, 40-80 CC per second	5/16" quick connect	1/4" quick connect, 5/16" quick connect	20 PSI to 120 PSI	1/4" Male 3/16" Male	Polypro	120V AC 60 Hz	35 Watts 20 Watts
IMV-701	Residential Ice Machine Water Valve S-86	No flow control	7/16" 24 UNS	7/16" 20 UNF	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	15 Watts
IMV-708	Residential Ice Machine Water Valve N-86 Dual	130 CC in 7.5 seconds, 22-38 CC per second	1/4" flare, loxit or compression	7/16" 20 UNF, 1/2" 20 UNF	20 PSI to 120 PSI	1/4" Male, 3/16" Male	Polypro	120V AC 50/60 Hz	35 Watts 20 Watts
IMV-716	Residential Ice Machine Water Valve S-86	140 CC in 7.5 seconds	7/16" 24 UNS	1/4" quick connect	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	35 Watts
IMV-782	Residential Ice Machine Water Valve S-86	140 CC in 7.5 seconds	7/16" 24 UNS	7/16" 20 UNF	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	35 Watts
IMV-990	Residential Ice Machine Water Valve S-86	180-600 CC in 7.5 seconds	7/16" 24 UNS	5/16" quick connect	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	20 Watts
IMV-1101	Residential Ice Machine Water Valve Triple	140 CC in 7.5 seconds 180-600 CC in 7.5 seconds	7/16" 20 UNS	7/16" 20 UNF, 1/2" 20 UNF	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	15 Watts , 35 Watts
IMV-2401	Residential Ice Machine Water Valve N-86 Dual	116 CC in 7.5 seconds	7/16" 20 UNF	7/16" 20 UNF	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	35 Watts 15 Watts
IMV-8100	Residential Ice Machine Water Valve S-86	180-600 CC in 7.5 seconds	7/16" 24 UNS	5/16" quick connect	20 PSI to 120 PSI	1/4" Male	Polypro	120V AC 60 Hz	20 Watts

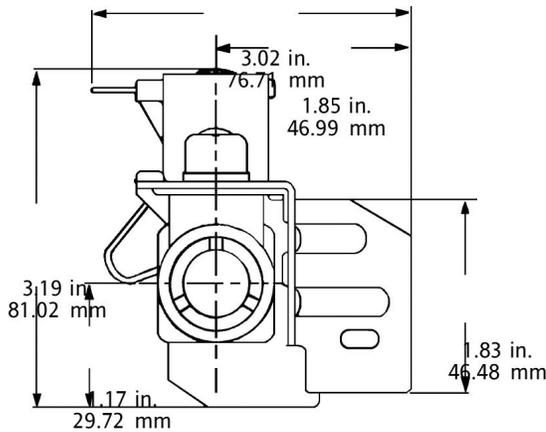
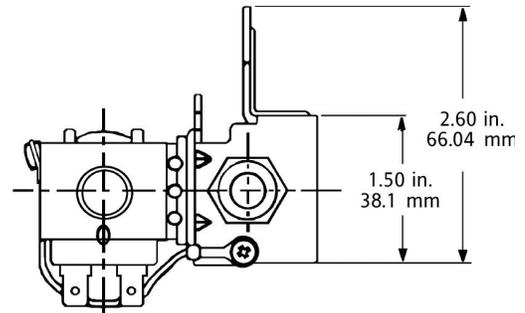
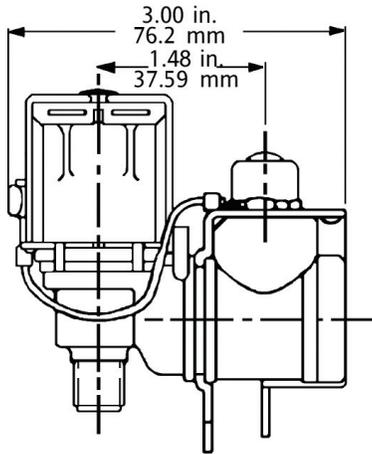
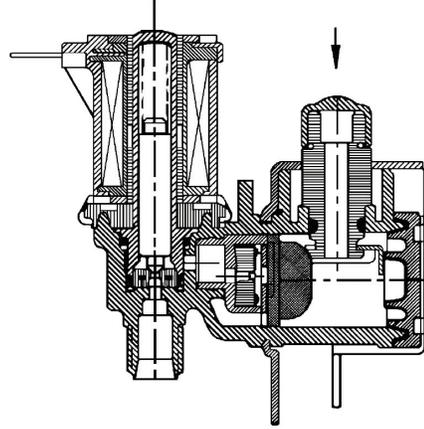
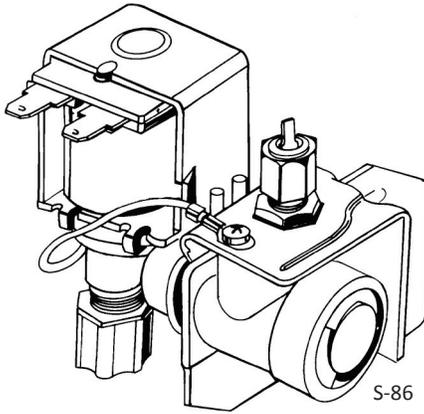




# WATER VALVES

Robertshaw®

## Product Drawings

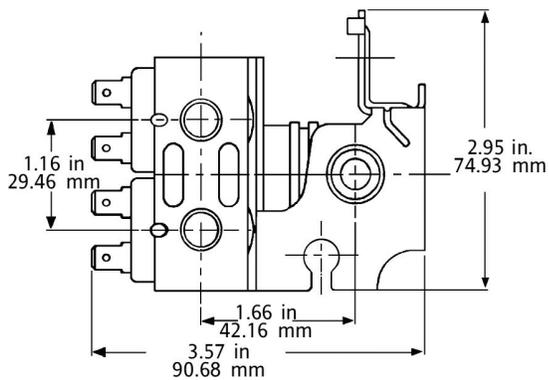
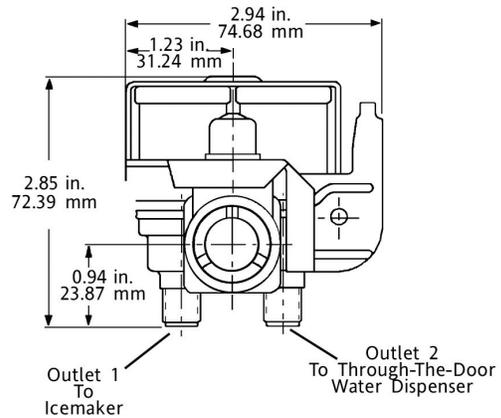
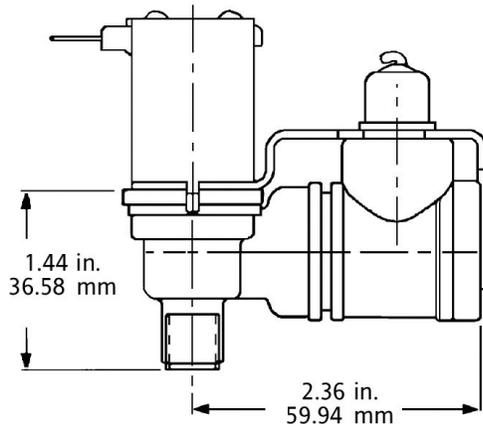
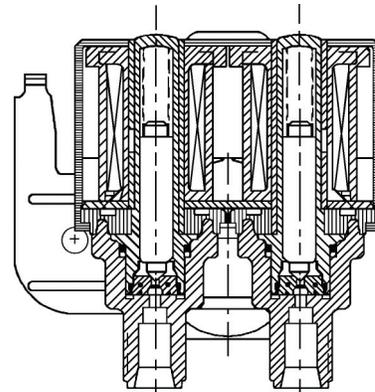
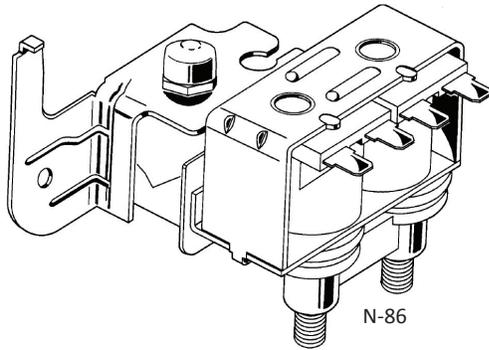


# WATER VALVES



Robertshaw®

## Product Drawings





# WATER VALVES

Robertshaw®



IMV-1401

## DIRECT ACTING SOLENOID WATER VALVES

### S-55 Series

The Robertshaw® S-55 Water Valve Series is designed to prevent foreign material from interfering with the drain function in automatic dishwashers and commercial icemakers.

### Features and Benefits

- Direct acting solenoid valves provide high flow at low head pressure
- Encapsulated coil provides high mechanical and dielectric strength, and is moisture resistant
- Bodies are made of polypro to withstand a variety of harsh water conditions
- Suitable for applications using water at temperatures up to 160°F (71°C)

### Replacement Information

Part Numbers	Replaces	Factory Number
IMV-1401	Scotsman 11051401	K-55017-9
IMV-1402	Scotsman 11051402	K-55017-11

### Specifications

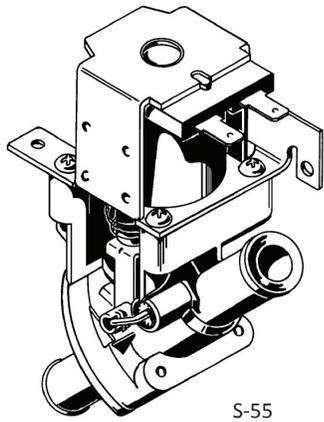
Part Numbers	Description	Flow Rate	Inlet	Outlet	Operating Pressure	Terminals	Body Material	Electrical Rating	Power
IMV-1401	Commercial Ice Machine Water Valve S-55	NA	1 1/16" ID Hose	5/8" ID Hose	0 PSI to 7 PSI	1/4" Male	Polypro	208/230V AC 60 Hz	38 Watts
IMV-1402	Commercial Ice Machine Water Valve S-55	NA	1 1/16" ID Hose	5/8" ID Hose	0 PSI to 7 PSI	1/4" Male	Polypro	120V AC 60 Hz	28 Watts



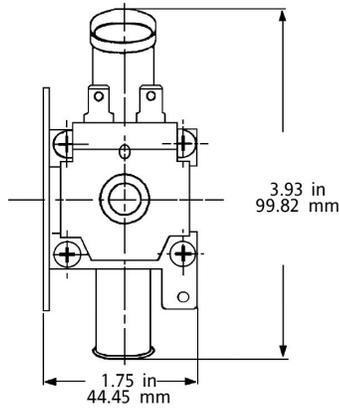
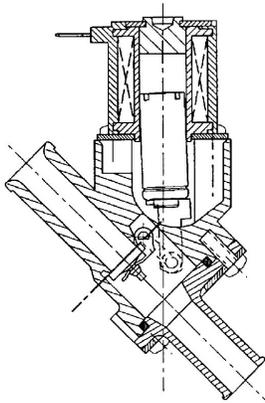
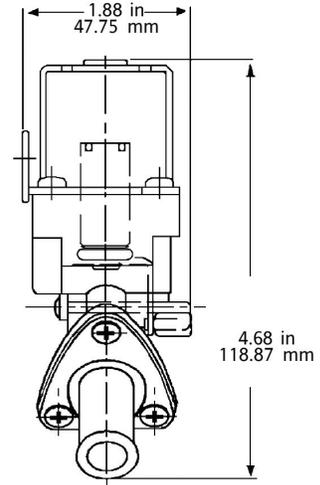
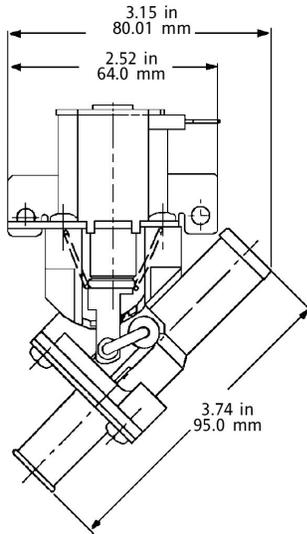
# WATER VALVES



## Product Drawings



S-55



*Robertshaw*<sup>®</sup>

**1** Year  
Limited  
Warranty



# WATER VALVES

Robertshaw®



CB-880

## GRAVITY-FED DUMP WATER VALVES

### GS-56 Series

The Robertshaw® GS-56 Water Valve Series is designed to dispense water in coffee and other hot beverage vending machines. This direct acting, gravity-fed dump valve is capable of providing low volume liquid flow at a minimum head pressure and a water temperature of 200°F (93°C).

### Features and Benefits

- Vent tube
- External flow adjustment screw slotted or hex
- Polysulfone body material for good chemical resistance and high temperature stability
- Maximum water temperature is 200°F (93°C)

## Replacement Information

Part Numbers	Replaces	Factory Number
CB-102	Grindmaster 61102	K-56778-41
CB-116	Bunn-O-Matic 26116002	K-56778-51
CB-880	Wilbur Curtis WC880E	K-56778-35

## Specifications

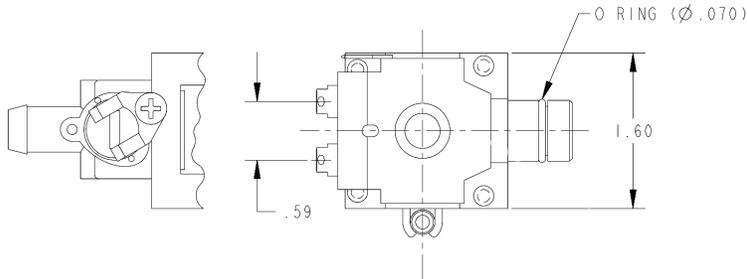
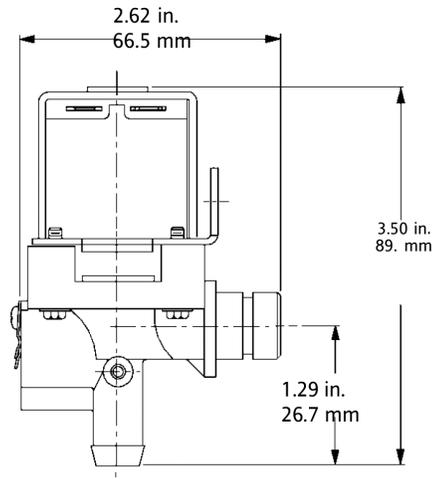
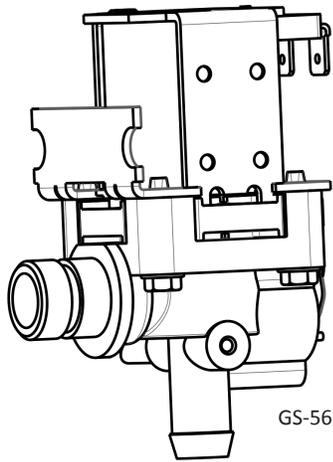
Part Numbers	Description	Flow Rate	Inlet	Outlet	Operating Pressure	Terminals	Body Material	Electrical Rating	Power
CB-102	Commercial Coffee Brewer Water Valve GS-56 with Venting Elbow	1.43 GPM	5/8" OD with O ring groove	1/2" ID Hose	20" Head	1/4" Male	Polysulfone	120V AC 50/60 Hz	12 Watts
CB-116	Commercial Coffee Brewer Water Valve GS-56	1.43 GPM	5/8" OD with O ring groove	1/2" ID Hose	20" Head	1/4" Male, Bent Down 90°	Polysulfone	120V AC 50/60 Hz	12 Watts
CB-880	Commercial Coffee Brewer Water Valve GS-56	1.43 GPM	5/8" OD with O ring groove	1/2" ID Hose	20" Head	1/4" Male	Polysulfone	120V AC 50/60 Hz	12 Watts



# WATER VALVES



## Product Drawings



**Robertshaw**<sup>®</sup>

**1** Year  
Limited  
Warranty





# WATER VALVES

Robertshaw®



DW-952

## GENERAL PURPOSE WATER VALVES

### S-45 Series

The Robertshaw® S-45 Water Valve Series is designed as a general purpose valve for energy conserving plumbing and heating applications.

### Features and Benefits

- Pilot-operated design provides flow capacity with minimum power requirements
- Serviceable strainer incorporated for the protection of both the valve and the appliance
- Encapsulated coil provides high mechanical and dielectric strength, and is moisture resistant
- UL requirements met for intermittent duty operation
- Suitable for applications using water at temperatures up to 160°F (71°C)

## Replacement Information

Part Numbers	Replaces	Factory Number
DW-952	Moyer Diebel 504952	K-62687-44
IMV-001	Scotsman 12-2990-01	K-62687-128
PL-849	Sloan Valve 0305849	K-77634

## Specifications

Part Numbers	Description	Flow Rate	Inlet	Outlet	Operating Pressure	Terminals	Body Material	Electrical Rating	Power
DW-952	Commercial Dishwasher Water Valve S-45	Up to 5 GPM	3/8" 18 FNPT	3/8" 18 FNPT	20 PSI to 120 PSI	1/4" Male	Brass	120V AC 50/60 Hz	10 Watts
IMV-001	Commercial Ice Maker Water Valve S-45	0.19 GPM	3/8" 18 FNPT	3/8" ID Hose	20 PSI to 120 PSI	1/4" Male	Brass	120V AC 60 Hz	15 Watts
PL-849	Commercial Plumbing Water Valve S-45	NA	3/8" 18 FNPT	3/8" 18 FNPT	20 PSI to 120 PSI	1/4" Male	Low Lead Brass	24V AC 50/60 Hz	7 Watts

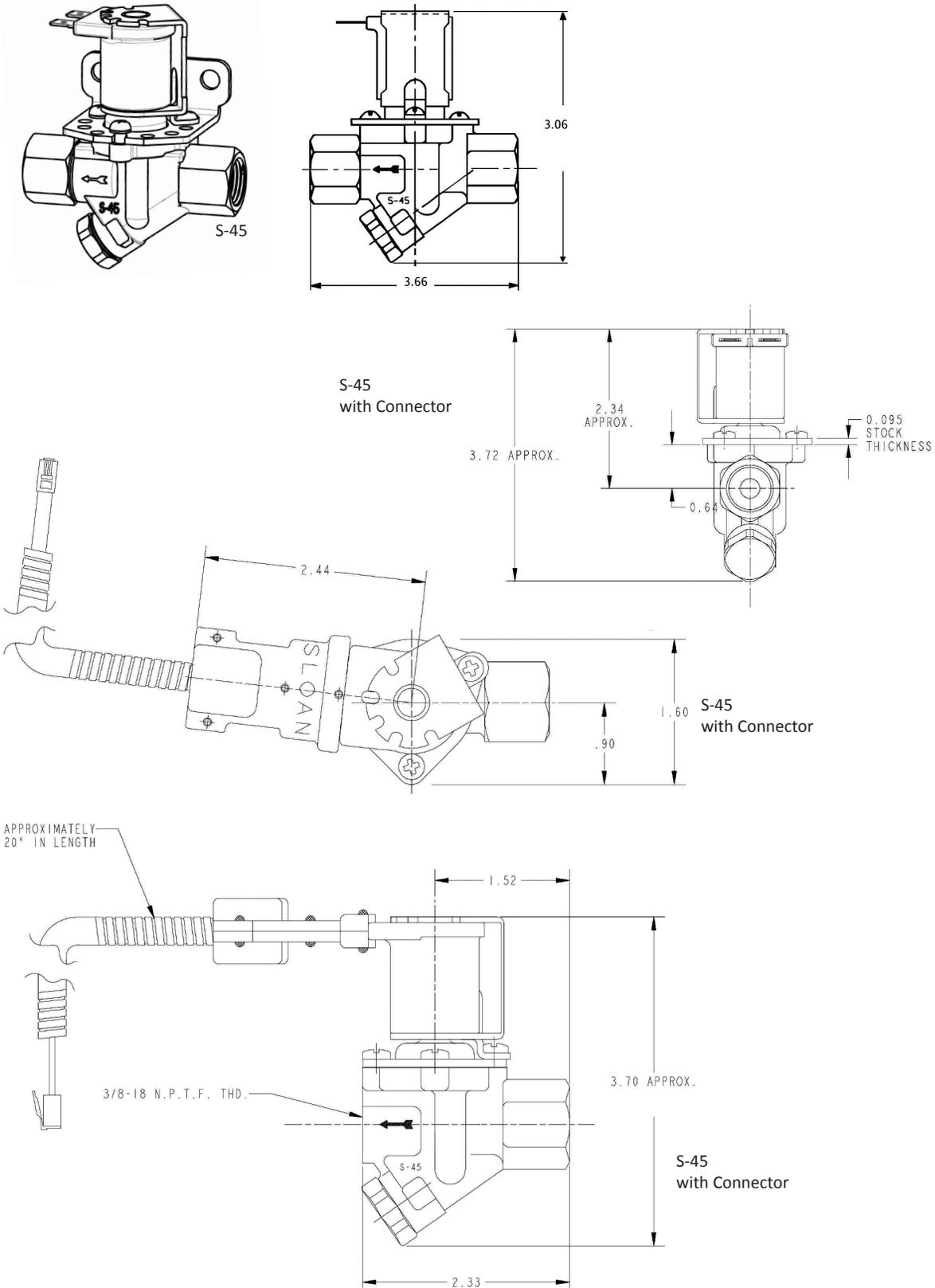


# WATER VALVES



*Robertshaw*<sup>®</sup>

## Product Drawings





# WATER VALVES

Robertshaw®



V180

## GENERAL PURPOSE WATER VALVES

### V Series

The Robertshaw® V180 and V280 Water Valve Series is designed for use in clotheswashers, dishwashers, showers, air conditioning systems and other domestic or commercial applications.

Flexible and designed and produced to meet the stringent requirements of the markets of today and the future.

### Features and Benefits

- Easy to rotate, coil to match OEM application
- Flexible mounting with four different positions
- Hose connection
- Conversion kit with bracket, screen, popular flow controls, and terminals
- IEC certified

### Specifications

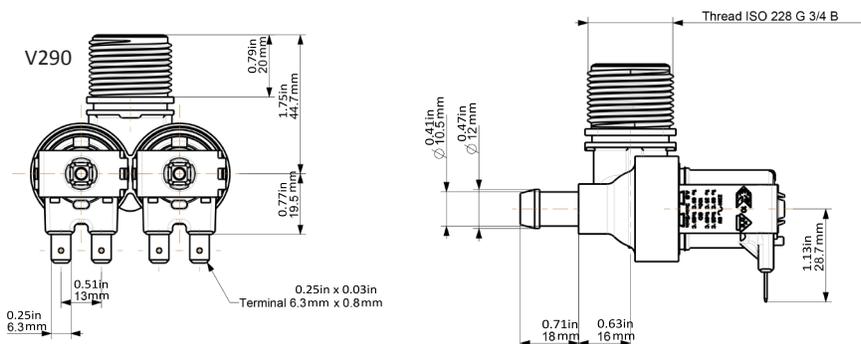
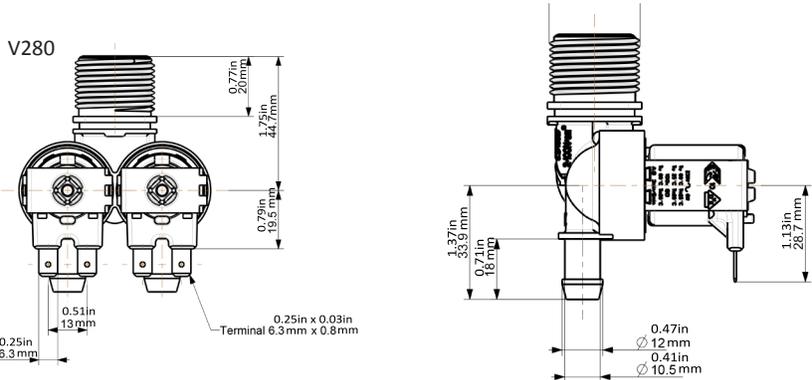
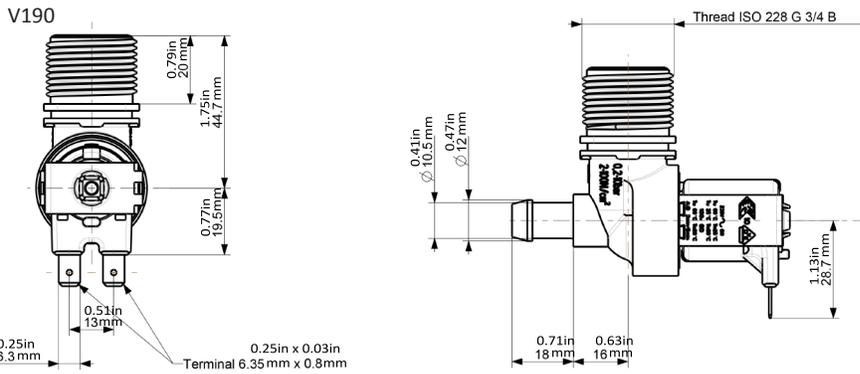
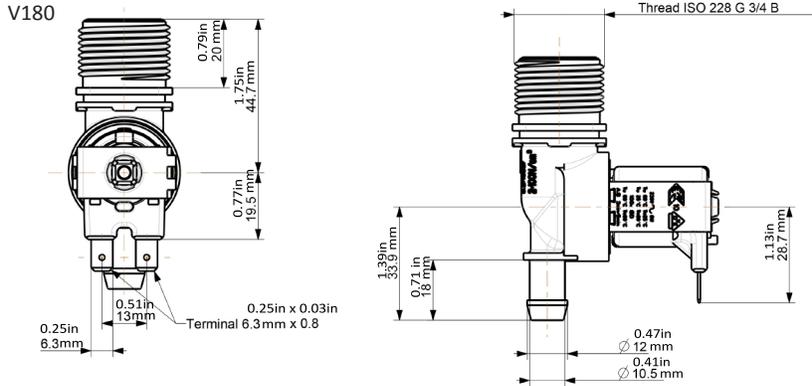
Part Numbers	Description	Flow Regulator	Inlet	Outlet	Operating Pressure	Terminals	Body Material	Thermistor	Outlet Orientation	Electrical Rating	Power
V180 (EU)	Clotheswasher and Dishwasher inlet water valve kit	2.5L/min, 8.0L/min, 10.0L/min	Thread ISO 228 G 3/4 B	10mm	0.02-1 Mpa	6.35mm Male	Polyamide	NA	90°	230V AC 50/60 Hz	6 Watts
V190 (EU)	Clotheswasher and Dishwasher inlet water valve kit	2.5L/min, 8.0L/min, 10.0L/min	Thread ISO 228 G 3/4 B	10mm	0.02-1 Mpa	6.35mm Male	Polyamide	NA	180°	230V AC 50/60 Hz	6 Watts
V280 (EU)	Clotheswasher and Dishwasher inlet water valve, dual kit	2.5L/min, 8.0L/min, 10.0L/min	Thread ISO 228 G 3/4 B	10mm	0.02-1 Mpa	6.35mm Male	Polyamide	NA	180°	230V AC 50/60 Hz	6 Watts
V290 (EU)	Clotheswasher and Dishwasher inlet water valve, dual kit	2.5L/min, 8.0L/min, 10.0L/min	Thread ISO 228 G 3/4 B	10mm	0.02-1 Mpa	6.35mm Male	Polyamide	NA	90°	230V AC 50/60 Hz	6 Watts

# WATER VALVES



**Robertshaw**<sup>®</sup>

## Product Drawings



**1** Year Limited Warranty

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<b>G</b>		O10-1408 .....	D29
G1401-00 .....	D17	O10-1409 .....	D29
G1401-20 .....	D17		
G1401-21 .....	D17	O10-1410 .....	D29
		O10-1416 .....	D29
<b>I</b>		O10-1418 .....	D29
IMV-001 .....	G22	O10-1483 .....	D30
IMV-003 .....	G10	O10-2054 .....	D31
		O12-1502 .....	D33
		O12-1506 .....	D33
		O12-1549 .....	D33
		O12-4154 .....	D33
		O12-4833 .....	D33
		O12-4834 .....	D33
		O12-4860 .....	D33
		O12-4900 .....	D33
		O12-4902 .....	D33
		O16-107 .....	D30
		O16-108 .....	D31
		O16-200 .....	D31
		O16-527 .....	D30
		O16-528 .....	D30
		O16-530 .....	D31
		O16-531 .....	D31
		O16-624 .....	D30
		O16-636 .....	D29
		O16-637 .....	D29
		O16-638 .....	D30
		O16-639 .....	D29
		O16-640 .....	D29
		O16-641 .....	D29
		O16-642 .....	D29
		O16-643 .....	D29
		O16-6930 .....	D29
		O16-6950 .....	D29
		O16-6951 .....	D29
		O16-6954 .....	D29
		O16-6980 .....	D29
		O16-6981 .....	D29
		O16-8705 .....	D30
		O16-8706 .....	D30
		O16-8713 .....	D30
		O16-8750 .....	D31
		O16-8751 .....	D31
		O16-8900 .....	D29
		O17-8701 .....	D33
		O17-8703 .....	D33
		O17-8705 .....	D33
		O17-8711 .....	D33
		O18-100 .....	D34
		O20-7006 .....	D31
		O60-100 .....	D29
		<b>P</b>	
		P30-3601 .....	D27
		P30-3701 .....	D27
		P30-3702 .....	D27
		P30-3801 .....	D27
		P30-5826 .....	D27
		P30-5839 .....	D27
		P30-5848 .....	D27
		P47 .....	B7
		PL-849 .....	G22
		PS801 .....	F23
		PS802 .....	F23

PS803.....	F23	V280 .....	G24
PS984-1R .....	F21	V290 .....	G24
PS986-1R .....	F21	VA-2 .....	D23
PS988-1R .....	F21	VA200000000 .....	D23
PS2110.....	F13	VB7 .....	D23
PS2210.....	F13	VB700000000 .....	D23
PS2703-022 .....	D41	VC1 .....	D23
PS3110.....	F15	VC100000000 .....	D23
PS3210.....	F15	VF3 .....	D23
PS4000.....	F17	VF300000000 .....	D23
PS5000.....	F19	VL1.....	D23
PS-R-01 .....	F26	VL2.....	D23
PS-R-02 .....	F26	VL3.....	D23
<b>S</b>		VL4.....	D23
SMART 1000 .....	F5	VL5.....	D23
SMART 2000 .....	F3	VL7.....	D23
SMART 3000 .....	F7	VL9.....	D23
SMART 4000 .....	F11	VL100000000.....	D23
SMART 5000 .....	F9	VL200000000.....	D23
SMART-M-04 .....	F25	VL300000000.....	D23
SMART-R-01H .....	F25	VL400000000.....	D23
SMART-R-01V .....	F25	VL500000000.....	D23
SMART-R-02.....	F25	VL700000000.....	D23
SMART-R-03.....	F25	VL900000000.....	D23
SMART-R-05.....	F25	VP4 .....	D23
SMART-R-06.....	F25	VP4A.....	D23
ST10-80K.....	C16	VP4A0000000 .....	D23
ST10-90K.....	C16	VP400000000 .....	D23
ST12-70K.....	C16	VR-6.....	D23
ST12-80K.....	C16	VR-600000000.....	D23
ST13-70K.....	C16	VS-5 .....	D23
ST22-60K.....	C16	VS-500000000 .....	D23
ST22-80K.....	C16	VT9 .....	D23
<b>T</b>		VT93 .....	D23
THE-0027AU .....	B2	VT900000000 .....	D23
THE-0029AU .....	B2	VT9300000000 .....	D23
THE-SUL180A.....	B3	VX0 .....	D23
THE-SYN161D .....	B3	VX000000000.....	D23
THETR608TOP2.....	B4	<b>W</b>	
THETR610TOP2.....	B4	W220 .....	B8
TU40 .....	B9	<b>Y</b>	
<b>U</b>		Y-30128-AF35 .....	A30
UBV03221-01 .....	E3		
UCV-118-01 .....	E3		
UNI-KIT360 .....	C19		
UPC-RC-C.....	E13		
UPC-RS-H.....	E12		
<b>V</b>			
V2-4100F0-370 .....	D36		
V2-408060-170.....	D36		
V2-408060-270.....	D36		
V2-410060-470.....	D36		
V3-410080-770.....	D36		
V3-412080-870.....	D36		
V6-412080-170.....	D36		
V6-414080-170.....	D36		
V10-414080-170.....	D36		
V10-418140-170.....	D36		
V12-4220T0-270.....	D36		
V180 .....	G24		
V190 .....	G24		

## TIPS ON SELECTING A REPLACEMENT GAS VALVE

**Safety Warning:** Any work on gas valves or equipment should be performed by a qualified service technician only. Please do not attempt any repairs or replacement if you are not qualified. Serious injury can occur from improper installation or usage.

**Disclaimer:** The cross references provided in this catalog are intended to be functional equivalents and not exact matches of products listed. Robertshaw assumes no liability in connection with the information contained herein and makes no representations regarding the accuracy of any such information. Final selection of a replacement product is the sole responsibility of the buyer.

### GAS VALVE SELECTION CHECKLIST GUIDELINES

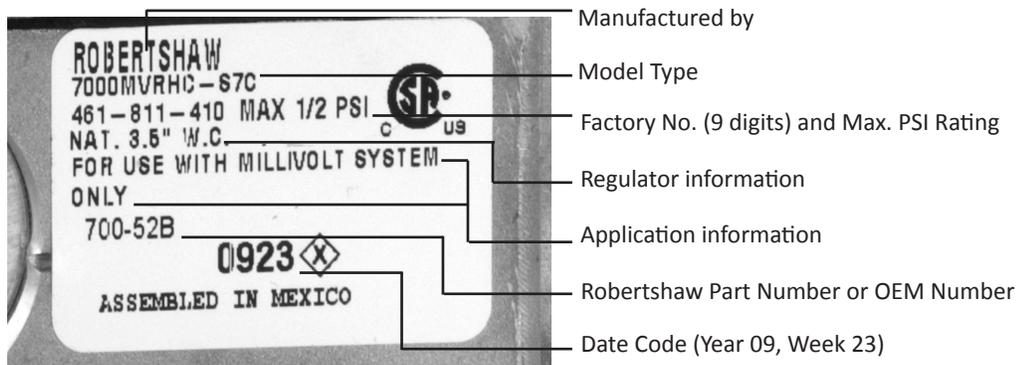
Always check the following with any gas valve retrofit application:

1. Check capacity
2. Check inlet and outlet sizes
3. Determine if the valve is non-regulated
  - a. Check if the pressure regulator requires adjusting
4. Determine if the replacement requires straight-thru
5. Determine if the application is LP or Natural Gas
  - a. For LP gas, a separate pressure regulator may be required
6. Determine if the pilot needs to be plugged
7. Determine if the valve is slow opening
8. Determine if a transformer is required
9. Determine if the replacement shaft and hub will require assembly
10. Check OEM and replacement manuals for proper installation instructions

### HOW TO READ AND INTERPRET A GAS VALVE LABEL

To identify your valve type, locate the red or white factory label on the valve body.

**Note:** It is essential to write down the nine digit factory number correctly.



An OEM valve may have an OEM part number instead of the Robertshaw part number. The cross reference on the following pages will cross most nine digit factory numbers or OEM part numbers to the Robertshaw numbers.

Gas valves with white labels are usually manufactured to be used on natural gas applications. Red labels indicate the valves are usually manufactured to be used on LP gas applications.

Any additional characters after the nine digit factory number are used for shipping purposes and should be ignored when cross referencing.

## FACTORY MODEL CODE IDENTIFICATION

Factory Model Number			DESCRIPTION
7000	2000	7200	
•			<b>A</b> Unitrol 7000 Body with small diameter valve seat. 100,000 BTU
•			<b>B</b> Unitrol 7000 Body with large diameter valve seat. 240,000 or 300,000 BTU
•			<b>BB</b> Unitrol 7000 Body with medium diameter valve seat - Intrinsicly "non-hunting"
•			<b>7010</b> Unitrol 7000 Body without a gas cock
•			<b>CSTR</b> Convertible Hydraulic Actuator - From natural to LP gas
•	•	•	<b>D</b> Solenoid Valve - Pilot Gas - Single coil operated on AC
•	•	•	<b>E</b> Electric Actuator - 24V AC
•			<b>E12</b> Electric Actuator - 12V AC
•	•	•	<b>E120</b> Electric Actuator - 120V AC
•		•	<b>E240</b> Electric Actuator - 240V AC
•			<b>EH</b> Electric Heat Motor Actuator (obsolete)
•			<b>EM</b> Electric Actuator with manual override (obsolete)
•			<b>ESTR-SS</b> Electric Solid-State Actuator (obsolete)
•			<b>F</b> Factory Fixed (not adjustable regulator setting) (3.5° to 5.0° WC)
•			<b>GO</b> Bleed Gas Operated Actuator
•			<b>GS</b> Gas Cock Safety - with gas cock and safety valve - no main valve
•			<b>GV</b> Gas Valve without a safety valve - No Safety Magnet
•			<b>-1H</b> Remote dual hydraulic type - dual bellows
•	•		<b>HC</b> High Capacity Body
•			<b>HHC</b> High Capacity Body AGA rated for side ways or vertical mounting. Can be replaced by HC model
•	•	•	<b>IPER</b> Intermittent Pilot Ignition Gas Valve - regulated
•			<b>L</b> Relight Interlock type. A European requirement
•	•		<b>LC</b> Low Capacity Body - 710 Series
•	•	•	<b>LP</b> For Liquefied Petroleum Gases
•			<b>M</b> Manual Actuator
•			<b>MS</b> Millivolt Safety Magnet - uses thermopile type safety
•			<b>MV</b> Millivolt Actuator
•		•	<b>P</b> Pulse Combustion
•	•	•	<b>R</b> Regulator Type
•		•	<b>RS</b> Adjustable (High - Low) pressure regulator adjusts percentage of output. -3 = 50% of full flow -4 = 60% of full flow -5 = 70% of full flow -6 = 80% of full flow

Factory Model Number			DESCRIPTION
7000	2000	7200	
•			<b>RB</b> High/Low
•	•	•	<b>RC</b> Convertible regulator from natural gas to LP and back
		•	<b>RN</b> Negative Pressure Regulator
•			<b>R1</b> Class I and II Natural Gas Pressure Regulator
•	•	•	<b>R2</b> Two-Stage pressure regulator valve opens to percentage of full flow as indicated by the number -1 = 30% of full flow -2 = 40% of full flow -3 = 50% of full flow -4 = 60% of full flow -5 = 70% of full flow -6 = 80% of full flow
•			<b>S</b> Hydraulic Snap-Acting Actuator - non regulated
		•	<b>S0</b> Step-opening regulated with factory fixed setting 30 seconds max. To full flow: -1 = 30% of full flow -2 = 40% of full flow -3 = 50% of full flow -4 = 60% of full flow -5 = 70% of full flow
•			<b>SR</b> Hydraulic Regulated Snap-Acting Actuator
•			<b>ST</b> Hydraulic Snap - Throttle Actuator, but set-up for use on a specific gas; natural gas only or LP gas only. Non-regulated number indicates percentage of By-Pass flow. -1 = 30% of full flow -2 = 40% of full flow -3 = 50% of full flow -4 = 60% of full flow -5 = 70% of full flow
•			<b>STR</b> Hydraulic Snap-Throttle Actuator, regulator number indicates percentage of By-Pass flow. -2 = 40% of full flow -3 = 50% of full flow -4 = 60% of full flow -5 = 70% of full flow
•	•	•	<b>S7</b> Slow Opening devices with either a plastic body or a metal body Orifice Valve Assembly A = 0 to 5 seconds to full flow B = 5 to 10 seconds to full flow C = 10 to 30 seconds to full flow
•			<b>S13</b> Slow Opening Control with .0135 orifice in body, but no other "Slow Opening" device. 0 to 5 seconds to full flow.
•			<b>S36</b> Slow Opening Control with two .018" orifices - one in Body and one in Cover, but no other Slow Opening device. 5 to 10 seconds to full flow.

## GAS VALVE CROSS REFERENCE FOR UNI-LINE® PARTS

Factory Number	Uni-Line Number	Factory Number	Uni-Line Number	Factory Number	Uni-Line Number
110ER	120-402	7000BDER-S7A	700-056	7000BMSM	700-185
110ERCHC	120-407	7000BE	700-405	7000BMV	700-503
110ERCHC20-2E	120-472	7000BE	700-401	7000BMV	700-505
110ERCHCS0-2C	120-474	7000BE-120	700-451	7000BMVR	700-510
110ERCHCS0-2D	120-473	7000BE-120	700-453	7000BMVR	700-504
110S	120-204	7000BE-240	700-461	7000BMVR	700-508
110S	120-201	7000BE-240	700-463	7000BMVR	700-506
110S	120-200	7000BER	700-402	7000BMVR-LP	700-515
110SR	120-202	7000BER	700-400	7000BMVR-S7C	700-511
110SS	120-203	7000BER	700-404	7000BMVR-S7C	700-512
220RLPTS8P	110-286	7000BER	700-406	7000BMVR-S7C	700-507
220RLPTS8P	110-285	7000BER-120	700-454	7000DEHC-S7C	700-058
220RLPTS8P	110-280	7000BER-120	700-452	7000DER2-HC-3-LP-S7C	700-063
220RLPTSP	110-262	7000BER2-3-LP-S7C	700-445	7000DER2-HC-4-S7C	700-064
220RLPTSP	110-270	7000BER2-4	700-446	7000DERHC	700-057
220RLPTSP	110-267	7000BER-240	700-462	7000DERHC-S7C	700-059
220RLPTSP	110-266	7000BER-240	700-464	7000EHC-120-S7C	700-455
220RLPTSP	110-265	7000BER2-HC-3-LP-S7C	700-447	7000EHC-240-S7C	700-465
220RTSP	110-202	7000BER2-HC-4	700-448	7000EHC-S7C	700-441
7000AE	700-407	7000BERC	700-412	7000ELC	710-401
7000AER	700-408	7000BER-LP	700-411	7000ERHC	700-438
7000AERB-3-LP-S7C	700-435	7000BER-LP-S7C	700-429	7000ERHC-120	700-468
7000AERB-5-S7C	700-434	7000BER-S7A	700-426	7000ERHC-120-S7C	700-456
7000AERC	700-419	7000BER-S7C	700-428	7000ERHC-240-S7C	700-466
7000AGO	700-811	7000BGOR-S7B	700-804	7000ERHC-S7C	700-442
7000AGOR	700-812	7000BGO-S7B	700-803	7000ERLC	710-402
7000AM	700-101	7000BGVE	700-423	7000ERLC	710-404
7000AMR	700-102	7000BGVE	700-417	7000GOHC-S7B	700-823
7000AMSGO	700-881	7000BGVE	700-421	7000GORHC-S7B	700-824
7000AMSGOR	700-882	7000BGVE-120	700-457	7000GVEHC-120-S7C	700-459
7000AMSGOR-LP	700-888	7000BGVER	700-422	7000GVEHC-S7C	700-431
7000AMV	700-509	7000BGVER	700-424	7000GVERHC-120-S7C	700-458
7000AMV	700-501	7000BGVER	700-420	7000GVERHC-S7C	700-432
7000AMVR	700-502	7000BGVER-120	700-450	7000GVER-S7A	700-430
7000AS	700-215	7000BGVER2-3-LP-S7C	700-440	7000GVMVLC	710-513
7000AS	700-201	7000BGVER2-4	700-413	7000MHC-S7C	700-113
7000AS-1H	700-209	7000BGVER-S36	700-416	7000MLC	710-101
7000ASR	700-202	7000BGVMV	700-523	7000MRHC-S7C	700-114
7000ASR-1H	700-210	7000BGVMVR	700-524	7000MRLC	710-108
7000ASR-LP	700-216	7000BKER-S7A	700-062	7000MRLC	710-102
7000AST-3	700-203	7000BKER-S7A	700-066	7000MRLC	710-107
7000AST-3-1H	700-206	7000BKER-S7C	700-061	7000MVHC-S7C	700-521
7000AST-LP-3	700-204	7000BM	700-105	7000MVLC	710-501
7000AST-LP-3-1H	700-207	7000BMR	700-106	7000MVRB-5-LC	710-503
7000ASTR-3	700-205	7000BMSE-120-S7C	700-471	7000MVRB-5-LC	710-511
7000ASTR-3-1H	700-208	7000BMSER	700-409	7000MVRHC-S7C	700-522
7000ASTR-4	700-213	7000BMSER-120	700-472	7000MVRLC	710-508
7000ASTR-LP-4	700-212	7000BMSER-120	700-470	7000MVRLC	710-502
7000BDER2-3-LP-S7C	700-051	7000BMSER-LP-120	700-469	7000SLC	710-201
7000BDER2-4-S7A	700-053	7000BMSGO	700-885	7000SLC	710-218
7000BDER-LP-S7A	700-055	7000BMSGOR	700-886	7000SLC	710-203
7000BDER-S7A	700-052	7000BMSGOR	700-887	7000SRLC	710-205

Factory Number	Uni-Line Number	Factory Number	Uni-Line Number	Factory Number	Uni-Line Number
7000SRLC	710-204	7200DER-SO-3	720-054	7222DERC	722-053
7010BGVER	700-418	7200DER-SO-4-120	720-083	7222DER-S7A	722-052
7010BGVMV	700-517	7200E	720-401	7222IPER	722-079
7010BGVMV	700-514	7200ER	720-402	R103RCTSLP	110-506
7010BGVMV	700-513	7200ER	720-400	R103RCTSLPPA	110-503
7010BGVMV	700-513	7200ER	720-406	R103RVTSLP	110-507
7100DER	700-077	7200ER	720-404	R103RVTSLP	110-509
7100DERB-5-S02	700-078	7200ERC	720-007	R103RVTSLPP	110-502
7100DER-LP-S7C	700-073	7200ERCS-2	720-472	R103RVTSLPPA	110-505
7100DER-LP-S7C	700-071	7200ERCS-2	720-474	R103RVTSLPPA	110-501
7100DERN	700-074	7200ER-S7C	720-403	R103RVTSLPPA	110-504
7100DERP	700-076	7200IPER	720-079	R103RVTSLPPA	110-508
7100DER-S7C	700-070	7200IPER2-4	720-082	R110RCTS-PC	110-203
7100DER-S7C	700-072	7200IPER-LP	720-080	R110RCTS-PC	110-204
7200DER	720-051	7200IPER-LP-S7C	720-073	R110RTS	110-326
7200DERB-5-SO-2	720-078	7200IPER-LP-S7C	720-071	R110RTS8P	110-353
7200DERCS-1	720-055	7200IPER-S7C	720-072	R110RTSP	110-206
7200DERN	720-074	7200IPER-S7C	720-070	R65RRTP	110-268
7200DER-S7C	720-050	7200IPER-SO-4	720-081		
7200DER-S7C	720-052	7222DER	722-051		

## COMMERCIAL COOKING CROSS REFERENCE FOR UNI-LINE® PARTS

Factory Number	Uni-Line Number	Factory Number	Uni-Line Number	Factory Number	Uni-Line Number
401XM	41-224	GS-C8-060-00-00	4290-008	S-234-36	5300-175
501A	41-204	GS-J1-036-00-00	4290-020	S-23-48	5300-041
501A	41-205	INF-120-1152	5500-134M	S-384-36	5300-114
501A	41-209	INF-120-1152	5500-135M	SA-245	5300-017
7000BGOR-S7B	700-804	INF-240-1153	5500-234M	SA-382-36	5300-017
7000BMSGOR	700-886	INF-240-1153	5500-235M	SJ-157-36	5300-146
7000BMSGOR	700-887	INF-240-597	5500-202M	SJ-328-36	5300-146
BJWA25PB-02-48	4350-015	INF-240P-1047	5500-287M	SM2	41-521
BJWA25PC-09-36	4350-028	INF-240P-1148	5500-212M	SP-184-60	5300-612
BJWA25PD-10-48	4350-040	INF-240PX-803	5500-200M	SP-186-60	5300-614
BJWA25PM-02-48	4350-127	KA-601-36	5300-015	SP-191-60	5300-618
BJWA25PM-03-48	4350-128	KA-601-72	5300-088	SP-192-36	5300-641
BJWA25PM-11-48	4350-027	KA-604-48	5300-027	SP-197-60	5300-651
BJWA44TC-12-36	4350-029	KNP-6-36	5300-502	SP-200-60	5300-671
D1-32-060-59-00	5000-851	KX-161-24	5300-766	SP-390-36	5300-219
D1-C5-060-59-00	5000-811	KX-299	5300-401	TS11J-1211-1-0	1720-008
EA3-44-36	5300-100	KX-396	5300-402	TS11J-1311-1-0	1720-005
FDH-1-06-48	4200-508	KX-87-36	5300-711	TS11J-3211-1-0	1720-004
FDO-1-04-48	4200-007	KXP-149-60	5300-735	TS11J-4211-1-0	1720-007
FDO-1-07-48	4200-005	LCC-36-060-00-00	5225-010	Z871470042	5210-125
FDO-3-05-54	4200-025	LCH-37-030-00-00	5225-009	Z950641100	1720-801
FDTH-1-05-48	4200-505	LCH-68-024-00-00	5225-047	Z950644100	1720-802
FDTH-1-06-48	4200-503	LCH-J6-024-00-00	5225-054		
FDTH-3-06-54	4200-026	LCHM-05-030-00-00	5225-112		
FDTO-1-05-48	4200-011	BJWA25PC-01-48	4350-027		
FJT-102-1040	4075-029	RX-1-36	5300-401		
FJTDO-13	4075-200	RX-2-24	5300-402		
GS-A6-030-18-00	4290-006	RX-6-36	5300-406		

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EFFECTIVE NOVEMBER 3, 2014

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THE TERMS AND CONDITIONS PROVIDED BELOW AND IN ANY ATTACHMENTS HERETO ARE COMPANY'S EXCLUSIVE TERMS AND CONDITIONS OF SALE, SHALL APPLY TO ALL PRODUCTS PROVIDED HEREIN, AND SHALL SUPERSEDE ANY INCONSISTENT, ADDITIONAL OR PREPRINTED TERMS AND CONDITIONS CONTAINED IN DISTRIBUTOR'S PURCHASE ORDER OR ANY OTHER DISTRIBUTOR DOCUMENT. COMPANY DOES NOT AGREE TO ANY PROPOSED ADDITION, MODIFICATION OR DELETION BY DISTRIBUTOR, OR DISTRIBUTOR'S CUSTOMERS, OF THESE TERMS OR TO ANY TERMS OR CONDITIONS SET FORTH IN DISTRIBUTOR'S OR DISTRIBUTOR'S CUSTOMER'S ORDERS. ANY SUCH TERMS AND CONDITIONS ARE HEREBY REJECTED AND CONSIDERED NULL AND VOID.

THESE TERMS AND CONDITIONS CAN BE VARIED ONLY BY A WRITTEN DOCUMENT SIGNED BY COMPANY. COMPANY RESERVES THE RIGHT TO MODIFY THESE TERMS AND CONDITIONS OF SALE AT ANY TIME WITHOUT PRIOR NOTICE TO DISTRIBUTOR. ANY REVISED TERMS AND CONDITIONS, HOWEVER, WILL ONLY AFFECT THOSE ORDERS RECEIVED BY COMPANY AFTER THE EFFECTIVE DATE OF THE REVISION.

Distributor will ensure by its contract with the end user or ultimate owner or its buyer that Company is given the benefit of these Terms and Conditions of Sale, including the exclusions and limitations of liability set forth herein, or as hereafter modified by Company, by all such users, owners and buyers and Distributor will indemnify Company, its officers, directors, shareholders, employees, agents and representatives against any actions, claims, demands, liabilities, damages, losses, costs and expenses including, but not limited to, attorneys and expert witness fees, to the extent that Company would not be liable to Distributor under these Terms and Conditions of Sale if the claim had been made by Distributor. Distributor will ensure that these Terms and Conditions of Sale for the Products are transmitted to its end customer(s) upon resale or transfer of the Product. Accordingly, except as to those terms in Sections I, Distributor Recognition; II, Ordering Information; III, Pricing; IV, Payment Terms; V, Freight and Delivery Terms; VI, Inspection and Acceptance; and VIII, Return Material Authorization, which are exclusive to Distributor, any reference to "Distributor" in these Terms and Conditions shall also include Distributor's customers, transferees, assigns, affiliates, or whoever else takes control or possession of the Product.

## I. DISTRIBUTOR RECOGNITION

- A. Recognition as a non-exclusive Company distributor is based upon market coverage, product knowledge, and general effectiveness in representing specific Products supplied by Company. Distributor acknowledges that Company may sell directly or to any third party that Company selects as and when Company so desires in its sole and absolute discretion. Distributor represents to Company that Distributor is engaged in business solely as a stocking distributor and its primary customers for Company's Products are HVACR contractors and others who directly engage in the installation and servicing of environmental controls, heating, ventilation and air conditioning controls and equipment. Distributor acknowledges that Company's Products are designed for specific applications and Distributor agrees it shall not market, resell, distribute, or recommend the use of any of Company's Products in any application where the use of the Product is not as intended or designed by Company or does not conform to Company's specifications for use, and shall indemnify Company, its officers, directors, shareholders, employees, agents and representatives for all such unauthorized use. Company shall have no responsibility, and/or liability and the Product Warranty set forth herein shall be void, if Distributor uses or recommends the use of any Product for any application for which it is not intended or designed.
- B. Distributor agrees that Company's arrangement with Distributor can be terminated by Company with or without cause, upon fourteen (14) days notice unless otherwise agreed in writing by Company and Distributor. In the event of termination, all of the goodwill and other proprietary and intellectual rights in and to Company's Products shall remain the sole property of Company. Distributor will not be entitled to any compensation or payments including, but not limited to, expenses, lost profits, sales or revenue, loss of goodwill or otherwise, as a result of Company's termination.
- C. Distributor agrees to provide a credit application and Tax Resale Certificate, if applicable, to Company's Credit Department to obtain credit approval in order to set up Distributor's account. Distributor also agrees to periodically furnish Company, at Company's request, updated financial information. Recognized distributors must maintain minimum annual net purchases of \$5,000 USD or CND, respectively.

## II. ORDERING INFORMATION

- A. Company will only accept orders from its recognized Distributors, or the Distributor's recognized branches. Possession of Company's product catalog or Price Schedule does not constitute authority or right to purchase items directly from Company.
- B. To submit orders, please fax order to:

USA and Canada	800.426.0804
International	951.737.8261
- C. Orders must state Distributor's account number, ship to address, catalog part number, item description, quantity ordered and unit price. Orders will not be processed without this information confirmed in writing by Distributor.
- D. Order changes by Distributor must be made in writing, or verified in writing, before Company can complete processing of the order, and shall be subject to the terms of Section V below.
- E. All Products may be combined in a single order for best pricing and freight terms.
- F. Products carrying the footnote "@" are only available in the multiples shown. Some items are also noted with a required minimum purchase quantity that must be followed. Company reserves the right to increase the order quantity in compliance to item minimums and multiples without authorization by Distributor or to refuse to accept the order.
- G. A minimum net billing of \$100 USD or CND, respectively, per order, per branch drop shipment applies (excluding freight and/or applicable taxes).
- H. Orders will only be accepted for shipment to one destination. Portions of orders for shipment to other addresses will be considered separately for pricing, freight, and item minimum and multiple requirements.
- I. Drop shipments to destinations other than a recognized Distributor's address, or its recognized branch address, will require approval based solely at the discretion of Company. If approved, additional charges may apply. Standard order terms and requirements will apply.
- J. Nothing in these Terms and Conditions of Sale requires or is intended to require Company to accept any purchase order from Distributor, and Company shall have no liability to Distributor or to any third party in the event Company decides not to accept any order.
- K. All orders are final once shipped to Distributor.

# TERMS AND CONDITIONS OF SALE - NA, SA, ANZ

## III. PRICING

- A. PRICES ON ALL ORDERS ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE AT ANY TIME. Written notification of pending price increases will be made in advance of the effective date of the price change, whenever practicable. Except where prices are specifically designated in Company's quotation as "Firm" for a specified period of time, all Products shipped on or after the effective date of a price change will be invoiced at the new price level. Company reserves the right to make price changes during the term of an existing Agreement (unless expressly agreed otherwise in such Agreement) or any blanket orders. Company's Policy and Distributor Price Schedule may be electronically downloaded in their current versions through Company's online literature service at [www.Robertshaw.com](http://www.Robertshaw.com). International Distributors should contact their customer service representative for current Price Schedules.
- B. Prices do not include any applicable taxes, excises, duties, quotation fees or other government charges or surcharges that Company may be required to pay or collect under any existing or future law. Distributor agrees to pay or reimburse Company for any applicable taxes, charges or surcharges that Company or Company's agents or suppliers are required to pay. Prices may also be adjusted at any time, with or without notice, for changes in exchange rates.
- C. In the event any order submitted by Distributor to Company contains pricing not in accordance with the then-current Price Schedule, or its special quoted pricing, Company will notify Distributor of the discrepancy in price and Distributor shall correct the pricing in writing by either acknowledging the correction on a revised order confirmation, a pricing approval form, or by submitting a new order to Company. All orders shall be placed on hold until Distributor provides written acknowledgment of correct pricing.

## IV. PAYMENT TERMS

- A. Subject to Company's Credit Department approval, standard invoice payment terms are Net 30 days from date of shipment.
- B. Payments can be made either via check, certified check, money order, wire transfer, or irrevocable and confirmed letter of credit, paid to the order of the remittance name specified on the respective invoice. All billings and payments shall be in United States Dollars (USD) or CAD, respectively. International Distributor's billings and payments shall be in the agreed currency. Company may require check in advance, cash in advance, or a Letter of Credit (LOC) on international accounts, which Distributor shall furnish upon request.
- C. If Distributor's order requires check in advance, supplies and raw materials may not be purchased and Product may not be produced or shipped until payment is received and funds are cleared from the bank upon which they are drawn. In the event standard or non-standard Product is produced and funds do not clear Distributor's bank, Distributor is liable to Company for all associated costs and damages thereof including, but not limited to, price of Products already shipped (plus freight charges); finished goods; costs of work-in-progress, vendor items, raw materials and parts Company cannot return, vendor cancellation charges, if any and other costs related to the order or incurred therewith. Applicable Product lead-times will begin once funds clear.
- D. Invoices are due and payable in one installment and any portion of the price which is not paid on time shall be subject to a service charge at the lesser of one and one half percent (1-1/2%) per month (18% per annum), or the maximum rate permitted by law, from the due date until the amount is paid in full. Company shall be entitled to recover from Distributor all costs for collection, including reasonable attorneys fees and court costs, incurred by Company in connection with any amount due Company from Distributor. Company reserves the right to withhold shipments or require Distributor to provide prepayment or a check in advance if, in Company's judgment, Distributor presents a credit risk.
- E. Deductions are not allowed without prior written authorization from Company. Any invoice corrections or money owed Distributor will be issued in the form of a credit from Company to Distributor's account.

## V. FREIGHT AND DELIVERY TERMS

- A. Unless otherwise agreed by Company in writing, the delivery terms for all orders are Ex works (Company's shipping point) (EXW, Incoterms 2010).
- B. For US and Canada Distributors, regular ground freight will be prepaid by Company via carrier of Company's choice on individual orders with a minimum net value of \$2,500.00 USD or CAD, respectively, before applicable taxes, and shipping at one time to any recognized Distributor or its branch. Orders less than \$2,500.00 USD or CAD, respectively, will be prepaid by Company but will be at Distributor's expense and freight charges will be added to Distributor's invoice.
- C. Unless otherwise agreed by Company in writing, international Distributor's freight will be prepaid by Company via carrier of Company's choice and freight charges will be added to Distributor's invoice.
- D. If Distributor requests and Company agrees, in its sole discretion, to arrange for shipment of Products as an accommodation to Distributor, Distributor must furnish Company with Distributor's carrier account number and carrier information. All freight, storage, insurance or other costs of shipment shall be paid by Distributor and, if advanced by Company, shall be added to Distributor's invoice.
- E. Distributor may request to pick up Product at Company's distribution facility site and Company may honor such request, in its sole discretion, provided Distributor notifies Company's Customer Service Department at least forty-eight (48) hours in advance of the pick-up date and Company confirms such request in writing within twenty-four (24) hours of Distributor's notice. In no event may Distributor pick up Product unless Distributor has received written confirmation from Company allowing such pick up.
- F. Company agrees to use commercially-reasonable efforts to meet delivery schedules requested by Distributor, but shall have no liability for failure to do so for any reason.
- G. Company reserves the right to select the manner in which the Product is packaged. Quoted prices include regular packing. Special requirements for packing will be subject to extra charges, unless otherwise agreed by Company in writing.
- H. Orders acknowledged by Company may not be canceled or amended, or deliveries deferred by Distributor, except with Company's prior written consent, and then only upon such terms as shall be acceptable to Company. In the event of order cancellation, in whole or in part, Distributor shall be liable to Company for all costs and damages arising from or related to such cancellation including, but not limited to, price of Products already shipped (plus freight charges finished goods; costs of work-in-progress, including vendor items, raw materials and parts Company cannot return, vendor cancellation charges, if any and other documented costs related to the order.
- I. Title and risk of loss to all Products shall pass to Distributor upon delivery by Company to a carrier at Company's shipping point.
- J. Export/Import and Code of Conduct Compliance. If Distributor distributes Company's Product outside the United States, Distributor shall be responsible for compliance with all applicable export, re-export and import control laws and regulations imposed on the Product; any related technical information by the United States government or by any foreign country; trade sanctions and embargo laws, regulations, rules, licenses, orders and requirements including, but not limited to, the U.S. Export Administration Regulations, rules and regulations administered by the U.S. Treasury Department's Office of Foreign Assets Control, EU Regulation No. 428/2009, any regulations in force within any relevant territory, and any orders issued under the foregoing in force from time to

# TERMS AND CONDITIONS OF SALE - NA, SA, ANZ

time. Distributor shall obtain all validated governmental authorizations or licenses, as required. Upon Company's request, Distributor shall furnish statements certifying such compliance either annually or on a per-order basis and shall cooperate in any audit or inspection related to applicable export or import control laws or regulations. Distributor shall comply with the Robertshaw Supplier Code of Conduct and the Robertshaw Code of Conduct, including their Anti-Bribery provisions, copies of both of which are available upon request to Company. Distributor and shall indemnify and hold Company and its directors, officers, shareholders, employees, agents and representatives harmless for any and all liability including, but not limited to, any and all fines, penalties, losses, costs, damages or expenses (including attorneys', expert and witness fees) incurred by Company as a result of, or relating to, Distributor's noncompliance with the terms herein.

- K. Harmonized Tariff Schedule (HTS) and export classification numbers such as Schedule B, ECCN, and the like, if provided by Company, represent solely an opinion of Company. Under no circumstances shall Company be liable whatsoever for the validity or any inaccuracies therein. Distributor shall be solely responsible for ensuring the proper classifications are declared on the shipment documents and to the relevant authorities. Company urges Distributor to consult with a subject matter expert, such as an attorney or a licensed Freight Forwarder, to review and determine the correct classification for the imported/exported Products.

## VI. INSPECTION AND ACCEPTANCE

- A. Distributor shall inspect all deliveries within two (2) business days of receipt. In the event there is damage to Product or shortage of Product, Distributor shall notify the carrier and Company within the two (2) business-day period and provide a copy of the signed packing list noting the damage or shortage thereon. All other Products shall be deemed to have been finally inspected and accepted by Distributor within ten (10) days after date of invoice, unless a written notice of claim is given by Distributor to Company within the 10-day period. This ten (10) day period applies to all other discrepancies, including discrepancies in invoicing, shortage or damage, and excludes shortage in shipment caused by carrier or damaged shipment caused by carrier, as provided above, which requires two (2) business days notice. No Product subject to a claim may be returned without the prior authorization of Company. Authorized return shipments must be sent to Company accompanied by a packing slip, and include Company's Return Materials Authorization (RMA) Number, purchase order number, Company's invoice number, the number of cartons and items received, condition of cartons and any other relevant facts that would be helpful in tracing the cause of the discrepancy, and must have transportation charges prepaid.
- B. Company will verify all reports of shipping discrepancies and, where applicable, will issue a credit invoice. No prior debits will be accepted.

## VII. WARRANTY

### A. Warranty

1. Company warrants its standard Products listed in the then-current Distributor Price Schedule to be free from defects in workmanship and material under normal use and service and to perform substantially in accordance with published Company specifications (subject to reasonable tolerances) in effect at the time of acceptance of Distributor's order, for a period of twelve (12) months from the date the Product is placed in use (proof of installation is required), or eighteen (18) months from the date of manufacture, whichever occurs first (the "Warranty Period").
2. Exceptions from the Warranty stated above:  

Some Products may contain extended warranties. Please refer to the Product's documentation for specific warranty coverage, if applicable.

  - Plastic items are not warranted for failure after installation in a machine or assembly.
  - Product subjected to abuse or damage is not warranted. Abuse or damage may be indicated by, but not limited to, one or more of the following:  

Burned contacts	Abuse or tampering
Stripped threads	Missing parts
Water or fire damage	Improper installation or application
Split castings	
3. Products that fail during the Warranty Period and otherwise qualify under the terms of Company's Warranty will, in Company's sole discretion, be (i) credited to Distributor's account at Distributor's lowest net invoice amount, (ii) repaired, or (iii) replaced provided that the Products are returned to Distributor pursuant to Section VIII(B) below. Payment deductions for warranty returns are not allowed. In no event shall the warranty claim exceed the Product price allocated to the Distributor's lowest net invoice price over either the previous twelve (12) months, or since inception of an Agreement between Company and Distributor, if any, whichever is less. If a returned Product is determined by the Company, in its sole discretion, to fall under the Warranty above, and if Distributor has requested on the packing list that a replacement Product be sent to Distributor, then Company will issue a replacement Product in lieu of issuing a credit to Distributor. Company reserves the right to supply suitable substitutes for Warranty Products that are not currently in production or otherwise available. Costs of Product removal or reinstallation, including labor, are not the responsibility of Company and not included in the Warranty.
4. THIS EXPRESS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER EXPRESS OR IMPLIED WARRANTIES, GUARANTEES, OR REPRESENTATIONS, BY OPERATION OF LAW OR OTHERWISE INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, TITLE, AND FITNESS FOR A PARTICULAR PURPOSE. COMPANY SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, SPECIAL, INDIRECT OR PUNITIVE DAMAGES OF ANY NATURE WHATSOEVER INCLUDING, BUT NOT LIMITED TO, LOST SALES, LOST REVENUES OR PROFITS, LOSS OF USE, OR GOODWILL ARISING OUT OF OR RESULTING FROM THE USE OR INABILITY TO USE COMPANY'S PRODUCTS. ANY STATEMENTS OR REPRESENTATIONS MADE BY OTHER PERSONS, ENTITIES, OR ANY THIRD PARTIES ARE SPECIFICALLY DISCLAIMED AND SHALL BE NULL AND VOID.

5. THE FOREGOING REMEDY SHALL BE THE DISTRIBUTOR'S SOLE AND EXCLUSIVE REMEDY AND COMPANY'S SOLE OBLIGATION FOR FAILURE OF PRODUCT TO CONFORM TO THE WARRANTY.

### B. Return for Warranty Consideration

1. All Products to be considered for warranty must be returned to Company with freight and transportation charges prepaid.
2. Product returned to Company must be packaged in such a manner that will prevent any further damage to the Product during transit. The Warranty terms above shall not apply to any items damaged in transit.
3. An itemized packing slip, including Distributor's name and address, is required for each shipment to Company of Product(s) to be considered for warranty. The packing slip must contain a reference number, items and their quantities being returned, reason for warranty return, date of installation, date of failure, and a contact name at the Distributor in case further information is required.
4. For Distributors within North America (USA and Canada), all cartons must be clearly identified as WARRANTY PRODUCT and returned to:

USA Distributors:	Canada Distributors:
Warranty Department	Warranty Department
Robertshaw	Robertshaw
1921 Anei Circle	4060 Ridgeway Drive, Unit 14
Brownsville, TX 78521	Mississauga, ON L5L5X9

# TERMS AND CONDITIONS OF SALE - NA, SA, ANZ

For International Distributors, please contact your customer service representative for return authorization and procedures.

## C. Inspection of Product

1. Company will inspect each item to confirm that the returned Product qualifies for the Warranty in Section VII. If the inspection by Company does not disclose any defect covered by the Warranty, then Company shall notify Distributor accordingly and the Distributor has the option to request Company to scrap the Product or return it at Distributor's expense. AT COMPANY'S OPTION, COMPANY MAY SCRAP THE PRODUCT WITH NO FURTHER LIABILITY TO DISTRIBUTOR, UNLESS DISTRIBUTOR NOTIFIES COMPANY OTHERWISE WITHIN ONE (1) WEEK OF COMPANY'S NOTIFICATION.
2. In the event Distributor sends Company goods that were not manufactured and/or distributed by Company, Company will notify Distributor. Distributor has the option to request Company to scrap the product or return it at Distributor's expense. AT COMPANY'S OPTION, COMPANY MAY SCRAP THE PRODUCT WITH NO FURTHER LIABILITY TO DISTRIBUTOR, UNLESS DISTRIBUTOR NOTIFIES COMPANY OTHERWISE WITHIN ONE (1) WEEK OF COMPANY'S NOTIFICATION.

## D. Final disposition of any warranty claim shall be determined solely by Company and shall be final and binding.

## VIII. RETURN MATERIAL AUTHORIZATION (FOR NEW AND UNUSED PRODUCT RETURNS)

- A. Returns will not be accepted, nor credits given, without a factory authorized Return Materials Authorization (hereinafter "RMA"). RMAs are only issued to the original point of purchase location for current manufactured and/or distributed items that fall within the Warranty terms and have been purchased within the previous twelve months. Returns will not be accepted for special order or non-stock items (as indicated in the Price Schedule).
- B. In order to request an RMA number, Distributors must provide the invoice number, sales order number (or customer's purchase order number), the item numbers and quantities of Products they wish to return, and the reason for return to their Sales or Customer Service Representative.
- C. RMA Processing
  1. The RMA number is valid only if the Product it refers to is received at the address specified on the RMA form, freight and transportation charges prepaid, within fourteen (14) days from the date of Company's-issued authorization. Company may reject the request if Product is received after fourteen (14) days from the date of Company's-issued authorization.
  2. The Product must be received in its original saleable condition (including all accessories and inserts), in its original packaging, and undamaged. Damaged Product will not be accepted for return or replacement, even if a RMA number has been issued.
  3. Credit for the return will be based on the lowest net invoice amount for the Distributor over the last 12 months, or per the Agreement between Company and Distributor, if any, unless proof of purchase for the actual shipped Product is provided.
  4. All returns are subject to a minimum fifteen percent (15%) restock charge or \$15.00 USD, whichever is greater. Company will not accept returns that do not have a proper RMA or are sent to Company in error.

## IX. DISCONTINUED PRODUCTS

- A. Company reserves the right to discontinue distribution of any Product without notice, or substitute material or complete devices, when items ordered are not currently in production or otherwise available.

## X. PERMISSIBLE VARIATIONS

- A. Company may, prior to the delivery of Product to Distributor, make changes in the Product including, but not limited to, changes to the model, design, component parts or dimensions. In addition, Company may make any change or variation in the Product that is within industry, government or professional organization standards or specifications applicable at the time of manufacture, without notice to Distributor. Distributor hereby agrees to accept any Product that may incorporate any such changes or variations, and any increase in price resulting from such changes or variations will be for the account of Distributor.

## XI. FORCE MAJEURE

- A. Company shall not be liable for any delay or failure in performance, or for any damages suffered by the Distributor by reason of such delay, if caused or arising directly or indirectly from any act beyond Company's reasonable control including, but not limited to, acts of God; vandalism; sabotage; accidents; fires; floods; strikes or other labor disputes; mechanical breakdowns; shortages or delays in obtaining suitable parts, equipment, material, labor, power or transportation; acts of suppliers; interruption of utility services; acts of terrorism, or acts of any unit or agency of government. Any delays so occasioned shall affect a corresponding extension of Company's performance dates that are, in any event, understood to be approximate.

## XII. LIMITATION OF LIABILITY

Notwithstanding any other provision in these Terms and Conditions, Company's liability shall be limited as follows:

- A. IN NO EVENT SHALL COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, SPECIAL OR PUNITIVE DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF SALES, PROFITS OR REVENUE, LOSS OF USE, LOSS OF GOODWILL OR INCREASE IN OPERATING COSTS.
- B. IN NO EVENT SHALL COMPANY'S LIABILITY EXCEED THE AMOUNT PAID TO COMPANY FOR THE PRODUCT FOR THE QUANTITIES OF COMPANY'S PRODUCTS GIVING RISE TO ANY SUCH LIABILITY, EXCEPT WITH RESPECT TO THIRD-PARTY CLAIMS FOR PERSONAL INJURY, WHICH SHALL BE LIMITED TO COMPENSATION FOR SUCH PERSONAL INJURY.
- C. COMPANY SHALL NOT BE LIABLE TO DISTRIBUTOR FOR ANY CLAIMS, DAMAGES, EXPENSES, FEES, COSTS, LOSSES, CAUSES OF ACTION, OR SUITS WHICH ARISE OUT OF OR RELATE TO THE SALE OF PRODUCT DUE TO THE DIRECTION, NEGLIGENCE, ACT, OMISSION, OR USE OF THE PRODUCT IN A MANNER NOT SPECIFICALLY AUTHORIZED, INTENDED OR DESIGNED BY COMPANY, WILLFUL MISCONDUCT, OR OTHER FAULT OF ANY NATURE WHATSOEVER OF DISTRIBUTOR, ITS EMPLOYEES, AGENTS, SERVANTS, CUSTOMERS, OR END USERS.
- D. THE ABOVE LIMITATIONS OF LIABILITY SHALL APPLY EVEN IF COMPANY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND REGARDLESS WHETHER THE CLAIM FOR RECOVERY IS BASED ON BREACH OF WARRANTY OR CONTRACT, NEGLIGENCE, INFRINGEMENT, STRICT LIABILITY OR OTHER TORT.
- E. THE RIGHT TO RECOVER DAMAGES WITHIN THE LIMITATIONS SPECIFIED ABOVE IS THE DISTRIBUTOR'S EXCLUSIVE ALTERNATIVE REMEDY IN THE EVENT THAT ANY OTHER CONTRACTUAL REMEDY FAILS OF ITS ESSENTIAL PURPOSE.

## XIII. CONFIDENTIALITY

- A. Company's Price Schedules, quotes and any discounts contained herein are considered confidential and/or proprietary information of Company and Distributor shall in no instance share any Price Schedules or discounts, business discussions, financial information, or other confidential and/or proprietary information of Company with any other person, group, entity, or third party.

# TERMS AND CONDITIONS OF SALE - NA, SA, ANZ

## XIV. GENERAL

- A. This document shall be governed by and interpreted in accordance with the laws of the State of Illinois, USA, regardless of the laws that might otherwise govern under Illinois principles of conflicts of laws and without regard to the United Nations Convention on Contracts for the International Sale of Goods. Venue for any dispute shall be exclusively in the Circuit Court of DuPage County, the Circuit Court of Cook County, or the US District Court for the Northern District of Illinois, Eastern Division.
- B. Company and Distributor expressly agree that all terms and conditions, quotations, purchase orders and any related documents and correspondence be drafted and interpreted in the English language.
- C. In the event that any of the provisions hereof shall be held invalid, illegal, void or unenforceable, the remaining provisions shall remain in full force and effect as written.
- D. As used herein, the terms Distributor and Company include their respective heirs, executors, personal representatives, successors and assigns, including their corporate successors by purchase, merger and acquisition.
- E. Distributor may not assign its rights or obligations, or any portion thereof, without the advance written consent of Company.
- F. Paragraph headings are inserted for convenience of reference only and shall not be used in the construction or interpretation hereof.
- G. Company's failure to assert any of its rights under these Terms and Conditions of Sale shall not be deemed a waiver of such rights and shall not extend to or affect any other right Company may possess or to any subsequent or dissimilar event.
- H. These Terms and Conditions of Sale supersede any and all previously published versions issued by Company. Except where there exists a fully executed agreement between Distributor and Company, these Terms and Conditions of Sale constitute the entire agreement between Distributor and Company and supersede all previous and/or contemporaneous understandings and agreements, whether verbal or written, express or implied, relating to the subject matter herein. Any changes to these Terms and Conditions of Sale must be in writing and signed by an authorized representative of Company.

## TERMS AND CONDITIONS OF SALE - EUROPE

EFFECTIVE JANUARY 1, 2015

The following are the Terms and Conditions of Sale of Robertshaw s.r.o., a Czech Republic company (the "Company"), for those of its products it may agree to sell for distribution ("Products").

THESE TERMS AND CONDITIONS ARE COMPANY'S EXCLUSIVE TERMS AND CONDITIONS OF SALE BETWEEN COMPANY AND DISTRIBUTOR, AND SHALL APPLY TO ALL PRODUCTS ILLUSTRATED HEREIN AND SUPERSEDE ANY INCONSISTENT, ADDITIONAL, PREPRINTED OR OTHER TERMS AND CONDITIONS CONTAINED IN DISTRIBUTOR'S PURCHASE ORDER OR ANY OTHER DISTRIBUTOR DOCUMENT OR ANY DOCUMENTS DERIVED FROM THE DISTRIBUTOR'S CUSTOMERS AND COMPANY DOES NOT AGREE TO ANY ADDITION, MODIFICATION OR DELETION OF THESE TERMS AND CONDITIONS. ANY OTHER TERMS AND CONDITIONS ARE HEREBY REJECTED AND CONSIDERED NULL AND VOID. THESE TERMS AND CONDITIONS CAN BE VARIED ONLY BY A WRITTEN DOCUMENT SIGNED BY COMPANY. COMPANY RESERVES THE RIGHT TO MODIFY THESE TERMS AND CONDITIONS OF SALE AT ANY TIME WITHOUT PRIOR NOTICE TO DISTRIBUTOR. ANY REVISED TERMS AND CONDITIONS, HOWEVER, WILL ONLY AFFECT THOSE ORDERS RECEIVED BY COMPANY AFTER THE EFFECTIVE DATE OF THE REVISION.

Distributor will ensure by its contract with the end user or ultimate owner or its buyer of the Products, that Company is given the benefit of these Terms and Conditions of Sale, including the exclusions and limitations of liability set forth herein, or as hereafter modified by Company, by all such users, owners and buyers and Distributor will indemnify Company, its officers, directors, shareholders, employees, agents and representatives against any actions, claims, demands, liabilities, damages, losses, costs and expenses including, but not limited to, legal and expert witness fees, to the extent that Company would not be liable to Distributor under these Terms and Conditions of Sale if the claim had been made by Distributor. Accordingly, except as to those terms in Sections I, Distributor Recognition; II, Ordering Information; III, Pricing; IV, Payment Terms; V, Freight and Delivery Terms; VI, Inspection and Acceptance; and VIII, Return Material Authorization, which are exclusive to Distributor, any reference to "Distributor" in these Terms and Conditions shall also include Distributor's customers, transferee's, assigns, affiliates, or whoever else takes control or possession of the Product.

### I. DISTRIBUTOR RECOGNITION

- A. Recognition as a non-exclusive Company distributor is based upon market coverage, product knowledge, and general effectiveness in representing specific products supplied by Company. Distributor acknowledges that Company may sell directly or to any third party that Company selects as and when Company so desires, at Company's sole and absolute discretion. Distributor represents to Company that Distributor is engaged in business solely as a stocking distributor and its primary customers for Company's Products are "HVACR" contractors and others who directly engage in the installation and servicing of environmental controls, heating, ventilation and air conditioning controls and equipment. Distributor acknowledges that Company's Products are designed for specific applications and Distributor agrees it shall not market, resell, distribute, or recommend the use of any of Company's Products in any application where the use of the Product is not as intended or designed by Company or does not conform to Company's specifications for use, and shall indemnify Company, its officers, directors, shareholders, employees, agents and representatives for all such unauthorized use.  
  
Company shall have no responsibility and/or liability and the Product Warranty set forth herein shall be void, if Distributor uses or recommends the use of any Product for any application for which it is not intended or designed.
- B. Distributor agrees that Company's arrangement with Distributor can be terminated by Company with or without cause, upon fourteen (14) days' notice unless otherwise agreed in writing by Company and Distributor. In the event of termination, all of the goodwill and other proprietary and intellectual rights in and to Company's Products shall remain the sole property of Company. Distributor will not be entitled to any compensation or payments including, but not limited to, expenses, lost profits, sales or revenue, loss of (or Company's gain of) goodwill or otherwise, as a result of Company's termination.
- C. Distributor agrees to provide a credit application to Company's Credit Department to obtain credit approval in order to set up Distributor's account. Distributor also agrees to periodically furnish Company, at Company's request, updated financial information. Recognized distributors must maintain minimum annual net purchases of €5,000.

# TERMS AND CONDITIONS OF SALE - EUROPE

## II. ORDERING INFORMATION

- A. Company will only accept orders from its recognized Distributors, or the Distributor's recognized branches. Possession of Company's product catalog or Price Schedule does not constitute authority or right to purchase items directly from Company.
- B. To submit orders, please fax order to: +420 587 805 241
- C. Orders must state Distributor's account number, ship to address, catalogue part number, item description, quantity ordered and unit price. Orders will not be processed without this information confirmed in writing by Distributor.
- D. Order changes by Distributor must be made in writing, or verified in writing, before Company can complete processing of the order, and shall be subject to the terms of Section V below.
- E. All Products may be combined in a single order for best pricing and freight terms.
- F. Products carrying the footnote "@" are only available in the multiples shown. Some items are also noted with a required minimum purchase quantity that must be followed. Company reserves the right to increase the order quantity in compliance to item minimums and multiples without authorization by Distributor, or to refuse to accept the order.
- G. A minimum net billing of €100 per order, per branch drop shipment applies (excluding freight and/or applicable taxes).
- H. Orders will only be accepted for shipment to one destination. Portions of orders for shipment to other addresses will be considered separately for pricing, freight, and item minimum and multiple requirements.
- I. Drop shipments to destinations other than a recognized Distributor's address, or its recognized branch address, will require approval based solely at the discretion of Company. If approved, additional charges may apply. Standard order terms and requirements will apply.
- J. Nothing in these Terms and Conditions of Sale requires or is intended to require or shall be construed by Distributor as requiring Company to accept any purchase order from Distributor, and Company shall have no liability to Distributor or to any third party in the event Company decides not to accept any order.
- K. All orders are final once shipped to Distributor.

## III. PRICING

- A. PRODUCT PRICES ON ALL ORDERS ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE AT ANY TIME. Company reserves the right to make price changes during the term of any blanket orders unless prices are specifically designated in Company's quotation as "firm" for a specified period of time. Company's Policy and Distributor Price Schedule may be electronically downloaded in their current versions through Company's online literature service at [www.Robertshaw.com](http://www.Robertshaw.com). International Distributors should contact their customer service representative for current Price Schedules.
- B. Prices do not include any applicable taxes, excises, duties, quotation fees or other government charges or surcharges that Company may be required to pay or collect under any existing or future law. Distributor agrees to pay or reimburse Company for any applicable taxes, charges or surcharges that Company or Company's agents or suppliers are required to pay.
- C. In the event any order submitted by Distributor to Company contains pricing not in accordance with Company's then-current Price Schedule, or its special quoted pricing, Company will notify Distributor of the discrepancy in price and Distributor shall correct the pricing in writing by either acknowledging the correction on a revised order confirmation, a pricing approval form, or by submitting a new order to Company. All orders shall be placed on hold until Distributor provides written acknowledgment of correct pricing.

## IV. PAYMENT TERMS

- A. Subject to Company's Credit Department approval, standard invoice payment terms are Net 30 days from date of shipment.
- B. Payments can be made either via money order, wire transfer, or irrevocable and confirmed letter of credit, paid to the order of the remittance name specified on the respective invoice. All billings and payments shall be in Euros (EUR) or such other currency as Company's Sales Order Acknowledgment may provide for. Company may require cash in advance or an irrevocable letter of credit, which Distributor shall furnish upon request.
- C. Distributor's order requires payment in advance, supplies and raw materials may not be purchased and Product may not be produced or shipped until payment is received and funds are cleared from the bank upon which they are drawn. In the event standard or non-standard Product is produced and funds do not clear Distributor's bank, Distributor is liable to Company for all associated costs and damages thereof including, but not limited to: price of Products already shipped (plus freight charges); finished goods; costs of work-in-progress, vendor items, raw materials and parts Company cannot return, vendor cancellation charges (if any) and other costs related to the order or incurred therewith. Applicable Product lead-times will begin once funds clear.
- D. Invoices are due and payable in one installment and any portion of the price which is not paid on time shall be subject to a service charge equal to 2% above the EURIBOR rate from time to time in force, from the due date until the amount is paid in full (before and after judgment). Company shall be entitled to recover from Distributor all costs for collection, including reasonable legal fees and court costs incurred by Company in connection with any amount due to the Company from Distributor. Company reserves the right to withhold shipments or require Distributor to provide payment in advance if, in Company's judgment, Distributor presents a credit risk.
- E. Deductions are not allowed without prior written authorization from Company. Any invoice corrections or money owed Distributor will be issued in the form of a credit from Company to Distributor's account.

# TERMS AND CONDITIONS OF SALE - EUROPE

## V. FREIGHT AND DELIVERY TERMS

- A. Unless otherwise agreed by Company in writing, the shipment terms for all orders are Ex works (Company's premises) (EXW, Incoterms 2010).
- B. All freight, storage, insurance or other costs of shipment arising outside of an EXW arrangement shall be paid by Distributor and, if advanced by Company, shall be added to Distributor's invoice.
- C. Company agrees to use commercially-reasonable efforts to meet delivery schedules requested by Distributor and agreed to in Company's Sales Order Acknowledgment, but shall have no liability for failure to do so for any reason and time for delivery shall not be of the essence.
- D. Company reserves the right to select the manner in which the Product is packaged. Quoted prices include regular packing. Special requirements for packing will be subject to extra charges, unless otherwise agreed by Company in writing.
- E. Orders acknowledged by Company may not be canceled or amended, or deliveries deferred by Distributor, except with Company's prior written consent, and then only upon such terms as shall be acceptable to Company. In the event of order cancellation, in whole or in part, Distributor shall be liable to Company for all costs and damages arising from or related to such cancellation including, but not limited to: price of Products already shipped (plus freight charges for finished goods); costs of work-in-progress, including vendor items, raw materials and parts Company cannot return; vendor cancellation charges (if any) and other documented costs related to the order.
- F. Title and risk of loss to all Products shall pass to Distributor upon delivery.
- G. Code of Conduct Compliance. Distributor shall comply with the Robertshaw Supplier Code of Conduct and the Robertshaw Code of Conduct, including their Anti-Bribery provisions, copies of both of which are available upon request to Company. Distributor shall indemnify and hold Company and its directors, officers, shareholders, employees, agents and representatives harmless for any and all liability including, but not limited to, any and all fines, penalties, losses, costs, damages or expenses (including legal, expert and witness fees) incurred by Company as a result of, or relating to, Distributor's non-compliance with the terms therein.
- H. Harmonized Commodity Descriptions and Codes and export classification numbers if provided by Company, represent solely an opinion of Company. Under no circumstances shall Company be liable whatsoever for the validity or any inaccuracies therein. Distributor shall be solely responsible for ensuring the proper classifications are declared on the shipment documents and to the relevant authorities. It is incumbent on Distributor to consult with a trade compliance expert to review and determine the correct classification for the imported/exported Products.

## VI. INSPECTION AND ACCEPTANCE

- A. Distributor shall inspect all deliveries within two (2) business days of receipt. In the event there is damage to Product or shortage of Product, Distributor shall notify any carrier and Company within the two (2) business-day period and provide a copy of the signed packing list noting the damage or shortage thereon. Products shall be deemed to have been finally inspected and accepted by Distributor within ten (10) days after date of invoice, unless a written notice of claim is given by Distributor to Company within the 10-day period. This ten (10) day period applies to all other discrepancies, including discrepancies in invoicing, shortage or damage, and excludes shortage in shipment caused by carrier or damaged shipment caused by carrier, as provided above, which requires two (2) business days' notice. No Product subject to a claim may be returned without the prior authorization of Company. Authorized return shipments must be sent to Company accompanied by a packing slip, and include Company's Return Materials Authorization (RMA) Number, purchase order number, Company's invoice number, the number of cartons and items received, condition of cartons and any other relevant facts that would be helpful in tracing the cause of the discrepancy, and must have transportation charges prepaid.
- B. Company will verify all reports of shipping discrepancies and, where applicable, will issue a credit invoice. No prior debits will be accepted.

## VII. WARRANTY

- A. Warranty
  1. Company warrants its standard Products listed in the then-current Distributor Price Schedule to be free from defects in workmanship and material under normal use and service and to perform substantially in accordance with published Company specifications (subject to reasonable tolerances) in effect at the time of acceptance of Distributor's order, for a period of twenty-four (24) months from the date the Product is manufactured (the "Warranty Period").
  2. Exceptions from the warranty stated above: Some Products may contain extended warranties. Please refer to the Product's documentation for specific warranty coverage, if applicable.
    - Plastic items are not warranted for failure after installation in a machine or assembly.
    - Product subjected to abuse or damage is not warranted. Abuse or damage may be indicated by, but not limited to, one or more of the following:

Burned contacts	Abuse or tampering
Stripped threads	Missing parts
Water or fire damage	Improper installation or application
Split castings	
  3. Products that fail during the Warranty Period and otherwise qualify under the terms of Company's Warranty will, in Company's sole discretion, be (i) credited to Distributor's account at Distributor's lowest net invoice amount, (ii) repaired, or (iii) replaced provided that the Products are returned to Distributor pursuant to Section VIII (B) below. Payment deductions for warranty returns are not allowed. In no event shall the warranty claim exceed the Product price allocated to the Distributor's lowest net invoice price over either the previous twelve (12) months, or since inception of an Agreement between Company and Distributor, if any, whichever is less. If a returned Product is determined by the Company, in its sole discretion, to fall under the Warranty above, and if Distributor has requested on the packing list that a replacement Product be sent to Distributor, then Company will issue a replacement Product in lieu of issuing a credit to Distributor. Company reserves the right to supply suitable substitutes for Warranty Products that are not currently in production or otherwise available. Costs of Product removal or re-installation, including labor, are not the responsibility of Company and not included in the Warranty.
  4. THIS EXPRESS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER EXPRESS OR IMPLIED WARRANTIES, GUARANTEES, OR REPRESENTATIONS, BY OPERATION OF LAW OR OTHERWISE INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, TITLE, AND FITNESS FOR A PARTICULAR PURPOSE. COMPANY SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, SPECIAL, INDIRECT OR PUNITIVE DAMAGES OF ANY NATURE WHATSOEVER INCLUDING, BUT NOT LIMITED TO, LOST SALES, LOST REVENUES OR PROFITS, LOSS OF USE, OR GOODWILL ARISING OUT OF OR RESULTING FROM THE USE OR INABILITY TO USE COMPANY'S PRODUCTS. ANY STATEMENTS OR REPRESENTATIONS MADE BY OTHER PERSONS, ENTITIES, OR ANY THIRD PARTIES ARE SPECIFICALLY DISCLAIMED AND SHALL BE NULL AND VOID.
  5. THE FOREGOING REMEDY SHALL BE THE DISTRIBUTOR'S SOLE AND EXCLUSIVE REMEDY AND COMPANY'S SOLE OBLIGATION FOR FAILURE OF PRODUCT TO CONFORM TO THE WARRANTY.

# TERMS AND CONDITIONS OF SALE - EUROPE

## B. Return for Warranty Consideration

1. All Products to be considered for warranty must be returned to Company with freight and transportation charges prepaid.
2. Product returned to Company must be packaged in such a manner that will prevent any further damage to the Product during transit. The Warranty terms above shall not apply to any items damaged in transit.
3. An itemized packing slip, including Distributor's name and address, is required for each shipment to Company of Product(s) to be considered for warranty. The packing slip must contain a reference number, items and their quantities being returned, reason for warranty return, date of installation, date of failure, and a contact name at the Distributor in case further information is required.
4. All cartons must be clearly identified as WARRANTY PRODUCT and returned to:

Warranty Department  
Robertshaw  
Dlouhá 4  
785 01 Sternberk, Czech Republic

## C. Inspection of Product

1. Company will inspect each item to confirm that the returned Product qualifies for the Warranty in Section VII. If the inspection by Company does not disclose any defect covered by the Warranty, then Company shall notify Distributor accordingly and the Distributor has the option to request Company to scrap the Product or return it at Distributor's expense. AT COMPANY'S OPTION, COMPANY MAY SCRAP THE PRODUCT WITH NO FURTHER LIABILITY TO DISTRIBUTOR, UNLESS DISTRIBUTOR NOTIFIES COMPANY OTHERWISE WITHIN ONE (1) WEEK OF COMPANY'S NOTIFICATION.
2. In the event Distributor sends Company products that were not manufactured and/or distributed by Company, Company will notify Distributor. Distributor has the option to request Company to scrap the product or return it at Distributor's expense. AT COMPANY'S OPTION, COMPANY MAY SCRAP THE PRODUCT WITH NO FURTHER LIABILITY TO DISTRIBUTOR, UNLESS DISTRIBUTOR NOTIFIES COMPANY OTHERWISE WITHIN ONE (1) WEEK OF COMPANY'S NOTIFICATION.

D. Final disposition of any warranty claim shall be determined solely by Company and shall be final and binding.

## VIII. RETURN MATERIAL AUTHORIZATION (FOR NEW AND UNUSED PRODUCT RETURNS)

- A. Returns will not be accepted, nor credits given, without a factory authorized Return Materials Authorization (hereinafter "RMA"). RMAs are only issued to the original point of purchase location for current manufactured and/or distributed Products that fall within the Warranty terms and have been purchased within the previous twelve months. Returns will not be accepted for special order or non-stock items (as indicated in the Price Schedule).
- B. In order to request an RMA number, Distributors must provide the invoice number, sales order number (or customer's purchase order number), the item numbers and quantities of Products they wish to return, and the reason for return to their Sales or Customer Service Representative.
- C. RMA Processing
  1. The RMA number is valid only if the Product it refers to is received at the address specified on the RMA form, freight and transportation charges prepaid, within fourteen (14) days from the date of Company's issued authorization. Company may reject the request if Product is received after fourteen (14) days from the date of Company's issued authorization.
  2. The Product must be received in its original saleable condition (including all accessories and inserts), in its original packaging, and undamaged. Damaged Product will not be accepted for return or replacement, even if a RMA number has been issued.
  3. Credit for the return will be based on the lowest net invoice amount for the Distributor over the last 12 months unless proof of purchase for the actual shipped Product is provided.
  4. All returns are subject to a minimum fifteen percent (15%) restock charge or €15.00, whichever is greater. Company will not accept returns that do not have a proper RMA or are sent to Company in error.

## IX. DISCONTINUED PRODUCTS

- A. Company reserves the right to discontinue distribution of any Product without notice, or substitute material or complete devices, when items ordered are not currently in production or otherwise available.

## X. PERMISSIBLE VARIATIONS

- A. Company may, prior to the delivery of Product to Distributor, make changes in the Product including, but not limited to, changes to the model, design, component parts or dimensions. In addition, Company may make any change or variation in the Product that is within industry, government or professional organization standards or specifications applicable at the time of manufacture, without notice to Distributor. Distributor hereby agrees to accept any Product that may incorporate any such changes or variations, and any increase in price resulting from such changes or variations will be for the account of Distributor.

## XI. FORCE MAJEURE

- A. Company shall not be liable for any delay or failure in performance, or for any damages suffered by the Distributor by reason of such delay or failure, if caused or arising directly or indirectly from any act beyond Company's reasonable control including, but not limited to: acts of God; vandalism; sabotage; accidents; fires; floods; strikes or other labor disputes; mechanical breakdowns; shortages or delays in obtaining suitable parts, equipment, material, labor, power or transportation; acts of suppliers; interruption of utility services; acts of terrorism, or acts of any unit or agency of government. Any delays so occasioned shall affect a corresponding extension of Company's performance dates that are, in any event, understood to be approximate.

## XII. LIMITATION OF LIABILITY

- A. Subject to clause XII (C), Company shall not in any circumstances be liable for any loss of use, production, profit, business, contracts, revenues or anticipated savings, any increase in operating costs, any product recall or corrective action costs or any other financial or economic loss or any indirect or consequential loss or damage whatsoever whether suffered by Distributor or by any third party.

# TERMS AND CONDITIONS OF SALE - EUROPE

- B. The exclusions and limitations of liability contained in these Terms and Conditions shall apply to all claims of any kind whether in contract tort or otherwise on the part of Company, its employees, agents, sub-contractors or suppliers.
- C. No limitation or exclusion contained in these Terms and Conditions shall apply in cases of fraud or fraudulent misrepresentation or in cases of death or personal injury caused by the negligence of Company, or for any other matter for which it would be illegal to exclude or to attempt to exclude Company's liability.
- D. Except as provided under clause XII(C), notwithstanding anything else in these Terms and Conditions or otherwise, the total aggregate liability of Company to Distributor for all claims of any kind for any loss or damage resulting from its performances or lack of performance under this and all other contracts under these Terms and Conditions in any one calendar year will not in any event exceed an amount equal to 50% of the value of the Products delivered to Distributor in that calendar year.

## XIII. CONFIDENTIALITY

- A. Company's Price Schedules, quotes and any discounts contained herein are considered confidential and/or proprietary information of Company and Distributor shall in no instance share any Price Schedules or discounts, business discussions, financial information, or other confidential and/or proprietary information of Company with any other person, group, entity, or third party.

## XIV. GENERAL

- A. This document shall be governed by and construed in accordance with the laws of the Czech Republic without regard to its conflict of laws provisions. The United Nations 'Convention on Contracts for the International Sale of Goods' signed in Vienna in 1980 shall not apply. Any disputes, controversies or differences arising out of or in any way connected with this document shall be determined and finally settled by binding arbitration in accordance with the Arbitration Rules of the International Chamber of Commerce "Rules", by a single arbitrator appointed in accordance with such Rules. The venue of arbitration shall be in London, England and the arbitration proceedings shall be conducted in the English language. Nothing in this arbitration clause shall prevent a party from applying to any appropriate court in the other party's jurisdiction for any injunction or other like interim remedy to restrain the other party from committing any breach or anticipated breach of these Terms and Conditions.
- B. Company and Distributor expressly agree that all terms and conditions, quotations, purchase orders and any related documents and correspondence be drafted and interpreted in the English language.
- C. In the event that any of the provisions hereof shall be held invalid, illegal, void or unenforceable, the remaining provisions shall remain in full force and effect as written.
- D. As used herein, the terms Distributor and Company include their respective heirs, executors, personal representatives, successors and assigns, including their corporate successors by purchase, merger and acquisition.
- E. Distributor may not assign its rights or obligations, or any portion thereof, without the advance written consent of Company.
- F. Paragraph headings are inserted for convenience of reference only and shall not be used in the construction or interpretation hereof.
- G. Company's failure to assert any of its rights under these Terms and Conditions of Sale shall not be deemed a waiver of such rights and shall not extend to or affect any other right Company may possess or to any subsequent or dissimilar event.
- H. These Terms and Conditions of Sale supersede any and all previously published versions issued by Company. Except where there exists a fully executed agreement between Distributor and Company, these Terms and Conditions of Sale constitute the entire agreement between Distributor and Company and supersede all previous and/or contemporaneous understandings and agreements, whether verbal or written, express or implied, relating to the subject matter herein. Any changes to these Terms and Conditions of Sale must be in writing and signed by an authorized representative of Company.

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