

# **SURE-START WINTERSTATS® IN KRAMER COMPRESSOR SYSTEMS**

## **SERVICE MANUAL**



**KRAMER TRENTON CO.,** Trenton, N. J. 08605

*Continuous Achievement in Heat Transfer Since 1914*

The Sure-Start Winterstat used in KRAMER COMPRESSOR SYSTEMS provides exactly the same advantages as the Sure-Start Winterstat used with Unicons. The Sure-Start Winterstats used in KRAMER COMPRESSOR SYSTEMS however, differ from those sold with Unicons. The "W" valve in KRAMER COMPRESSOR SYSTEMS is a specially modified check valve rather than a modulating pressure control valve. Refer to Fig. 1.

#### NORMAL RELATIONSHIP BETWEEN HEAD AND RECEIVER PRESSURES

- A. **SUMMER:** When the outdoor temperature is 80° or above, the receiver pressure will generally be the same as the head pressure or approximately 5 pounds lower (Winterstat head pressure setting 105 PSI for R12, 175 PSI for R22 and R502).
- B. **WINTER:** When the outdoor temperature at the Unicon is below about 70°, the head pressure should be maintained at the Winterstat setting (105 PSI for R12, 175 PSI for R22 and R502) and the receiver pressures should be approximately 15 PSI lower (90 PSI for R12, 160 PSI for R22 and R502).

#### WINTERSTAT ADJUSTMENT

Winterstats in KRAMER COMPRESSOR SYSTEMS are all adjustable. On those Winterstats which employ the tubular "T" shaped "R" valve, turning in the adjustment screw increases the head pressure. Where the "R" valve, has two adjustment stems, the top stem controls the head pressure by varying the force applied to the spring which presses on the diaphragm. The adjustment here is very sensitive and one full turn in of the adjustment screw may raise the head pressure as much as 50 PSI.

The bottom stem is the manual opening stem. When the stem is down (out of the valve) the valve is manually opened and the Winterstat cannot function. When the stem is up (all the way into the valve), the Winterstat will maintain the head pressure at which the "R" valve was set by means of the top adjusting screw.

The Winterstat valve cannot be correctly adjusted when the normal head pressure (Winterstat not in operation) is higher than the desired Winterstat setting.

#### HIGH HEAD PRESSURE

If the high pressure cut-out is properly set, cut out on high head pressure can be caused by any one of the following:

1. Air or non-condensibles in the system.
2. Overcharge.
3. Excessively high entering air temperature to the condenser.

- (a) Caused by recirculation of air discharged by the condenser back to the condenser inlet.
- (b) Inadequate ventilation.
4. Inadequate air flow over condenser.
  - (a) Insufficient clearance around compressor unit.
  - (b) Dirty condenser.
5. Condenser fans overloading or stopped for any reason.
6. "R" valve set too high.
7. Receiver inlet valve closed.
8. "C" check valve at condenser outlet plugged.
9. "W" check valve stuck open.
10. Bellows leak on those compressors employing the tubular "T"-type valve.
11. Excessive load (back pressure much higher than normal).

#### TESTS AND CORRECTIVE MEASURES

##### 1 & 2. NON-CONDENSIBLES AND OVERCHARGE:

- (a) Install gauges at compressor head, receiver purge valve, and suction service valve.
- (b) Under conditions of excessive head pressure, the receiver will normally be very hot. If under conditions of excessive head pressure the receiver is cool, or cold, non-condensibles or overcharge are indicated. Purging from the receiver will correct this situation. If vapor flows from the purge valve and the receiver warms up and the head pressure falls, non-condensibles are the difficulty. If liquid flows from the purge valve, the system is overcharged. After removing the excess refrigerant charge, recheck for non-condensibles.

##### 3. EXCESSIVE ENTERING AIR TEMPERATURE TO THE CONDENSER:

The entering air to the condenser should be no warmer than the temperature measured in a shady spot well shielded from the sun and from radiant effect of roof or reflective surfaces. All KRAMER COMPRESSOR SYSTEMS are designed to operate satisfactorily under conditions of 110° maximum air temperature entering the condenser where ratings for 110° are shown in catalog.

##### 4 & 5. DIRTY CONDENSER & FAN MOTORS OVERLOADED:

A dirty condenser coil not only reduces the flow

of air over the condenser but is also likely to overload the condenser fan motors, causing them to cut out on the thermal protector and stay off for considerable periods. The only solution, naturally, is cleaning the condenser. Since the KRAMER COMPRESSOR SYSTEMS can be readily applied outdoors, it should be located where an ample supply of clean, lint and grease free air is available.

#### 6. "R" VALVE SET TOO HIGH:

If everything else is normal but a high head condition exists due to an excessive "R" valve setting, simply back out the adjusting screw on the "R" valve and reduce the pressure. Below the desired setting, slowly turn in the adjusting stem to raise the head pressure to the desired level.

#### 7. RECEIVER INLET VALVE CLOSED:

If the receiver inlet valve is closed or throttled, the receiver will be cool and the receiver pressure will be very much lower (20 PSI or more) than the head pressure.

#### 8. THE CONDENSER OUTLET CHECK PLUGGED:

If the condenser outlet check valve is plugged, the receiver will be hot. The receiver pressure will be approximately 15 PSI lower than the head pressure. Adjustment of the "R" valve in the direction of reduced pressure setting will have no effect nor will manually opening the "R" valve (Iron body models only). Disassemble check valve to clean or repair. (See Bull. UCI-747 - Union Check Valves)

#### 9. "W" CHECK VALVE STUCK OPEN:

If the "W" check valve is stuck open, the receiver will be hot but the receiver pressure will be the same as the head pressure or slightly lower. Reducing the setting of the "R" valve will have little or no effect. Throttling the compressor will sharply reduce the head pressure (on systems with multiplexed compressors, the suction valves on all compressors must be uniformly throttled for this test): Disassemble check valve to clean or replace working parts. (See Bull. UCI-747 - Union Check Valves)

#### 10. BELLOWS LEAK IN TUBULAR "R" VALVE:

If the bellows in the tubular "T"-type "R" valve

leaks, the increased pressure under the adjusting screw will tend to drive the "R" valve closed. Removing the seal cap over the adjusting screw will immediately correct this condition and oil and refrigerant which may have collected under the cap will be observed. In this case the "R" valve must be replaced.

#### 11. EXCESSIVE LOAD (BACK PRESSURE MUCH HIGHER THAN NORMAL):

Under conditions of pulldown or post-defrost, back pressure higher than normal will produce higher than normal head pressures.

#### 12. HEAD PRESSURE CUT-OUT SET TOO LOW:

Where the machine is locking out on the high pressure control, check the setting with a gauge since the scale on the switch is quite coarse. For R-12 the high pressure cut-out should stop the compressor at about 220 PSI; for R-22 and R502 the cut-out should stop the compressor at 360 PSI.

#### 13. ACCURATE GAUGES:

Accurate gauges in good condition are essential for trouble shooting a KRAMER COMPRESSOR SYSTEM. Gauges are like a doctor's stethoscope. Keep yours clean and check them periodically by comparing them with a standard gauge, at various pressures.

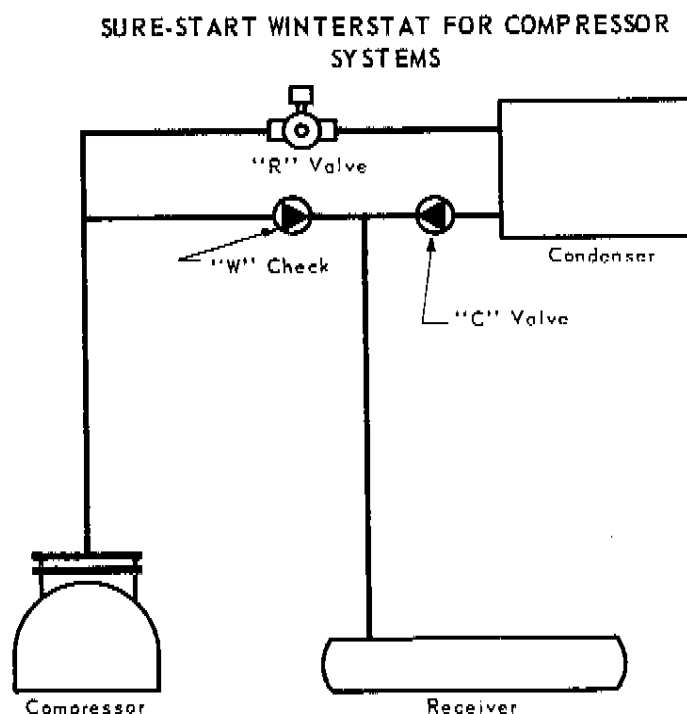


Fig. 1

# KRAMER

## PROCEDURE FOR TROUBLE SHOOTING SURE-START WINTERSTATS IN KRAMER COMPRESSOR SYSTEMS

1. Install (2) gages. One to read head pressure and one for receiver pressure.
2. Start system. If head pressure rises rapidly throttle compressor suction valve.
3. Make sure system is not in defrost.

PROBLEM	CAUSE	SOLUTION
<u>HIGH HEAD PRESSURE</u> <b>OBSERVATION</b> 1. Receiver pressure <u>low</u> or normal	1. "W" hand valve closed 2. "W" check valve stuck closed	Open hand valve Replace valve
2. Receiver pressure <u>high</u> – with (A) Receiver <u>cold</u>	Non-condensibles or system overcharge	Purge from top of receiver with compressor running.
(B) Receiver <u>hot</u> and liquid line at "C" valve inlet hot	1. Excessive load 2. High back pressure 3. Wrong compressor on multi-circuit 4. Condenser fins blocked with dirt 5. Fans rotating backwards 6. Fans off 7. Excessive air temp. at condenser 8. Air re-circulation at condenser	Check condenser selection Throttle compressor Check for proper circuiting Clean condenser Check for incorrect wiring Check motor and power supply Relocate condenser Check cause and correct
(C) Receiver <u>hot</u> and liquid line at "C" valve inlet cold	Check head to receiver pressure drop (If over 12 PSI) "R" valve set too high "R" valve plugged "R" valve bellows leak "C" valve plugged (If under 12 PSI) "W" check valve stuck open	Readjust Repair or replace Replace Replace Replace
PROBLEM	CAUSE	SOLUTION
<u>LOW HEAD PRESSURE</u> <b>OBSERVATION</b> 1. Receiver <u>hot</u>	Shortage of refrigerant Sight glass clear?	Add refrigerant It's vapor – add refrigerant
2. Receiver <u>cold</u>	1. "R" valve set too low 2. "R" valve manually open 3. "R" valve stuck open	Readjust – see adjustment settings. Reset manual opening stem Repair or replace
PROBLEM	CAUSE	SOLUTION
<u>NORMAL HEAD PRESSURE</u> <b>OBSERVATION</b> 1. <u>Low</u> receiver pressure	1. "W" hand valve closed 2. "W" check valve stuck closed	Open hand valve Replace valve