UNITED TECHNOLOGIES CARRIER — Commercial Division, Carrier Corporation	BULLETIN: CA-SB-19-D-85-101 DATE: 7/2/85 PAGE: 1 OF: 6
SERVICE BULLETIN SUBJECT: 17/19DM DIFFUSER WALL CONTROL CALIBRATION AND ADJUSTMENT (NON 32MP)	SUPERSEDE BULLETIN: DATE: PAGE: OF:

PURPOSE

To transmit instructions for calibrating 19DM diffuser wall control and making final adjustments to obtain stable operation.

MACHINES AFFECTED

All 17/19DM chillers with diffuser wall control module (i.e., without microprocessor controls).

REFERENCES

Diffuser wall operation is discussed in the 19DM Start-Up, Operation and Maintenance Instructions (Catalog 531-959). You should be familiar with the controls section before using this procedure.

DIFFUSER MODULE OPERATION

The diffuser control module positions the wall as determined by motor current. At full load, the wall is opened (retracted) to the full-open position for the particular compressor. At minimum load, the wall is closed (extended) against a mechanical stop. At intermediate loads, of course, the wall is positioned accordingly to keep the diffuser passage "tuned" to the load.

The maximum open wall opening is dependent on the impeller shroud size (tip width). Larger shrouds require more travel and vice-versa. Therefore, the compressor size is "identified" to the diffuser module by means of four jumpers (J1, J2, J3 and J4) discussed in the next section. Once set up, the module is able to control wall travel for its particular compressor.

DIFFUSER MODULE CALIBRATION (Refer to figures 1 and 2 as needed)

Calibration is performed with the machine not running and with the diffuser wall in the closed (extended) position. To close the wall, place a jumper between terminals L1 and 18. This will run the oil pump and drive the wall closed. You can observe movement of the wall via the feedback pot actuator rod. Leave the jumper installed throughout the calibration.

With jumper J1 installed, connect a digital volt meter (DVM) across terminals TP1 and TP2 of the diffuser wall module. Adjust potentiometer R35 until the DVM reads 9 millivolts DC.

Disconnect jumper J1 and adjust R33 until the DVM reads 7.1 millivolts. If the compressor is a Frame 2, reinstall J1. If it is a Frame 3, discard the jumper.

Shroud	Compressor Code	Jumpers Required (installed)
3	42 thru 47, 72 thru 77	J4, J3, J2
4	49 thru 54, 79 thru 84	J4, J3 only
5	56 thru 61, 86 thru 91	J4 only
6	63 thru 68, 93 thru 98	None
7	B2 thru B7, C2 thru C7	None

FEEDBACK POTENTIOMETER CALIBRATION

With the wall still closed and oil pump running, connect the DVM across terminals 92 and 93 of the diffuser module. Meter should read between 0.50 and 0.95 volts DC. If the reading is outside this range, loosen the locknut on the actuator rod (see figure 2), and adjust the thumbwheel until the meter reads 0.7 volts DC. Tighten the lockout.

Connect the DVM across terminals 93 and TP4 of the diffuser module. Adjust R37 until the DVM reads 0 + 2 millivolts DC. Note: This pot is quite sensitive; small movements will cause large swings in voltage readings.

MOTOR CURRENT CALIBRATION

Start the machine and calibrate the motor current as outlined in the 19DM Start-Up, Operation and Maintenance Instructions (Catalog 531-959).

This completes the standard calibration of the diffuser wall control. Unless complications arise during operation (surge, for example), no further adjustments are required. The following section covers correction of such complications.

OPERATING ADJUSTMENT

In some applications, the nominal diffuser wall position may be too far open to provide adequate lift at a given load. This will result in surge at normal operating conditions. Therefore, a one-time "fine tuning" adjustment may be required (during operation) to properly position the diffuser wall.

Before attempting this adjustment, make certain the diffuser module is properly calibrated as described above. Design flow must be confirmed and entering condenser water temperature must be at design. If design temperature cannot be attained, throttle the condenser water to obtain design condenser pressure. It is best to adjust for operation at or near full load but it can be accomplished at part load provided the full load point is checked for stability.

Operating adjustment is performed as follows:

Turn the "X" OPERATING curve adjustment knob all the way to "10" which will move the wall slightly closed. Allow two minutes for the machine to stablize. The "Y" adjustment must be at zero. If this brings the compressor out of surge, decrease the "X" adjustment one digit at a time (allow the machine to stabliize) until the optimum setting is reached. That is, when the wall is as far open as possible without causing surge.

If surge still persists with "X" at "10", turn the knob back to zero and proceed to the next step.

Beginning with the pair of pins marked J4, jumper the two pins and allow the machine to stabilize. If surge still persists, jumper the two pins marked J3 and finally J2, if necessary.

Note: Depending on the compressor code, one or more of these jumpers may already be present. If so, begin with the highest number jumper which is not installed.

If by adding one or more jumpers the surge is eliminated, the adjustment is complete.

If surge still persists with all jumpers (J4, J3, J2) installed, the feedback pot must be adjusted.

With the chiller running and with water temperatures at design, loosen the hex locknut on the feedback pot actuator rod. Turn the thumbwheel one full turn to move it toward the feedback pot. The diffuser module will immediately sense the resistance change and close the wall to obtain the previous valve.

Allow about one minute for the chiller to stabilize and repeat above step if necessary until the compressor comes out of surge. Then, retighten the lockout on the actuator rod.

Note: Allow the wall to close only enough to obtain stable operation. If the diffuser passage is choked too much, capacity will be sacrificed.

Once the fine-tuning is complete, run the chiller at full load and various part loads to verify stable operation at all conditions.

Attachments

SERVICE BULLETIN

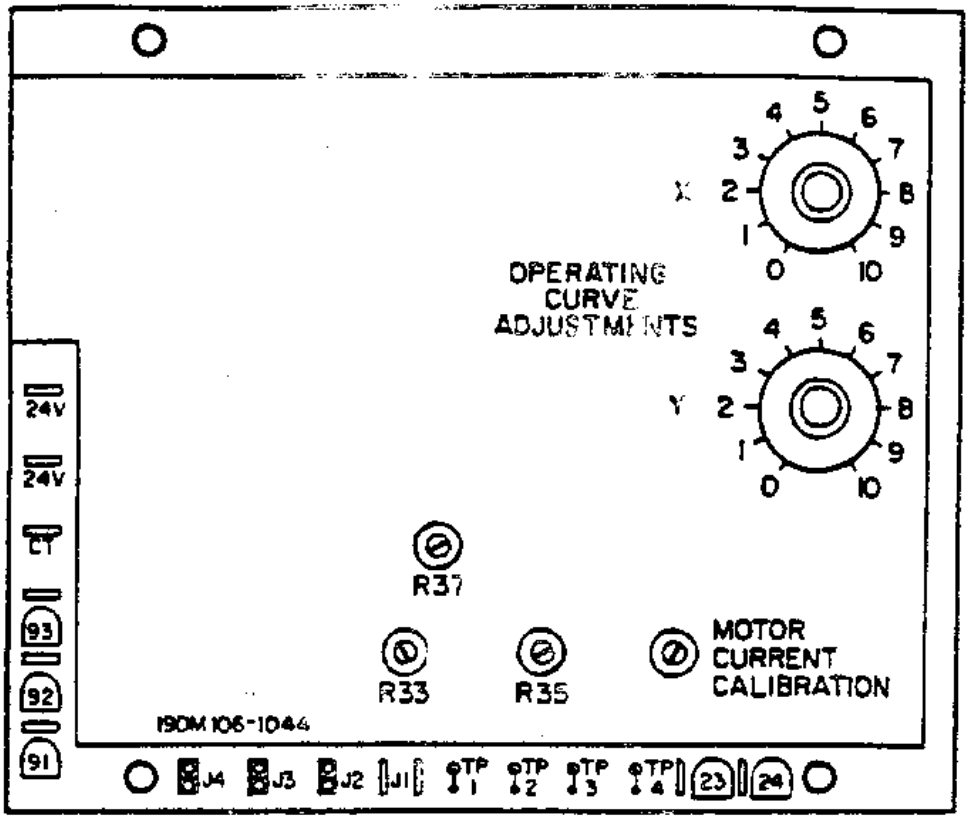

FIG. 1

19DM DIFFUSER WALL CONTROL MODULE

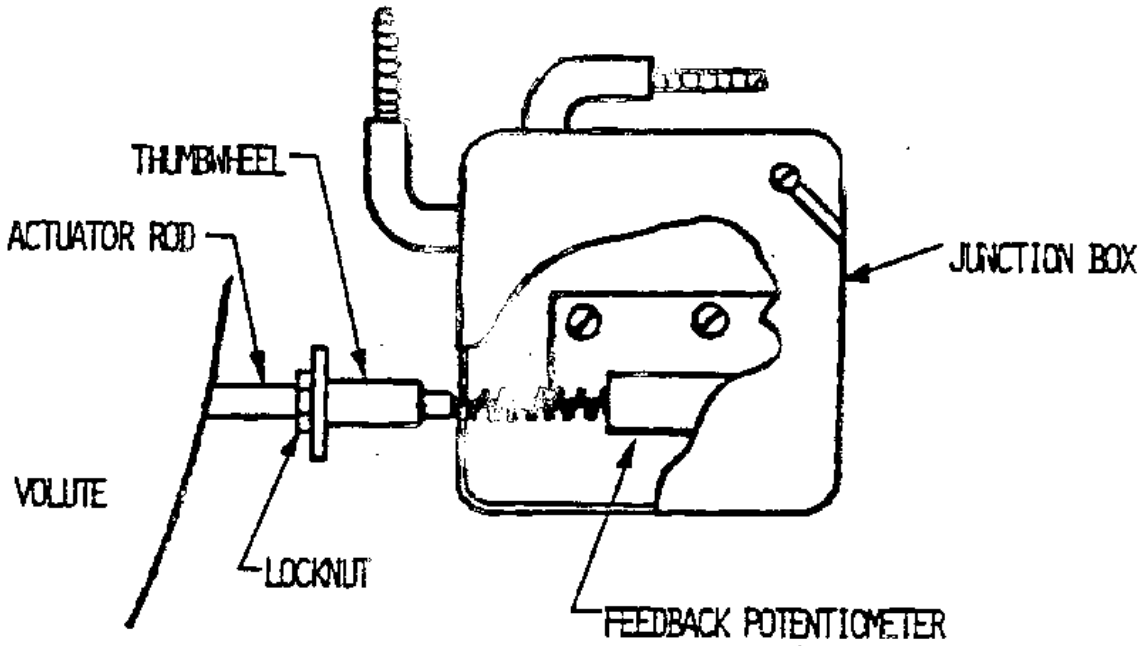

FIG. 2

19DM DIFFUSER WALL FEEDBACK POTENTIOMETER ASS'Y