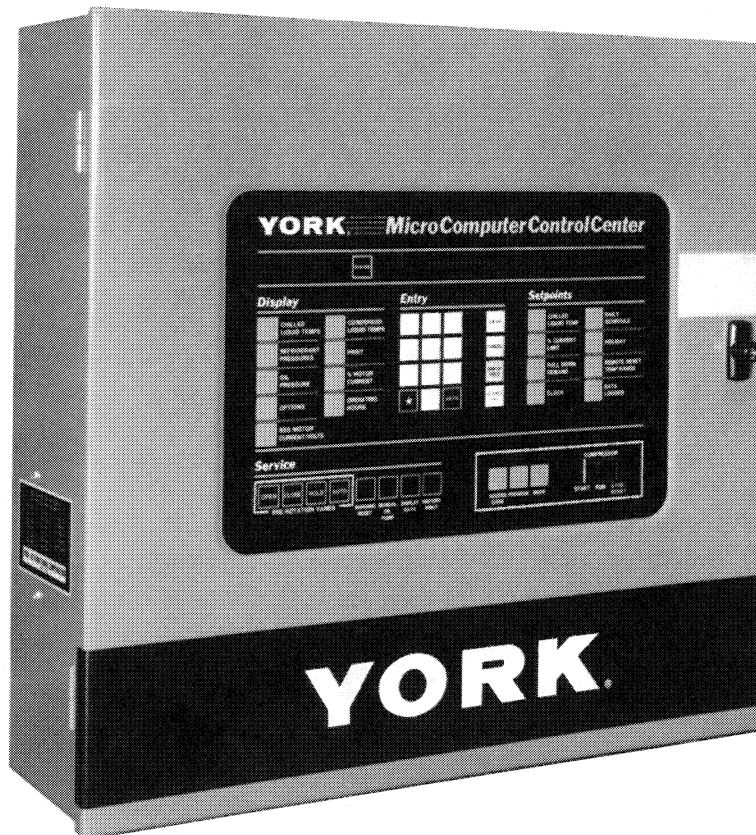


MICROCOMPUTER CONTROL CENTER
Part No. 031-00954
for
MODEL YTA1A1B1 THRU YTL6X6F2 (STYLE E)
and
MODEL YTA1A1B1 THRU YTL3X3E2 (STYLE E)
FACTORY PACKAGED TURBO-MODULATOR II SYSTEM
COOLING AND HEAT RECOVERY UNITS
150 THRU 1000 TONS



• YORK
MicroComputer
Control Center

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WARNING

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever action may be required to correct the interference.

Additionally, any electronic equipment can generate EMI (electromagnetic interference) which, depending upon the installation and magnitude, may affect other electronic equipment. The amount of EMI generated is determined by the source inductance, load inductance, and circuit impedances. Responsibility for assuring the satisfactory operation of other equipment included in the same power source as the YORK equipment rests solely with the user. YORK disclaims any liability resulting from any interference or for the correction thereof.

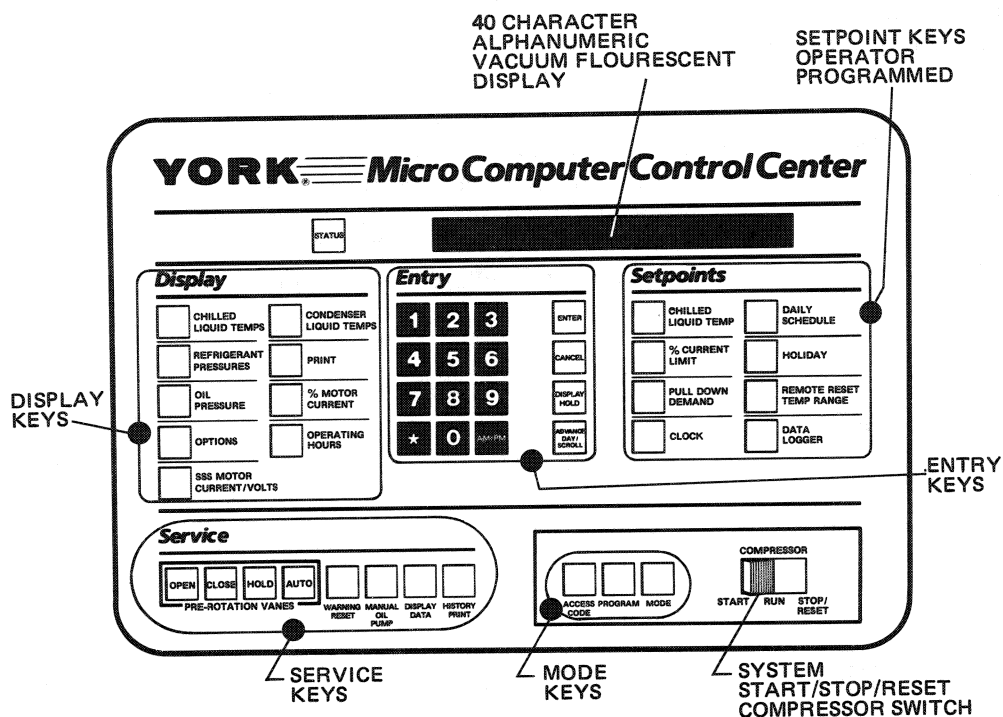
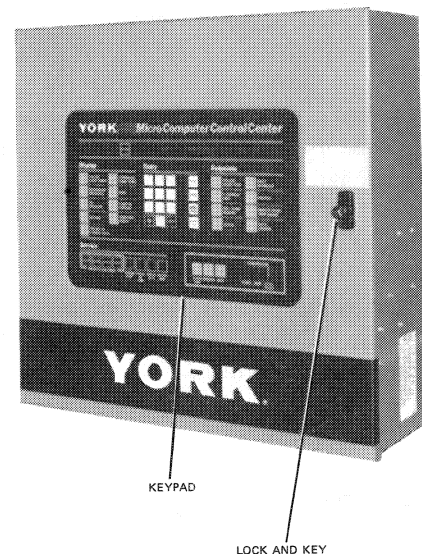


FIG. 1 - MICROCOMPUTER CONTROL CENTER AND KEYPAD

INTRODUCTION

The York MicroComputer Control Center is a microprocessor based control system for R-11 centrifugal chillers. It controls the leaving chilled water temperature via pre-rotation vane control and has the ability to limit motor current via control of the pre-rotation vanes. Further, it is compatible with YORK Solid State Starter, electro-mechanical starter and Turbo-Modulator applications.

A keypad mounted on the front of the Control Center (see Fig. 1) allows the operator to display system operating parameters on a 40 character alphanumeric display that is part of the keypad. These readings are displayed via "Display" keypad as follows: (In the English mode; temperatures in °F, pressures in (PSIA) (in the metric mode, temperatures in °C, Pressures in KPa).

- CHILLED LIQUID TEMPERATURES - LEAVING AND RETURN
- REFRIGERANT PRESSURES - EVAPORATOR AND CONDENSER
- DIFFERENTIAL OIL PRESSURE
- CONDENSER LIQUID TEMPERATURES - OPTIONAL FIELD INSTALLED - LEAVING AND RETURN

- OPTIONS
- PRINT
- HISTORY PRINT
- MOTOR CURRENT IN % OF FULL LOAD AMPS
- SATURATION TEMPERATURES - EVAPORATOR AND CONDENSER
- DISCHARGE TEMPERATURE
- OIL TEMPERATURE
- PURGE PRESSURE
- SOLID STATE STARTER MOTOR CURRENT/VOLTS

The system setpoints (see Fig. 1) are operator entered on the front control center "Setpoints" keypad. These setpoints can also be displayed on the 40 character alphanumeric display. The system setpoints are:

- CHILLED LIQUID TEMPERATURE (LCWT)
- %CURRENT LIMIT
- PULLDOWN DEMAND LIMIT
- CLOCK (TIME-OF-DAY)
- DAILY SCHEDULE (7 DAY TIME-CLOCK PROGRAMMING)
- HOLIDAY
- REMOTE RESET TEMPERATURE RANGE
- DATA LOGGER

The cause of all system shutdowns (safety or cycling) is preserved (until the system is reset or restarts) in the microcomputer's memory for subsequent viewing on the keypad display. The operator is continually advised of system operating conditions by various background and warning messages. The keypad contains special service keys for use by the service technician when performing system troubleshooting.

The MicroComputer Control Center is designed to be compatible with most energy management systems (EMS) in use today. The standard design allows for the following EMS interface:

1. Remote Start
2. Remote Stop
3. Remote LCWT Setpoint (Pulse Width Modulated signal)
4. Remote Current Limit Setpoint (Pulse Width

Modulated signal)

5. A "Remote Mode Ready to Start" Status Contacts
6. Safety Shutdown Status Contacts
7. Cycling Shutdown Status Contacts

As an enhancement to the standard EMS features, an optional card file with plug-in printed circuit boards is available. These optional cards will accept a remote LCWT 0 to 10°F or 0 to 20°F setpoint offset and/or remote current limit setpoint interface from three user input choices:

1. 4-20 MA
2. 0-10 VDC
3. contact closures

CONTROL CENTER

The Control Center front panel layout consists of five key groups, one switch, and a 1 line by 40 character alphanumeric vacuum fluorescent display: (See Fig. 1.)

CHARACTER DISPLAY - The alphanumeric vacuum fluorescent display is located to the right of the "STATUS" key. All messages, parameters, set points, and data can be viewed at this location. The main communications between the operator or service technician and the Micro Computer Control Center occurs on this display.

DISPLAY - Provide a direct read out of each monitored parameter on the alphanumeric display.

ENTRY - These keys are used to enter the values for the operator programmed setpoints. These keys are used in conjunction with the **SETPOINT** keys while in program mode.

SETPOINTS - These keys are used as follows:

1. To view each setpoint, in any Mode, or
2. To select the individual setpoints that are programmed by the operator in Program Mode only.

Pressing the appropriate key enables the operator to program that setpoint pressing the **ENTRY** keys.

SERVICE - Included in this group of keys are those functions that are only relevant to servicing the chiller.

Typically, these keys would not be used for daily chiller operation.

ACCESS CODE - Permits operator to access the program.

PROGRAM - Permits operator to program the Control Center.

MODE - Permits operator to check what mode the control center is presently in (**LOCAL**, **REMOTE** or **SERVICE**).

1. **Service** - allows manual PRV control with visual display readout of PRV operation.
2. **Local** - allows manual compressor start from the "COMPRESSOR" switch on control center front.
3. **Program** - allows operator programming of system setpoints.
4. **Remote** - allows remote start, remote stop of compressor and remote reset of LCWT and % current limit.

COMPRESSOR-START, RUN, STOP/RESET SWITCH - This 3-position rocker switch is used to start (except in remote mode), stop/run/reset the system.

OPERATION

DISPLAYING SYSTEM PARAMETERS

The **Display** keys are used to display selected monitored parameters as follows: (Refer to Fig. 1).

- Press and release the appropriate **DISPLAY** key - the message will be displayed for 2 seconds.
— or —
- Press and hold the appropriate **DISPLAY** key - the message will be displayed and updated every 0.5 seconds until the **DISPLAY** key is released.
— or —
- Press and release appropriate **DISPLAY** key, then press and release the **DISPLAY HOLD** key - the message will be displayed and updated every 2 seconds until the **DISPLAY HOLD** key is again pressed and released, or 10 minutes have elapsed, whichever comes first.

NOTE: If the display actually displays X's, then the monitored parameter is out of normal operating range (Ref. Fig. 2). If the "English/Metric" jumper is installed on the Micro Board, all temperatures are displayed in degrees Fahrenheit (°F) and all pressures are displayed in pounds per sq. inch absolute (PSIA), except oil pressure which is displayed in pounds per sq. inch differential (PSID). If the "English/Metric" jumper is not installed, all temperatures are displayed in degrees Centigrade (°C) and all pressures are displayed in Kilo-Pascals (KPa).

		EPROM VERSION	DISPLAY READS
Condenser Pressure	= <9.3 PSIA; >41.6 PSIA	(3.B) (3.C)	XX.X
	= <10.0 PSIA; >40.0 PSIA	(Later Versions)	XX.X
Evaporator Pressure	= <5.0 PSIA; >12.9 PSIA	(3.B) (3.C)	XX.X
	= <4.0 PSIA; >12.5 PSIA	(Later Versions)	XX.X
Purge Pressure	= <9.0 PSIA; >78.2 PSIA	(3.B)(3.C)(3.E)	XX.X
	= <14.7 PSIA or > 75.0 PSIA (Low Pressure Purge Unit)	(Later Versions)	XX.X PSIA
	= <00.0 PSIA or >100.0 PSIA (High Pressure Pump Assisted Purge Unit)	031-01097-001 Thru -012 Rev. .10 and higher	XX.X PSIA
Discharge Temp.	= <20.3°F; >226.4°F		XX.X
Oil Temp.	= <20.3°F; >226.4°F		XX.X
Leaving Condenser Water Temp.	= <8.4°F; >114.4°F		XXX.X °F
Entering Condenser Water Temp.	= <8.4°F; >114.4°F		XXX.X°F
Leaving Evaporator Water Temp.	= <0°F		XX.X°F
	= >81.1°F		81.1°F
Entering Evaporator Water Temp.	= <.1°F		XX.X°F
	= >93°F		93°F

FIG. 2 – SYSTEM PARAMETERS - OUT OF RANGE READINGS
YORK APPLIED SYSTEMS

To Display **CHILLED LIQUID TEMPERATURES:**

Press **CHILLED LIQUID TEMPS** display key as described in column one to produce the following alphanumeric display message:

CHILLED LEAVING = XX.X °F, RETURN = XX.X °F

To Display **REFRIGERANT PRESSURE:**

Use **REFRIGERANT PRESSURE** display key as described in column one to produce the following alphanumeric display message:

EVAP = XX.X PSIA, COND = XX.X PSIA

To Display **OIL PRESSURE:**

Use **OIL PRESSURE** display key as described in column one to produce the following alphanumeric display message:

OIL PRESSURE = XX.X PSID

To Display **OPTIONS:**

Use the **OPTIONS** key to display and program the optional parameters for "Guardian Service" and "Remote Chiller Communications". Refer to instruction Form **160.46-NOM 4.1** for operation and programming. If this option is not installed,

NO OPTIONS INSTALLED is displayed when this key is pressed.

To Display **SSS MOTOR CURRENT/VOLTS:** (Solid State Starter Applications Only)

If chiller is equipped with a YORK Solid State Starter, use **SSS MOTOR CURRENT/VOLTS** key to display 3-phase compressor motor current and 3-phase solid state starter input line voltage.

Continuously pressing this key will display the motor current and line voltage alternately. When used with the **DISPLAY HOLD** key, motor current and line voltage will alternately be displayed each time this key is pressed. The messages are as follows:

'A AMPS = XXXX; B AMPS = XXXX; C AMPS = XXXX'

'V A-B = XXXX; V B-C = XXXX; V C-A = XXXX'

If chiller is not equipped with a Solid State Starter, this key produces the following message:

SOLID STATE STARTER NOT INSTALLED

In program mode, this key is used to display the applicable line voltage range (200-208 VAC, 220-240 VAC, 380 VAC, 400 VAC, 415 VAC, 440-480 VAC, 500-600 VAC, Supply Voltage Range Disabled). The correct line voltage range is programmed at the YORK factory and is checked by the service technician at start-up. For security reasons, a special access code is required to program the line voltage range. The line voltage range is used to determine a low line voltage threshold for cycling shutdown. Refer to "SYSTEM SETPOINTS" next column for Trip/Reset values.

To Display CONDENSER LIQUID TEMPERATURES (Field Installed Option Package):

Use CONDENSER LIQUID TEMPS display key as described above to produce the following alphanumeric display message:

COND LEAVING = XXX.X °F. RETURN = XXX.X °F

NOTE: If the condenser liquid thermistors are not connected, the display will blank when this key is pressed.

To initiate a PRINT to Printer:

Press the PRINT key to initiate a printout to an optional printer. When the key is pressed,

PRINT ENABLE

is displayed. Refer to "MicroComputer Control Center — System Status Printers" instruction (Form 160.46-NO1.2) for details of the optional printers.

To Display MOTOR CURRENT:

Press the % MOTOR CURRENT display key as described above to display motor current as a percent of Full Load Amps (FLA). The message is as follows:

MOTOR CURRENT = XXX% FLA

NOTE: • Liquid Cooled Solid State Starter Applications - the % Motor Current displayed is the highest of three line currents divided by the programmed chiller FLA value x 100%.

• Electro-Mechanical Starter Applications - the % of Motor Current displayed is the highest of the three line currents converted to analog voltage calibrated to be 9.7 VDC @ 100% FLA.

To Display OPERATING HOURS:

Use the OPERATING HOURS key as described in column one, page 5, to produce the following message:

ACCUMULATED RUN TIME = XXXXX HRS

Version 3.E and later EPROM versions provide OPERATING HOURS and STARTS COUNTER:

OPER. HOURS = XXXX; START COUNTER = XXXX

SYSTEM SETPOINTS

The system setpoints may be programmed by the system operator. The Setpoints keys are located on the Control Center keypad (See Fig. 1). To program, see "Programming System Setpoints" page 10. The following is a description of these setpoints (with the English/Metric jumper installed on the Micro Board):

CHILLED LIQUID TEMP — This key displays the leaving chilled water temperature (LCWT) setpoint in degrees Fahrenheit. If not programmed, the default value is 45°F. See "Programming System Setpoints", page 11)

NOTE: If an Energy Management System is interfaced to the Control Center for the purpose of remote LCWT setpoint reset, then the operator-programmed chilled liquid temp will be the base or lowest setpoint available to the Energy Management System (EMS). This chilled liquid temp value must also be entered into the EMS. Further, any subsequent change to this value must also be entered into the EMS.

% CURRENT LIMIT — This key displays the maximum value of motor current permitted by its programmed setting. The value is in terms of percent of Full Load Amps (FLA). If not programmed, the default value is 100% (See "Programming System Setpoints", page 11).

If chiller is equipped with a YORK Solid State Starter, the system FLA is also displayed. This value is programmed by the factory and should never be changed. The Micro Board uses this value to calculate and display the % motor current parameter that is displayed when the % MOTOR CURRENT display key is pressed. Also, proper current limit control depends on the correctly programmed FLA value. For security reasons, a special access code is required to program the FLA value. It should only be changed by a service technician.

PULL DOWN DEMAND — This function is used to provide energy savings following the chiller start-up. This key displays a programmable motor current limit and programmable period of time. Operation is as follows: Whenever the system starts, the Pull Down Demand Limit is maintained for the programmed time, then the current limit control returns to % current limit setpoint. The maximum permitted motor current is in terms of % FLA. The duration of time that the current is limited is in terms of minutes (to a maximum of 255). If not programmed, the default value is 100% FLA for 00 minutes (See "Programming Systems Setpoints" page 12). Thus, no pull down demand limit is imposed following system start, and the % current limit setpoint is used.

CLOCK — This key displays the day of the week, time of day and calendar date. If not programmed, the default value is **SUNDAY 12:00 AM 1/1/89**. (See "Programming System Setpoints page 12).

DAILY SCHEDULE — This key displays the programmed daily start and stop times, from Sunday thru Saturday plus Holiday. If desired, the Control Center can be programmed to automatically start and stop the chiller as desired. This schedule will repeat on a 7-day calendar basis. If the Daily Schedule is not programmed, the default value is 00:00 AM start and stop times for all days of the week and the holiday. (Note that the system will not automatically start and stop on a daily basis with these default values because 00:00 is an "Impossible" time for the Micro Board, See "Programming System Setpoints", page 13). Finally, one or more days in the week can be designated as a holiday (See description under **HOLIDAY** setpoint) and the Control Center can be programmed (using **DAILY SCHEDULE** setpoint) to automatically start and stop the chiller on those days so designated. The operator can override the time clock at any time using the **COMPRESSOR** switch.

Note that if only a start time is entered for a particular day, the compressor will not automatically stop until a scheduled stop time is encountered on a subsequent day.

HOLIDAY — This key indicates which days in the upcoming week are holidays. On those designated days, the chiller will automatically start and stop via the holiday start and stop times programmed in the **DAILY SCHEDULE** setpoint. It will do this one time only and the following week will revert to the normal daily schedule for that day.

REMOTE/RESET TEMP RANGE — This key displays the maximum offset of remote LCWT setpoint reset. This offset is either 10° or 20°F as programmed. When in the remote mode, this value is added to the operator programmed chilled liquid temp setpoint and the sum equals the temperature range in which the LCWT can be reset. For example, if the operator programmed chilled liquid temp setpoint is programmed with a value of 10°F, then the chilled liquid

temp setpoint can be remotely reset over a range of 46°F to 56°F (46 + 10 = 56). If not programmed, the default value for this parameter is 20°F.

For additional information on remote LCWT reset, refer to Form 160.46-PA4.1.

NOTE: If an Energy Management System is interfaced to the Control Center for the purpose of remote LCWT setpoint reset, then the operator programmed **REMOTE RESET TEMP RANGE** value determines the maximum value of temperature reset controlled by the Energy Management System.

DATA LOGGER - This key is used when an optional printer is connected to the MicroComputer Control Center. Refer to Form 160.46-NO1.2 for operation instructions.

SSS MOTOR CURRENT/VOLTS - This key is used on Solid State Starter applications only. Although this is a display key, it is also used to program the applicable AC power line voltage range (200-208 VAC, 220-240 VAC, 380 VAC, 400 VAC, 415 VAC, 440-480 VAC, 550-600 VAC). The MicroComputer Control Center uses this entry to determine the undervoltage-shutdown threshold. For each line voltage category, there are two shutdown thresholds - a minimum line voltage level required to start the compressor and a minimum level required after the Control Center is in **RUN** mode. In **RUN** mode, the voltage must be less than the run threshold for 20 continuous seconds in order to initiate a shutdown. When the chiller shuts down,

MON 10:00 AM LOW LINE VOLTAGE is displayed. This undervoltage protection can be disabled. The selectable supply voltage ranges and their shutdown thresholds are as follows:

SUPPLY VOLTAGE RANGE	TO START	RUN
200-208 VAC	174 VAC	160 VAC
220-240	200	185
380	331	305
400	349	320
415	362	335
440-480	400	370
550-600	502	460
Supply voltage range disabled	0	None

If Control Center is equipped with version 3.E and later EPROM, an overvoltage shutdown threshold is also checked. If the line voltage exceeds the overvoltage threshold for 20 continuous seconds, the chiller shuts down,

MON XX:XX AM HIGH LINE VOLTAGE is displayed. The high line voltage check is disabled along with the low line voltage check if desired. Refer to chart on next page for thresholds.

For security reasons, a special access code is required to program the supply voltage range. The supply voltage range is programmed at the factory and should only be changed by a service technician.

LOW/HIGH VOLTAGE TRIP/RESET VALUES

COMPRESSOR MOTOR SUPPLY VOLTAGE RANGE - (V)	LOW LINE VOLTAGE OPERATING POINT		HIGH LINE VOLTAGE OPERATING POINT	
	CUTOUT-(V) (ON FALL)	CUTIN-(V) (ON RISE)	CUTOUT-(V) (ON RISE)	CUTIN-(V) (ON FALL)
200-208	160	174	227	220
220-240	185	200	262	254
380	305	331	415	402
400	320	349	436	423
415	335	362	454	440
440-480	370	400	524	508
550-600	460	502	655	635
SUPPLY VOLTAGE RANGE DISABLED	NONE	0	NONE	0

PURGE - The purge setpoints are only applicable to those chillers equipped with the high pressure pump assisted purge unit or are equipped with Micro Board 031-01065-001 and EPROM 031-01097-001 thru -012 Revision .10 or higher (i.e.; C.01S.10). There are two programmable purge setpoints; **EXCESS PURGE THRESHOLD** and **PURGE TYPE**.

The **EXCESS PURGE THRESHOLD** is the number of purge exhausts that are allowed to occur in 1 hour of chiller operating time before an excess purge warning message is displayed. If the number of purge exhausts exceed this value, "WARNING - EXCESS PURGE" is displayed on the keypad display (Refer to description of this message in "DISPLAY MESSAGES" section of this book). The **DISPLAY DATA** key is used to program this setpoint. It is programmable from 10 to 30 purge exhausts per hour by operating personnel. The default value is 20 purge exhausts per hour. Field service personnel can program this setpoint over a wider range (Refer to service manual Form 160.46-M2, Section 13). The typical value would be the default value 20/hour. However, the number can be lowered to detect small leaks.

The **PURGE TYPE** is either the high pressure pump assisted purge unit (Exhausts at 90 PSIA) or the low pressure purge unit (Exhausts at 34.7 PSIA). If the correct purge type is not entered, the purge unit will not exhaust at the correct pressure. The purge type must be entered at chiller commissioning or when the above EPROM is retrofit to the MicroComputer Control Center. Instructions for programming this setpoint are included in service manual Form 160.46-M2. This should be performed by qualified service personnel only.

DISPLAYING SYSTEM SETPOINTS

The currently programmed **Setpoint** values can be viewed at any time (See page 18) in **SERVICE**, **LOCAL** or **REMOTE** operating mode as follows:

- Press and release the appropriate **Setpoint** key - the message will be displayed for 2 seconds.

— or —

- Press and hold the appropriate **Setpoint** key - the message will be displayed as long as the key is pressed.

— or —

- Press and release appropriate **Setpoint** key, then press and release the **DISPLAY HOLD** key. The message will be displayed until the **DISPLAY HOLD** key is again pressed and released, or 10 minutes have elapsed, whichever comes first.

To Display **CHILLED LIQUID TEMP** Setpoint:

Use the **CHILLED LIQUID TEMP** setpoint key as described on page 6 to produce the following message:

LEAVING SETPOINT = XX.X °F

NOTE: The value displayed is the actual LCWT setpoint. For example, the value displayed in **LOCAL** or **PROGRAM** modes is that which is operator programmed. The value displayed in the **REMOTE** mode is that base setpoint with added temperature reset by an Energy Management System, via remote LCWT setpoint (PWM signal) if a remote reset signal was received within 30 minutes.

To Display **% CURRENT LIMIT** Setpoint:

Use **% CURRENT LIMIT** setpoint key as described above to produce the following message:

CURRENT LIMIT = XXX % FLA

NOTE: The value displayed is the actual % current limit setpoint. For example; the value displayed in **LOCAL** or **PROGRAM** mode is that which is operator programmed. The value displayed in the **REMOTE** mode is that which has been programmed by the Energy Management System via the remote current limit setpoint input.

If chiller is equipped with a YORK Solid State Starter, the message is:

CURRENT LIMIT = XXX % FLA; *MTR CUR = 000 FLA

NOTE: On Solid State Starter applications, this value is programmed at the YORK factory. A special access code is required.

To Display **PULL DOWN DEMAND** Setpoint:

Use **PULL DOWN DEMAND** setpoint key as described on page 7 to produce the following message:

SETPOINT = XX MIN @ XX % FLA XX MIN LEFT

To Display **CLOCK** Setpoint (Time of Day):

Use **CLOCK** setpoint key as described above to produce the following message:

TODAY IS DAY XX:XX AM/PM 1/1/89

To Display **DAILY SCHEDULE** Setpoints:

- Press and hold the **DAILY SCHEDULE** setpoint key.
The chiller start and stop times for each day of the week are sequentially displayed, beginning with Sunday and ending with Holiday. The display will continuously scroll until the **DAILY SCHEDULE** key is released.
— or —
- Press and release the **DAILY SCHEDULE** setpoint key. Then press and release the **DISPLAY HOLD** key. The chiller start and stop times for each day of the week are sequentially displayed beginning with Sunday and ending with Holiday. The display will continuously scroll until the **DISPLAY HOLD** key is again pressed and released, or 10 minutes have elapsed, whichever ever comes first.

The display message for **DAILY SCHEDULE** will scroll in the following sequence:

SUN START = 08:30 AM STOP = 06:00 PM
 MON START = 05:00 AM STOP = 07:00 PM
 TUE START = 05:00 AM STOP = 07:00 PM
 WED START = 05:00 AM STOP = 07:00 PM
 THU START = 05:00 AM STOP = 07:00 PM
 FRI START = 05:00 AM STOP = 07:00 PM
 SAT START = 05:00 AM STOP = 01:00 PM
 HOL START = 00:00 AM STOP = 00:00 PM

To Display **HOLIDAY** Setpoints:

Use **HOLIDAY** setpoint key as described in the beginning of this section to produce the following message:

S _ M _ T _ W _ T _ F _ S _ HOLIDAY NOTED BY *

NOTE: On the days that are designated by an *, the chiller will automatically start and stop per the holiday schedule established in **DAILY SCHEDULE** setpoints.

To Display **REMOTE RESET TEMP RANGE** Setpoint:

Use **REMOTE RESET TEMP RANGE** setpoint key as described above to produce the following message:

REMOTE RESET TEMP RANGE = 10°F
 — or —
 REMOTE RESET TEMP RANGE = 20°F

To Display **DATA LOGGER** setpoints:

Refer to YORK Form 160.46-NO1.2 for operation of this key.

To Display **UNDERVOLTAGE** setpoints:
(Solid State Starter applications Only)

Press **SSS MOTOR CURRENT/VOLTS** key in **PROGRAM** mode to display the selected voltage range. One of the following messages will be displayed.

SUPPLY VOLTAGE RANGE 200-208
 —or—
 SUPPLY VOLTAGE RANGE 220-240
 —or—
 SUPPLY VOLTAGE RANGE 380
 —or—
 SUPPLY VOLTAGE RANGE 400
 —or—
 SUPPLY VOLTAGE RANGE 415
 —or—
 SUPPLY VOLTAGE RANGE 440-480
 —or—
 SUPPLY VOLTAGE RANGE 550-600
 —or—
 SUPPLY VOLTAGE RANGE DISABLED

A special access code is required to program the Supply Voltage Range. The Supply Voltage Range is programmed at the factory and checked at system start-up. (Note to service technician: Refer to programming instructions in Service Instruction 160.46-M2).

To Display **PURGE** setpoint:

(Not Applicable to all Units. See Explanation under "System Setpoints" Section Previously)

Press **DISPLAY DATA** key in **PROGRAM** mode to display the **EXCESS PURGE** threshold. The following is displayed:

MAXIMUM PURGES PER HOUR = XX

PROGRAMMING THE MICROCOMPUTER CONTROL CENTER

PROGRAMMING SYSTEM SETPOINTS

The system setpoints can be entered at any time even when the system is running. Proceed as follows to enter system setpoints. (Refer to Fig. 3)

1. Press **ACCESS CODE** key.
2. **ENTER VALID ACCESS CODE** is displayed.
3. Using **Entry** keys, enter **9 6 7 5**.
4. As each digit is entered, the characters **Y O R K** are displayed.
NOTE: If digits other than **9 6 7 5** are entered, **Y O R K** is still displayed.

NOTE: For ease in remembering the code, note that the letters **Y O R K** correspond to the digits **9 6 7 5** on a telephone dial.

5. Press **ENTER** key.
NOTE: If digits other than **9 6 7 5** were entered in step No. 4, **INVALID ACCESS CODE** is displayed when the **ENTER** key is pressed. If this occurs, enter the correct access code (9675) and proceed.
6. **ACCESS TO PROGRAM KEY AUTHORIZED** is displayed.
NOTE: Unless terminated by pressing the **ACCESS CODE** key again, the operator will have access to the **PROGRAM** key for 10 minutes. When 10 minutes have elapsed, access to program key will be automatically disabled and the operator must return to step No. 1 to gain access.
7. Press **PROGRAM** key.
8. **PROGRAM MODE, SELECT SETPOINT** is displayed.

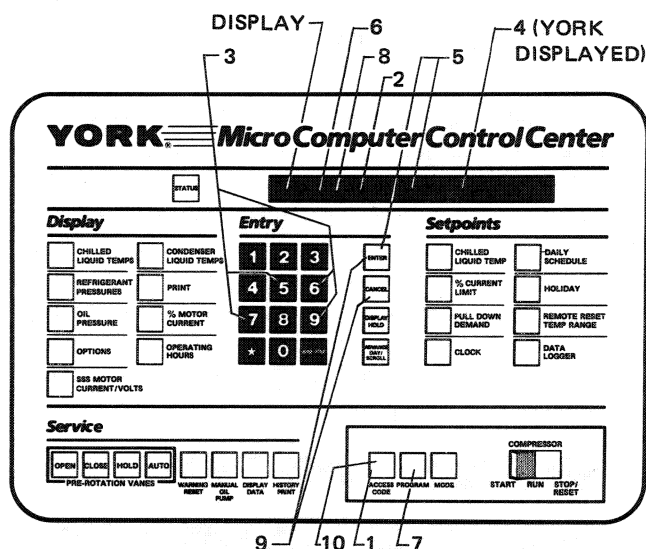


FIG. 3 - KEYPAD — PROGRAMMING SYSTEM SETPOINTS

9. Enter setpoints as detailed below. If you make a mistake when entering a value, press **CANCEL** key and then **ENTER** key. The display will revert to the default values and the cursor will return to the first changeable digit. You can then proceed to enter the correct values. If the entered value exceeds acceptable limits, **OUT OF RANGE - TRY AGAIN!** Message will be displayed for 2 seconds, then the **PROGRAM MODE, SELECT SETPOINT** message will reappear.
10. When all the desired setpoints have been entered, press the **ACCESS CODE** key to exit program mode and terminate access to program mode. **ACCESS TO PROGRAM MODE DISABLED** is displayed. The Control Center will automatically return to **LOCAL, REMOTE** or **SERVICE** modewhichever was last selected.

To enter **CHILLED LIQUID TEMP** Setpoint: (Refer to Fig. 4.)

1. Press and release **CHILLED LIQUID TEMP** setpoint key. The following program prompt message will be displayed:

LEAVING SETPOINT = XX.X °F (BASE)

(BASE) refers to the base or lowest setpoint available to an Energy Management System. If any Energy Management System is applied, this value must be entered into the Energy Management System. Refer to previous explanation or **REMOTE/RESET TEMP RANGE**, Page 7.

2. Use **ENTRY** keys to enter desired value.
3. Press and release **ENTER** key.
PROGRAM MODE, SELECT SETPOINT message is displayed.

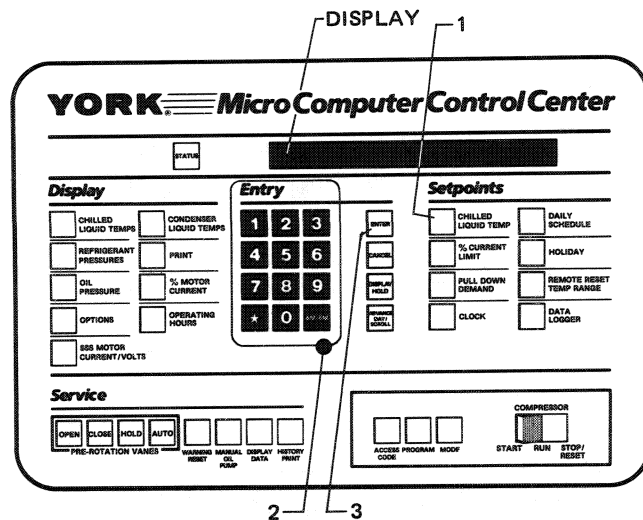


FIG. 4 – KEYPAD — PROGRAMMING “LEAVING CHILLED WATER TEMP.” SETPOINT

To Enter **% CURRENT LIMIT** Setpoint: (Electro-Mechanical Starter or Turbo-Modulator Refer to Fig. 5)

1. Press and release **% CURRENT LIMIT** setpoint key. The following program prompt message is displayed:
CURRENT LIMIT = XXX% FLA

2. Use **ENTRY** keys to enter desired value.
3. Press and release **ENTER** key.
PROGRAM MODE, SELECT SETPOINT message is displayed.

(Solid State Starter – Refer to Fig. 5)

1. Press and release **% CURRENT LIMIT** setpoint key. The following program prompt message is displayed:
CURRENT LIMIT = XXX% FLA; MTR CUR = _____ FLA
2. Use **ENTRY** keys to enter desired current limit value.
NOTE: Motor Current FLA value is entered by YORK factory and checked at system start-up. It cannot be changed without special access code. (Note to service technician: refer

to Programming Instructions in Service Instruction Form 160.46-M2.)

3. Press and release **ENTER** key.
PROGRAM MODE, SELECT SETPOINT is displayed.

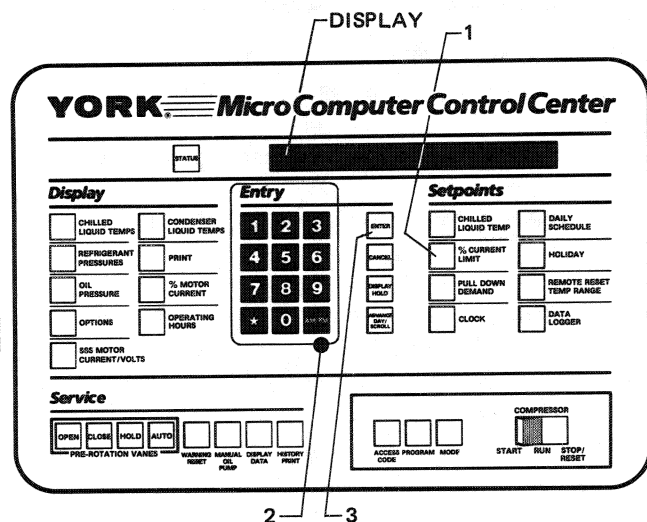


FIG. 5 – KEYPAD – PROGRAMMING “% CURRENT LIMIT” SETPOINT

To Enter **PULL DOWN DEMAND** Setpoint: (Refer to Fig. 6)

1. Press and release **PULL DOWN DEMAND** setpoint key. The following program prompt message is displayed:

SETPOINT = XXX MIN @ XXX % FLA. XX MIN LEFT

2. Use **Entry** keys to enter desired values. For explanation, see **PULL DOWN DEMAND**, page 7. Note that 'XX min left' is not an operator entered value.
3. Press and release **ENTER** key.
PROGRAM MODE, SELECT SETPOINT message is displayed.

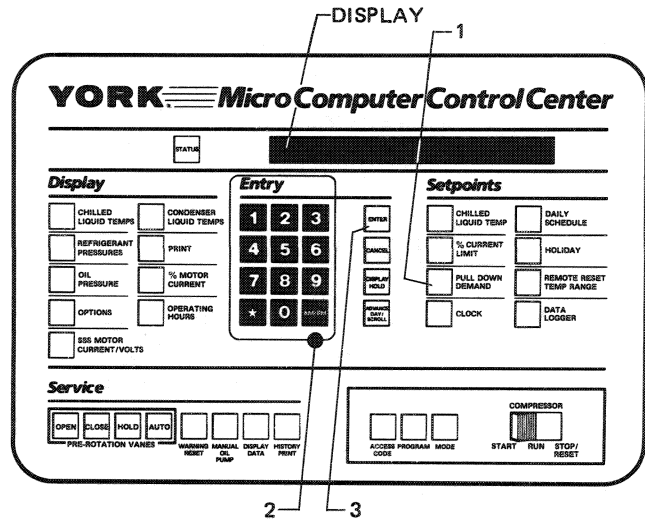


FIG. 6 - KEYPAD — PROGRAMMING "PULL DOWN DEMAND" SETPOINT

To Enter **CLOCK** Setpoint: (Refer to Fig. 7)

1. Assure Micro Board Program jumper J57 is in "CLKON" position.
2. Press and release **CLOCK** setpoint key. The following program prompt message is displayed:
TODAY IS MON 10:30 PM 1/1/89
3. Press **ADVANCE DAY/SCROLL** key until the proper day of week appears on the display.
4. Use **Entry** keys to enter proper time of day.
5. Press **AM/PM** key to change the AM to PM or vice versa.
6. Use **Entry** keys to enter proper calendar date. (MONTH/DAY/YR) If month and day are single digit entries, precede the entry with "0". For example 02/04/88.

7. Press and release **ENTER** key.
PROGRAM MODE, SELECT SETPOINT message is displayed.

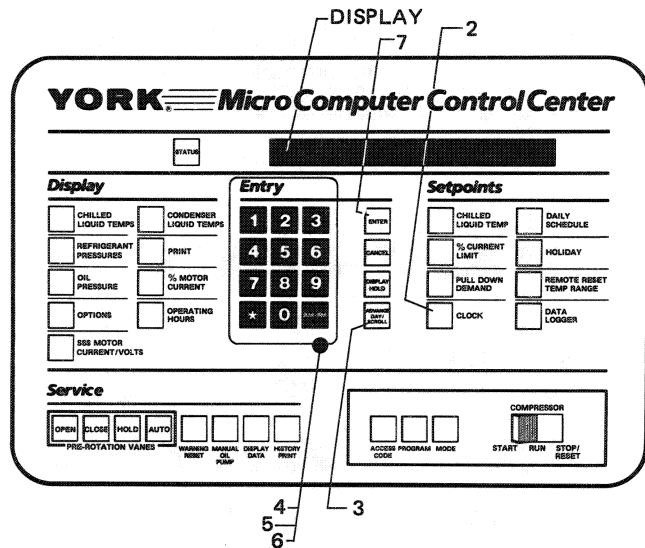


FIG. 7 - KEYPAD — PROGRAMMING "CLOCK" SETPOINT

To Enter **DAILY SCHEDULE** Setpoint (Refer to Fig. 8.)

1. Press and release **DAILY SCHEDULE** setpoint key. The following program prompt message is displayed:
DAY START XX:XX AM/PM STOP XX:XX AM/PM
2. Press **ADVANCE DAY/SCROLL** key until the day you wish to program appears on the display.
3. Use **Entry** keys to enter desired start time. If you wish to cancel the scheduled start and stop times for a particular day, press **CANCEL** key and then **ENTER** key.
4. Press **AM/PM** key to change the AM to PM or vice versa. If the desired entry is already displayed, proceed to enter the stop time. The cursor will automatically move to the stop time.
5. Use **Entry** keys to enter desired stop time.
6. Press **AM/PM** key to change the AM to PM or vice versa.
7. Press and release **ENTER** key.
PROGRAM MODE, SELECT SETPOINT message is displayed.

—or—

Press **ADVANCE DAY/SCROLL** key. The display will advance to the next consecutive day and the previous day will be automatically entered.

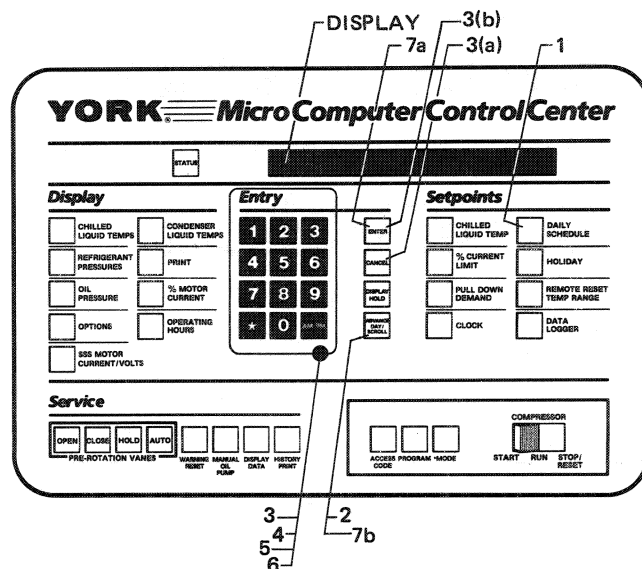


FIG. 8 - KEYPAD — PROGRAMMING “ DAILY SCHEDULE” SETPOINT

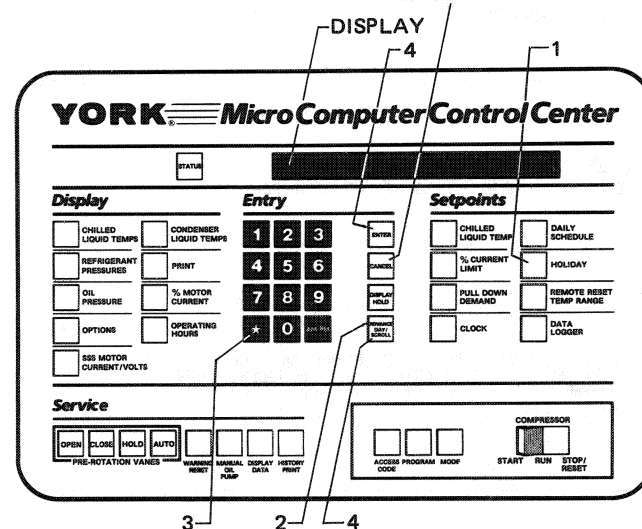
To Enter **HOLIDAY** Setpoint: (Refer to Fig. 9.)

1. Press and release **HOLIDAY** setpoint key. The following program prompt message is displayed:
S M T W T F S HOLIDAY NOTED BY*
2. Press and release **ADVANCE DAY/SCROLL** key to move cursor to the day that you wish to designate as a holiday.
3. Press and release ***** entry key. An ***** will appear next to the selected day.
4. After you have placed an ***** next to each of the days that you wish to designate a holiday, press **ENTER** key.
PROGRAM MODE, SELECT SETPOINT message is displayed.

To cancel all of the designated holidays: perform Step 1, press **CANCEL** key, and then press **ENTER** key.
PROGRAM MODE, SELECT SETPOINT message is displayed.

To cancel one of the designated holidays: perform Step 1, press **ADVANCE DAY/SCROLL** key until the cursor appears to the right of the desired day, press the ***** key, then press the **ENTER** key.

4
 TO CANCEL ALL HOLIDAYS
 PERFORM STEP 1
 PRESS “CANCEL”
 PRESS “ENTER”



4 — TO CANCEL ONE OF THE DESIGNATED HOLIDAYS—
 PRESS “ADVANCE DAY / SCROLL”
 PRESS “*” KEY
 PRESS “ENTER”

FIG. 9 - KEYPAD — PROGRAMMING “HOLIDAY” SETPOINT

To Enter **REMOTE/RESET TEMP RANGE** Setpoint:
(Refer to Fig. 10)

1. Press and release **REMOTE/RESET TEMP RANGE** setpoint key. The following program prompt message is displayed:
REMOTE/RESET TEMP RANGE = XX °F
2. Use **Entry** keys to enter desired value (10 or 20).
3. Press and release **ENTER** key.
PROGRAM MODE, SELECT SETPOINT message is displayed.

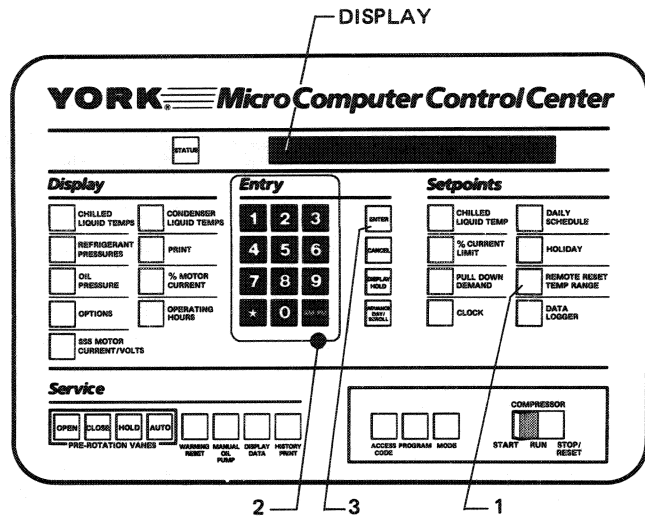


FIG. 10 – KEYPAD — PROGRAMMING “REMOTE RESET” TEMP RANGE

To Enter **DATA LOGGER** Setpoint:

Refer to Form 160.46-NO1.2 for operation of this key.

To Enter **EXCESS PURGE THRESHOLD** Setpoint:
(Refer to Fig. 11)

(Not Applicable to all Chillers. See Explanation Under "System Setpoints" Section Previously)

1. Press and release **DISPLAY DATA** key. The following program prompt message is displayed:
MAXIMUM PURGES PER HOUR = XX
2. Use **ENTRY** keys to enter desired values.
3. Press and release **ENTER** key.

PROGRAM MODE, SELECT SETPOINT message is displayed.

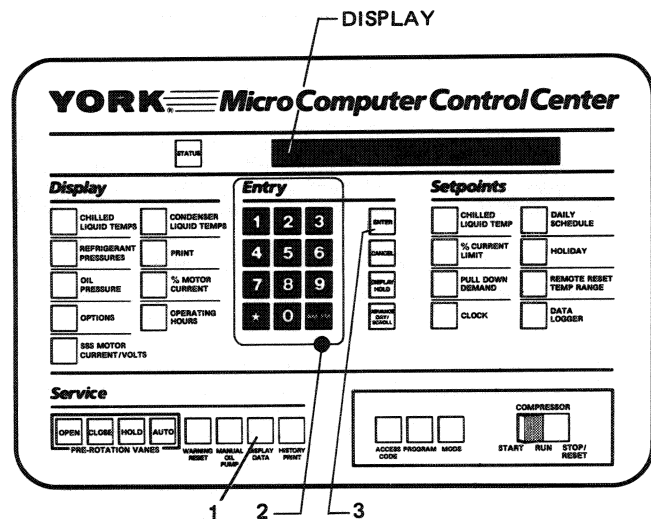


FIG. 11 – KEYPAD - PROGRAMMING "EXCESS PURGE THRESHOLD"

SERVICE KEYS

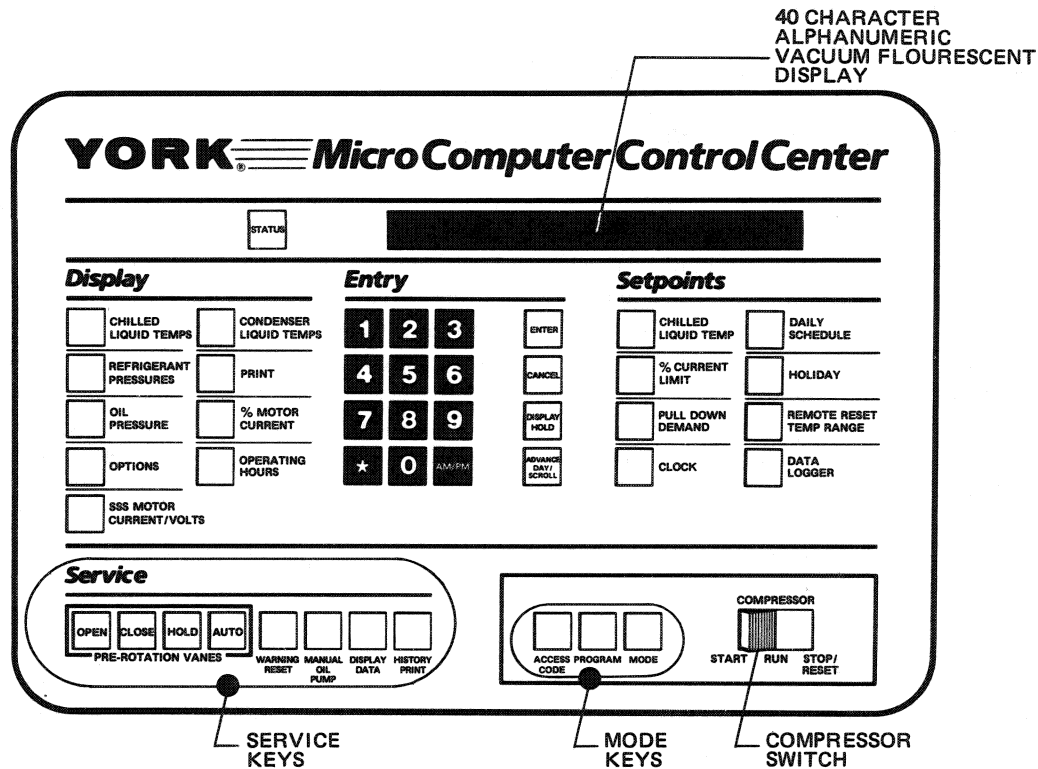


FIG. 12 – KEYPAD — SERVICE KEYS LOCATION

The **Service** keys are provided for the service technician's use when performing routine maintenance or when troubleshooting the system. The **WARNING RESET** and **PRE-ROTATION VANES** keys are enabled in **SERVICE** mode only. The remainder of the **Service** keys are enabled in **SERVICE**, **LOCAL** or **REMOTE** mode.

PRE-ROTATION VANES KEYS

OPEN – Press and release this key to drive the pre-rotation vanes open. If the chiller is running, **SYSTEM RUN-VANES OPENING** is displayed. If chiller is not running, **SYS READY TO START-VANES OPENING** is displayed. The vanes will continue to open until the **CLOSE**, **HOLD**, or **AUTO** (if temperature error requires it) keys are pressed and released. (This function applies to non-Turbo-Modulator applications only)

HOLD – Press and release this key to hold the pre-rotation vanes in their present position. If chiller is running, **SYSTEM RUN-VANES HOLDING** is displayed. If chiller is not running, **SYS READY TO START-VANES HOLDING** is displayed. The vanes will remain stationary until the **OPEN**, **HOLD** or **AUTO** keys are pressed and released. (This function applies to non-Turbo-Modulator Applications only).

AUTO – Press and release this key to put the pre-rotation vanes under LCWT control as long as the current limit

setpoint is not reached, which causes the current limit function to override the LCWT control. If system is running, **SYSTEM RUN-AUTO VANES** is displayed. The actual opening and closing of the vanes is indicated on the display. When the vanes are opening, **SYSTEM RUN-VANES OPENING** is displayed. If the vanes are closing, **SYSTEM RUN-VANES CLOSING** is displayed. Whenever the Control Center is in **LOCAL**, **REMOTE** or **PROGRAM** mode, the vane control circuitry is automatically placed in **AUTO** mode and the vanes operate to control the leaving chilled water temperature to the programmed setpoint. (This function applies to non-Turbo-Modulator applications only.)

CLOSE – Press and release this key to drive the pre-rotation vanes closed. If the chiller is running, **SYSTEM RUN-VANES CLOSING** is displayed. If chiller is not running, **SYS READY TO START-VANES CLOSING** is displayed. When the vanes are fully closed, **SYS READY TO START-VANES CLOSED** is displayed. The vanes will continue to close until the **OPEN**, **HOLD** or **AUTO** keys are pressed. (This function applies to non-Turbo-Modulator Applications only.)

OTHER SERVICE KEYS

WARNING RESET – Press and release this key to reset the excess purge counting circuitry and the excess purge display message. Also, any "WARNING" or

"STATUS" message can be reset with this key, unless the condition still exists. To reset any cycling or warning message, place the Control Center in **SERVICE** mode and press **WARNING RESET** key. To reset any safety shutdown message, press **WARNING RESET** key in **SERVICE** mode with the **COMPRESSOR** switch in the **STOP/RESET** position.

MANUAL OIL PUMP - This key is operational in any mode. Press and release this key to run the oil pump. Press and release the key again to stop the oil pump. A 10-minute maximum is imposed on the running of the oil pump (i.e., the oil pump will automatically shut off after 10 minutes). If a longer running time is desired, the key must be pressed again.

DISPLAY DATA - This key is operational in any three of the Control Center modes of operation (**SERVICE**, **LOCAL** or **REMOTE**). It is used to display certain system operating parameters that are relevant to troubleshooting the chiller system.

Press and hold the **DISPLAY DATA** key. The following messages will sequentially scroll on the display. Each message will be displayed for 2 seconds.

No. 1

SAT TEMPS EVAP = XX.X°F COND = XX.X°F

No. 2

DISCHARGE TEMP = XXX.X°F OIL TEMP = XXX.X°F

No. 3

PURGE PRESSURE = XX.X PSIA

No. 4 (Note 1 & 2)

60 MINUTE PURGE COUNT BYPASS: XX MIN LEFT

Purge exhausts are not counted during the first 60 minutes of chiller operation. Therefore, this message replaces the purge count messages below during the first hour of operation.

— or —

PURGES LAST XX MIN = XX; MAX PURGES/HR = XX

After the first hour of chiller operation has elapsed, purge exhausts are counted. This message is displayed during the first hour following the initial 1 hour bypass (see above), and after the excess purge message is cleared. The minutes elapsed during this first hour of purge exhaust counting are displayed. The purge count is incremented each time a purge exhaust occurs. Also, the excess purge threshold that has been programmed by the operator or service person is displayed as **MAX PURGES/HR**. When the minute count reaches 60, this message is replaced with the following message.

— or —

PURGES LAST HOUR = XX; MAX PURGES/HR = XX

After the initial 1 hour bypass and the first hour of purge

exhaust counting has elapsed as explained above (2 hours of chiller run time), this message is displayed thereafter. A running total of the number of purge exhausts that have occurred within the last hour is displayed. The excess purge threshold that has been programmed by the operator or service person is displayed as **MAX PURGES/HR**.

To hold each of the above messages, press and release the **DISPLAY DATA** key, then press and release the **DISPLAY HOLD** key. Message No. 1 above will be displayed and updated every 2 seconds until the **DISPLAY DATA** key is again pressed and released. Message No. 2 is then displayed and updated every 2 seconds until the **DISPLAY DATA** key is again pressed and released. Message No. 3 is then displayed and updated every 2 seconds until either the **DISPLAY DATA** key is again pressed and released (whereupon message No. 1 is displayed), or the **DISPLAY HOLD** key is pressed and released (whereupon the **DISPLAY DATA** messages are removed from the display.)

NOTES:

1. These messages are only applicable to chillers equipped with pump assisted purge unit or those chillers equipped with Micro Board 031-01065-001 and EPROM 031-01097-001 thru -012 Revision .10 or higher.
2. **Purge Count** - following a 1 hour bypass at start, purge exhausts are counted and displayed in the above messages while the chiller is running. With the exception of the first hour after the bypass, the value displayed is the number of exhausts that have occurred in the "Last Hour". For example, if you walk up to the Micro Panel at 9:11AM and press the **DISPLAY DATA** key and it says that there have been 7 purges in the "Last Hour", that means that there have been 7 exhausts since 8:11AM. If you do this at 2:57PM, it means that there have been 7 exhausts since 1:57PM, etc.

The purge count is reset to zero by the following:

- A. Clearing the excess purge message.
- B. Moving the Micro Board program jumper J57 (CLK ON/OFF) from "CLK OFF" to CLOCK ON" position.
- C. Starting the chiller.

The purge count is frozen by the following:

- A. When the chiller is not running.
- B. An excess purge message is being displayed and at least 1 full hour of purge exhausts have accumulated.

HISTORY PRINT - This key is used to initiate a history print to the optional printer. Refer to Form 160.46-NO1.2 for operation of this key.

OPERATING MODES

The MicroComputer Control Center can be operated in four different operating modes as follows:

SERVICE - Enables all the Service keys except **DISPLAY DATA**, **MANUAL OIL PUMP**, and **HISTORY PRINT**, which are enabled in all modes. See "Service Keys" page 22.

LOCAL - This is the normal operating mode. The compressor can be started and stopped from the Control Center. Also, the **Display** and **Setpoints** parameters can be displayed.

PROGRAM - Allows the operator to program the **Setpoints** parameters, and change operating modes.

REMOTE - In this mode, the Control Center will accept control signals from a remote device (i.e., Energy Management System) or cycling inputs. The control signal inputs are:

1. Remote Start
2. Remote Stop
3. Remote LCWT Setpoint
4. Remote Current Limit Setpoint

NOTE: The compressor can be stopped by the **COMPRESSOR** switch, regardless of the operating mode. The switch must be in **RUN** position to enable **REMOTE** mode. The operator cannot locally start the compressor using the **COMPRESSOR** switch when in the **REMOTE** mode.

To determine which operating mode the Control Center is presently in, simply press the **MODE** key.

- If the Control Center is in **LOCAL** mode, **LOCAL OPERATING MODE IN EFFECT** is displayed.
- If the Control Center is in **REMOTE** mode, **REMOTE OPERATING MODE IN EFFECT** is displayed.
- If the Control Center is in **SERVICE** mode, **SERVICE OPERATING MODE IN EFFECT** is displayed.

To change operating mode, proceed as follows:

1. Press **ACCESS CODE** key.
2. **ENTER VALID ACCESS CODE** is displayed.
3. Using **Entry** keys, enter **9 6 7 5**.
4. As each digit is entered, the characters **Y O R K** are displayed.

NOTE: If digits other than **9 6 7 5** are entered, **Y O R K** is still displayed.

5. Press **ENTER** key.
NOTE: If digits other than **9 6 7 5** were entered in step No. 4, **INVALID ACCESS CODE** is displayed when the **ENTER** key is pressed. If this occurs, enter the correct access code (**9675**) and proceed.
6. **ACCESS TO PROGRAM KEY AUTHORIZED** is displayed.
NOTE: Unless terminated by pressing the **ACCESS CODE** key again, the operator will have access to the **PROGRAM** key for 10 minutes. When 10 minutes have elapsed, access to **PROGRAM** key will be automatically disabled and the operator must return to step No. 1 to gain access.
7. Press **PROGRAM** key.
8. **PROGRAM MODE, SELECT SETPOINT** is displayed.
9. Press **MODE** key.
10. The mode that has been previously selected will be displayed as follows:
LOCAL MODE SELECTED
—or—
SERVICE MODE SELECTED
—or—
REMOTE MODE SELECTED
11. Press **ADVANCE DAY** key to scroll to desired mode. Each time this key is pressed, a different mode is displayed as above:
12. When the desired mode is displayed, press **ENTER** key.
13. **PROGRAM MODE, SELECT SETPOINT** is displayed.
14. Press **ACCESS CODE** key to exit **PROGRAM** mode and terminate access to **PROGRAM** mode.
15. **ACCESS TO PROGRAM MODE DISABLED** is displayed.

COMPRESSOR SWITCH (REFER TO FIG. 12, PAGE 15)

This rocker switch is used to locally operate the compressor. It is used to start, run and stop the compressor. Also, it resets the Control Center after a safety shutdown.

To **START*** chiller compressor in **LOCAL** mode:

Move **COMPRESSOR** switch from **STOP/RESET** to **START** position. Switch will spring-return to **RUN** position.

To **STOP** compressor:

Move switch from **RUN** to **STOP/RESET** position.

To **RESET** Control Center:

Following a safety shutdown, the operator is required to reset the Control Center prior to restarting the system. Move switch from **RUN** to **STOP/RESET** position.

*NOTE: The operator cannot start the compressor (using this switch) when the Control Center is in **REMOTE** mode.

DISPLAY MESSAGES

The following display messages will be automatically displayed unless the operator is requesting additional information via the keypad.

SYSTEM RUN - CURRENT LIMIT IN EFFECT

Displayed when the chiller is running, and the motor current is equal-to or greater-than the operator-programmed "XXX % FLA" current limit value. When the motor current reaches 100% of this value, the pre-rotation vanes are not permitted to open further. If the current continues to rise to 104% of this value, the vanes will be driven closed - not fully closed only far enough to allow the current to decrease to a value less than 104% of the operator-programmed "XXX % FLA" current limit.

For example:

With the operator-programmed "% CURRENT LIMIT" set at 50% and the FLA of the chiller equal to 200A, the current limit circuit would perform as follows:

(100%) (50% x FLA) = Vanes inhibited from opening further

(104%) (50% x FLA) = Vanes driven toward close position

Therefore:

(100%) (50% x 200) = 100A = Vanes stop opening

(104%) (50% x 200) = 104A = Vanes driven toward close position

SYSTEM RUN-AUTO VANES

Displayed when the chiller is running, the MicroComputer Control Center is in **SERVICE** mode, and the vanes are operating in **AUTO** mode.

SYSTEM RUN-VANES OPENING

Displayed when the chiller is running and the MicroComputer Control Center is in **SERVICE** mode with:

- The vanes operating in **AUTO** mode and opening to maintain the leaving chilled water temperature setpoint.

— or —

- The operator has pressed the vanes **OPEN** key on the keypad.

SYSTEM RUN-VANES CLOSING

Displayed when the chiller is running and the MicroComputer Control Center is in **SERVICE** mode with:

- The vanes operating in **AUTO** mode and closing to maintain the leaving chilled water temperature setpoint.

— or —

- The operator has pressed the vanes **CLOSE** key on the keypad.

SYSTEM RUN-VANES HOLDING

Displayed when the chiller is running, the MicroComputer Control Center is in **SERVICE** mode, and the operator has pressed the vanes **HOLD** key.

SYS READY TO START-VANES OPENING

Displayed when the chiller is not running and the operator has pressed the vanes **OPEN** key on the keypad.

SYS READY TO START-VANES CLOSING

Displayed when the chiller is not running and the operator has pressed the vanes **CLOSE** key on the keypad.

SYS READY TO START-VANES HOLDING

Displayed when the chiller is not running and the operator has pressed the vanes **HOLD** key on the keypad.

SYSTEM RUN-LOW PRESSURE LIMIT IN EFFECT

Displayed when the chiller is running and the evaporator pressure falls to 5.55 PSIA (R11); 4.50 PSIA (R123). Simultaneously, the pre-rotation vanes will be prevented from further opening. This action maintains chiller operation to prevent low-evaporator-pressure shutdown at 5.42 PSIA (R11); 4.40 PSIA (R123). When the evaporator pressure rises to 5.65 PSIA (R11); 4.70 PSIA (R123), the vanes will be permitted to open.

Low pressure limit feature is not used when program jumper (JP3) is cut (Brine Application).

SYSTEM RUN-HIGH PRESSURE LIMIT IN EFFECT

Displayed when the chiller is running and the condenser pressure rises to 28.8 PSIA. Simultaneously, the pre-rotation vanes will be inhibited from further opening. This action occurs to prevent system shutdown on high condenser pressure at 29.7 PSIA. When the condenser pressure falls to 28.6 PSIA, the vanes will be permitted to open.

SYSTEM RUN-PRESS STATUS

Displayed when the chiller is running. It instructs the operator to press the **STATUS** key, whereupon one of the following messages will be displayed:

On those chillers equipped with the pump assisted purge unit or are equipped with Micro Board 031-01065-001 and with EPROM P/N 031-01097-001 thru -012, Revision .10 or higher, the following "Warning Messages" are displayed alternately with the foreground message. The foreground message is displayed for 2 seconds, then the warning message is displayed for 2 seconds, etc. It is not necessary to press the **STATUS** key.

- WARNING: COND OR EVAP TRANSDUCER ERROR**

Indicates a probable condenser or evaporator transducer problem, because the output is unreasonable. The microprocessor arrives at this conclusion by subtracting the evaporator transducer output from the condenser transducer output. The result must be zero or some positive number. If the result is a negative number, it concludes that there is a probable condenser or evaporator transducer problem. This function is inhibited for the first 10 minutes of chiller run-time, and is checked every 10 minutes thereafter. Message is reset by pressing the **WARNING RESET** key in the **Service** mode.

- WARNING PURGE FLOAT SWITCH ERROR**

Indicates the microprocessor is receiving conflicting digital signals from purge top float switch and purge bottom float switch (i.e., liquid is simultaneously above TFS and below BFS . . . an impossible condition). Message is reset by pressing **WARNING RESET** key in the **Service** mode.

- WARNING: PURGE TRANSDUCER ERROR**

(Original Design Low Pressure Purge Unit)

Indicates that purge pressure, as sensed by purge pressure transducer, is greater than 70 PSIA (for 255 sec.). Message is reset by pressing **WARNING RESET** key in the **Service** mode.

- WARNING: HIGH PURGE PRESSURE**

(Original Design Low Pressure Purge Unit)

Indicates that purge pressure, as sensed by purge pressure transducer, is greater than 55 PSIA (for 255 sec.). Message is reset by pressing **WARNING RESET** key in the **Service** mode.

- WARNING: HIGH PURGE PRESSURE**

(Pump Assisted Purge Unit)

If the purge transducer output is indicating a pressure greater than 95 PSIA (for 255 continuous sec.) the above warning message is displayed alternately with the normal foreground message. When the pressure decreases to less than 95 PSIA, the message is automatically cleared.

- WARNING: EXCESS PURGE**

(Original Design Low Pressure Purge Unit)

Indicates that 6 or more exhaust cycles have occurred with in 3 fill cycles. **WARNING RESET** key must be pressed to clear display in the **Service** mode. This function is inhibited for the first 30 minutes of chiller run-time.

- MON XX.XX WARNING - EXCESS PURGE**

(Pump Assisted Purge Unit and Chillers Equipped with Micro Board 031-01065-001 and EPROM 031-01097-001 thru -012, Revision .10 and Higher)

Anytime after the first hour of chiller operation, if the purge exhaust count equals the programmed "MAX PURGE/HR" threshold, this message is alternately displayed with the normal foreground message. The day and time displayed is the time the excess purge event occurred. This message will be displayed until manually cleared using the **WARNING RESET** key in the **Service** mode. Clearing the message also resets the purge exhaust count to zero and invokes the message

PURGES LAST-XX MIN = XX; MAX PURGES/HR = XX

While the excess purge message is displayed, the purge exhaust count will continue to increment until the 1 hour period has elapsed. The count is then frozen until the excess purge message is cleared. This provides a record of the total number of purge exhausts that occurred within the 1 hour period that the excess purge event occurred.

Refer to **DISPLAY DATA** key in **SERVICE KEYS** section for complete explanation of purge counting.

NOTE: If the **STATUS** key is arbitrarily pressed, without the operator being prompted by the **PRESS STATUS** message, the following message shall be displayed:

NO MALFUNCTION DETECTED

SYSTEM RUN-LEAVING TEMP CONTROL

Displayed while the chiller is running. Indicates that the pre-rotation vanes are being controlled by the leaving chilled water temperature (LCWT). This is the normal mode of chiller operation. Thus, if the LCWT is above the setpoint, but pulling down rapidly, the vanes will pulse closed as the LCWT nears the setpoint.

SYSTEM READY TO START

Indicates that the system is not running, but will start upon application of a start signal.

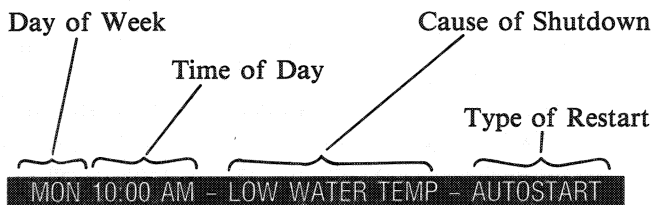
SYSTEM SHUTDOWN-PRESS STATUS

Displayed when chiller is shut down on a cycling shutdown, safety shutdown (operator must move the **COMPRESSOR** switch to **STOP/RESET** in order to restart) or operator-initiated shutdown (within 30 minutes of initial start-up). The status message consists of the day and time of shutdown, cause of shutdown, and type of restart required. Upon pressing **STATUS** key, System Shutdown Message will be displayed for 2 seconds and then return to

SYSTEM SHUTDOWN-PRESS STATUS

Display can be held indefinitely by depressing **DISPLAY HOLD** key. For examples of System Shutdown Messages, see below:

SYSTEM SHUTDOWN MESSAGES



Chiller was shut down Monday at 10:00AM because the LCWT has decreased to a value that is 4°F below the operator-programmed chilled liquid temperature setpoint. However, if the setpoint is less than 40°F, the chiller will

always shut down at 36°F. Further, if the chiller is running and the setpoint is changed, the (Low Water Temperature) cutout will be 36°F for 10 minutes in order to eliminate nuisance trips. Finally, for brine chilling applications, the LWT cutout is always 4°F below the setpoint (The water jumper on the Micro Board must be removed for a brine unit).

MON XX:XX AM - LOW WATER TEMP - TM - AUTOSTART

Turbo-Modulator Unit has shut down the chiller because the LCWT has decreased to a value that is 4°F below the operator-programmed chilled liquid temperature setpoint. If the chiller is running and the setpoint is increased greater than 4°F, the Turbo-Modulator Unit will initiate a shutdown. The shutdown is caused by LWT contact supplied from the Turbo-Modulator Unit. To cause the Micro Board to monitor the Turbo-Modulator Unit LWT input, the non-Turbo-Modulator Unit jumper on the Micro Board must be removed.

MON XX:XX AM - FLOW SWITCH - AUTOSTART

Chiller is shut down because a chilled-liquid flow switch has opened. The flow switch must open for a minimum of 2 seconds in order to cause a shutdown. The flow switch is checked 25 seconds into "Start Sequence Initiated" and continuously thereafter.

MON XX:XX AM - SYSTEM CYCLING - AUTOSTART

A remote command (computer relay contact or manual switch) connected to the Remote/Local cycling input of the digital input board has shut down the chiller.

MON XX:XX AM - MULTI UNIT CYCLING - AUTOSTART

Lead/Lag sequence control accessory has shut down the chiller.

MON XX:XX AM - POWER FAILURE-AUTOSTART

The chiller is shut down because there has been a power interruption or failure. The chiller will automatically restart when power is restored. This message will be displayed if the Micro Board is configured for **AUTO-RESTART AFTER POWER FAILURE**. The Micro Board is factory set for manual restart after power failure. To convert it to auto-restart after power failure, remove one of the two-pin program jumpers from the cloth bag located inside the control center and place it on the terminals labeled "Auto R" (J60) on the Micro Board.

MON XX:XX AM - POWER FAILURE

The chiller is shut down because there has been a power interruption or failure. When power is restored, the chiller

can be restarted by pressing the **COMPRESSOR** switch to **STOP/RESET** position and then to **START** position. This message will be displayed if the Micro Board is configured for **MANUAL RESTART AFTER POWER FAILURE**. The Micro Board is factory set for manual restart after power failure. This has been accomplished by removing the two-pin jumper from the terminals labeled "Auto R" (J60) on the Micro Board.

AC UNDERVOLTAGE - AUTOSTART

The chiller is shut down because the MicroComputer Control Center was in **RUN** mode, displaying

SYSTEM RUN - LEAVING TEMP CONTROL, but the motor

current was less than 10% FLA for 25 continuous seconds. This is indicative of an AC undervoltage condition that has caused the start relay (1R) in the MicroComputer Control Center to de-energize. This condition is checked when the MicroComputer Control Center goes into **RUN** mode (after 30 second pre-lube). This condition can also be caused by failure of any component that would cause a loss of the start signal from the Control Center. In essence, this check assures that the compressor is running when the Control Center is displaying **SYSTEM RUN - LEAVING TEMP CONTROL**

If equipped with 3.E or later EPROM. This check is not performed when Micro Board program jumper JP4 is removed (Steam Turbine Applications).

MON XX:XX AM - INTERNAL CLOCK - AUTOSTART

The operator-programmed daily stop schedule has shut down the chiller. The chiller will automatically restart when the operator-programmed daily start schedule initiates a start. It can be overridden by pressing the **COMPRESSOR** switch to the **START** position.

REMOTE STOP

This message will be displayed when a remote device (typically an Energy Management System) has commanded the chiller to shut down. The chiller will restart upon application of a separate start signal from the remote device. This message will only be displayed when Control Center is in **REMOTE** mode.

ANTI-RECYCLE, XX MIN LEFT

The chiller may not restart more frequently than every 30 minutes. Displayed when chiller is shut down and there is time remaining on the anti-recycle timer. In normal operation, chiller cannot be restarted until **ANTI-RECYCLE, 00 MIN LEFT** is displayed. However, when servicing the chiller, it may be desirable to inhibit this 30-minute timer. If so, simply install a jumper plug in the unmarked terminals of the Micro Board directly under Auto-Restart jack.

WARNING: Remove this jumper after servicing.
Failure to do this voids the Warranty.

MON XX:XX AM - LOW EVAP PRESSURE

The chiller is shut down because the evaporator pressure has decreased to 5.42 PSIA (R11); 4.40 PSIA (R123). The chiller will be allowed to start when the pressure increased to 5.43 PSIA (R11); 4.41 PSIA (R123). To restart chiller, press the **COMPRESSOR** switch to the **STOP/START** position and then to the **START** position.

MON XX:XX AM - LOW EVAP PRESSURE - BRINE

The chiller is shut down because the brine Low Evaporator Pressure (LEP, not included with standard Control Center) safety contacts have opened. The brine LEP safety is located external to the Control Center. Safety cut-out settings will vary with the brine application. To restart the chiller, wait until the safety contacts close, press the **COMPRESSOR** switch to the **STOP/RESET** position and then to the **START** position.

MON XX:XX AM - LOW OIL PRESSURE

The chiller is shut down because the oil pressure has decreased to 15 PSID while running, or never achieved 20 PSID prior to compressor start during the oil pump pre-lube run. The chiller will be allowed to restart when the pressure increases to 20 PSID. Differential pressure is sensed by two pressure transducers. To restart chiller, press **COMPRESSOR** switch to **STOP/RESET** position and then to the **START** position.

MON XX:XX AM - HIGH PRESSURE

The chiller is shut down because condenser pressure has increased to 15 PSIG (29.7 PSIA). System will be allowed to restart when pressure decreases to 9 PSIG (23.7 PSIA). Pressure is sensed by an High Pressure (HP) safety control that is located on a mounting bracket above the oil-pump starter located on the condenser near the purge unit. This message is prompted by the opening of the HP safety control contacts. To restart chiller, press **COMPRESSOR** switch to the **STOP/RESET** position and then to the **START** position.

MON XX:XX AM - EVAP TRANS OR PROBE ERROR

The chiller is shut down because the leaving chilled water temperature minus the evaporator saturation temperature is outside the range of -2.5°F to +25°F continuously for 10 minutes. To restart the chiller, press **COMPRESSOR** switch to **STOP/START** position and then to **START** position. On Brine Applications (program jumper JP3 removed), this

check is no longer performed when the evaporator transducer is reading a pressure below its "out-of-range" threshold.

MON XX:XX AM - MOTOR CONTROLLER - EXT. RESET

The chiller is shut down because a current module (CM-2 Electro-Mechanical starter application), or the YORK Solid State Starter, or Turbo-Modulator initiated a shutdown. To restart system, reset the external device that caused the shutdown. The chiller will automatically restart.

NOTE: The following motor controller shutdowns do not require an external reset to restart the chiller.

1. Turbo-Modulator - over-current, repeat trip, over-temperature.
2. Solid State Starter - power fault, 110°F start inhibit, phase rotation/loss, out of lock.
3. Current Module - power fault.

MON XX:XX AM - POWER FAULT - AUTOSTART

The chiller is shut down because of a Solid Start Starter or current module (CM-2 Electro-Mechanical starter application) "Power Fault" shutdown. The chiller will automatically restart. This function is sensed by the motor controller input to the digital input board. A power-fault shutdown is initiated by the motor controller contacts (CM-1) opening and reclosing in one second.

MON XX:XX AM HIGH DISCHARGE TEMP

The chiller is shut down because the discharge temperature has increased to 220°F. The system will be allowed to restart when the temperature has decreased to 219°F. Temperature is sensed by a thermistor RT2. To restart the chiller, press **COMPRESSOR** switch to **STOP/RESET** position and then to the **START** position.

MON XX:XX AM HIGH OIL TEMP

The chiller is shut down because the oil temperature has increased to 180°F. The system will be allowed to restart when the temperature decreases to 179°F. The temperature is sensed by a thermistor RT3. To restart the chiller, press **COMPRESSOR** switch to **STOP/RESET** position and then to the **START** position.

MON XX:XX AM - OIL PRESSURE TRANSDUCER

Chiller is shut down because to oil pressure has increased to 60 PSID. The chiller will be allowed to restart when the oil pressure decreases to 59 PSID. Pressure is sensed by two oil-pressure transducers that are sensing low and high sump pressure. This safety shutdown is provided primarily as a check on the oil pressure transducers. Display of this message is generally indicative of a defective transducer or interface. To restart the chiller, press **COMPRESSOR**

switch to **STOP/RESET** position and then to the **START** position.

VANE MOTOR SWITCH OPEN

Chiller is shut down because a system-start sequence has been initiated, but the pre-rotation vanes are not fully closed.

MON XX:XX AM - STARTER MALFUNCTION DETECTED

The chiller is shut down because the Control Center has detected a motor-current value greater than 15% FLA for 10 seconds minimum anytime when the compressor-start signal is not energized. To restart the chiller, press **COMPRESSOR** switch to **STOP/RESET** a position and then to the **START** position.

MON XX:XX AM - PROGRAM INITIATED RESET

The chiller is shut down because the Micro Board did not receive a hardware-generated interrupt on schedule. Typical is an Analog/Digital Converter interrupt. This message is indicative of a Micro Board hardware failure or electrical noise on Micro Board. The chiller will automatically restart. This message indicates that the watchdog timer-circuit has reset the microprocessor. This occurs when the time needed to step through program is longer than allowable, thus the software program is initialized at the beginning.

SYSTEM READY TO START - PRESS STATUS

The chiller was shut down on a safety shutdown and will start upon application of a local or remote start signal. Since the message states that the chiller is "Ready to Start", it means that the condition that caused the shutdown no longer exists and the Control Center has been manually reset. When the **STATUS** key is pressed, a message is displayed that describes the reason for shutdown. The message will be displayed for 2 seconds and then return to

SYSTEM READY TO START - PRESS STATUS. Those messages that could be displayed are any of the previously described safety-shutdown messages or warning messages. They can be cleared from the display by entering Service mode and pressing **WARNING RESET** key. Or, the message will be cleared by initiating a compressor start.

START SEQUENCE INITIATED

Indicates that the Micro Board has received a local or remote start signal and has initiated the chiller start-up routine.

This is the compressor pre-lube period. The duration of this period is controlled by the "Prerun" (JP6) wire jumper on the Micro Board as follows:

FUNCTION	JUMPER POSITION
30 Sec Oil Pump Rerun	Installed
*180 Sec Oil Pump Rerun	Cut

* Only used on YDTK 131-144 "F" compressors.

SYSTEM COASTDOWN

Displayed while motor is decelerating after a chiller shut-down. The oil pump is running during this period. The duration of this period is controlled by the "CSTDN" (JP4) wire jumper on the Micro Board as follows:

FUNCTION	JUMPER POSITION
150 Sec. Coastdown	Installed
* 6 Min. Coastdown	Cut

* Use on steam turbine applications only.

MON XX:XX AM - MTR PHASE CURRENT UNBALANCE**(Solid State Starter Applications Only)**

The chiller is shut down because the compressor-motor current was unbalanced while the chiller was running. The current balance is only checked after the motor has been running for a minimum of 45 seconds and the motor current is 80% FLA or greater. If the current in any phase deviates from the average ($\frac{a+b+c}{3}$) current by greater than 30% for a minimum of 45 consecutive seconds, a shutdown is initiated. To restart the system, press the **COMPRESSOR** switch to **STOP/RESET** position and then to the **START** position. An example of the conditions for shutdown is as follows:

IF:

$$\begin{aligned} I_{0A} &= 200A \\ I_{0B} &= 200A \\ I_{0C} &= 118A \end{aligned}$$

THEN:

$$I_{AV} = \frac{200 + 200 + 118}{3}$$

$$I_{AV} = 173A$$

$$I_{ACCEPTABLE} = 173 \pm 30\% = 121A \text{ or } 225A$$

THEREFORE:

Since $I_{0C} = 118A$ which is less than the acceptable 121A, the chiller would shut down if this unbalance exists for 45 consecutive seconds.

MON XX:XX AM - LOW LINE VOLTAGE**(Solid State Starter Applications Only)**

Chiller is shut down because the voltage in any phase of line voltage has decreased below the under-voltage-shutdown threshold for 20 consecutive seconds, or failed to achieve the minimum required starting line-voltage. Refer to explanation under "System Setpoints - SSS Motor Current/Volts", page 7. The system will automatically restart when all phases of line voltage increase to the minimum required starting voltage.

MON XX:XX AM - HIGH LINE VOLTAGE**(Solid State Starter Applications with Version 3.E or Later EPROM Only)**

Chiller is shut down because the voltage in any phase of line voltage has increased above the over-voltage threshold for 20 consecutive seconds. Refer to explanation under "System Setpoints - SSS Motor Current/Volts", page 7. The system will automatically restart when all phases of line voltage decrease to the maximum allowable line voltage to start the chiller.

MON 09:30 AM LOW OIL TEMPERATURE-AUTOSTART

Whenever the oil temperature falls below 55°F, or the oil temperature sensor is disconnected from the Micro Board, the preceding message will appear. The system will automatically restart when the display indicates 71°F.

MON XX:XX AM FAULTY DISCHARGE TEMP SENSOR

Whenever the discharge temperature falls below 32°F, or the discharge temperature sensor is disconnected from the Micro Board, the preceding message will appear. To restart the system when the discharge temperature rises or the sensor has been connected, press the **COMPRESSOR** switch to the **STOP/RESET** position and then to the **START** position.

MON XX:XX AM - AUX SAFETY SHUTDOWN

The system is shut down because an external device, connected to digital input board TB1-31 (Aux Safety Shutdown Input), has initiated a system shutdown. This input is a general purpose input that can be used to annunciate a user-defined safety shutdown. To restart chiller, press **COMPRESSOR** switch to **STOP/RESET** position and then to the **START** position.

REPLACE RTC, U16 - REPROGRAM SETPOINTS

Indicates that the battery located inside the **REAL-TIME CLOCK IC Chip (U16)** on the Micro Board is defective. This battery provides back-up power to the RTC memory (RAM) in the event of a utility AC power failure. This assures the system setpoints will be maintained. If this message appears, the RTC IC Chip (U16) on the Micro Board must be replaced. If there had been a power failure while this message is displayed, the setpoints will have been lost and must be reprogrammed. Order a replacement RTC IC Chip (YORK part number 031-00955-000) from the YORK Parts Distribution Center. With AC power removed from system, locate RTC Chip U16 on the Micro Board and remove existing RTC Chip from socket and discard. Observe anti-static pre-cautions and install new RTC Chip in socket. Assure proper IC orientation - orientation notch must be UP. (Refer to Fig. 13)

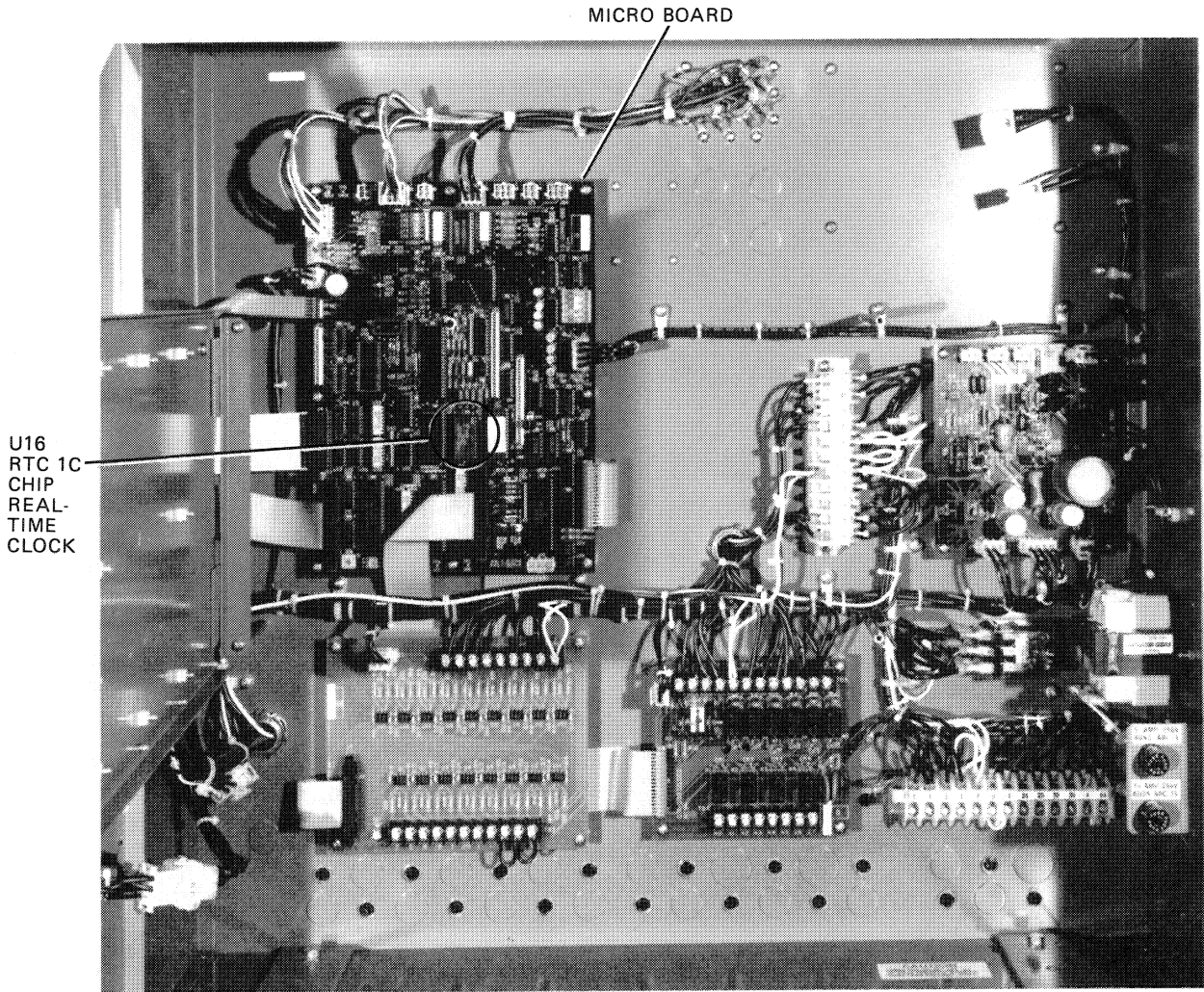


FIG. 13 – MICROCOMPUTER CONTROL CENTER - INTERIOR - WITH PANEL OPEN - LOCATION OF REAL TIME CLOCK U16 RTC IC CHIP

