GENERAL
This instruction supplements the information published in the User’s Information Manual, Form 530.55-O2Y. It is prepared to assist the service technician when called upon to service the Sunline 3000 Rooftop units. It is not intended to be used by a person who is not familiar with the control functions associated with heating and air conditioning equipment.

TIMER OVERRIDE
The microprocessor has several anti-cycle timer circuits to protect various components from damage. With care and on sight observation of operating conditions it is possible to reduce the waiting time by overriding the timers.

When the Status display indicates the unit or a system is being held off by a timer; i.e. a display with such wording as ANTI RECYCLE, AR TMR or AC TMR; it is only necessary to hold in for 5 seconds. This will bypass the control timer and operation will be restored in a matter of seconds.

SERVICE MODE
ON/OFF SWITCH
The ON/OFF switch on the Rooftop Unit Control only controls the output signals. Therefore, in the OFF position the micro will be fully energized. This makes it possible to change the configuration, functions, and setpoints while the unit remains idle. It is recommended that this switch be OFF before accessing the Service Mode.

ACCESS
As explained in the User’s Information Manual referenced above, it is possible to display the operating conditions of the unit (key DISPLAY DATA) and the preprogrammed functions of the microprocessor (key PRINT OPER DATA).

After analyzing the operating data, it may be advantageous to reprogram some of the functions to improve the performance and/or protection of the unit.

To access these functions and place the control system in the SERVICE MODE, proceed as follows:

Depress the keys.

The display will read:

DO NOT PRESS ENTER!
PRESS the keys. The first function will appear on the display screen.

TO CHANGE SETPOINTS.

CAUTION: The preprogrammed functions should only be changed when proven absolutely necessary, and extreme care must be exercised when doing so.

In each display the cursor (_) will appear under the value that may be reprogrammed. To change the value, use either the or keys. When the new value appears above the cursor it may be entered into the program by pressing the key. Whenever the key is pressed the cursor will move to the next reprogrammable value in the display, or the next display will appear on the screen.

DISPLAYS
• The first display to appear will be:

SUCT PR CO XX PSIG
SUCT PR UL XXX PSIG

The SUCTION PRESSURE CUT OUT serves two functions. First, it is the pressure which must be attained on a compressor start up before the liquid line solenoid will open. If it is not reached within 3 minutes after start up, the compressor will shut down. Second, it is the pressure setpoint above which the suction pressure must be maintained within at least 4 minutes and thereafter from start up. Otherwise the compressor will shut down. Any shut down is recorded as a system fault.

NOTE: Three system faults of any kind within 90 minutes will lock out the system.

The SUCTION PRESSURE UPPER LIMIT serves one function. If the pressure rises to this setpoint, the liquid line solenoid will close to unload the compressor and remain closed until the pressure decreases to 85 PSIG.

The CUT OUT is adjustable from 40 to 70 PSIG. The default value is 44 PSIG. The UPPER LIMIT is adjustable from 85 to 140 PSIG. The default value is 105 PSIG.

The or keys will change the setpoints 1 PSIG at a time.

• The second display to appear will be:

DSCH PR CO XXX PSIG
DSCH PR UL XXX PSIG

NOTE: These functions are only applicable when the 0É Low Ambient option is installed or a field installed transducer has been applied.

The DISCHARGE PRESSURE CUT OUT is the discharge pressure at which the compressor will shut down.

NOTE: Three system faults of any kind within 90 minutes will lock out the system.

The DISCHARGE PRESSURE UPPER LIMIT is the discharge pressure setpoint at which the liquid line solenoid valve will close to unload the compressor and remain closed until the pressure decreases to 380 PSIG.
The CUT OUT is adjustable from 250 to 399 PSIG with a default value of 395 PSIG. The UPPER LIMIT is adjustable from 225 to 390 PSIG with a default value of 390 PSIG.

The \[\text{up} \quad \text{or} \quad \text{down}\] keys will change the setpoint 1 PSIG at a time.

- The third display to appear will be:

  | LOW AMB CO | XX DEG F |
  | HIGH AMB CO | XXX DEG F |

The LOW AMBIENT CUT OFF is the outdoor temperature at which the mechanical cooling will be turned off. It will automatically restart when the temperature rises 2°F above the cut off.

**CAUTION:** If the unit is not equipped with the 0°F low ambient option this setpoint should never be below 45°F unless attended by a technician.

The HIGH AMBIENT CUT OFF is the outdoor temperature at which the unit will shut down because the ambient is too high. It will remain off until the temperature falls 5°F below the setpoint.

These are not faults which lock out the system.

The LOW AMBIENT CUT OUT is adjustable from 0°F to 60°F with a default value of 45°F. The HIGH AMBIENT CUT OUT is adjustable from 95°F to 130°F with a default value of 115°F.

**CAUTION:** On units without the Low Ambient option installed, and the High Ambient Cut Off must be set above 115°F, it is recommended that a discharge pressure transducer be field installed as additional compressor protection.

The \[\text{up} \quad \text{or} \quad \text{down}\] keys will change the setpoint 1°F at a time.

- The fourth display to appear will be:

  | MINIMUM FRESH AIR DAMPER POSITION | XX% |

**NOTE:** This function only applies to units with the economizer option installed.

The MINIMUM FRESH AIR DAMPER POSITION setpoint is the open position of the outside air damper for ventilation purposes when the economizer is not in the free cooling mode. The MINIMUM POSITION is adjustable from 0% to 50% with a default value of 10%.

The \[\text{up} \quad \text{or} \quad \text{down}\] keys will change the setpoint 1% at a time.

- The fifth display to appear will be:

  | DSCH AIR | XX.X DEG F |
  | XX.X TO XX.X DEG F |

The DISCHARGE AIR TEMPERATURE setpoint serves two functions. On units with the economizer option installed and operating in the free cooling mode, the outside air and return air dampers will be regulated to maintain the discharge air temperature setpoint. On all units operating in the cooling mode the steps of capacity of the compressors will be controlled to maintain the discharge air temperature setpoint.

The control range shown below the setpoint is the temperature range between minimum and maximum steps of capacity.

The DISCHARGE AIR TEMPERATURE is adjustable from 45°F to 66°F with a default value of 54°F.

The CONTROL RANGE is adjustable from 1°F to 5°F with a default value of 3°F.

**NOTE:** A wide range will reduce the frequency of loading/unloading the compressors thus reducing wear and tear.

The \[\text{up} \quad \text{and} \quad \text{down}\] keys change the temperature setpoint 0.1°F with each press. With each change in the setpoint the control range will also change by a corresponding amount.

- The sixth display to appear will be:

  | OIL PRESS CO | XX PSID |
  | EVAP TEMP CO | XX DEG F |

The OIL PRESSURE CUT OUT, measured as the pressure differential between oil pressure and suction pressure, is the minimum oil pressure that must be maintained when the compressor is operating or it will shut down. Also, the micro constantly monitors the oil pressure from 4 to 250 seconds after start up. In this time frame the pressure does not have to rise above the cut off setting but must rise at a predetermined rate (approximately 1 psig per 10 seconds) or the compressor will be shut down and will not restart for 180 seconds.

**NOTE:** Three system faults of any kind within 90 minutes will lock out the system.

The EVAPORATOR TEMPERATURE CUT OUT is the minimum temperature of the air leaving the evaporator coil that must be maintained to prevent a unit shut down. The unit will be enabled to restart when the temperature rises 5°F above the setpoint.

The OIL PRESSURE CUT OFF is adjustable from 15 PSID to 30 PSID with a default value of 25 PSID.

The EVAPORATOR TEMPERATURE CUT OUT is adjustable from 35°F to 55°F with a default value of 40°F.

The \[\text{up} \quad \text{or} \quad \text{down}\] keys will change the setpoints as follows:

OIL PRESS = 1 PSID at a time.  EVAP TEMP = 1°F at a time.

- The seventh display to appear will be:

  | DSH STATIC PRESSURE |
  | SP XX CO XX.X IN WC |

**NOTE:** This function is only applicable on VAV units.

The DISCHARGE STATIC PRESSURE is the pressure in inches of water column as measured in the supply air duct. The SETPOINT is the pressure which will be maintained by regulating the position of the inlet guide vanes on the supply air fan. The CUT OUT is the pressure which, if exceeded, will shut down the unit. This could occur if the building pressure should change drastically or all the VAV boxes should suddenly close.
The DISCHARGE STATIC PRESSURE SETPOINT is adjustable from 0.5 to 3.7 IN WC. The default value is 1.0 IN WC.

The DISCHARGE STATIC PRESSURE CUT OFF is adjustable from 3.0 to 9.9 IN WC with a default value of 3.0 IN WC.

The \( \uparrow \) or \( \downarrow \) keys will change the pressure settings 0.1 IN WC at a time.

- The eighth display to appear will be:

```
BLDG STATIC PRESSURE SETPOINT X.XX IN WC
```

**NOTE:** This function is only applicable on units with the modulating exhaust fan option or modulating return air fan with exhaust option installed.

The BUILDING STATIC PRESSURE is the internal pressure within the conditioned space. On units with modulating exhaust fans, the SETPOINT is the pressure which will control the operation of the exhaust air fans. When the building pressure exceeds 40% of the setpoint the first exhaust fan will start. If the pressure continues to rise the inlet guide vanes will be modulated to maintain this intermediate setpoint. If the pressure continues to rise and reaches the setpoint the second exhaust fan will come on and the inlet guide vanes will be modulated to maintain the setpoint.

On units with modulating return air fan with exhaust the SETPOINT is the pressure which will control the operation of the IGV's on the return air fan inlet.

The BUILDING STATIC PRESSURE is adjustable from 0.02 to 0.20 IN WC with a default value of 0.10 IN WC.

The \( \uparrow \) or \( \downarrow \) keys will change the setpoint settings 0.01 IN WC at a time.

- The ninth display to appear will be:

```
MANUAL OVERRIDE TMR XXX MINUTES
```

**NOTE:** This function is only applicable when the accessory room sensor with an unoccupied override push button switch is used.

The MANUAL OVERRIDE TIMER permits the occupant to temporarily operate the unit at occupied conditions when it is in the unoccupied mode. The time frame of a single override period is programmable using this function.

The TIMER is adjustable from 60 minutes to 360 minutes with a default value of 60 minutes.

The \( \downarrow \) or \( \uparrow \) keys change the the time period 15 minutes at a time.

- The tenth display to appear will be:

```
AIR MIXING TIMER XXX SECONDS
```

The AIR MIXING TIMER function only applies to the supply air fan and return air fan if installed. Whenever the fan(s) start, the timer will hold off the heating or cooling operation until the space air has circulated long enough to provide an average air temperature across the sensors. The time required to do this is variable depending on building use and construction.

The AIR MIXING TIMER is adjustable for 0 seconds to 300 seconds. The default value is 15 seconds.

The \( \downarrow \) or \( \uparrow \) keys changes the time 15 seconds at a time.

- The eleventh and twelfth displays to appear will be:

```
BUILDING PR RANGE
-0.XX TO +0.XX IN WC
```

```
BUILDING PR INPUT
X.X TO X.X VOLTS
```

These two functions are dependent upon each other.

The foregoing information on discharge static transducers would apply to BUILDING PRESSURE transducers.

The BUILDING PRESSURE RANGE is adjustable from \( \approx 0.25 \) to \( \approx 0.99 \) IN WC with a default value of \( -0.25 \) to \( +0.25 \) IN WC.

The \( \uparrow \) or \( \downarrow \) keys change the setting 0.01 IN WC at a time.

The BUILDING PRESSURE INPUT is one of two choices. It is either 0.5 to 4.5 VOLTS or the default value of 1.0 to 5.0 VOLTS.

- The thirteenth display will be one of the following:

```
VAV AIR FLOW CHECK
AIR PROVING SW ONLY
```

```
VAV AIR FLOW CHECK
AIR PROVING & STATIC PR
```

Choosing one or the other of these functions depends on the application of a VAV unit to a duct system. If the unit is connected to a dedicated duct system, then the AIR PROVING SWITCH would suffice that air is flowing through the unit to set the RUN PERMISSIVE command. However, if two or more units are connected to a common duct system, the air flow of one could influence the air flow of the other unit(s). Therefore, to set the RUN PERMISSIVE command both air flow and static pressure at the unit must be sensed.

The \( \downarrow \) or \( \uparrow \) will change the selection.

- The fourteenth display will be one of the following.

```
RETURN AIR TEMPERATURE CONTROL
```

```
SPACE AIR TEMPERATURE CONTROL
```

```
DISCHARGE AIR TEMPERATURE CONTROL
```

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Choosing one of these functions depends on customer preference. The micro will determine the mode of operation using a signal from the factory installed return air sensor or the factory installed discharge air sensor or the field installed space sensor.

The \[\uparrow\] or \[\downarrow\] key will change the selection.

- The fifteenth display will be one of the following:
  
  SUP FAN - DSCH PRESS
  RET FAN - BLDG PRESS

  NOTE: RET FAN = RETURN FAN OR EXHAUST FANS
  OR

  SUPPLY & RETURN
  FAN TRACKING MODE

  NOTE: If display í is on the screen it will be followed by the following when [ENTER] is depressed.

  FAN BOOST TYPE - (FIXD OR CALC)
  BOOST AMOUNT \[XX\] %

The selection of one or the other of these functions depends on how the IGV's are to be regulated. If the one marked á above is selected, the IGV's of the supply fan will open and close according to changes in the discharge duct static pressure, and those in the return air fan (or exhaust fans) will depend on building static pressure. If the one marked í above is selected, then the IGV's in the return air fan will follow the position of the IGV's in the supply air fan which are regulated by discharge duct static pressure. The relationship between the two will depend on the selections of the parameters of the display marked ó above. The range of the boost can be from 0 - 20%. If it is FIXED the percentage will be added to the position of the supply fan IGV's. If it is CALC(ULATED) then the boost will be in accordance with a formula in the micro.

Example:

Assume the Boost is programmed at 10% and the supply air fan vanes are 50% open.

FIXED = Boost + Sup Fan = 10 + 50 = 60% Return Fan setting

CALC = Boost + \[1 + \frac{10}{100}\] \(\frac{10}{100}\) Sup. Fan =

\[10 + \left(1 + \frac{10}{100}\right)\] 50 = 65% Return Fan setting

The \[\uparrow\] or \[\downarrow\] will change the selection of á or í above.

When display ó is on the screen, FIXD or CALC may be selected by using the \[\uparrow\] or \[\downarrow\] and pressing [ENTER] / [ADV].

Whereupon the cursor will move to the ______% and the \[\uparrow\] or \[\downarrow\] will change the selection 1% at a time.

- The sixteenth display will be the following:

RETURN AIR OFFSET
(IGNORED OR ACTIVE)

The room sensor has a slide adjustment that will change the setpoint 3°F. This feature can be aborted if so desired. It is only applicable when the room sensor is installed.

The \[\uparrow\] or \[\downarrow\] will change the selection.

- The seventeenth display will be the following:

MINIMUM IGV POSITION
\[XX\] %

The MINIMUM IGV POSITION pertains to the opening of the inlet guide vanes on the supply air fan of a VAV unit at start up. The smaller the setting the more gradual is the pressurization of the supply air duct system. The MINIMUM POSITION is programmable from 10% to 30% with a default value of 20%.

The \[\uparrow\] or \[\downarrow\] will change the setpoint 1% at a time.

- The eighteenth display will be one of the following:

CONDENSER FAN CONTROL stages the operation of the condenser fans to maintain the discharge pressure to provide proper operation of the expansion valves. If the unit is equipped with the low ambient option there will be discharge pressure transducers installed on each compressor. In this case the selection should be DISCH PRESS ONLY and the unit will operate satisfactorily to 0°F.

On the other hand, if the unit lacks the low ambient option, the condenser fans will be staged according to outside air temperature. In this case OAT & DISCH PRESS should be selected. The unit will operate satisfactorily to 45°F. If discharge pressure transducers are added to the unit at a later date, this same selection should be applied.

RETURN FAN
SELECTED

This selection only applies to 90 and 100 ton units.

OR

EXHAUST FAN
SELECTED

This selection only applies to 50, 60 and 75 ton units.

Whenever a unit has a return air fan or exhaust air fans it is imperative that the proper selection be programmed into the microprocessor. Otherwise, this selection may be ignored.

Use the \[\uparrow\] or \[\downarrow\] to make the proper selection.

CAUTION: If one of the above selections is made, then it is important to return to display 15 and recheck that the appropriate selection has been made.

- The nineteenth display will be one of the following:

COND FAN CONTROL:
DISCH PRESS ONLY

OR

COND FAN CONTROL:
OAT & DISCH PRESS

\[a.)\]

\[b.)\]

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Use the \( \uparrow \) and \( \downarrow \) to make the necessary selection.

Pressing ENTER / ADV will return the display to the first screen where the procedure may be repeated. Pressing any other key on the keyboard will cancel the process at anytime.

**DIAGNOSTIC TECHNIQUE**

One of the assets of the YORK Rooftop Unit Control is the fact that it has the ability to detect a problem and store the information in a history buffer. This makes it easier to pinpoint a fault and quickly restore the unit to proper operation.

To use the Control as a diagnostic tool proceed as follows:

If the entire unit is shut down, press the STATUS key.

If the display screen is blank refer to the TROUBLE SHOOTING SECTION of this instruction.

Otherwise, a message will appear on the screen. For all the possible messages, refer to the STATUS REPORT section of Instruction 530.55-02Y. If any one of the following appears on the screen refer to the TROUBLE SHOOTING SECTION of this instruction for assistance.

A

UNIT FAULT
HIGH AMBIENT TEMP

B

UNIT FAULT
115 VAC UNDER VOLTAGE

C

UNIT FAULT
LOW DISCHARGE TEMP

D

UNIT FAULT
LOSS OF AIR FLOW

E

UNIT FAULT
HIGH STATIC PRESSURE

There is one exception which should be noted. The following fault could appear and the fan could still be running.

MECH COOLING LOCKOUT
HEAT & VENT ONLY

If the unit is in the cooling mode and the fan is running but one or both refrigeration systems are shut down; one of the following messages will be displayed:

SYS #1 MESSAGE A
SYS #2 MESSAGE B

Any one of the following system FAULTS will appear on the screen as message A or B.

HIGH DSCH
LOW OIL PRESS
LOW SUCTION
LLSV NOT ON

If the fault clears itself the system will restart and the message will change accordingly. However, if three systems faults in any combination occurs within 90 minutes, the system will lock out. The display will not read LOCKED OUT. However, the message will not change on the screen and more information may be obtained by accessing the HISTORY which is discussed below.

**NOTE:** Whenever the unit or system is LOCKED OUT, the safety device may be reset by opening and closing the electrical circuit to the Rooftop Unit Control or turning the rocker switch on the panel off and on.

The HISTORY buffer has the ability to identify any shut down, either unit or system, as a safety shut down and the capability of storing in memory the last three safety shut downs. It also stores the operating data at the time they occurred. The history may be accessed by pressing the HISTORY key.

The display will read:

DISPLAY SAFETY SHUT DOWN NO 1 (1 TO 3)

Use the \( \uparrow \) or \( \downarrow \) to select the shut down for review.

**NOTE:** The most recent shut down will be NO 1, the second most recent NO 2, and the third most recent NO 3. History of earlier shut downs if any will have been lost.
The key is used to scroll to the next screen which will read:

```
SHUTDOWN OCCURRED
(TIME) (DATE)
```

Pressing the key will proceed to the next screen.

If the fault is a unit fault the display will be one of those shown above.

If the fault is a system fault the display will be as shown above for System #1 and System #2 with this exception. If a system (1 or 2) has experienced three safety shutdowns within 90 minutes and the remaining operating system experiences a shut down; the first display will then read:

```
SYS #1: LOCKED OUT
MESSAGE A
```

OR

```
SYS #1: MESSAGE A
```

When the key is depressed the next screen will read:

```
SYS #2: LOCKED OUT
MESSAGE B
```

OR

```
SYS #2: MESSAGE B
```

The messages will be one of those shown above for systems. Diagnostic assistance is provided in the TROUBLE SHOOTING SECTION of this instruction for each of these messages.

Operating conditions at the time of the shut down are also recorded in to memory. To scroll through the data use the key.

If a printer is not used (see Form 530.55-02Y for more details) it is suggested that a data sheet be prepared and the information recorded for analysis as it appears on the screen. The data sheet should contain the following:

```
OPERATING MODE
SYSTEM CONTROL
SUPPLY FAN
EXHAUST FAN
RETURN AIR TEMP
DISCHARGE AIR TEMP
SPACE TEMP
OUTSIDE AIR TEMP
COOLING SETPOINT
HEATING SETPOINT
DISCHARGE STATIC PRESSURE
BUILDING PRESSURE
LOW AMBIENT CUT OUT
LOW PRESSURE CUT OUT
EVAP TEMP CUT OUT
RUN PERMISSIVE

COMPRESSOR 1 DATA
COMPRESSOR STATUS
SUCTION PRESSURE
OIL PRESSURE
DISCHARGE PRESSURE
LIQUID LINE SOLENOID
STAGES OF LOADING
CONDENSER FAN STAGE
RUN TIME
HOT GAS VALVE

COMPRESSOR 2 DATA
COMPRESSOR STATUS
SUCTION PRESSURE
OIL PRESSURE
DISCHARGE PRESSURE
LIQUID LINE SOLENOID
STAGES OF LOADING
CONDENSER FAN STAGE
RUN TIME

ECONOMIZER & HEATING DATA
OUTSIDE AIR DAMPER
RETURN AIR DAMPER
GAS OR ELEC HEATING STAGES
HOT WATER MODULATING VALVE

FAN DATA
FAN OPERATION MODE
FAN TRACKING MODE
FAN BOOST:
SUP FAN INLET GUIDE VANES
EXH FAN INLET GUIDE VANES
SF RUN TIME
EF RUN TIME

FAN DATA
TEMPERATURE CONTROL
LEAD COMPRESSOR
RETURN AIR OFFSET
ENTHALPY
VAV AIRFLOW SENSOR

*ONLY ON UNITS WITH DISCHARGE PRRESSURE TRANSDUCER INSTALLED.
```
**TROUBLESHOOTING**

An analysis of the data will very often pinpoint the problem. Nevertheless, the following guides have been prepared to aid the technician in finding a solution to a FAULT that appears in the display.

**NOTE:** The micro only detects control faults. It does not detect mechanical faults. For example a liquid line solenoid may burn out and one might expect the display to read **LLSV NOT OPEN** because the pressure at which the solenoid should have opened had been reached so as far as the micro is concerned the valve has opened.

<table>
<thead>
<tr>
<th>DISPLAY</th>
<th>POSSIBLE CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
</table>
| BLANK SCREEN       | 1. MALFUNCTIONING MICRO BOARD. | 1. PERFORM THE FOLLOWING CHECKS: \( \begin{align*} 
\text{1.} & \quad \text{CHECK +5V, +12V, +24V & +30V POWER SUPPLIES.} \\
\text{2.} & \quad \text{MAKE CERTAIN CORRECT EPROM IS INSTALLED PROPERLY IN MICRO BOARD.} \\
\text{2.} & \quad \text{CHECK DISPLAY CABLE FROM MICRO BOARD TO DISPLAY BOARD.} \\
\text{3.} & \quad \text{INSTALL NEW DISPLAY BOARD.} \\
\text{4.} & \quad \text{INSTALL NEW MICRO BOARD.} \\
\end{align*} \) |
|                    | 2. WIRING ERROR TO DISPLAY BOARD. | 2. CHECK DISPLAY CABLE FROM MICRO BOARD TO DISPLAY BOARD. |
|                    | 3. DEFECTIVE DISPLAY BOARD. | 3. INSTALL NEW DISPLAY BOARD. |
|                    | 4. DEFECTIVE MICRO BOARD. | 4. INSTALL NEW MICRO BOARD. |

**UNIT FAULTS**

<table>
<thead>
<tr>
<th>DISPLAY</th>
<th>POSSIBLE CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH AMBIENT TEMP</td>
<td>1. HIGH AMB CUT OUT SET TOO LOW.</td>
<td>1. REPROGRAM HIGH AMBIENT CUT OUT.</td>
</tr>
</tbody>
</table>
|                | 2. OAT SENSOR PROBLEMS. | 2. ù CHECK FOR PROPER WIRING TO OAT SENSOR. CORRECT IF NECESSARY. \( \begin{align*} 
\text{1.} & \quad \text{CHECK OUTPUT VOLTAGE OF OAT SENSOR TO THE EXPECTED VALUE. IF DEFECTIVE CHANGE OAT SENSOR.} \\
\text{3.} & \quad \text{CHECK LOCATION OF OAT SENSOR, MAKE CERTAIN IT IS NOT BEING AFFECTED BY REVERSE FAN OPERATION OR DIRECT SUNLIGHT.} \\
\end{align*} \) |
|                | 3. OAT SENSOR LOCATION. | 3. CHECK LOCATION OF OAT SENSOR, MAKE CERTAIN IT IS NOT BEING AFFECTED BY REVERSE FAN OPERATION OR DIRECT SUNLIGHT. |

<table>
<thead>
<tr>
<th>DISPLAY</th>
<th>POSSIBLE CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOSS OF AIR FLOW</td>
<td>1. SUPPLY FAN NOT OPERATING.</td>
<td>1. CHECK SUPPLY FAN MOTOR, FUSES, STARTER AND OVERLOAD ELEMENTS. REPLACE IF NECESSARY.</td>
</tr>
<tr>
<td></td>
<td>2. SUPPLY FAN ROTATING IN REVERSE.</td>
<td>2. REWIRE MOTOR FOR PROPER ROTATION OF SUPPLY FAN.</td>
</tr>
<tr>
<td></td>
<td>3. NOT CONFIGURED FOR VAV OPTION.</td>
<td>3. IF VAV NOT SELECTED, REPROGRAM THE OPTION.</td>
</tr>
<tr>
<td></td>
<td>4. STATIC PRESSURE TRANSDUCER LOCATION.</td>
<td>4. CHECK INSTALLATION OF DISCHARGE STATIC PRESSURE TRANSDUCER. MAKE CERTAIN PROBE IS IN CORRECT POSITION OF DUCT WORK TO DETECT THE STATIC PRESSURE AND PLASTIC TUBING IS AIR TIGHT.</td>
</tr>
</tbody>
</table>
|                | 5. STATIC PRESSURE TRANSDUCER PROBLEM. | 5. ù CHECK Wiring of DISCHARGE STATIC TRANSDUCER. CORRECT IF NECESSARY. \( \begin{align*} 
\text{1.} & \quad \text{CHECK VOLTAGE OUTPUT OF TRANSDUCER TO EXPECTED VALUE. IF DEFECTIVE REPLACE.} \\
\text{2.} & \quad \text{CHECK PROGRAMMED RANGE AND INPUT VOLTAGE SETPOINTS. REPROGRAM IF IN ERROR.} \\
\text{5.} & \quad \text{CHECK RESISTOR (R2) FOR PROPER VALUE. REPLACE IF WRONG.} \\
\end{align*} \) |
|                | 6. NOT CONFIGURED FOR CONSTANT VOLUME OPTION. | 6. IF CONSTANT VOLUME NOT SELECTED, REPROGRAM THE OPTION. |
|                | 7. POOR AIR FLOW SWITCH LOCATION. | 7. IF NOT SENSING AIR FLOW, RELOCATE. |
|                | 8. AIR FLOW SWITCH MALFUNCTION. | 8. MAKE CERTAIN AIR FLOW SWITCH OPERATES PROPERLY. IF NOT REPLACE SWITCH. |
### 115VAC UNDER VOLTAGE

<table>
<thead>
<tr>
<th>Display</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Absence of 115VAC to 24VAC Transformer</td>
<td>1. See loss of air flow checks.</td>
<td></td>
</tr>
<tr>
<td>2. Absence of 24VAC to micro board</td>
<td>2. Check wiring &amp; internal fuse on secondary side of 120/24VAC transformer. (3T)</td>
<td></td>
</tr>
</tbody>
</table>

### HIGH STATIC PRESSURE

<table>
<thead>
<tr>
<th>Display</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Discharge static transducer problem.</td>
<td>2. Check wiring of discharge static transducer. Correct if necessary.</td>
<td></td>
</tr>
<tr>
<td>3. Discharge static cut out setpoint programmed too low.</td>
<td>3. Check programmed static pressure setpoint. If incorrect, reprogram.</td>
<td></td>
</tr>
</tbody>
</table>

### LOW DISCHARGE TEMP

<table>
<thead>
<tr>
<th>Display</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Supply fan not operating properly.</td>
<td>1. Check supply fan motor, fuses, starter and overloads. Replace if necessary.</td>
<td></td>
</tr>
<tr>
<td>2. Discharge air cut out setpoint programmed too low.</td>
<td>2. Check discharge air temperature cut out setpoint. If incorrect reprogram.</td>
<td></td>
</tr>
<tr>
<td>3. Dat sensor problems.</td>
<td>3. Make certain discharge air temperature sensor, is located to detect the dat. Correct if necessary.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check wiring of dat. sensor correct if necessary. Check voltage output of dat. sensor to expected value. Replace if defective.</td>
</tr>
</tbody>
</table>

### MECH COOLING LOCKOUT - HEAT & VENT ONLY

<table>
<thead>
<tr>
<th>Display</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Low amb cut out set too high.</td>
<td>1. Reprogram low ambient cut out.</td>
<td></td>
</tr>
<tr>
<td>2. Oat sensor problems.</td>
<td>2. Check for proper wiring to oat sensor. Correct if necessary. Check output voltage of oat sensor to the expected value. If defective change oat sensor.</td>
<td></td>
</tr>
</tbody>
</table>

### SYSTEM FAULTS

<table>
<thead>
<tr>
<th>Display</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Dsch</td>
<td>1. High pressure cut out set points too low.</td>
<td>1. Reprogram high pressure cut out.</td>
</tr>
<tr>
<td></td>
<td>2. Discharge press sensor problems.</td>
<td>2. Check wiring of discharge transducer. Correct if necessary. Check output voltage of discharge transducer to the expected output. Change discharge transducer if required.</td>
</tr>
<tr>
<td></td>
<td>3. High amb cut out set too high</td>
<td>3. Reprogram high ambient cut out.</td>
</tr>
<tr>
<td></td>
<td>5. Condenser fan(s) not operational.</td>
<td>5. Check fans, fuses and contactors and internal overloads. Replace if necessary.</td>
</tr>
<tr>
<td></td>
<td>6. Condenser fan(s) running in reverse.</td>
<td>6. Rewire motor for correct rotation of condenser fan(s).</td>
</tr>
<tr>
<td></td>
<td>7. Air flow to condenser coils restricted.</td>
<td>7. Remove any obstructions to air flow into condenser.</td>
</tr>
<tr>
<td></td>
<td>8. Too much refrigerant in system.</td>
<td>8. Evacuate and recharge to proper level of refrigerant.</td>
</tr>
</tbody>
</table>
### LOW OIL PRESS

<table>
<thead>
<tr>
<th>DISPLAY</th>
<th>POSSIBLE CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW OIL PRESS</td>
<td>1. LOW OIL CHARGE.</td>
<td>1. VISUALLY INSPECT OIL LEVEL USING SIGHT GLASS. IF OIL IS REQUIRED, ADD YORK “C” OIL TO PROPER LEVEL.</td>
</tr>
<tr>
<td></td>
<td>2. REFRIGERANT IN OIL.</td>
<td>2. CHECK CRANKCASE HEATER FOR PROPER OPERATION. (HEATER SHOULD BE ON AT LEAST 8 HOURS PRIOR TO START UP.)</td>
</tr>
<tr>
<td></td>
<td>3. WIRING ERROR TO OIL OR SUCTION PRESSURE TRANSDUCER.</td>
<td>3. CHECK WIRING TO BOTH OIL AND SUCTION TRANSDUCERS. CORRECT IF NECESSARY.</td>
</tr>
<tr>
<td></td>
<td>4. DEFECTIVE OIL OR SUCTION PRESSURE TRANSDUCER.</td>
<td>4. CHECK OUTPUT VOLTAGE OF TRANSDUCER TO THE EXPECTED OUTPUT. CHANGE TRANSDUCER IF REQUIRED.</td>
</tr>
<tr>
<td></td>
<td>5. DEFECTIVE LIQUID LINE SOLENOID.</td>
<td>5. CHECK LIQUID LINE SOLENOID, IF DEFECTIVE CHANGE VALVE.</td>
</tr>
<tr>
<td></td>
<td>6. DEFECTIVE OIL PUMP IN COMPRESSOR.</td>
<td>6. CHECK OIL PUMP, IF DEFECTIVE CHANGE PUMP.</td>
</tr>
<tr>
<td></td>
<td>7. COMPRESSOR MOTOR PROTECTOR TRIPPED.</td>
<td>7. ù CHECK COMPR. WIRING, CORRECT IF NECESSARY. ù CHECK MOTOR PROTECTOR, REPLACE IF DEFECTIVE.</td>
</tr>
<tr>
<td></td>
<td>8. MECHANICAL HIGH PRESSURE CUT OUT OPENED.</td>
<td>8. ù CHECK HIGH PRESS CUT OUT, REPLACE IF DEFECTIVE. ù CHECK SYSTEM FOR HIGH HEAD PRESSURE (SEE SOLUTIONS 5-8 UNDER HIGH DISCH DISPLAY ABOVE).</td>
</tr>
</tbody>
</table>

### LOW SUCTION

<table>
<thead>
<tr>
<th>DISPLAY</th>
<th>POSSIBLE CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW SUCTION</td>
<td>1. SUCTION PRESSURE CUTOUT SETPOINT TOO HIGH.</td>
<td>1. REPROGRAM SUCTION PRESSURE CUT OUT.</td>
</tr>
<tr>
<td></td>
<td>2. LOW REFRIGERANT CHARGE.</td>
<td>2. ADD PROPER CHARGE TO UNIT.</td>
</tr>
<tr>
<td></td>
<td>3. THERMAL EXPANSION VALVE ADJUSTMENT/FAILURE.</td>
<td>3. ù ADJUST COMPRESSOR SUCTION SUPERHEAT FOR 11ÉF. ù REPLACE POWER ELEMENT OF VALVE.</td>
</tr>
<tr>
<td></td>
<td>4. FAULTY WIRING TO SUCTION TRANSDUCER.</td>
<td>4. CHECK FOR PROPER WIRING TO SUCTION TRANSDUCER. CORRECT IF FAULTY.</td>
</tr>
<tr>
<td></td>
<td>5. DEFECTIVE SUCTION PRESSURE TRANSDUCER.</td>
<td>5. CHECK OUTPUT VOLTAGE OF TRANSDUCER TO THE EXPECTED VALUE. IF DEFECTIVE CHANGE TRANSDUCER.</td>
</tr>
<tr>
<td></td>
<td>6. BLOCKAGE IN THE REFRIGERANT PIPING.</td>
<td>6. ù CHECK SUCTION LINE FOR BLOCKAGE IN SUCTION STRAINER, CLEAN IF NECESSARY. CHECK FILTER DRYER, REPLACE IF REQUIRED. ù CHECK FOR KINKS OR DINGS IN LINES. REPAIR DEFECTS.</td>
</tr>
<tr>
<td></td>
<td>7. DEFECTIVE LIQUID LINE SOLENOID.</td>
<td>7. CHECK SOLENOID COIL AND VALVE, IF DEFECTIVE, REPLACE.</td>
</tr>
</tbody>
</table>

### LLSV* NOT ON

<table>
<thead>
<tr>
<th>DISPLAY</th>
<th>POSSIBLE CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLSV* NOT ON</td>
<td>1. SUCTION PRESSURE CUTOUT SETPOINT TOO LOW.</td>
<td>1. REPROGRAM SUCTION PRESSURE CUT OUT.</td>
</tr>
<tr>
<td></td>
<td>2. FAULTY WIRING TO SUCTION TRANSDUCER AND SOLENOID.</td>
<td>2. CHECK FOR PROPER WIRING TO SUCTION TRANSDUCER AND SOLENOID, CORRECT IF NECESSARY.</td>
</tr>
<tr>
<td></td>
<td>3. DEFECTIVE SUCTION PRESSURE TRANSDUCER.</td>
<td>3. CHECK OUTPUT VOLTAGE OF TRANSDUCER TO THE EXPECTED VALUE. IF DEFECTIVE CHANGE TRANSDUCER.</td>
</tr>
<tr>
<td></td>
<td>4. FAULTY SUCTION OR DISCHARGE VALVES IN COMPRESSOR.</td>
<td>4. CHECK PUMPING CAPABILITY OF COMPRESSOR AND/OR LEAK BACK. REPLACE VALVES.</td>
</tr>
</tbody>
</table>
CHECKING SUPPLY VOLTAGES

On the micro board there are 4 voltage and 1 ground test points to determine if the proper voltage is being supplied to various on-board circuits. These test points are not all in one location. However, they are clearly marked as follows:

<table>
<thead>
<tr>
<th>Test Point</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPA</td>
<td>GRD</td>
</tr>
<tr>
<td>TPB</td>
<td>+5V</td>
</tr>
<tr>
<td>TPC</td>
<td>+12V</td>
</tr>
<tr>
<td>TPD</td>
<td>+24V</td>
</tr>
<tr>
<td>TPE</td>
<td>+30V</td>
</tr>
</tbody>
</table>

When the board is energized (rocker switch on keypad maybe either ON or OFF, unit switch [SW1] must be ON), a direct current voltmeter connected from TPA (GRD) and another test point should read the voltage indicated above.

CHECKING TRANSDUCERS

To determine if a transducer is defective, the input and output voltages and the pressure surrounding the transducer must be measured.

The first tests may be made at the micro board as follows:

After accessing the board locate the junction blocks and sockets marked J4; J7 and J5 (the markings are incapsulated on the board).

J4 and J7 are identical. J4 is system number 1 and J7 is system number 2. The discharge static pressure and building static pressure transducers are connected at J5.

On the left side of the junction blocks are also encapsulated a row of numbers to identify the terminals of the junction and socket. For example:

![Table with numbers]

It is possible to insert voltmeter needle point probes along side of the wires in the connecting socket to obtain a reading. The voltmeter must measure D.C. voltage and have an adjustable scale to 5 volts.

Since J4 and J7 are identical the following would apply to the system transducers.

<table>
<thead>
<tr>
<th>Transducer</th>
<th>Voltage Input Use Terminals</th>
<th>Voltage Output Use Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suction Pressure</td>
<td>1 - 5 @ J4 OR J7</td>
<td>1 - 10 @ J4 OR J7</td>
</tr>
<tr>
<td>Oil Pressure</td>
<td>3 - 6 @ J4 OR J7</td>
<td>3 - 11 @ J4 OR J7</td>
</tr>
<tr>
<td>High Pressure</td>
<td>8 - 7 @ J4 OR J7</td>
<td>8 - 12 @ J4 OR J7</td>
</tr>
</tbody>
</table>

The input voltage should read +5 volts. If not the problem is in the power supply to the board.

The output voltage will vary depending on the measured pressure as follows:

The voltage reading for the transducers connected at J5 may be obtained as follows:

<table>
<thead>
<tr>
<th>Transducer</th>
<th>Voltage Input Use Terminals</th>
<th>Voltage Output Use Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge Static Pressure</td>
<td>4 - 9 @ J5</td>
<td>4 - 14 @ J5</td>
</tr>
<tr>
<td>Building Static Pressure</td>
<td>6 - 10 @ J5</td>
<td>6 - 15 @ J5</td>
</tr>
</tbody>
</table>

The input voltage should read +5 volts. If not the problem is in the power supply to the board.

The output voltage will vary depending on the measured pressure as follows:

<table>
<thead>
<tr>
<th>Discharge Static Pressure Transducers</th>
<th>Output Voltage VS Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1V = 0 INWC</td>
</tr>
<tr>
<td></td>
<td>2V = 1.25 INWC</td>
</tr>
<tr>
<td></td>
<td>3V = 2.50 INWC</td>
</tr>
<tr>
<td></td>
<td>4V = 3.75 INWC</td>
</tr>
<tr>
<td></td>
<td>5V = 5.0 INWC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Building Static Pressure Transducers</th>
<th>Output Voltage VS Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1V = -0.25 INWC</td>
</tr>
<tr>
<td></td>
<td>2V = -0.125 INWC</td>
</tr>
<tr>
<td></td>
<td>3V = 0 INWC</td>
</tr>
<tr>
<td></td>
<td>4V = +0.125 INWC</td>
</tr>
<tr>
<td></td>
<td>5V = +0.25 INWC</td>
</tr>
</tbody>
</table>

If these checks indicate the transducer may be defective a check at the transducer should also be considered.

Each transducer comes with a three wire pigtail and waterproof connector attached. The wires are color coded as follows.

Red = Input voltage  
Black = Ground  
White or Green = Output signal

The input voltage may be easily measured by disconnecting the waterproof connector and checking the voltage between the red and black wires in the connector half that comes from the control center. This should read 5 volts. If not, the problem is in wiring between the micro board and the transducer.

The output voltage may be measured. It must be measured with the transducer connected to the micro board and installed in its normal location. To obtain a voltage reading, the insulation on the White or Green wire and the Black wire must be scratched away to expose enough bare conductor to make good contact with the voltmeter probes. The voltage should be in accordance with the above specifications.

If the transducer is proven to be good after the voltage check, be sure to apply electrical tape to cover the exposed conductors.
CHECKING TEMPERATURE SENSORS

The performance of temperature sensors may be checked by measuring the voltage input and output and the temperature of the air surrounding the sensor.

The outside air and discharge air temperature sensors are connected to the micro board at junction J6. Voltage measurements may be made as follows:

<table>
<thead>
<tr>
<th>SENSOR</th>
<th>VOLTAGE INPUT USE TERMINALS</th>
<th>VOLTAGE OUTPUT USE TERMINALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTSIDE AIR</td>
<td>1 - 4 @ J6</td>
<td>1 - 7 @ J6</td>
</tr>
<tr>
<td>DISCHARGE AIR</td>
<td>2 - 5 @ J6</td>
<td>2 - 8 @ J6</td>
</tr>
</tbody>
</table>

The input voltage should read +5V.

The output voltage will vary depending on the measured temperatures as follows:

<table>
<thead>
<tr>
<th>OUTSIDE AIR Output Voltage vs Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5V = 33.7°F</td>
</tr>
<tr>
<td>2.0V = 50.0°F</td>
</tr>
<tr>
<td>2.5V = 65.5°F</td>
</tr>
<tr>
<td>3.0V = 80.8°F</td>
</tr>
<tr>
<td>3.5V = 100.8°F</td>
</tr>
<tr>
<td>4.0V = 127.9°F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DISCHARGE AIR Output Voltage vs Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5V = 30.0°F</td>
</tr>
<tr>
<td>2.0V = 47.0°F</td>
</tr>
<tr>
<td>2.5V = 64.2°F</td>
</tr>
<tr>
<td>3.0V = 82.5°F</td>
</tr>
<tr>
<td>3.5V = 103.3°F</td>
</tr>
<tr>
<td>4.0V = 130.8°F</td>
</tr>
</tbody>
</table>

NOTE: The above are not linear, so errors will occur in interpretations especially at the higher and lower temperatures.

There are two other sensors which might possibly fail and cause operational difficulties. They are the return air temperature sensor and the space temperature sensor (optional). The former is connected to the micro at J6 and the latter at J5. The voltage measurements may be made as follows:

<table>
<thead>
<tr>
<th>SENSOR</th>
<th>VOLTAGE INPUT USE TERMINALS</th>
<th>VOLTAGE OUTPUT USE TERMINALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>RETURN AIR</td>
<td>3 - 6 @ J6</td>
<td>3 - 9 @ J6</td>
</tr>
<tr>
<td>SPACE AIR</td>
<td>1 - 7 @ J5</td>
<td>1 - 12 @ J5</td>
</tr>
</tbody>
</table>

The input voltage should be +5V.

The output voltage will vary depending on the temperature at the sensor. The voltage vs temperature performance of both is the same as the DISCHARGE AIR SENSOR shown above.