

# ROBERTSHAW<sup>®</sup> UNIVERSITY



# RANCO O PRESSURE CONTROLS



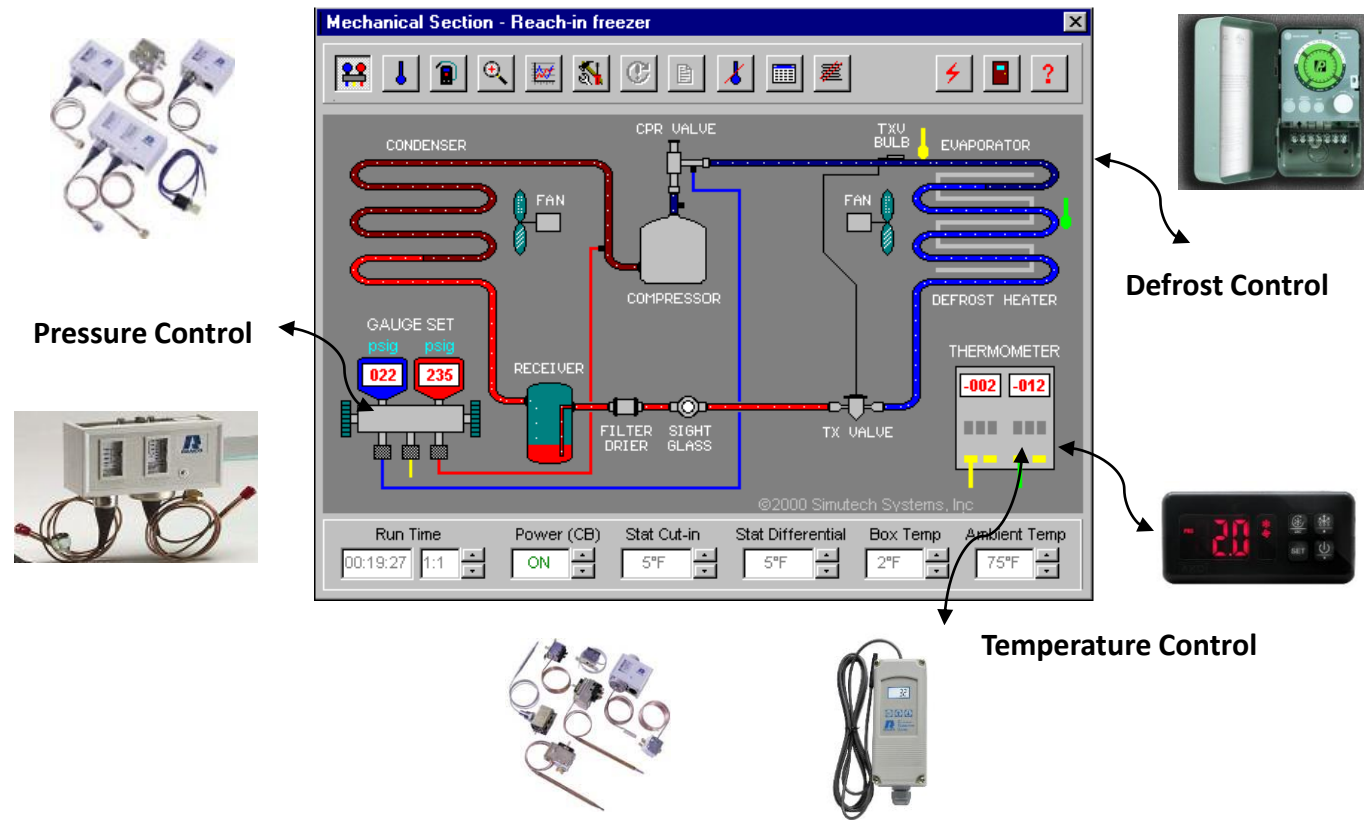
## OVERVIEW

- Low Pressure Controls
- High Pressure Controls
- Dual Pressure Controls

**ARANCO**  
It Just Makes Sense™



# REFRIGERATION SYSTEM



# WHY RANCO PRESSURE CONTROLS?

- Over 50 million Ranco® O controls produced since 1936
- Multiple pressure ranges for most refrigerant types
- Non-Conductive Lexan cover and captive set screw
- Offers Super Cap™ for vibration protection
- Low Mass Copper Alloy Capillary Tube (reduces capillary stress caused by equipment vibration)
- Adjustable Differential and Range
- Easy to read Scale Plate
- Heavy-Duty Plated Steel Frame
- O Series can also be temperature controls
  - O10-1402 (Pressure Control)
  - O10-1409 (Temperature Control)

**RANCO**  
It Just Makes Sense™



# □ PRESSURE CONTROLS

## Single Function Pressure Controls

### Pressure Controls

- Suction Pressure Sensing for Temperature Control
- Suction Pressure Sensing for Pumpdown Control
- Suction Pressure Sensing for Capacity Control
- Suction Pressure Sensing for Low Pressure Limit Control
- Suction Pressure Sensing for Alarm Control

### Fan Cycling Controls

- High Pressure Sensing for Condenser Fan Control

### High Pressure Limit Controls

- High Pressure Sensing for High Pressure Limit Control and Alarm



# □ PRESSURE CONTROLS

## Single Function Pressure Controls

### Pressure Controls

- **O10 Series** - SPST – Opens Low – For conventional low pressure cycling, pump down, defrost termination, alarm control
- **O11 Series** – SPST – Opens High – Typically used in unloader applications
- **O16 Series** – SPDT – Opens High or Low – Can be used in all categories of applications
- **O20 Series** – DPST – Opens Low – Same as O10 Series categories For Double Break or 3 Phase applications

### Fan Cycling Controls

- High Pressure Sensing for Condenser Fan Control

### High Pressure Limit Controls

- High Pressure Sensing for High Pressure Limit Control and Alarm





# □ PRESSURE CONTROLS

## Dual Function Pressure Controls – Multiple refrigerants

- **Low Pressure Side and High Pressure Side**
- **O12 Series – SPST O22 Series – SPDT**
- Suction Pressure Sensing for Temperature + High Pressure Limit
- Suction Pressure Sensing for Pumpdown + High Pressure Limit
- Suction Pressure Sensing for Limit Control + High Pressure Limit
- Color coded Flare Nuts
- Manual and/or Automatic Reset Combines high and low pressure limit control into one unit
- Low pressure cycles compressor depends on suction pressure
- High pressure controls high pressure shutdown

In refrigeration applications low-pressure controls are used to cycle compressors on and off in response to evaporator pressures that indirectly control box temperatures.

High Pressure controls are used to keep compressors from operating with a high head pressure.





# CUT-IN, CUT-OUT

Both pressure and temperature controls incorporate cut-out, cut-in, and differential adjustments in the HVACR field.

- The cut-out of a control is where the control interrupts or opens the electrical circuit. The cut-in is where the electrical circuit closes, and the “differential” is the difference between the cut-in and cut-out points.

$$\text{Cut-in} - \text{Cut-out} = \text{Differential}$$

or

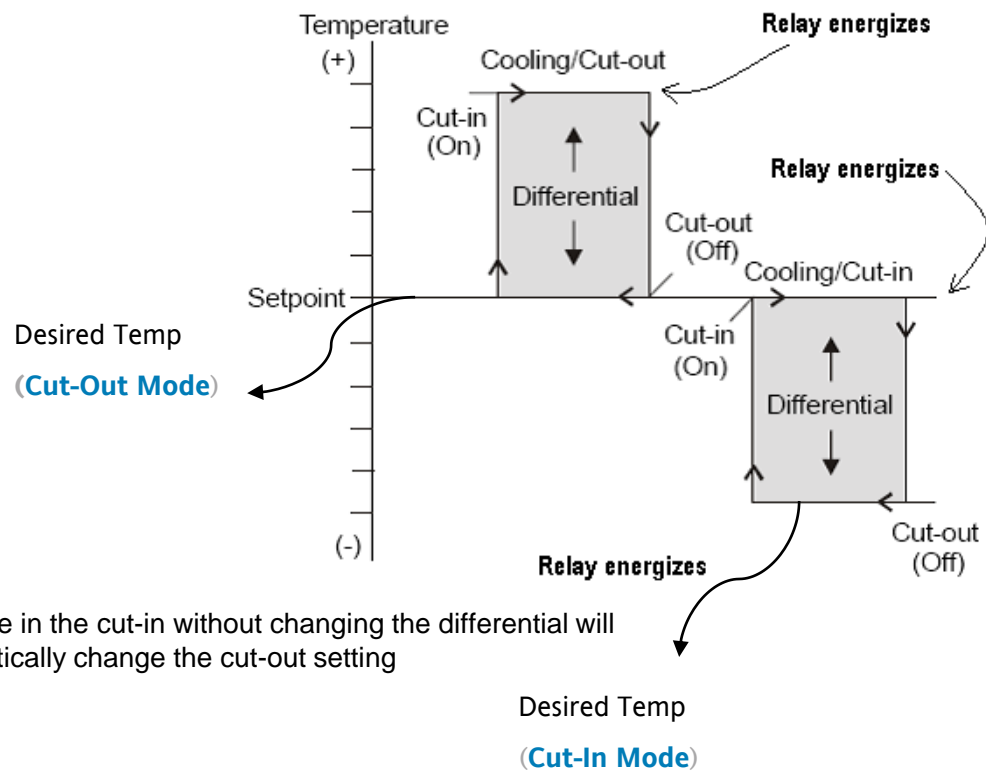
$$\text{Cut-in} - \text{Differential} = \text{Cut-out}$$

- If a pressure control has cut-in of 20 psi and a cut-out of 5 psi the differential is 15 psi.

# DIFFERENTIAL

- Narrow Differential (10°F or less)
  - When a narrow differential is desired
  - Closely maintain within 5 to 6°F
- Wide Differential (10°F or more)
  - Required due to swing in evaporator temperature between compressor ON and OFF
  - Household refrigerators and room air conditioners
  - Differential between 8 to 14°F

# CUT-IN / CUT-OUT COOLING EXAMPLE



# CAPILLARY CONNECTION

- Capillary Tube Connected Directly into Refrigeration Line
- Male and Female Connections



# COMMERCIAL REFRIGERATION SUPER CAP<sup>®</sup>

- Super Cap<sup>®</sup> Capillary Protection System
- Provides 10 times more vibration protection
- Uses unique vibration-dampening cone
- Light weight copper alloy tubing
- Available on single and dual pressure controls



# COMPATIBLE REFRIGERANTS

Refrigerant	Functionally Compatible?	Low	High	Ultra High
		10"Hg to 100 PSI	100 PSI to 500 PSI	200 PSI to 700 PSI
R-134A	Yes	Yes	Yes	
R-22	Yes		Yes	
R-401A	Yes		Yes	
R-401B	Yes		Yes	
R-402A	Yes		Yes	
R-402B	Yes		Yes	
R-403A	Yes	Yes		
R-403B	Yes	Yes		
R-404A	Yes		Yes	Yes
R-407A	Yes		Yes	Yes
R-407C	Yes		Yes	
R-407F	Yes		Yes	
R-410A	Yes			Yes
R-448A	Yes		Yes	
R-449A	Yes		Yes	
R-450A	Yes	Yes	Yes	
R-452A	Yes		Yes	
R-455A	Yes		Yes	
R-500	Yes		Yes	
R-507	Yes		Yes	Yes
R-513A	Yes	Yes		
R-515			Yes	
R-123		Yes		
R12332D		Yes		
R427A			Yes	
R437A			Yes	
R438A			Yes	
R409A			Yes	
R413A			Yes	
R417A			Yes	

# ULTRA HIGH PRESSURE O CONTROL

## O16-6201-070



Reset Type	Switch	Pressure Range	Differential	Pressure Connection	Capillary Length
Auto	SPDT	200-700 PSI	50-150 PSI	1/4" nut w/ 7/16 UNF straight thread	36"

- 410A compatible – expected to be produced at least through 2025
- Highest pressure limit available on the market
- Includes capillary
- 105 units in stock – 4-6 week lead time
- Feature sell sheet
- Price competitive with Johnson Controls and Danfoss units - \$63/each





# O16-6201-070 CROSS REFERENCE

	<b>Robertshaw</b>	<b>Johnson Controls</b>	<b>Johnson Controls</b>	<b>Johnson Controls</b>	<b>Danfoss</b>	<b>Danfoss</b>
<b>Mfg #</b>	O16-6201-070	P70CA-400C	P70AA-400C	P70CA-3C	060-5245	060-5242
<b>Switch Action</b>	SPDT	SPST Open High	SPST Open Low	SPST Open High	SPDT	SPST Open Low
<b>Reset type</b>	Auto	Auto	Auto	Auto	Auto	Auto
<b>Pressure Range</b>	200 to 700 PSI	200 to 610 PSI	100 to 470 PSI	50 to 500 PSI	100 to 600 PSI	100 to 465 PSI
<b>Differential</b>	50 to 150 PSI	60 to 150 PSI	35 to 200 PSI	60 to 150 PSI	58 to 140 PSI	25 to 85 PSI
<b>Pressure Connection</b>	36" capillary with 1/4" flare nut	36" capillary with 1/4" flare nut	36" capillary with 1/4" flare nut	36" capillary with 1/4" flare nut	36" capillary with 1/4" flare nut	36" capillary with 1/4" flare nut

