

DESCRIPTION/APPLICATION

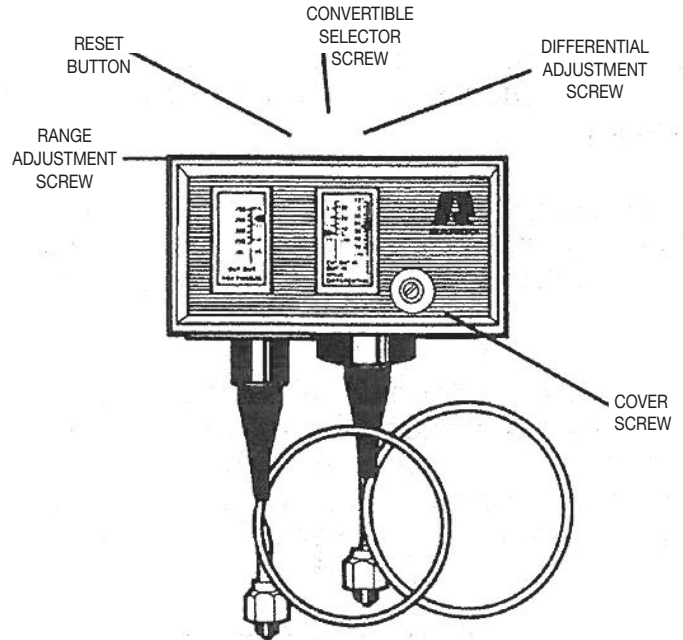
Ranco® dual pressure controls are used for either operating or protecting commercial refrigeration and air conditioning systems. Within one NEMA 1 enclosure, there are a combination of both high and low pressure controls interconnected to operate a common switch.

Ranco dual pressure controls are suitable for R12, R22, and R502 refrigerants and are available with either male flare or capillary with flare nut pressure connections.

The O12, with a single pole, single throw switch (SPST), or single pole, double throw (SPDT), will directly control a single phase compressor; the O12 may also be used with a contactor for pilot control of single and three-phase compressors. The O22, with a double pole, single throw switch (DPST), will directly control single or three-phase compressors. The electrical ratings inside the control cover must not be exceeded.

The low pressure closes (cuts-in) the switch on rise of compressor suction pressure and opens (cuts-out) the switch on pressure drop. The high pressure function overrides to open the switch as the compressor discharge pressure rises. See page 3 for Control Adjustments.

Three versions of switch operation are available: automatic on both low and high pressure; manual reset on both low and high pressure; and convertible (manual or automatic) on high pressure with automatic on low pressure. The convertible reset feature allows the high pressure side to be changed from manual to automatic reset by merely turning the selector screw.

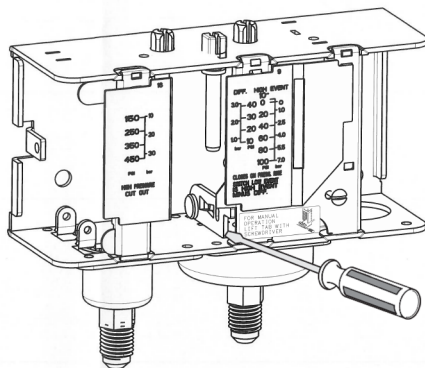


INSTALLATION

CAUTION:

To prevent possible electrical shock or equipment damage, disconnect electrical power to unit before and during installation. **DO NOT** restore electrical power to unit until the control is properly installed and grounded. **DO NOT** locate the control in an explosive atmosphere as a safety hazard can result due to possible spark generation in the control.

Controls are not to be located in areas of extreme moisture, dirt or dust, or in a corrosive or explosive atmosphere. These environments can shorten control life.



IMPORTANT NOTICE MANUAL OPERATION (tripping switch)

The switch can be manually closed by lifting the bellows tab on the low pressure side, provided that the system high pressure is below the high pressure cut-in. Cycling the control at any other point **WILL CAUSE CONTROL DAMAGE AND VOID THE WARRANTY.**

CONTROL BODY MOUNTING

It is important not to twist or strain the control body as shifting of the calibration may result.

Ranco® dual pressure controls can be mounted in any position, either vertically or horizontally, without affecting performance.

The control can be mounted on an existing bracket, on the angle bracket provided, or can be flush-mounted without a bracket. No other holes are to be cut or drilled in the control frame.

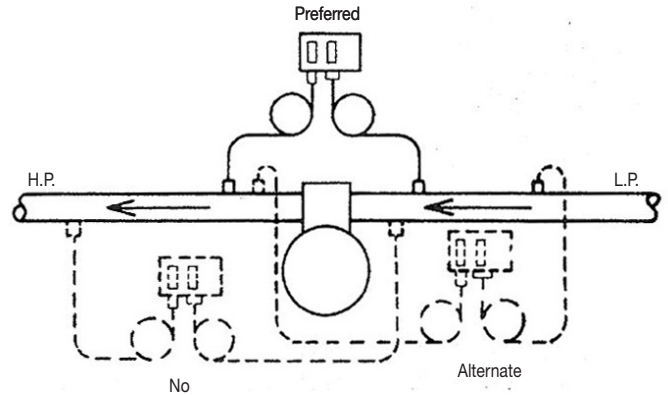
1. Secure the control to either an existing bracket or the angle bracket provided by using at least two of the tapped holes in the back of the control with the supplied screws.
If other mounting screws are used, they must not protrude into the control more than 1/8" (3mm) to avoid damage.
2. When using the angle bracket, the control can be mounted to the compressor or any flat surface by using two or more of the four slotted holes in the base of the angle bracket.

NOTE: The control also can be flush mounted without the bracket by using the 0.20" (5mm) holes in the back of the control frame. Access can be gained by removing the front cover and securing the control body to a wall or any **flat** surface. Mounting to an uneven surface may cause improper control operation.

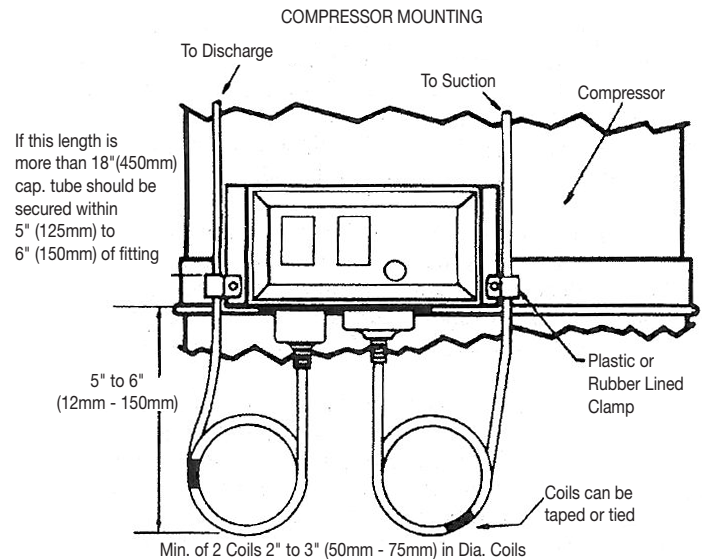
CAPILLARY CARE AND MOUNTING

Compressors vibrate. Copper work-hardens and fractures when flexed beyond its physical limits. Combine these two factors and broken capillaries can result. Breakage can be prevented by proper installation practices.

1. Minimize the number of times the capillary is bent. Each time it is rebent, it work-hardens making it more susceptible to breakage.
2. Avoid sharp bends, kinks, strains or pinch marks in the capillary. Never allow the capillary to rest against sharp edges or rub against metal surfaces where it can be damaged by friction.
3. The capillary should be straight within 4" (100mm) of the pressure connection so the pulsations do not work-harden the capillary.
4. Purge all tubing and lines before connecting pressure controls.
5. Route the capillary so that it will be self-draining to minimize oil logging.



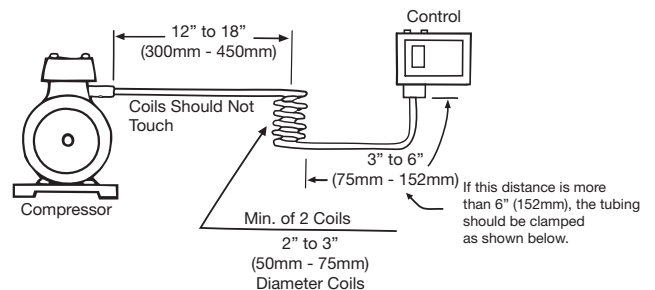
6. When the control is mounted directly on the compressor, the capillary must be secured to the compressor so that everything moves together. If the capillary or control is shaking or vibrating against the compressor vibration, work-hardening of the capillary may occur, leading to eventual failure.



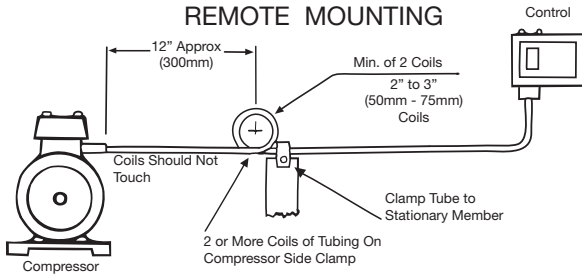
7. When the control body is mounted remote from the compressor and the pressure connections are on the compressor, a vibration coil must be used between the compressor and the mounted control.

The capillary between the pressure connection and the vibration coil should be secured to the compressor.

REMOTE MOUNTING



The capillary between the vibration coil and the control body should be secured to a stationary member when that distance exceeds 6" (150mm).

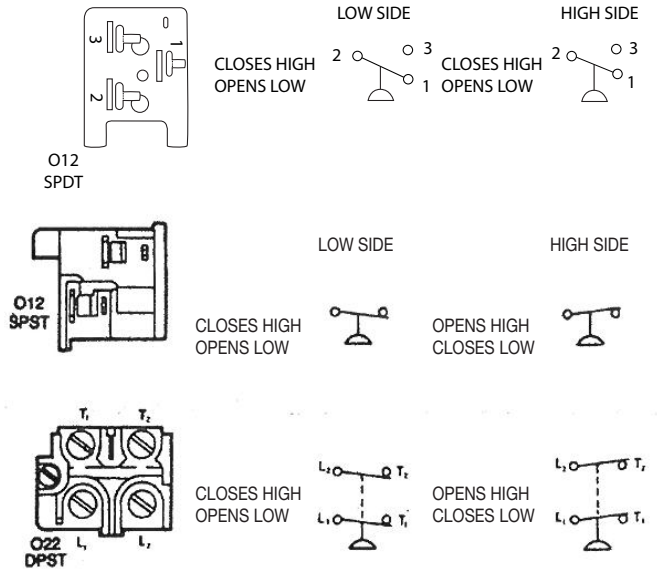
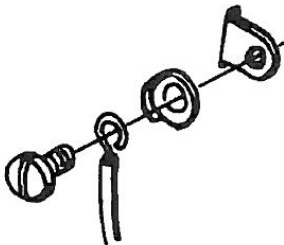


8. Coil and secure any excess capillary to avoid possible damage due to vibration. Capillary coils should be no less than 2" (50mm) in diameter (3" (75mm) is recommended). Whenever possible, insert a section of rubber pipe insulation into the coils to absorb vibration.
9. Although coiling and securing the excess capillary is important to dampen the effects of vibration, it is just as important to allow enough slack in the capillary so that it is not taut like a "banjo string".
10. On startup of the equipment, observe the capillary for excessive vibration and make corrections as required.

CONTROL WIRING

1. Disconnect electrical power to the unit.
2. All electrical wiring should conform to the National Electrical Code and local regulations.
3. The electrical ratings inside the control cover must not be exceeded.
4. Use copper conductors only.
5. When mounting a conduit connector to the control frame, take care to not damage the switch or the control mechanism.
6. The terminals must not be bent, cut off, drilled or retapped. Electrical leads should not be taut; allow slack for temperature change and vibration. Provide a drip loop in the wiring to prevent water from reaching the control.
7. Attach electrical leads to the switch terminals using the screws provided.

The furnished cup washers are to be used on SPDT switches when the conductor wires are directly connected to the terminals. The stripped end of the conductor should be made into a clockwise formed eye with an inside diameter to slip over the shank of the terminal screw. The cup washer, with its flanges outward, should be placed between the terminal and the screw head to capture the eye of the conductor.



CONTROL ADJUSTMENTS

Control settings are to be as specified by the equipment manufacturer and as required for the application. DO NOT adjust the pointers beyond the highest or lowest marks on the scaleplate. The scaleplate is only for reference and the final control settings should be verified with a gauge set.

As a final check, the system should be run through several cycles to assure proper settings and installation.

LOW PRESSURE SIDE (cut-in on rise)

The cut-out setting should never be lower than 18 to 20 inches of vacuum (-10 PSI, -69 kPa) on R12 and single stage R22 and R502 systems should never be set lower than 0 PSIG to 3 inches of vacuum (-10 bar, -1.5 PSI, -10 kPa). Excessively low settings can cause compressor damage.

NOTE: A control with manual reset on the low side has a scaleplate that directly indicates the cut-out and has a fixed differential of approximately 10 PSI (0.7 bar, 69 kPa). A control with automatic reset on the low side, has a scaleplate that directly indicates the **cut-in** and **differential** (difference between cut-in and cut-out). The cut-out is calculated as follows:

1. Adjust the low pressure range screw until the scale pointer indicates the desired **cut-in**. Turning the range screw clockwise lowers both the **cut-in** and the cut-out; counterclockwise raises both.
2. Adjust the differential screw until the scale pointer indicates the desired **differential**. Turning the differential screw clockwise increases the differential; counterclockwise decreases.

The cut-out is calculated by subtracting the differential from the cut-in setting. 20" vacuum (0.68 bar, -68 kPa) is the lowest attainable cut-out.

EXAMPLE:
 Cut-In Differential Cut-Out
 36 - 20 = 16



LOW PRESSURE CUT-OUT CHECK

The low pressure side can be precalibrated by using a container of refrigerant and a gauge set. Use a continuity meter to indicate the closing and opening of the switch. Adjust the control to the desired settings; pressurize the control while adjusting the settings.

Low pressure settings can be rechecked when the unit is running by connecting a gauge to the suction line service valve. Close the liquid line valve and allow the system to pump down, observing the cut-out point. Then open the liquid line valve and allow the pressure to increase, observing the cut-in point. Adjust the settings as necessary.

HIGH PRESSURE SIDE (cut-out on rise)

The high pressure function has a fixed differential of 50 or 60 PSI (3.4 - 4.1 bar, 344 - 414 kPa) depending upon the control model. This means that in order for the control to reset, the pressure must drop 50-60 PSI (3.4 - 4.1 bar, 344 - 414 kPa) below the cut-out.

NOTE: Some controls are equipped with high pressure limit stops. Although the high pressure range can be adjusted, the factory set limit stop prevents adjustment higher than the limit stop setting. **DO NOT** attempt to force the adjustment beyond the limit stop setting.

Adjust the high pressure range screw until the scale pointer indicates the desired cut-out setting. Turning the screw clockwise lowers the cut-out; counterclockwise raises.

HIGH PRESSURE CUT-OUT CHECK

The high pressure cut-out can be checked by disconnecting the fan or by blocking the air flow on air cooled condensers. On water cooled condensers, reduce or shut off the water flow while observing the cut-out and adjust as required. **CAUTION:** These checks must be for a brief time only.

MANUAL RESET

Before resetting the control, the cause of the abnormal pressure should be determined and corrected. Controls equipped with a manual reset feature can be reset by depressing the reset bar or reset button. However, before the control can be reset, the high pressure must drop 50-60 PSI (3.4 - 4.1 bar, 344 - 414 kPa) below the control cut-out. If the control is a manual reset on the low side, the pressure must rise approximately 10 PSI (68 kPa) above the control cut-out.

CONVERTIBLE RESET (Manual/Automatic)

Many dual function controls are equipped with a manual/automatic reset capability for high pressure. The reset function is selected by positioning the selector screw atop the control in an up position for manual reset, or down for automatic reset. After the screw is positioned, the nut must be relocked.



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