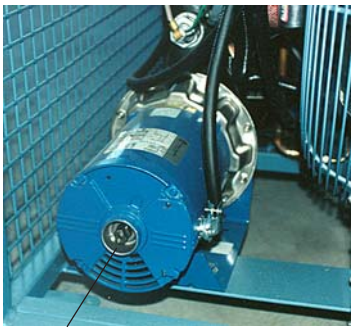
SUBJECT: PHASING OF SCROLL COMPRESSORS #3-I-229 8/11/1999

Many **ADVANTAGE** chillers use Scroll (rotary) compressors. Scroll compressors are more efficient, durable and reliable than traditional reciprocating compressors. Scroll compressors are liquid tolerant, have low torque variation and contain fewer moving parts.

It is important to understand that unlike reciprocating compressors, scroll compressors are phase sensitive. They must be rotating in the correct direction to be effective. The following guidelines should help ensure that installation and start-up remain as trouble free as possible.



Motor shaft

FOR MK SERIES PORTABLE CHILLERS... on all portable chillers that have one or more internal coolant pumps, the compressor(s) will be set in phase with the pump(s) during the factory testing process. On units with an 'HE' controller, the phase status can be checked simply by observing the 'phase' light on the instrument control panel. On units with an 'LE' controller, the phase status must be checked by observing the pump motor shaft on the end of the pump and comparing its rotation to the directional arrow on the motor. (Correct rotation is clockwise when the motor is in view as in the picture to the left.) The phase needs to be changed when the 'phase' light is on (for 'HE' instruments) or when the pump is rotating counter-clockwise. Changing the phase should only be done at the main power entry. To do so, lock out the power at the main disconnect and switch any 2 power wires at the disconnect.

Cut away view of a Scroll Compressor

WATER CONDENSED TITAN CENTRAL CHILLERS... on all water-cooled central chillers that have internal coolant pumps, the compressor(s) will be set in phase with the pump(s) during the factory testing process. At start-up, the phase status must be checked by observing the pump motor shaft of either pump. Correct rotation is a clockwise direction when the motor shaft is viewed from the rear of the motor (see above picture). Correct rotation is confirmed by the directional arrow on the motor. The phase needs to be changed if the pump is rotating backwards, evidenced when the motor shaft is rotating in a counter-clockwise direction. Changing the phase should only be done at the main power entry. To do so, lock out the power at the main disconnect and switch any 2 power wires at the disconnect.

APT AND WPT CENTRAL CHILLER MODULES... chilled water modules have no internal coolant pumps. So even though they are run tested at the factory, the phase sequence will be lost when power is disconnected for shipment. To facilitate recreating the proper phase sequence, a small black phase detector with a single red LED is installed on the electrical sub panel. In the field, a glowing red light indicates that the unit is properly phased. If the red LED is not on, the phase is incorrect must be altered. To do so, lock out the disconnect and switch any two power wires at the disconnect.

ALL CHILLERS WITH OUTDOOR REMOTE CONDENSERS... since these units are not charged with refrigerant, they cannot be fully run tested and phased at the factory. These units must be phased entirely in the field. If the unit has an integral pump, first check the pump for proper rotation and if necessary, change it at the power entry. After that is done, or if the unit has no coolant pump, wait for the compressor to come on. When it does, observe the refrigerant gauges. If the compressor is rotating in the proper direction, the gauge readings will diverge, meaning that the head pressure will increase and the suction pressure decrease. If the pressures stay about the same and the compressor emits a rattling of noise, shut the unit down and change the phase for that individual compressor either at the contactor or at the compressor itself. In the case of multiple compressors, each one must be checked independently.

If you have questions concerning the phasing of scroll compressors, please call the **ADVANTAGE** service department at 317-887-0729.

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