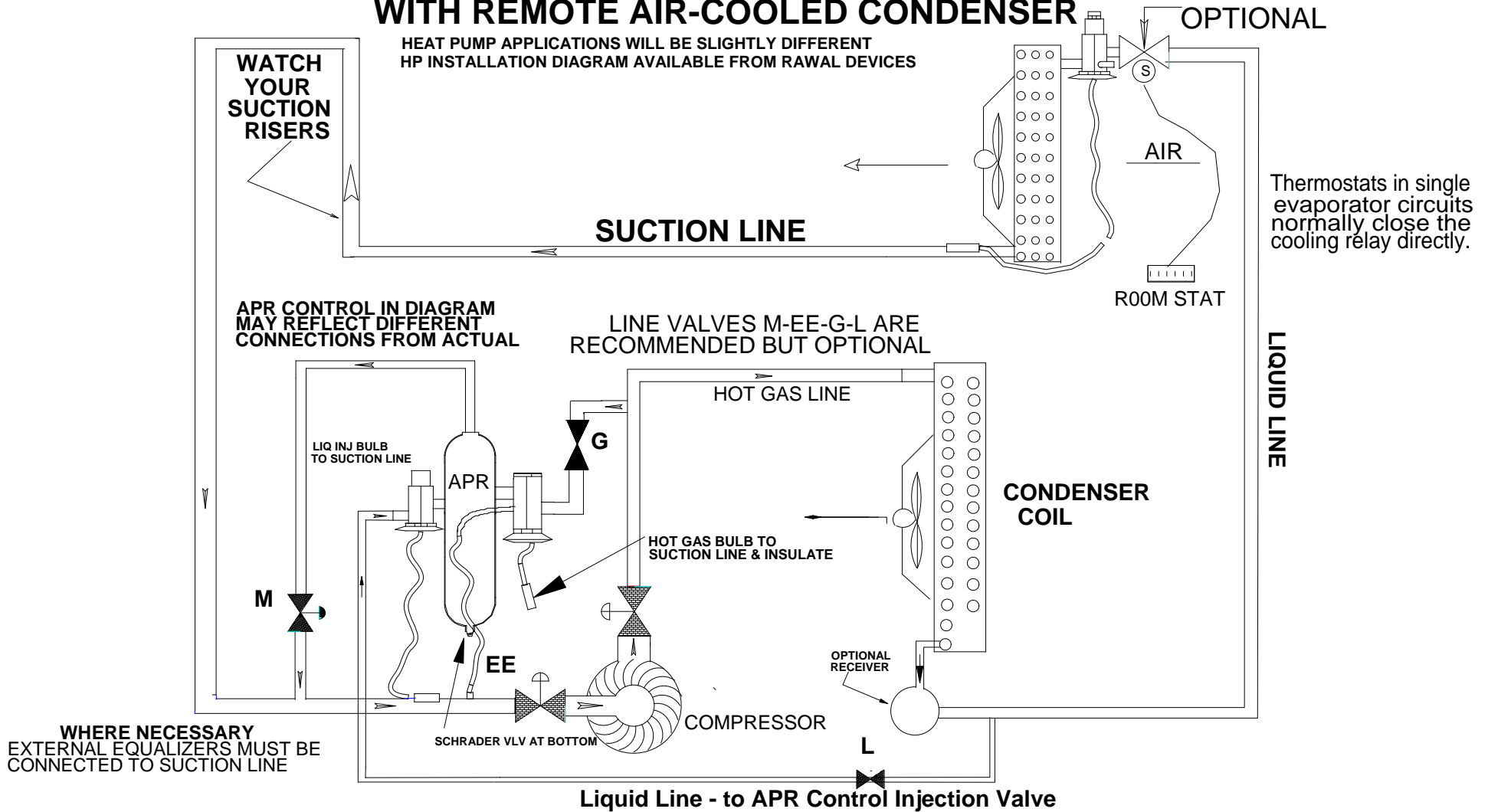


APR for R-410A IN SINGLE EVAPORATOR MODE

WITH REMOTE AIR-COOLED CONDENSER

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APR Control Installation Instructions R-410A

If possible pump down system and lock existing refrigerant in the receiver or condenser. If you cannot secure existing system charge, use proper refrigerant recovery methods to save and store the refrigerant charge. Before installing the APR Control make sure your system is clean –if not, or in doubt a new filter / strainer must be used to protect the APR Control to isolate and remove the system contaminants. Particles of dirt can settle on the valve seat of the hot gas bypass valve and prevent it from closing, leading to possible compressor overheating and system damage.

After you install the APR Control, use standard evacuation procedures and follow the directions listed below. All connections between the system and the APR Control can be made in the condensing section. The APR Control may be mounted outside the condensing unit housing if space or access are a problem. The APR Control should be mounted vertical, with discharge from the desuperheating chamber UP or an orientation so chamber discharge is above Schrader valve at bottom. Using line valves to isolate the APR Control connections to liquid, hot gas and suction is **strongly recommended**. Functionally, isolation valves will assist in charging the systems and trouble shooting should difficulty with set-up arise.

Connections to the refrigerant circuit can be on horizontal or vertical pipes, but discharge from the APR Control desuperheating chamber to the suction line must be into the top of the suction line to prevent oil from draining into the APR Control chamber.

All soldering connections to the APR Control should be made with type 400 6% silver (205° C) solder - consistent with staybright #6 or #8. DO NOT hard solder or silver solder APR Control connections. (Exceptions can be made where vibration or pulsation is present or Government specification call for hard solder or braising.)

Always use plenty of wet rags or heat absorbing paste on the valves and aim your flame away from valve bodies to prevent possible damage.

- 1) Tee in a line shut off valve (G) at the compressor hot gas discharge line, (size to APR hot gas valve inlet) where strainer is supplied, install it in the 3/8" OD APR hot gas inlet only.
- 2) Tee in a line shut off valve (M) at the suction line prior to compressor, (size to APR mixed gas discharge outlet at top of desuperheating chamber), 5/8" OD.
- 3) Tee in a line shut off valve (L) at the liquid line near the condenser coil or receiver outlet, size to APR injection valve inlet 3/8" OD.
- 4) Mount APR Control securely in the condensing unit.
- 5) Connect hot gas from the line valve (G) to the hot gas inlet on hot gas valve connected to APR Control. Hot Gas valve inlet marked with Red Hot Gas sticker.
- 6) Connect suction from the line valve (M) to the mixed gas outlet on top of APR Control desuperheating chamber.
- 7) Connect liquid from the line valve (L) to the liquid injection valve (txv) inlet on APR Control.
- 8) External equalizers on sides of APR Control hot gas valve should be connected to the suction line between mixed gas discharge connection from the APR Control and compressor inlet.
- 9) The injection valve bulb and Hot Gas Bypass valve bulb *must* be mounted to the suction line between compressor and mixed gas discharge connection from the APR Control.
- 10) Leak test system and evacuate. Before charging system close all APR Control line valves, do not leave the APR Control open when charging the system. No additional charge is required for the APR Control to operate.
- 11) For R-410a High Temperature Systems – **Hot Gas Bypass valve of the APR Control has been set to open at 109 psig (36° F)**. See adjustment sheet if you require further instructions.
APR Control injections valve is set to open at around 60° F (or 15° superheat) to protect the compressor from overheating.

Adjustment settings to all APR-410A valves need to be confirmed in the field.



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Adjusting the APR Control / R-410A

(Pressures are shown for refrigerant 410A ONLY -----For R-22 see appropriate adjustment sheet)

With your system operating normally and your gauges attached, gradually decrease the system load on the evaporator coil by reducing the return air quantity until the suction reads 109 psig (equal to 36° F. Reducing the air quantity over the evaporator coil is equivalent to reducing the load on the system and will cause the suction pressure to fall.

When the suction pressure reaches 109 psig, confirm that the hot gas bypass valve (HGBV) of the APR Control opens at that suction pressure. If not, determine at what pressure the HGBV is currently opening. Adjusting the hot gas bypass valve will require first removing the cover bolt on the adjustment stem to access the allen set. The allen socket (hex wrench socket) in the stem will change the pressure at which the APR Control is set to begin opening, 5 psig per turn (clockwise (tightening) reduces opening pressure setting, counter-clockwise (loosening) increases opening pressure setting).

When the control is set, return your system to normal by returning the load (in the form of return air to the evaporator) to its normal operating quantity. The APR Control is now adjusted properly and will open at 109 psig, modulating the system capacity continuously to match the changing load.

The APR Control will continue bypassing enough hot-gas discharge from the compressor to keep the system capacity in balance with the system load, and the system energy draw consistent with the system capacity. You have now achieved “system load compliance mode.” The system now has the ability to self-adjust its capacity to continuously equal the changing system load and vary its energy input to match the change.

LATENT/SENSIBLE COIL ADJUSTMENT – EXTENDED SYSTEM RUNTIME

The normal, approximately 70% to 30% ratio, of sensible to latent heat removal of an evaporator coil can be altered with the APR Control. To enhance the dehumidifying ability of the evaporator, we have preset the HGBV at a higher pressure (than that necessary for just protecting the evap coil from frost/freezing condition). This enhancement of the dehumidifying action is most effective when the evaporator coil is four rows or more deep and initially has a low bypass factor.

By noting suction line pressure when the circuit cycles off, and attempting to set the pressure at which the APR Control HGBP valve opens should keep the APR Control ahead of the thermostatic response – allowing for increased runtime. (If it is necessary to increase the suction pressure higher than 115 psig for proper performance, please consult with Rawal Devices, Inc. Engineers about your application).