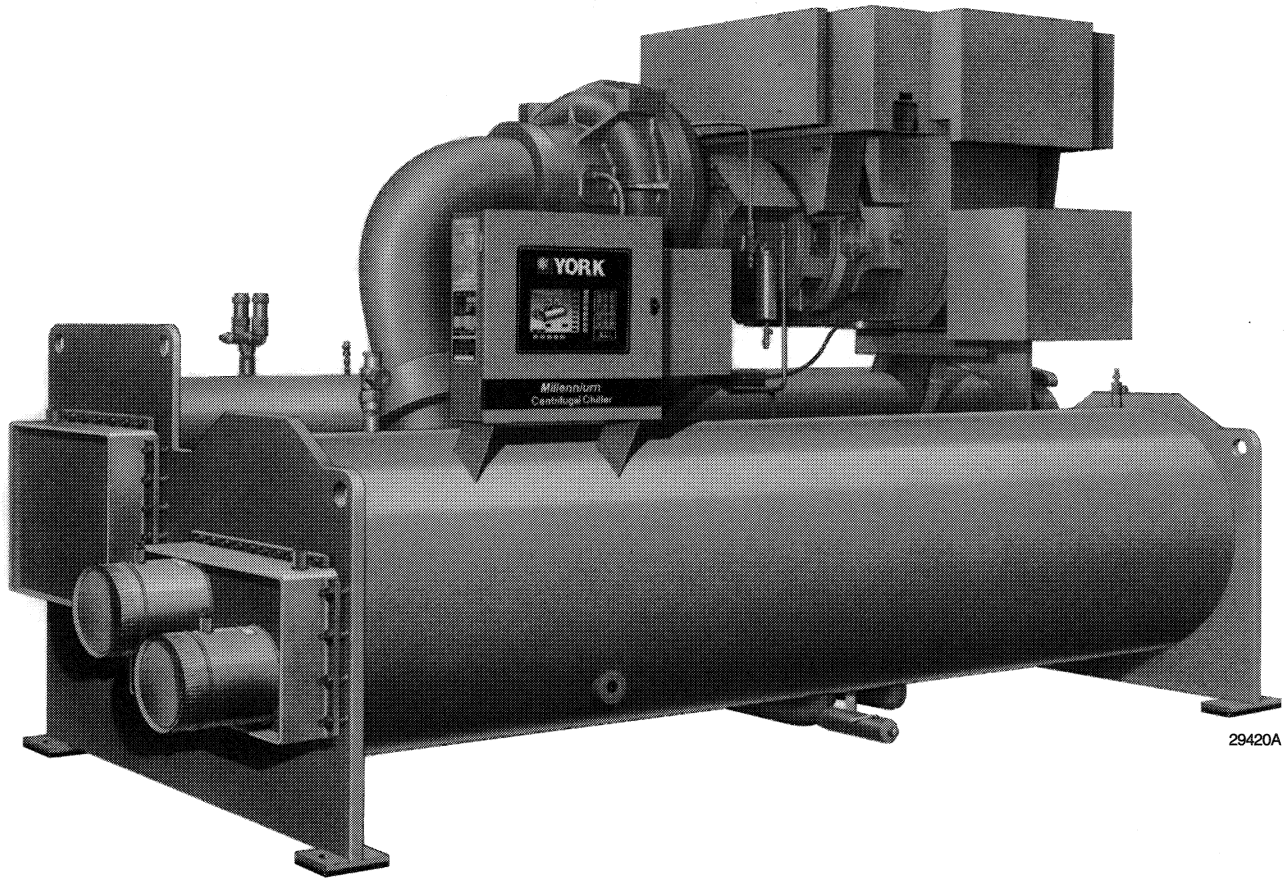
YORK®	*MILLENNIUM* ™ CENTRIFUGAL LIQUID CHILLERS	
OPERATING & MAINTENANCE	Supersedes: See Back Cover	Form 160.54-O1 (200)

MODEL YK (STYLE E)
R-134a COOLING ONLY

WITH OPTIVIEW™ CONTROL CENTER FOR ELECTRO-MECHANICAL STARTER, SOLID STATE STARTER & VARIABLE SPEED DRIVE



29420A

NOTE: YK STYLE E CHILLERS ARE YEAR 2000 COMPLIANT

‡	**NOTE:** THIS SYMBOL PLACED IN THE MARGINS OF THE TEXT INDICATES ADDITIONS, CHANGES OR DELETIONS MADE SINCE THE PREVIOUS ISSUE (399)

IMPORTANT!
READ BEFORE PROCEEDING!
GENERAL SAFETY GUIDELINES

This equipment is a relatively complicated apparatus. During installation, operation, maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to: refrigerants, oils, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized operating/service personnel. It is expected that this individual possesses independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.

SAFETY SYMBOLS

The following symbols are used in this document to alert the reader to areas of potential hazard:



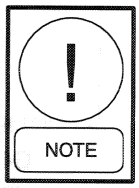
DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



CAUTION identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution. Usually an instruction will be given, together with a brief explanation.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



NOTE is used to highlight additional information which may be helpful to you.



External wiring, unless specified as an optional connection in the manufacturer's product line, is NOT to be connected inside the micro panel cabinet. Devices such as relays, switches, transducers and controls may NOT be installed inside the micro panel. NO external wiring is allowed to be run through the micro panel. All wiring must be in accordance with YORK's published specifications and must be performed ONLY by qualified YORK personnel. YORK will not be responsible for damages/problems resulting from improper connections to the controls or application of improper control signals. Failure to follow this will void the manufacturer's warranty and cause serious damage to property or injury to persons.

CHANGEABILITY OF THIS DOCUMENT

In complying with YORK's policy for continuous product improvement, the information contained in this document is subject to change without notice. While YORK makes no commitment to update or provide current information automatically to the manual owner, that information, if applicable, can be obtained by contacting the nearest YORK Applied Systems Service office.

It is the responsibility of operating/service personnel as to the applicability of these documents to the equipment in question. If there is any question in the mind of operating/service personnel as to the applicability of these documents, then, prior to working on the equipment, they should verify with the owner whether the equipment has been modified and if current literature is available.

REFERENCE INSTRUCTIONS

	DESCRIPTION	FORM NO.
	SOLID STATE STARTER (MOD "A") – OPERATION & MAINTENANCE	160.46-OM3.1
	SOLID STATE STARTER (MOD "B") – OPERATION & MAINTENANCE	160.00-O2
	VARIABLE SPEED DRIVE – OPERATION	160.00-O1
	VARIABLE SPEED DRIVE – SERVICE INSTRUCTIONS	160.00-M1
	INSTALLATION	160.54-N1
	OPTIVIEW CONTROL CENTER - SERVICE INSTRUCTIONS	160-54-M1
	WIRING DIAGRAM – UNIT WITH ELECTRO-MECHANICAL STARTER	160.54-PW1
	WIRING DIAGRAM – UNIT WITH MOD "A" SOLID STATE STARTER	160.54-PW2
‡	WIRING DIAGRAM – UNIT WITH MOD "B" SOLID STATE STARTER	160.54-PW2.1
	WIRING DIAGRAM – UNIT WITH VARIABLE SPEED DRIVE	160.54-PW3
	RENEWAL PARTS – UNIT	160.49-RP4
	RENEWAL PARTS – OPTIVIEW CONTROL CENTER	160.54-RP1

NOMENCLATURE

YK CB CB G4 – CM E

- YK — MODEL
- CB — COOLER CODE
  CB, CC, CD, CE, DB, DC, DD, DE, FB, FC, FD
  GB, GC, GD, GF, GH, HB, HC, HF, HH, JF, JG
  JH, TF, TG, TH, VF, VH, WF, WH
- CB — CONDENSER CODE
  CB, CC, CD, DB, DC, DD, EB, EC, ED
  FB, FC, FD, GB, GC, GD, HB, HC, HD, JB, JC,
  JD, TB, TC, TD, VB, VC, VD
- G4 — COMPRESSOR CODE
  G4, H0, H1, H2, H3, H4, H5
  H6, H8, J1, J2, J3, J4
- – — POWER SUPPLY
  – for 60 Hz
  5 for 50 Hz
- CM — MOTOR CODE

MOTOR CODE			
60 Hz		50 Hz	
CH	CX	5CE	5CT
CJ	CY	5CF	5CU
CK	CZ	5CG	5CV
CL	CA	5CH	5CW
CM	CB	5CI	5CX
CN	DA	5CJ	5DA
CP	DB	5CK	5DB
CR	DC	5CL	5DC
CS	DD	5CM	5DD
CT	DE	5CN	5DE
CU	DF	5CO	5DF
CV	DH	5CP	5DG
CW	DJ	5CQ	5DH
		5CR	5OJ
		5CS	

- E — DESIGN LEVEL (E)

TABLE OF CONTENTS

SECTION 1 Description of System and Fundamentals of Operation 7

SECTION 2 OptiView Control Center 9

SECTION 3 Printers 94

SECTION 4 System Operating Procedures 108

SECTION 5 System Components Description 115

SECTION 6 Operational Maintenance 121

SECTION 7 Troubleshooting 123

SECTION 8 Maintenance 125

SECTION 9 Preventive Maintenance 134

‡

LIST OF FIGURES

FIG. 1 – MODEL YK MILLENNIUM CHILLER 7

FIG. 2 – REFRIGERANT FLOW-THROUGH CHILLER 8

DETAIL A – COMPRESSOR PREROTATION VANES 8

FIG. 3 – OPTIVIEW CONTROL CENTER 10

FIG. 4 – HOME SCREEN 14

FIG. 5 – SYSTEM SCREEN 16

FIG. 6 – EVAPORATOR SCREEN 18

FIG. 7 – CONDENSER SCREEN 20

FIG. 8 – REFRIGERANT LEVEL CONTROL SCREEN . 22

FIG. 9 – COMPRESSOR SCREEN 24

FIG. 10 – PROXIMITY PROBE CALIBRATION SCREEN 26

FIG. 11 – HOT GAS BYPASS SCREEN 28

FIG. 12 – PRE-ROTATION VANES CALIBRATION SCREEN 30

FIG. 13 – VSD TUNING SCREEN 32

FIG. 14 – OIL SUMP SCREEN 34

FIG. 15 – ELECTRO-MECHANICAL STARTER SCREEN 36

FIG. 16 – MOD "A" SOLID STATE STARTER SCREEN 38

FIG. 17 – MOD "B" SOLID STATE STARTER SCREEN 40

FIG. 18 – VARIABLE SPEED DRIVE SCREEN 42

FIG. 19 – VARIABLE SPEED DRIVE DETAILS SCREEN 44

FIG. 20 – ADAPTIVE CAPACITY CONTROL DETAILS SCREEN 46

FIG. 21 – HARMONIC FILTER DETAILS SCREEN 48

FIG. 22 – SETPOINTS SCREEN 50

FIG. 23 – SETUP SCREEN 52

FIG. 24 – SCHEDULE SCREEN 54

FIG. 25 – USER SCREEN 56

FIG. 26 – COMMS SCREEN 57

FIG. 27 – PRINTER SCREEN 58

FIG. 28 – SALES ORDER SCREEN 60

FIG. 29 – OPERATIONS SCREEN 61

FIG. 30 – HISTORY SCREEN 62

FIG. 31 – HISTORY DETAILS SCREEN 64

FIG. 32 – CUSTOM VIEW SCREEN 65

FIG. 33 – CUSTOM VIEW SETUP SCREEN 66

FIG. 34 – TREND SCREEN 68

FIG. 35 – TREND SETUP 70

FIG. 36 – COMMON SLOTS SCREEN 72

FIG. 37 – PRINTERS 94

FIG. 38 – SAMPLE PRINTOUT (STATUS) 98

FIG. 39 – SAMPLE PRINTOUT (SETPOINTS) 100

FIG. 40 – SAMPLE PRINTOUT (SCHEDULE) 102

FIG. 41 – SAMPLE PRINTOUT (SALES ORDER) 103

FIG. 42 – SAMPLE PRINTOUT (HISTORY) 104

FIG. 43 – SAMPLE PRINTOUT (CYCLING OR SAFETY SHUTDOWN INITIATED PRINT) 106

FIG. 44 – CHILLER STARTING SEQUENCE & SHUTDOWN SEQUENCE (EM STARTER & SOLID STATE STARTER) 109

FIG. 45 – CHILLER STARTING SEQUENCE & SHUTDOWN SEQUENCE (VARIABLE SPEED DRIVE) 110

FIG. 46 – LIQUID CHILLER LOG SHEETS 111

FIG. 47 – SYSTEM COMPONENTS 115

FIG. 48 – SCHEMATIC DRAWING (YK) COMPRESSOR LUBRICATION SYSTEM 118

FIG. 49 – OIL RETURN SYSTEM 121

FIG. 50 – CHARGING OIL RESERVOIR WITH OIL 122

FIG. 51 – OPERATING ANALYSIS CHART 123

FIG. 52 – EVACUATION OF CHILLER 125

FIG. 53 – SYSTEM PRESSURES 126

FIG. 54 – SATURATION CURVE 127

FIG. 55 – REFRIGERANT CHARGE 128

FIG. 56 – DIAGRAM - MEGGING MOTOR WINDINGS 129

FIG. 57 – MOTOR STATOR TEMPERATURE & INSULATION RESISTANCE 130

SECTION 1
DESCRIPTION OF SYSTEM AND FUNDAMENTALS OF OPERATION

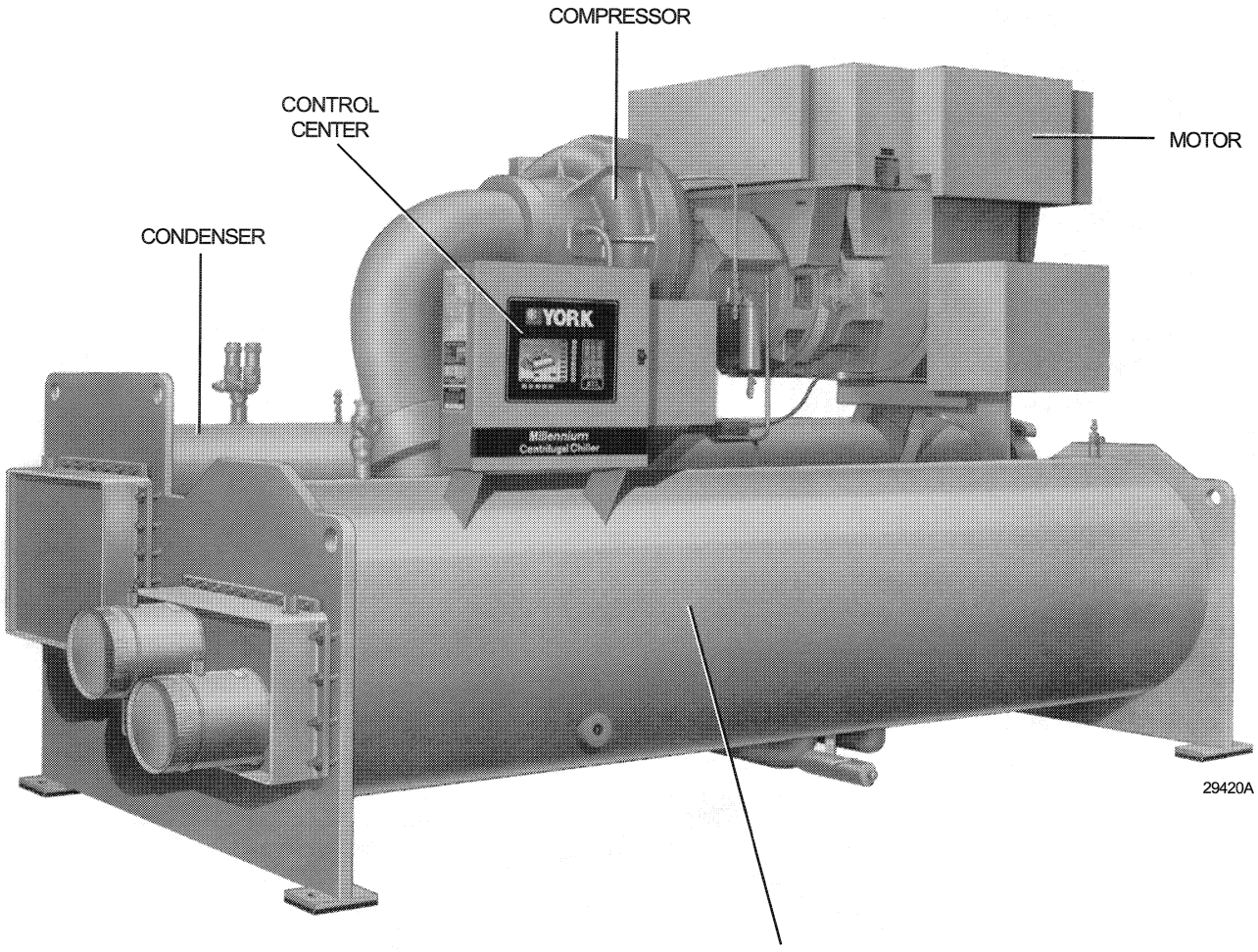


FIG. 1 – MODEL YK MILLENNIUM CHILLER

SYSTEM OPERATION DESCRIPTION (SEE FIG. 2)

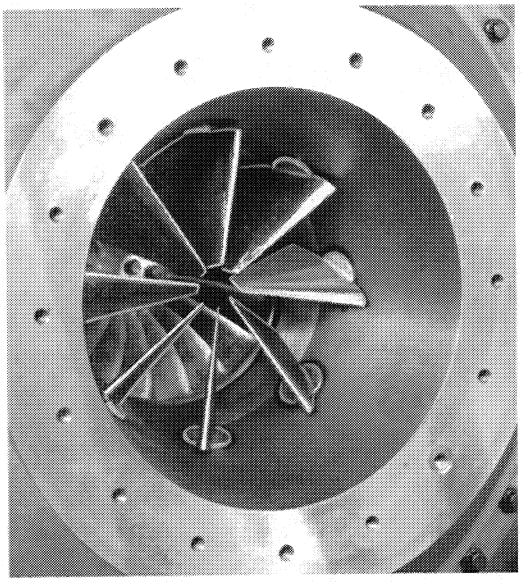
The YORK Model YK Millennium Chiller is commonly applied to large air conditioning systems, but may be used on other applications. The chiller consists of an open motor mounted to a compressor (with integral speed increasing gears), condenser, cooler and variable flow control.

The chiller is controlled by a modern state of the art Microcomputer Control Center that monitors its operation. The Control Center is programmed by the operator to suit job specifications. Automatic timed start-ups and shutdowns are also programmable to suit nighttime, weekends, and holidays. The operating status, temperatures, pressures, and other information pertinent to operation of the chiller are automatically displayed and read on a graphic ‡ display. Other displays can be observed by pressing the keys as labeled on the Control Center. The chiller with the Microcomputer Control Center is applied with an electro-mechanical starter, YORK Solid State Starter (optional), or Variable Speed Drive (optional).

There could be either of two different Solid State Start- ‡ ers applied. Later production chillers are equipped with the Mod "B" Solid State Starter. This starter contains a combination Logic/trigger Board that interfaces the Control Center with a serial communications link. Earlier vintage chillers are equipped with the Mod "A" Solid State Starter. This starter contains a Trigger Board that interfaces to a Logic Board that is installed inside of the Control Center.

In operation, a liquid (water or brine to be chilled) flows through the cooler, where boiling refrigerant absorbs heat from the liquid. The chilled liquid is then piped to fan coil units or other air conditioning terminal units, where it flows through finned coils, absorbing heat from the air. The warmed liquid is then returned to the chiller to complete the chilled liquid circuit.

The refrigerant vapor, which is produced by the boiling action in the cooler, flows to the compressor where the rotating impeller increases its pressure and temperature



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DETAIL A – COMPRESSOR PREROTATION VANES

and discharges it into the condenser. Water flowing through the condenser tubes absorbs heat from the refrigerant vapor, causing it to condense. The condenser water is supplied to the chiller from an external source, usually a cooling tower. The condensed refrigerant drains from the condenser into the liquid return line, where the variable orifice meters the flow of liquid refrigerant to the cooler to complete the refrigerant circuit.

The major components of a chiller are selected to handle the refrigerant, which would be evaporated at full load design conditions. However, most systems will be called upon to deliver full load capacity for only a relatively small part of the time the unit is in operation.

CAPACITY CONTROL

The major components of a chiller are selected for full load capacities, therefore capacity must be controlled to maintain a constant chilled liquid temperature leaving the cooler. Prerotation vanes (PRV), located at the entrance to the compressor impeller, compensate for variation in load (See Fig. 2. Detail A).

The position of these vanes is automatically controlled through a lever arm attached to an electric motor located outside the compressor housing. The automatic adjustment of the vane position in effect provides the performance of many different compressors to match various load conditions from full load with vanes wide open to minimum load with vanes completely closed.

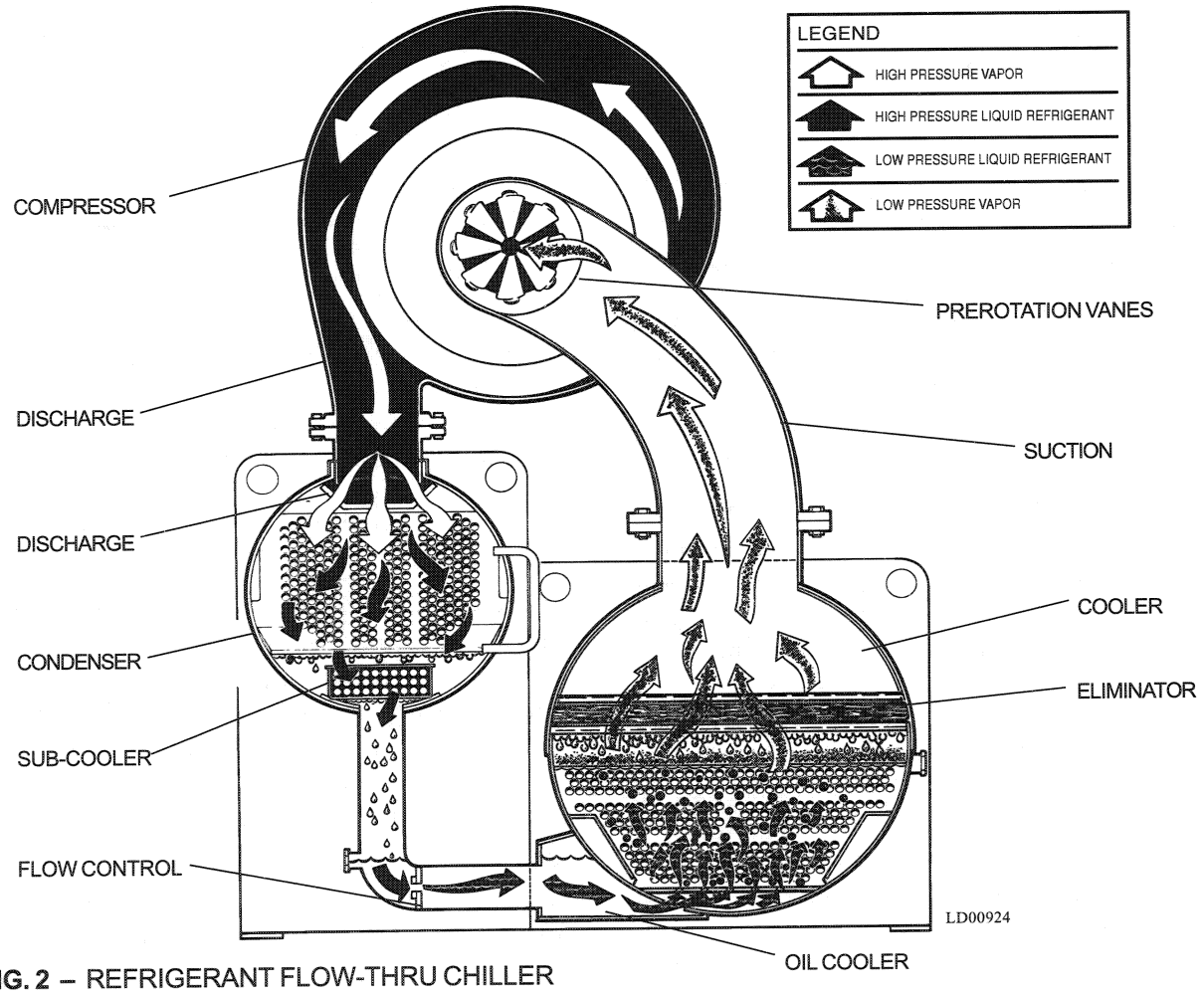


FIG. 2 – REFRIGERANT FLOW-THRU CHILLER

SECTION 2
OPTIVIEW CONTROL CENTER
INTRODUCTION

The YORK OptiView Control Center is a microprocessor based control system for R-22 or R134a centrifugal chillers. It controls the leaving chilled liquid temperature via pre-rotation vane controls and has the ability to limit motor current via control of the pre-rotation vanes. It is compatible with YORK Solid State Starter (optional), Variable Speed Drive (optional), and Electro-mechanical starter applications.

The panel comes configured with a full screen LCD Graphic Display mounted in the middle of a keypad interface. The graphic display allows the presentation of several operating parameters at once. In addition, the operator may view a graphical representation of the historical operation of the chiller as well as the present operation. For the novice user, the locations of various chiller parameters are clearly and intuitively marked. Instructions for specific operations are provided on many of the screens.

The graphic display also allows information to be represented in both English (temperatures in °F and pressures in PSIG) and Metric (temperatures in °C and pressures in KPa) mode. The advantages are most apparent, however, in the ability to display many languages. ‡

The Control Center continually monitors the system operation and records the cause of any shutdowns (Safety, Cycling or Normal). This information is recorded in memory and is preserved even through a power failure condition. The user may recall it for viewing at any time. During operation, the user is continually advised of the operating conditions by various status and warning messages. In addition, it may be configured to notify the user of certain conditions via alarms. A complete listing of shutdown, status, and warning messages is attached in the **Display Messages** section of this book.

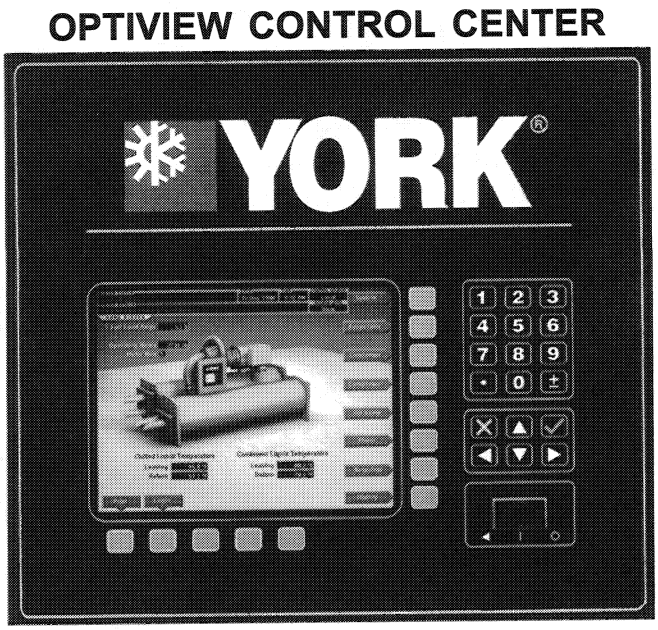
There are certain screens, displayed values, programmable Setpoints and manual control shown in this book that are for Service Technician use only. They are only displayed when logged in at **SERVICE** access level or higher. The Setpoints and parameters displayed on these screens are explained in detail in YORK Service Manual 160.54-M1. **These parameters affect chiller operation and should NEVER be modified by anyone other than a qualified Service Technician. They are shown in this book for reference only.**

Advanced Diagnostics and troubleshooting information for Service Technicians are included in YORK Service Manual 160.54-M1. Also included in the Service manual are detailed descriptions of chiller features, such as the Refrigerant Level Control, Variable Speed Drive Oil Pump, Hot Gas Bypass, High Speed Thrust Bearing Proximity Probe, Remote Setpoints, Smart Freeze Protection, and Standby Lubrication.

The control center expands the capabilities of remote control and communications. By providing a common networking protocol through the ISN, YORK Chillers not only work well individually, but also as a team. This new protocol allows increased remote control of the chiller, as well as 24-hour performance monitoring via a remote site. In addition, compatibility is maintained with the present network of ISN communications. The chiller also maintains the standard digital remote capabilities as well. Both of these remote control capabilities allow for the standard Energy Management System (EMS) interface: ‡

1. Remote Start
2. Remote Stop
3. Remote Leaving Chilled Liquid Temperature Setpoint adjustment (0-10VDC, 2-10VDC, 0-20mA or 4-20mA) or Pulse Width Modulation ‡
4. Remote Current Limit Setpoint adjustment (0-10VDC, 2-10VDC, 0-20mA or 4-20mA) or Pulse Width Modulation ‡
5. Remote "Ready to Start" Contacts
6. Safety Shutdown Contacts
7. Cycling Shutdown Contacts

‡



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FIG. 3

The OptiView Control Center display is highlighted by a full screen graphics display. This display is nested within a standard keypad, and is surrounded by "soft" keys which are redefined based on the currently displayed screen. Eight buttons are available on the right side of the panel, and are primarily used for navigation between the system screens. At the base of the display are 5 additional buttons. The area to the right of the keypad is used for data entry with a standard numeric keypad provided for entry of system setpoints and limits.



The *Decimal* key provides accurate entry of setpoint values.



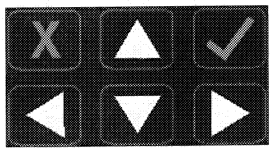
A +/- key has also been provided to allow entry of negative values and AM/PM selection during time entry.



In order to accept changes made to the chiller setpoints, the *Check* key is provided as a universal 'Enter' key or 'Accept" symbol.



In order to reject entry of a setpoint or dismiss an entry form, the *'X'* key is provided as a universal 'Cancel' symbol.



Cursor Arrow keys are provided to allow movement on screens which contain a large amount of entry data. In addition, these keys can be used to scroll through history and event logs.

The Start/Stop control is operated via a three-position rocker switch. When toggled all the way to the right, it is considered in the **STOP/RESET** position. When in the middle position, this is considered the **RUN** state. When toggled to the left-most position, it is considered in the **START** state. Each state is described in detail below:

- **STOP / RESET (O)**
  When in this position, the chiller will not run under any condition. For safety reasons, this position is required for many maintenance tasks to be completed (such as proximity probe and vane calibration). In addition, the switch must be placed in this state following a Safety shutdown before the chiller is allowed to restart. This guarantees that manual intervention has taken place and the shutdown has been acknowledged.
- **START (◀)**
  The switch can only remain in this position when being acted upon by a manual force. Once the user has released the switch, it automatically reverts to the RUN position. Generally, this state only occurs momentarily as the operator attempts to locally start the unit. Once this position has been sensed, if all fault conditions are cleared, the unit will enter the system prelube (start sequence).
- **RUN (■)**
  When in this position, the chiller is able to operate. The switch spring-returns to this state after it has been toggled to the **START** position. When in this state, the chiller is allowed to function normally, and will also allow the chiller to automatically restart following a Cycling shutdown. The switch must be in this state to receive a valid remote start signal when operating under a remote control source.

INTERFACE CONVENTIONS

OVERVIEW

The new graphical display on each control panel allows a wide variety of information to be presented to the user. Each screen description in this document will begin with a section entitled **Overview** which will describe the graphical elements on the screen and give a short summary of the functions available. Each element on the screen will then be categorized into three distinct groups: Display Only, Programmable, and Navigation. Below is a short description of what types of information are included in these groups.

The Programmable values and Navigation commands are also subject to access level restrictions as described below. For each of these elements, an indication is given to show the minimum access level required to program the value or navigate to the sub-screen.

DISPLAY ONLY

Values in this group are read-only parameters of information about the chiller operation. This type of information may be represented by a numerical value, a text string, or an LED image. For numerical values, if the monitored parameter is above the normal operating range, the high limit value will be displayed along with the '>' symbol; if it is below the normal operating range, the low limit value will be displayed along with the '<' symbol. In some cases, the value may be rendered invalid by other conditions and the display will use X's to indicate this.

PROGRAMMABLE

Values in this group are available for change by the user. In order to program any setpoints on the system, the user must first be logged in with the appropriate access level. Each of the programmable values requires a specific Access Level which will be indicated beside the specified value. All of the programmable controls in the system fall into one of the categories described below:

Access Level

In order to program any setpoints on the system, the user must first login with an appropriate access level. When power is applied to the chiller, the system begins with an Access Level of **VIEW**. This will allow the user to navigate to most screens and observe the values displayed there. However, the user will not be allowed to change any values. To change any values, the user must return to the **Home Screen** (shown by default when power is applied to the system), and use the **LOGIN** button or utilize the **CHANGE SETPOINTS** key described below. At this point, the user will be prompted to enter a User ID and the corresponding Password. By default, the User ID is zero (0). In order to gain standard **OPERATOR** level access, the Password would be entered as **9 6 7 5**, using the numeric keypad. **OPERATOR** access reverts to the **VIEW** level after 10 continuous minutes without a keypress. If a custom User ID and Password have been defined (see User Screen), the user may enter that User ID and the corresponding Password value.

If the correct password is received, the user is authorized with the appropriate Access Level. If an incorrect password is entered, the user is notified of the failure and prompted again. At this point the user may retry the password entry, or cancel the login attempt.

Change Setpoints

On screens containing setpoints programmable at the **OPERATOR** access level, a key with this label will be visible if the present access level is **VIEW**. This key brings up the Access Level prompt described above. It allows the user to login at a higher Access Level without returning to the Home Screen. After login, the user may then modify setpoints on that screen.

Setpoints

The control center uses the setpoint values to control the chiller and other devices connected to the chiller system. Setpoints can fall into several categories. They could be numeric values (such as 45.0°F for the Leaving Chilled Liquid Temperature), or they could Enable or Disable a feature or function.

Regardless of which setpoint is being programmed, the following procedure applies:

1. Press the desired setpoint key. A dialog box appears displaying the present value, the upper and lower limits of the programmable range, and the default value.

2. If the dialog box begins with the word "ENTER", use the numeric keys to enter the desired value. Leading zeroes are not necessary. If a decimal point is necessary, press the '•' key (i.e. 45.0).

   Pressing the ▲ key, sets the entry value to the default for that setpoint. Pressing the ▼ key, clears the present entry. The ◀key is a backspace key and causes the entry point to move back one space.

   If the dialog box begins with "SELECT", use the ◀ and ▶keys to select the desired value.

   If the previously defined setpoint is desired, press the 'X' (Cancel) key to dismiss the dialog box.

3. Press the '✓' (Enter) key.

   If the value is within range, it is accepted and the dialog box disappears. The chiller will begin to operate based on the new programmed value. If out of range, the value will not be accepted and the user is prompted to try again.

Manual Controls

Some keys are used to perform manual control functions. These may involve manual control of items such as the pre-rotation vanes, variable orifice or oil pump speed. Other keys in this category are used to initiate/terminate processes such as calibrations or reports.

Free Cursor

On screens containing many setpoints, a specific "soft" key may not be assigned to each setpoint value. A soft key will be assigned to enable the cursor arrow keys below the numeric keypad which are used to "highlight" the desired setpoint field. At this point, the '✓' key is pressed to bring up a dialog prompting the user to enter a new setpoint value. The 'X' key cancels cursor mode. (See the Schedule Screen [page 54] for an example.)

NAVIGATION

In order to maximize the amount of values which the panel can display to the user, and in order to place those values in context, multiple screens have been designed to describe the chiller operation. In order to move from one screen to the next, navigation keys have been defined. These keys allow the user to either move "forward" to a sub-screen of the present screen, or move "backward" to the previous screen. Except for the Home Screen display, the upper-right "soft" key will always return the user to the Home Screen. The navigation "soft" keys is as simple as pressing the key next to the label containing the name of the desired screen. The system will immediately refresh the display with the graphics for that screen. Following is a layout of all the screens and how they are connected.

- Home Screen (page 14)
  - System Screen (page 16)
  - Evaporator (page 18)
  - Condenser (page 20)
    - Level Control (page 22)
  - Compressor (page 24)
    - Proximity Probe Calibration (page 26)
    - Hot Gas Bypass (page 28)
    - Vane Calibration (page 30)
    - VSD Tuning (page 32)
  - Oil Sump (page 34)
  - Motor (page 36)
    - EM Starter Version (page 36)
    - Mod "A" Solid State Starter (page 38) ‡
    - Mod "B" Solid State Starter (page 40)
    - VSD Version (page 42)
      - VSD Details (page 44)
      - ACC Details (page 46)
      - Harmonic Filter Details (page 48)
  - Setpoints (page 50)
    - Setup (page 52)
      - Schedule (page 54)
      - User (page 56)
      - Comms (page 57)
      - Printer (page 58)
      - Sales Order (page 60)
      - Operations (page 61)
      - Diagnostics *(Refer to YORK Service Manual 160.54-M1)*
  - History (page 62)
    - History Details (page 64)
    - Custom View (page 65)
      - Custom Setup (page 66)
    - Trend (page 68)
      - Trend Setup (page 70)
        - Common Slots (page 72)

‡ LANGUAGES

The Screens can be displayed in various languages. Language selection is done on the USER Screen. The desired language is selected from those available. Not all languages are available. English is the default language. If a language other than English is being displayed, an English-only speaking person should navigate to the USER Screen using the preceding Navigation chart and select English per the USER Screen instructions in this book.

ANALOG INPUT RANGES

The following table indicates the valid display range for each of the analog input values. In the event that the input sensor is reading a value outside of these ranges, the < or > symbols will be displayed beside the minimum or maximum value, respectively.

ANALOG INPUT	ENGLISH RANGE			METRIC RANGE		
	LOW	HIGH	UNITS	LOW	HIGH	UNITS
Leaving Chilled Liquid Temperature	0.0	82.0	°F	-17.7	27.7	°C
Return Chilled Liquid Temperature	0.0	94.1	°F	-17.7	34.5	°C
Leaving Condenser Liquid Temperature	8.0	133.5	°F	-13.3	56.3	°C
Return Condenser Liquid Temperature	8.0	133.5	°F	-13.3	56.3	°C
Evaporator Refrigerant Temperature (Optional)	0.0	126.1	°F	-17.7	52.3	°C
Discharge Temperature	31.8	226.3	°F	-0.1	107.9	°C
Oil Temperature	31.8	226.3	°F	-0.1	107.9	°C
Condenser Pressure (R22 and R134a)	0.0	315.0	PSIG	0.0	2172.4	KPAG
Condenser Temperature (R22)*	-122.1	130.9	°F	-85.6	54.9	°C
Condenser Temperature (R134a)*	-98.7	160.1	°F	-72.6	71.7	°C
Evaporator Pressure (R22 – water)	49.4	128.8	PSIG	340.6	888.2	KPAG
Evaporator Pressure (R22 – brine)	25.0	100.0	PSIG	172.4	689.6	KPAG
Evaporator Pressure (R134a)	5.5	77.4	PSIG	37.9	533.7	KPAG
Evaporator Temperature (R22 – water)*	13.0	67.0	°F	-10.5	19.4	°C
Evaporator Temperature (R22 – brine)*	-18.0	51.4	°F	-27.7	10.7	°C
Evaporator Temperature (R134a)*	-44.9	64.7	°F	-42.7	18.1	°C
Oil Sump Pressure (R22)	23.2	271.8	PSIG	160.0	1874.4	KPAG
Oil Sump Pressure (R134a)	0.0	315.0	PSIG	0.0	2172.4	KPAG
Oil Pump Pressure (R22 and R134a)	0.0	315.0	PSIG	0.0	2172.4	KPAG
High Speed Thrust Bearing Proximity Position	8.0	99.0	MILS	8.0	99.0	MILS
High Speed Thrust Bearing Drain Temperature**	19.1	300.0	°F	-7.1	148.8	°C
Refrigerant Level	0.0	100.0	%	0.0	100.0	%
Drop Leg Refrigerant Temperature	0.0	121.7	°F	-17.7	49.8	°C

*Saturation temperatures are calculated values. They will display XXX if the pressure used for the calculation is out of range.

‡ **Not applicable to chillers equipped with Flash Memory Card version C.MLM.01.03 and higher.

HOME SCREEN

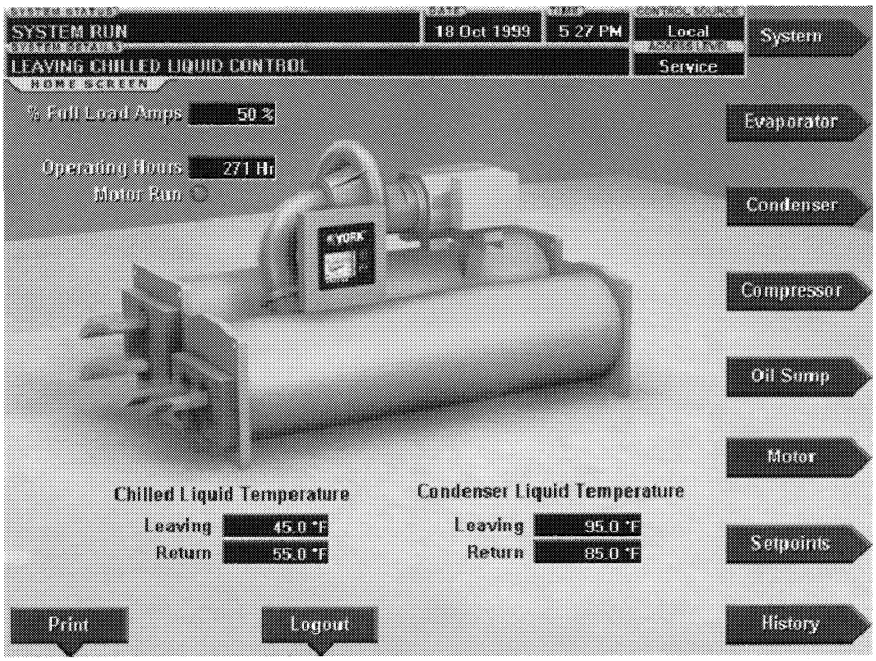


FIG. 4

00299VIP

OVERVIEW

When the chiller system is powered on, the above default display appears. The primary values which must be monitored and controlled are shown on this screen. The Home Screen display depicts a visual representation of the chiller itself. Animation indicates chilled liquid flow.

DISPLAY ONLY

Chilled Liquid Temperature - Leaving
Displays the temperature of the liquid as it leaves the evaporator.

Chilled Liquid Temperature - Return
Displays the temperature of the liquid as it enters the evaporator.

Condenser Liquid Temperature - Leaving
Displays the temperature of the liquid as it leaves the condenser.

Condenser Liquid Temperature - Return
Displays the temperature of the liquid as it enters the condenser.

Motor Run (LED)
Is **ON** when the digital output controlling the Motor Starter contact is on.

Input Power (kW)
Available only if the chiller system is utilizing a Variable ‡ Speed Drive or Mod "B" Solid State Starter motor controller. This displays the total input power used by the system.

% Full Load Amps
This displays the percentage of full load amps utilized by the system.

Operating Hours
Displays the cumulative operating hours of the chiller.

PROGRAMMABLE

Login
Access Level Required: VIEW
The OptiView Panel restricts certain operations based on password entry by the operator. Three different access levels are provided as follows: **VIEW:** The panel defaults to the lowest access level which is termed **VIEW**. In this mode, the chiller operating values and setpoints can be observed, but no changes can be made. **OPERATOR:** The second access level is termed **OPERATOR** and will allow the customer to change all of the setpoints required to operate the chiller system. The **OPERATOR** access level reverts to the **VIEW** level after 10 continuous minutes without a keypress. **SERVICE:** In the event that advanced diagnostics are necessary, a **SERVICE** access level has been provided. Only qualified service personnel utilize this access level. This level provides advanced control over many of the chiller functions and allows calibration of many of the

chiller controls. The access levels are listed above in hierarchical order beginning with the lowest level and proceeding to the highest level. Users logged in under higher access levels may perform any actions permitted by lower access levels.

The **OPERATOR** access level is accompanied by a 10-minute timeout. After ten (10) successive minutes without a keypress, the panel will revert to the **VIEW** access level. This prevents unauthorized changes to the chiller if a user was logged in at a higher access level and failed to logout. Proper procedure requires that after making necessary setpoint adjustments the user return to the Home Screen and logout.

Logout

Access Level Required: OPERATOR
This key is displayed when a user is logged in at any level other than **VIEW**. Pressing it will return the access level to **VIEW**.

Print

Access Level Required: VIEW
Use this key to generate a hard-copy report of the present system status. This provides a snapshot of the primary operating conditions at the time the key is pressed. The History page provides enhanced reporting capability. (See HISTORY below.) This option will not be present if the chiller is presently configured to log any incoming Adaptive Capacity Control map points. (See the Adaptive Capacity Control Details screen.)

Message Clear

Access Level Required: SERVICE
When certain safety or cycling conditions have been detected and the chiller has been shutdown, the main status display of the chiller will continue to display a message indicating the cause of the shutdown. Using this key, the message can be cleared once the condition has been removed.

Warning Reset

Access Level Required: OPERATOR
Use of this key acknowledges a warning condition and resets the message display associated with it.

NAVIGATION

System

Used to provide additional system information.

Evaporator

A detailed view of all evaporator parameters, including the programmable Leaving Chilled Liquid Setpoints.

Condenser

A detailed view of all condenser parameters, including control of the liquid level functions.

Compressor

A detailed view of all the compressor parameters. This includes pre-rotation vane control, Hot Gas Bypass Control, Proximity Probe calibration, and PRV calibration.

Oil Sump

A detailed view of all the oil pump and oil sump parameters. This includes the Variable Speed Oil Pump when installed. It also controls the Seal Lubrication functionality.

Motor

A detailed view of the motor controller parameters, specific to the controller type presently utilized on the chiller system. This allows programming of the Current Limit and the Pulldown Demand Limit values. For a VSD system, the Adaptive Capacity Control and Harmonic Filter information is controlled under this screen.

Setpoints

This screen provides a single location to program the most common system setpoints. It is also the gateway to many of the general system setup parameters such as Date/Time, Display Units, Scheduling, Printer Setup, etc.

History

This screen provides access to a snapshot of system data at each of the last 10 shutdown conditions.

SYSTEM SCREEN

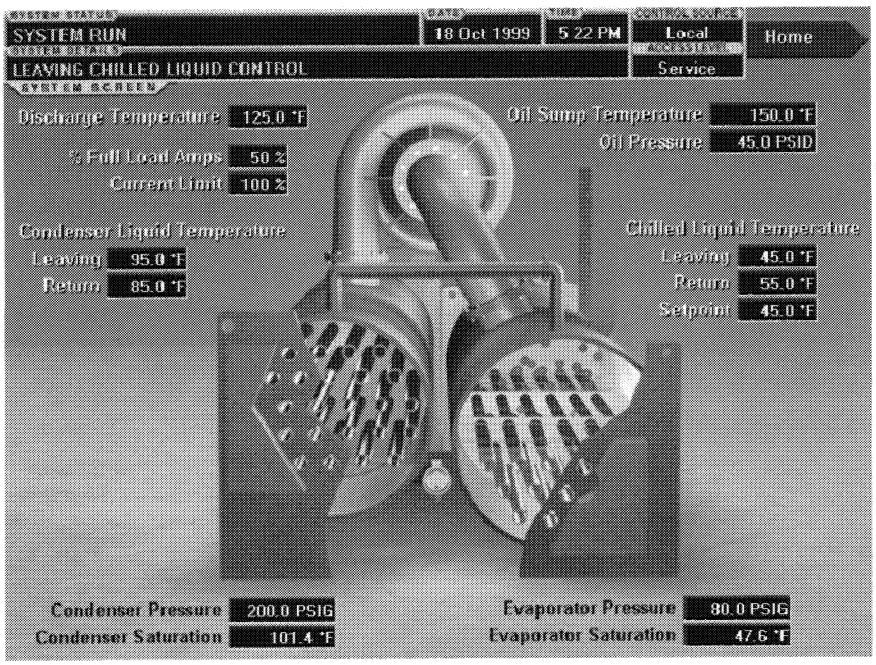


FIG. 5

00300VIP

OVERVIEW

This screen gives a general overview of common chiller parameters for both shells.

DISPLAY ONLY

Discharge Temperature
Displays the temperature of the refrigerant in its gaseous state at discharge of the compressor as it travels to the condenser.

Chilled Liquid Temperature - Leaving
Displays the temperature of the liquid as it leaves the evaporator.

Chilled Liquid Temperature - Return
Displays the temperature of the liquid as it enters the evaporator.

Chilled Liquid Temperature - Setpoint
Displays the active temperature setpoint to which the chiller is controlling the evaporator liquid. This value ‡ could come from a 0-20mA, 4-20mA, 0-10VDC or 2-10VDC input in Analog Remote mode, PWM signal in Digital Remote mode, ISN/GPIC interface in ISN mode, or a locally programmed value.

Evaporator Pressure
Displays the present refrigerant pressure in the evaporator.

Evaporator Saturation Temperature
Displays the present saturation temperature in the evaporator.

Condenser Liquid Temperature - Leaving
Displays the temperature of the liquid as it leaves the condenser.

Condenser Liquid Temperature - Return
Displays the temperature of the liquid as it enters the condenser.

Condenser Pressure
Displays the refrigerant pressure in the condenser.

Condenser Saturation Temperature
Displays the saturation temperature in the condenser.

Oil Sump Temperature
Displays the temperature of the oil in the sump.

Oil Pressure
Displays the pressure differential between the high side oil pressure transducer (output of oil filter) and the low

side oil pressure transducer (compressor housing). The displayed value includes offset pressure derived from auto-zeroing during the system prelube. If either of the transducers used to calculate this differential is out of range, the display field will show XX.X.

% Full Load Amps
This displays the percentage of full load amps utilized by the system.

Current Limit
Displays the current limit value in use. This value could
‡ come from a 0-20mA, 4-20mA, 0-10VDC or 2-10VDC input in Analog Remote mode, PWM signal in Digital Remote mode, ISN/GPIC interface in ISN mode, or a locally programmed value.

PROGRAMMABLE

None

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

EVAPORATOR SCREEN

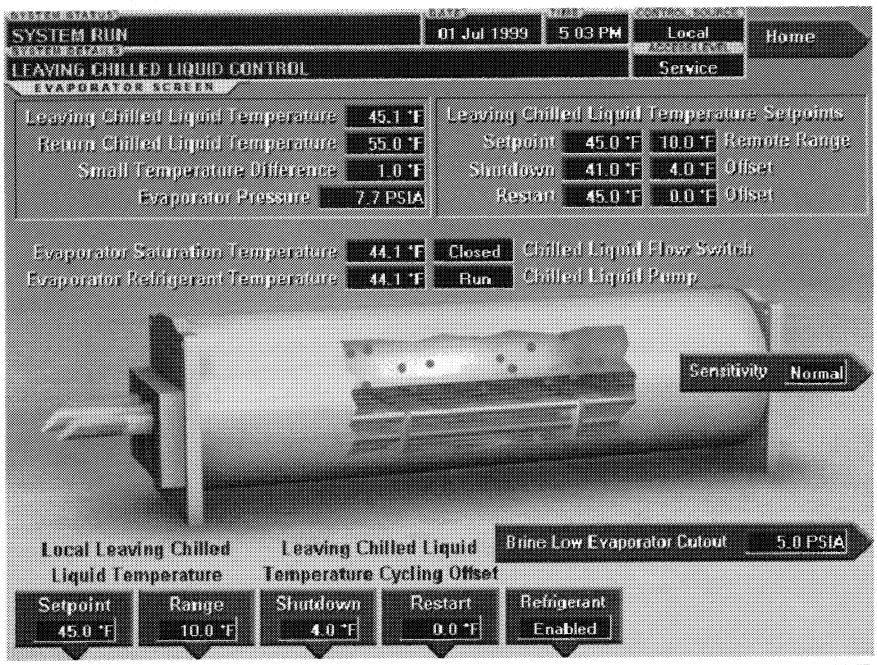


FIG. 6

00301VIP

OVERVIEW

This screen displays a cutaway view of the chiller evaporator. All setpoints relating to the evaporator side of the chiller are maintained on this screen. Animation of the evaporation process indicates whether the chiller is presently in a **RUN** condition. Animation of the liquid flow indicates chilled liquid flow.

DISPLAY ONLY

Chilled Liquid Flow Switch (Open / Closed)
Displays whether the liquid flow is present in the evaporator.

Chilled Liquid Pump
Displays the command presently sent by the control center to the Chilled Liquid Pump (**RUN** or **STOP**).

Evaporator Pressure
Displays the present refrigerant pressure in the evaporator.

Evaporator Saturation Temperature
Displays the present saturation temperature in the evaporator.

Return Chilled Liquid Temperature
Displays the temperature of the liquid as it enters the evaporator.

Leaving Chilled Liquid Temperature
Displays the temperature of the liquid as it leaves the evaporator.

Evaporator Refrigerant Temperature
Displays the temperature of the refrigerant in the evaporator, if the sensor is present.

Small Temperature Difference
Displays the difference between the Leaving Chilled Liquid temperature and the Evaporator Refrigerant temperature. The Evaporator Refrigerant temperature will be represented by the Refrigerant Temperature sensor input if the sensor is present, otherwise it will be represented by the Evaporator Saturation temperature.

Leaving Chilled Liquid Temperature Setpoints – Setpoint
Displays the present setpoint to which the chiller is operating, whether controlled locally or remotely.

Leaving Chilled Liquid Temperature Setpoints - Shutdown
Displays the Leaving Chilled Liquid Temperature at which the chiller will shut down to avoid over-cooling the building. By default this value is 4°F below the Leaving Chilled Setpoint.

Leaving Chilled Liquid Temperature Setpoints – Restart
Displays the Leaving Chilled Liquid Temperature at which the chiller will restart after it has shut down due to over-cooling temperature. By default, the chiller will restart at the Leaving Chilled Liquid Temperature Setpoint.

PROGRAMMABLE

Local Leaving Chilled Liquid Temperature - Range
Access Level Required: OPERATOR
‡ This is the range over which an analog (0-20mA, 4-20mA, 0-10VDC or 2-10VDC) in Analog Remote Mode or a digital signal (PWM) in Digital remote mode can reset the Leaving Chilled Liquid Temperature setpoint above the operator programmed **Base** Setpoint (see below). Programmable as either 10°F or 20°F, with a default of 20°F, it is added to the **Base** value to create a range over which the remote device can reset the setpoint. For example, if this setpoint is programmed for 10°F and the operator programmed value is 45°F, then the remote device can set the Leaving Chilled Liquid Temperature setpoint over the range 45.0° - 55.0°F.

Local Leaving Chilled Liquid Temperature - Setpoint
Access Level Required: OPERATOR
This value allows the user to define the Leaving Chilled Liquid Temperature that is to be maintained by the chiller. It is programmable over the range of 38.0°F to 70.0°F (water) or 10.0°F to 70.0°F (brine). If Smart Freeze (see below) is enabled, the range is 36.0°F to 70.0°F (water).
‡ A remote device can provide an analog signal (0-20mA, 4-20mA, 0-10VDC or 2-10VDC) in Analog Remote mode, or PWM signal in Digital Remote mode that changes the setpoint by creating an offset above the operator programmed **Base** Leaving Chilled Liquid Temperature setpoint. This offset may be defined up to 10.0°F or 20.0°F above the **Base** setpoint (see the Remote Leaving Chilled Liquid Temperature Setpoint Range description above). Additionally, a remote GPIC device (in ISN Remote mode) can define the setpoint through a serial data stream. In this case, the incoming setpoint is not an offset that is applied to the locally programmed **Base** setpoint value, but rather is the setpoint value itself.

Leaving Chilled Liquid Temperature Cycling Offset - Shutdown
Access Level Required: OPERATOR
This value allows the user to specify the Leaving Chilled Liquid Temperature at which the chiller will shut down on a **LEAVING CHILLED LIQUID – LOW TEMPERATURE** cycling shutdown. This is done by defining an offset below the Leaving Chilled Liquid Temperature setpoint. It is programmable over a range of 1°F to 64°F below the setpoint, to a minimum cutout of 36°F (water), 34°F (water with Smart Freeze enabled) or 6°F (brine). It establishes the minimum allowable temperature for the Leaving Chilled Liquid Temperature and prevents over-cooling of the building. Anytime the Leaving Chilled Liquid Temperature setpoint is increased, the shutdown threshold is 36.0°F (water) or 6.0°F (brine) for the next ten (10) minutes. If Smart Freeze (see below) is enabled, the threshold is 34.0°F for the next 10 minutes. After ten (10) minutes have elapsed, the shutdown threshold becomes the programmed setpoint value.

Leaving Chilled Liquid Temperature Cycling Offset - Restart
Access Level Required: OPERATOR
This value allows the user to specify the Leaving Chilled Liquid Temperature at which the chiller will restart after a shutdown on a **LEAVING CHILLED LIQUID – LOW TEMPERATURE** cycling shutdown. This is done by defining an offset above the Leaving Chilled Liquid Temperature setpoint. It is programmable over a range of 0°F to 70°F above the setpoint, to a maximum restart value of 80°F. The chiller will automatically restart when this temperature is reached. This setpoint can be used to reduce chiller cycling by delaying the chiller restart until the cooling load has increased.

Brine Low Evaporator Cutout
Access Level Required: SERVICE
This value is only available in Brine mode. It allows the user to specify the Evaporator Pressure at which a safety shutdown is initiated. Service Technicians refer to YORK Service Manual 160.54-M1.

Sensitivity
Access Level Required: SERVICE
This value allows the user to adjust the sensitivity of the Leaving Chilled Liquid Temperature control. Service Technicians refer to YORK Service Manual 160.54-M1.

Smart Freeze (Off / On)
Access Level Required: SERVICE
This value is only available if the chiller is not in Brine mode. It allows the user to enable the Smart Freeze Point Operation which allows the chiller to run closer to the freeze point without shutting down. Service Technicians refer to YORK Service Manual 160.54-M1.

Refrigerant (Enabled / Disabled)
Access Level Required: SERVICE
When an Evaporator Refrigerant Sensor has been installed it must be enabled via this toggle before the system will utilize the new, enhanced resolution input. Service Technicians refer to YORK Service Manual 160.54-M1.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

CONDENSER SCREEN

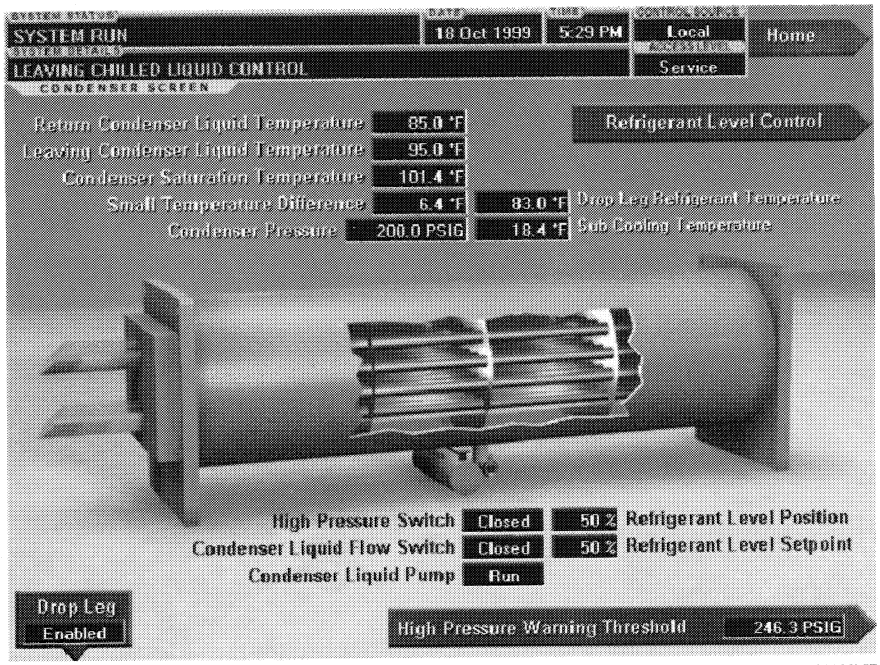


FIG. 7

00302VIP

OVERVIEW

This screen displays a cutaway view of the chiller condenser. All setpoints relating to the condenser side of the chiller are maintained on this screen. Animation indicates condenser liquid flow. This screen also serves as a gateway to controlling the Refrigerant Level.

DISPLAY ONLY

Leaving Condenser Liquid Temperature
Displays the water temperature as it leaves the condenser.

Return Condenser Liquid Temperature
Displays the water temperature as it enters the condenser.

Condenser Pressure
Displays the refrigerant pressure in the condenser.

Condenser Saturation Temperature
Displays the saturation temperature in the condenser.

Small Temperature Difference
Displays the difference between the Condenser Refrigerant temperature and the Leaving Condenser Liquid temperature. The Condenser Refrigerant temperature will be represented by the Condenser Saturation temperature.

Drop Leg Refrigerant Temperature
Displays the temperature of the refrigerant in the drop leg between the condenser and evaporator shells, if the sensor is present.

Sub-Cooling Temperature
Displays the difference between the Condenser Refrigerant temperature and the Drop Leg Refrigerant temperature. The Condenser Refrigerant temperature will be represented by the Condenser Saturation temperature. If the Drop Leg sensor is not present, this temperature is not displayed.

High Pressure Switch (Open / Closed)
Displays the present position of the high pressure switch. This will indicate whether a High Pressure fault is present.

Condenser Liquid Flow Switch
Indicates whether flow is present in the condenser.

Condenser Liquid Pump (Run / Stop)
Indicates whether Condenser liquid pump is operating.

Refrigerant Level Position
Displays the present position of the refrigerant level if this function is enabled.

Refrigerant Level Setpoint
Displays the setpoint to which the refrigerant level is being controlled.

Ramp Up Time Remaining
Displays the time remaining in the period in which the Refrigerant Level setpoint is being ramped to a Refrigerant Level target setpoint. This is only displayed if the Refrigerant Ramp is enabled and the value is non-zero. Service Technicians refer to YORK Service Manual 160.54-M1.

PROGRAMMABLE

High Pressure Warning Threshold
Access Level Required: SERVICE
This value allows the user to define the condenser pressure at which the chiller will initiate a warning.

Drop Leg (Enabled / Disabled)
Access Level Required: SERVICE
When a Drop Leg Refrigerant Sensor has been installed it must be enabled via this toggle before the system will utilize the new, enhanced resolution input. Service Technicians refer to YORK Service Manual 160.54-M1.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

Refrigerant Level Control
Access Level Required: SERVICE
Moves to the sub-screen allowing programming of the refrigerant liquid level control setpoints.

REFRIGERANT LEVEL CONTROL SCREEN

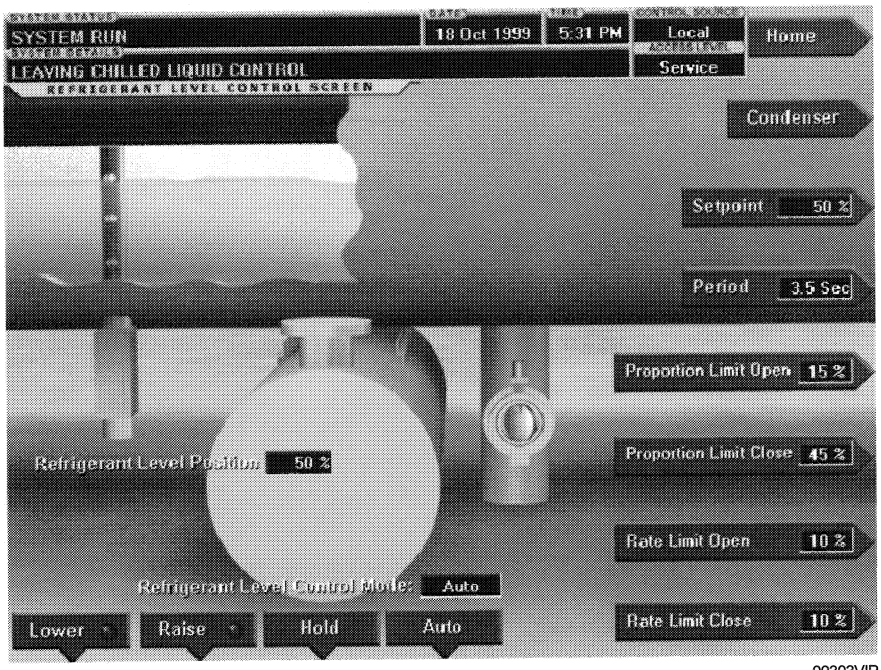


FIG. 8

00303VIP

OVERVIEW

This screen displays a cutaway view of the chiller condenser, along with the liquid refrigerant level sensor and the flow control valve. All setpoints relating to the liquid level control are maintained on this screen. Through animation, the variable orifice position is displayed. In addition, the refrigerant flow control valve (variable orifice) can be manually operated.

NOTE

Requires a login access level of SERVICE. Service Technicians refer to YORK Service Manual 160.54-M1 for operation instructions and explanation of all programmable setpoints and displayed values.

DISPLAY ONLY

Refrigerant Level Position
Displays the present position of the liquid level.

Refrigerant Level Control Mode
Indicates whether the liquid level control is under manual or automatic control.

Raise (LED)
Is ON when the digital output controlling the Level Raise contact is on.

Lower (LED)
Is ON when the digital output controlling the Level Lower contact is on.

PROGRAMMABLE

[Refrigerant Level] Setpoint
Service Technicians refer to YORK Service Manual 160.54-M1.

[Refrigerant Level Control] Period
Service Technicians refer to YORK Service Manual 160.54-M1.

[Refrigerant Level Control] Proportional Limit Open
Service Technicians refer to YORK Service Manual 160.54-M1.

[Refrigerant Level Control] Proportional Limit Close
Service Technicians refer to YORK Service Manual 160.54-M1.

[Refrigerant Level Control] Rate Limit Open
Service Technicians refer to YORK Service Manual 160.54-M1.

[Refrigerant Level Control] Rate Limit Close
Service Technicians refer to YORK Service Manual 160.54-M1.

[Refrigerant Level Control] Raise (Manual)
This key puts the level control into manual mode and sends a **RAISE** command to the variable orifice.

[Refrigerant Level Control] Lower (Manual)
This key puts the level control into manual mode and sends a **LOWER** command to the variable orifice.

[Refrigerant Level Control] Hold (Manual)
This key puts the level control into manual mode and sends a **HOLD** command to the variable orifice.

[Refrigerant Level Control] Auto
Returns the Level Control to automatic mode.

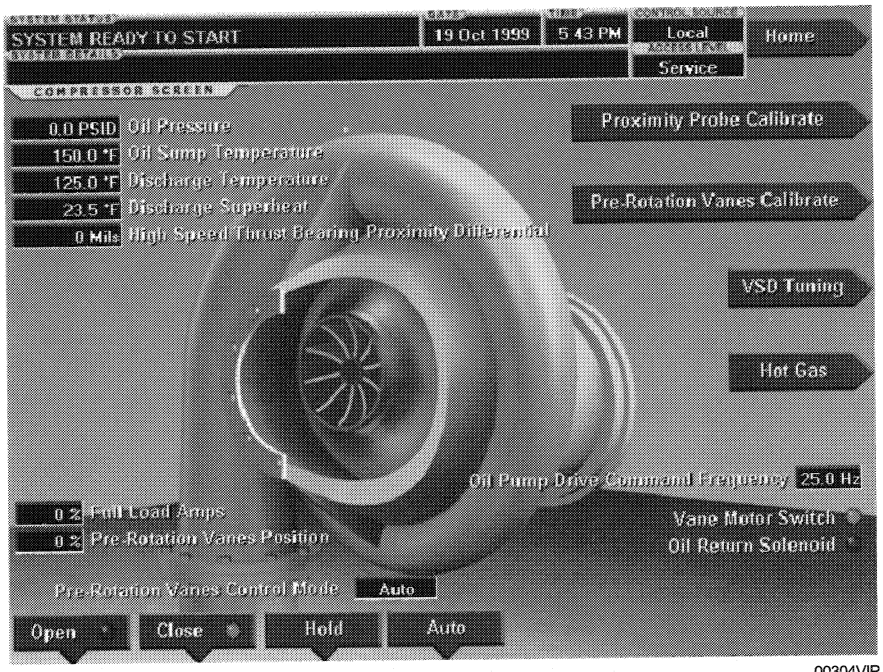
NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

Condenser
Access Level Required: VIEW
Return to the Condenser Screen.

COMPRESSOR SCREEN

‡



00304VIP

FIG. 9

OVERVIEW

This screen displays a cutaway view of the chiller compressor, revealing the impeller, and shows all conditions associated with the compressor. In addition, with the proper Access Level, the pre-rotation vanes may be manually controlled. Animation of the compressor impeller indicates whether the chiller is presently in a **RUN** condition. This screen also serves as a gateway to subscreens for calibrating the pre-rotation vanes, calibrating the proximity probe, configuring the Hot Gas Bypass, or providing advanced control of the compressor motor Variable Speed Drive.

DISPLAY ONLY

Oil Pressure

Displays the pressure differential between the high side oil pressure transducer (compressor bearing input) and the low side oil pressure transducer (oil sump). The displayed value includes offset pressure derived from autozeroing during the system prelube. If either of the transducers used to calculate this differential is out of range, the display field will show XX.X.

The offset pressure is the pressure differential between the high oil pressure (HOP) transducer and the low oil pressure (LOP) transducer outputs during a three (3) second period beginning ten (10) seconds into the system prelube. During this time, the transducers will be sensing the same pressure and their outputs should indicate the same pressure. However, due to accuracy tolerances in transducer design, differences can exist. Therefore to compensate for differences between transducers and assure differential pressure sensing accuracy, the offset pressure is subtracted algebraically from the differential pressure. The offset pressure calculation will not be performed if either transducer is out of range. The offset value will be taken as 0 PSI in this instance.

Oil Sump Temperature

Displays the temperature of the oil in the sump

Discharge Temperature

Displays the temperature of the refrigerant in its gaseous state at discharge of the compressor as it travels to the condenser.

‡ **Discharge Superheat**
(Flash memory card version C.MLM.01.02 or later)
Displays the Discharge superheat, calculated as (Discharge Temperature – Condenser Saturation temperature).

High Speed Thrust Bearing Oil Drain Temperature

Displays the temperature of the oil in the high-speed thrust bearing drain line. Not applicable to chillers equipped with
‡ Flash Memory Card version C.MLM.01.03 and higher.

High Speed Thrust Bearing Proximity Differential

Displays the distance between the high-speed thrust collar and the tip of the proximity probe. This measure-

ment takes into account the reference position established at the time of compressor manufacture.

High Speed Thrust Solenoid (LED - Style E-R22 Only)
Indicates whether the solenoid is presently energized.

Vane Motor Switch (LED)
Indicates whether the vanes are completely closed.

Oil Return Solenoid (LED)
Indicates whether the solenoid is presently energized.

Vent Line Solenoid (LED - Style E-R22)
Indicates whether the solenoid is presently energized.

Liquid Line Solenoid (LED - Style E-R22 and E-R134a J-Compressors)
Indicates whether the solenoid is presently energized.

Pre-Rotation Vanes Control Mode
Access Level Required: SERVICE
Indicates whether the vanes are under manual or automatic control.

[Pre-Rotation Vanes] Open (LED)
Access Level Required: SERVICE
Indicates whether the vanes are in the process of opening.

[Pre-Rotation Vanes] Close (LED)
Access Level Required: SERVICE
Indicates whether the vanes are in the process of closing.

Pre-Rotation Vanes Position (Variable Speed Drive and Hot Gas Option only)
Access Level Required: SERVICE
This value displays the present position of the pre-rotation vanes as a percentage between 0 and 100%.

‡ **Full Load Amps**
Access Level Required: SERVICE
Displays the motor current as a percentage of the Full Load Amps (FLA) value.

Phase A, B, C Current (Solid State Starter only)
Access Level Required: SERVICE
Displays the 3-phase motor current values being read from the Solid State Starter.

Oil Pump Drive Command Frequency (Variable Speed Oil Pump only)
The value displays the present frequency at which the oil pump is being commanded to run.

PROGRAMMABLE

[Pre-Rotation Vanes] Open (Manual)
Access Level Required: SERVICE
This key puts the vane control into manual mode and sends an **OPEN** command to the vanes.

[Pre-Rotation Vanes] Close (Manual)
Access Level Required: SERVICE
This key puts the vane control into manual mode and sends a **CLOSE** command to the vanes.

[Pre-Rotation Vanes] Hold (Manual)
Access Level Required: SERVICE
This key puts the vane control into manual mode and sends a **HOLD** command to the vanes.

[Pre-Rotation Vanes] Auto
Access Level Required: SERVICE
This key returns the vane control to automatic mode.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

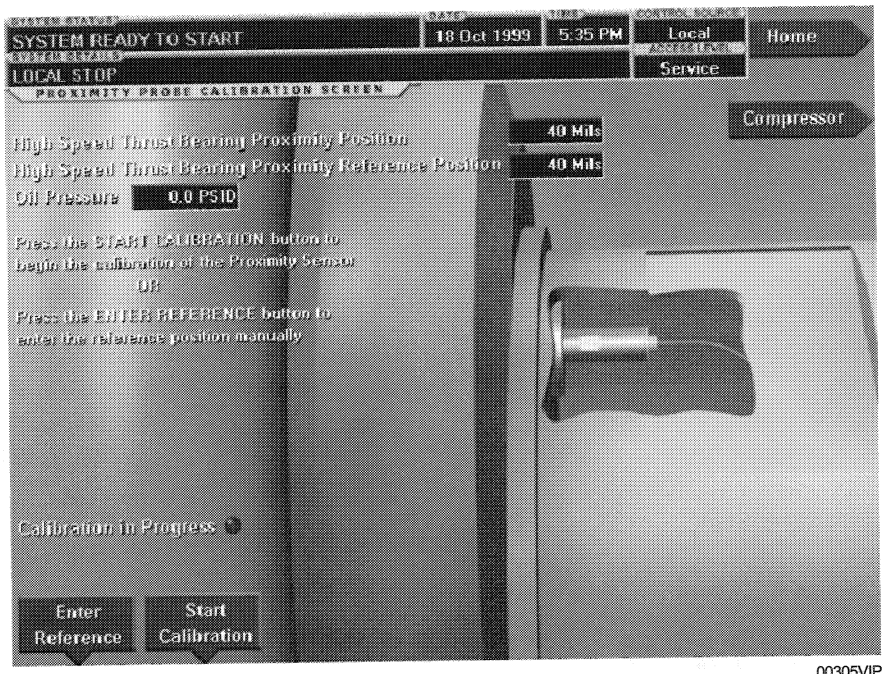
Proximity Probe Calibration
Access Level Required: SERVICE
Only available if the chiller is stopped. Moves to the sub-screen allowing calibration of the High Speed Thrust Bearing Proximity Probe sensor. Service Technicians refer to YORK Service Manual 160.54-M1.

Pre-Rotation Vane Calibration
Access Level Required: SERVICE
Only available if the chiller is stopped and the system uses a Variable Speed Drive or Hot Gas Bypass control. Moves to the sub-screen allowing calibration of the Pre-rotation vanes. Service Technicians refer to YORK Service Manual 160.54-M1.

VSD TUNING (Variable Speed Drive only)
Access Level Required: SERVICE
Moves to the sub-screen allowing advanced tuning of the Variable Speed Drive. Service Technicians refer to YORK Service Manual 160.54-M1.

‡ **Hot Gas**
Access Level Required: SERVICE
Moves to a sub-screen that allows programming of the Hot Gas Bypass control setpoints and manual control of the Hot Gas Bypass valve. Only displayed if Hot Gas Bypass feature has been enabled on the OPERATIONS Screen. Service technicians refer to YORK Service manual 160.54-M1.

PROXIMITY PROBE CALIBRATION SCREEN



00305VIP

FIG. 10

OVERVIEW

This screen displays a cutaway view of the chiller compressor, revealing the proximity probe sensor and provides the capability of calibrating the proximity probe sensor.

NOTE

Requires a login access level of SERVICE. Service Technicians refer to YORK Service Manual 160.54-M1 for operation instructions and explanation of all programmable setpoints and displayed values.

DISPLAY ONLY

High Speed Thrust Bearing Proximity Position
Displays the distance between the high-speed thrust collar and the proximity probe that is used to measure the position.

High Speed Thrust Bearing Proximity Reference Position
Displays the presently defined offset reference position. This value is defined at the conclusion of a calibration sequence.

Oil Pressure
Displays the pressure differential between the high side oil pressure transducer (compressor bearing input) and the low side oil pressure transducer (oil sump). The displayed value includes offset pressure derived from autozeroing during the system prelube. If either of the transducers used to calculate this differential is out of range, the display field will show XX.X.

Calibration in Progress (LED)
Indicates that the calibration sequence is in progress.

Calibration Messages
These are text messages which step the user through the calibration process and indicate its success or failure.

PROGRAMMABLE

Enter Reference
Service Technicians refer to YORK Service Manual 160.54-M1 for an explanation of this setpoint.

Start Calibration
This option is hidden after calibration has started. Service Technicians refer to YORK Service Manual 160.54-M1 for an explanation of this setpoint.

Cancel Calibration
This option only becomes available after calibration has started. Service Technicians refer to YORK Service Manual 160.54-M1 for an explanation of this setpoint.

Accept Calibration
This option only becomes available after the calibration sequence is complete. Service Technicians refer to YORK Service Manual 160.54-M1 for an explanation of this setpoint.

Fault Acknowledge
This option is only displayed if a fault is present. Allows clearing of High Speed Thrust Bearing related shut-downs. Service Technicians refer to YORK Service Manual 160.54-M1 for a more detailed explanation.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

Compressor
Access Level Required: VIEW
Return to the Compressor Screen.

HOT GAS BYPASS SCREEN

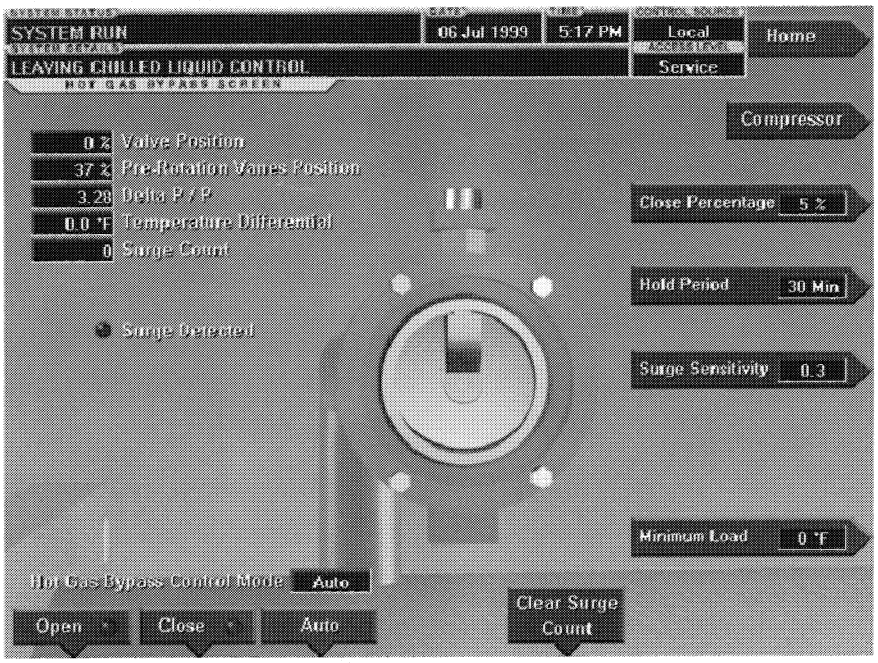


FIG. 11

00306VIP

‡ OVERVIEW

This screen displays a cutaway view of the Hot Gas Bypass Valve. All setpoints relating to Hot Gas Bypass control are maintained on this screen. Also, related Hot Gas Bypass control parameters are displayed for reference. Through animation, the relative valve position is displayed. In addition, the valve can be manually operated.

NOTE

Requires access level of SERVICE. Service Technicians refer to YORK Service Manual 160.54-M1 for operation instructions and explanation of all programmable setpoints and displayed values.

DISPLAY ONLY

Valve Position
Displays the position of the Hot Gas valve over the range of 0% (closed) to 100% (fully open).

Pre-rotation Vanes Position
Displays the position of the Pre-Rotation Vanes over the range of 0% (closed) to 100% (fully open). Displayed at XXX until calibration procedure is performed by service technician.

Delta P/P
A parameter that represents system differential or "Head". It is calculated as [(condenser pressure – evaporator pressure) / evaporator pressure]

Temperature Differential
The difference between the Leaving Chilled Liquid Temperature and the Leaving Chilled Liquid Temperature Setpoint. It is calculated by subtracting the Leaving Chilled Liquid temperature from the Leaving Chilled Liquid Temperature Setpoint.

Surge Count
This is the total number of surge events that have been detected over the lifetime of the chiller.

Surge Detected (LED)
Illuminated for 5 seconds each time a surge is detected.

PROGRAMMABLE

Close Percentage
Service technicians refer to YORK Service Manual 160.54-M1.

Hold Period
Service technicians refer to YORK Service Manual 160.54-M1.

Surge Sensitivity
Service technicians refer to YORK Service Manual 160.54-M1.

Minimum Load
Service technicians refer to YORK Service Manual 160.54-M1.

Clear Surge Count
Service technicians refer to YORK Service Manual 160.54-M1.

[Hot Gas Bypass Control] Open (Manual)
This key puts the Hot Gas Bypass Control in manual mode and increases the valve position by 5%.

[Hot Gas Bypass Control] Close (Manual)
This key puts the Hot Gas Bypass Control in manual mode and decreases the valve position by 5%.

[Hot Gas Bypass Control] Auto
Returns the Hot Gas Bypass Control to automatic mode.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen

Compressor
Access Level Required: VIEW
Causes an instant return to the Compressor Screen

PRE-ROTATION VANES CALIBRATION SCREEN

‡

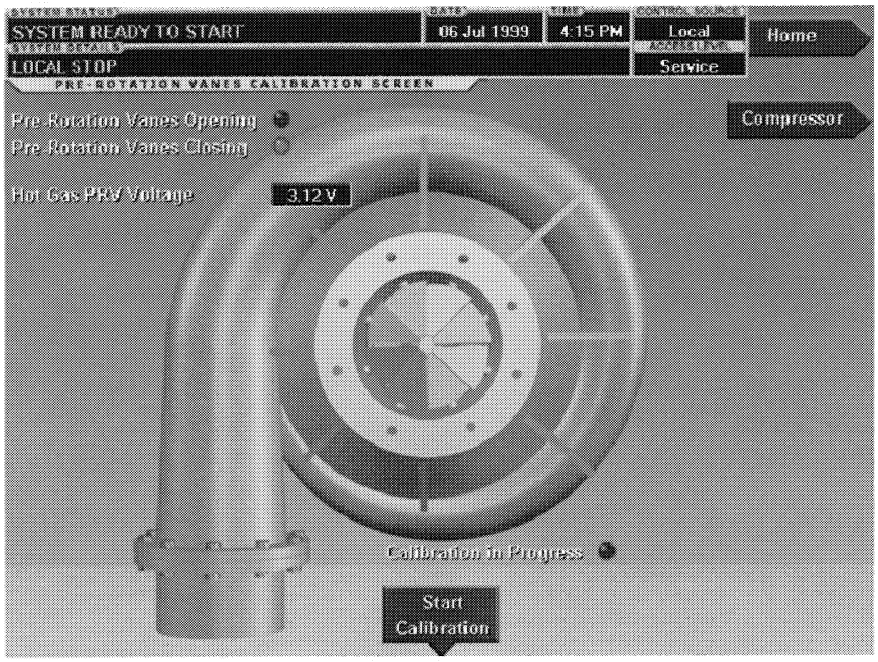


FIG. 12

00307VIP

OVERVIEW

This screen displays a cutaway view of the chiller compressor, revealing the pre-rotation vanes and provides the capability of calibrating the pre-rotation vanes for either Variable Speed Drive or Hot Gas Bypass applications.

NOTE

Requires a login access level of SERVICE. Service Technicians refer to YORK Service Manual 160.54-M1 for operation instructions and explanation of all programmable setpoints and displayed values.

DISPLAY ONLY

Pre-Rotation Vanes Opening (LED)
Indicates the vanes are opening.

Pre-Rotation Vanes Closing (LED)
Indicates the vanes are closing.

Calibration in Progress (LED)
Indicates the calibration sequence is in progress.

Calibration Messages
These are text messages which step the user through the calibration process and indicate its success or failure.

‡ **Hot Gas PRV Voltage**
(Flash Memory Card version C.MLM.01.01 or later)
Displays the Pre-Rotation Vanes position potentiometer feedback voltage when the Hot Gas feature is Enabled.

PROGRAMMABLE

Start Calibration
This option is hidden after calibration has started. Service Technicians refer to YORK Service Manual 160.54-M1 for an explanation of this setpoint.

Cancel Calibration
This option only becomes available after calibration has started. Service Technicians refer to YORK Service Manual 160.54-M1 for an explanation of this setpoint.

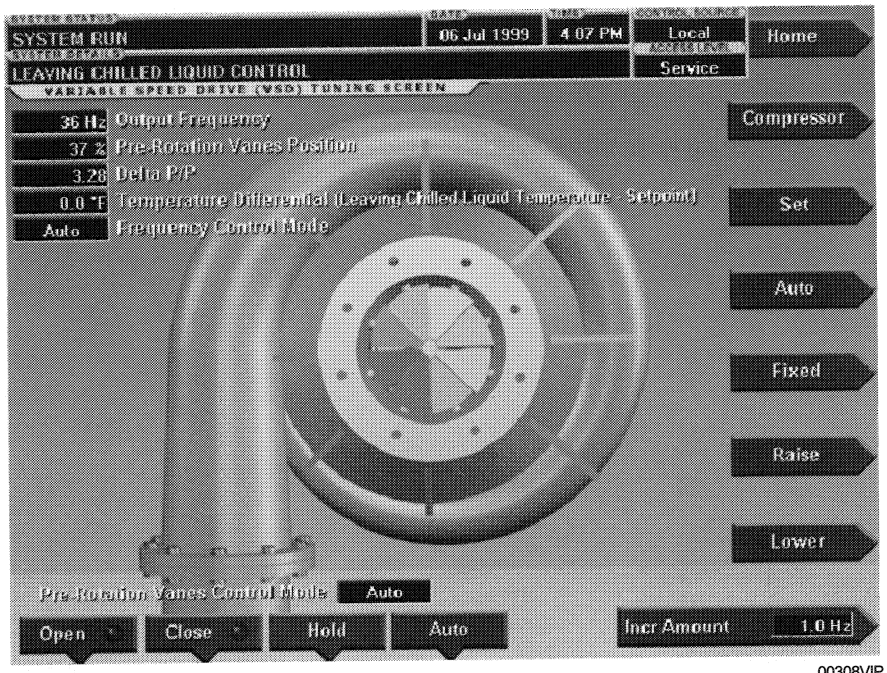
NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

Compressor
Access Level Required: VIEW
Return to the Compressor Screen.

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TO MAINTAIN FORMAT

VSD TUNING SCREEN



00308VIP

FIG. 13

OVERVIEW

This screen displays a cutaway view of the chiller compressor, revealing the pre-rotation vanes and provides the capability of manually controlling the pre-rotation vanes. Animation of the pre-rotation vanes indicates the pre-rotation vane position. In addition, this screen allows manual control of the frequency command being sent to the Variable Speed Drive.

NOTE

Requires a login access level of SERVICE. Service Technicians refer to YORK Service Manual 160.54-M1 for operation instructions and explanation of all programmable setpoints and displayed values.

DISPLAY ONLY

Output Frequency
Displays the Output Frequency reported by the Variable Speed Drive.

Temperature Differential
Displays the differential between the Leaving Chilled Liquid Temperature and Setpoint.

Delta P/P
Displays a value based on the pressure differential between the Evaporator and Condenser pressures. [(Condenser – Evaporator) / Evaporator]

Pre-Rotation Vanes Control Mode
Indicates whether the vanes are under manual or automatic control.

[Pre-Rotation Vanes] Open (LED)
Indicates whether the vanes are in the process of opening.

[Pre-Rotation Vanes] Close (LED)
Indicates whether the vanes are in the process of closing

Pre-Rotation Vane Position
This value displays the present position of the pre-rotation vanes as a percentage between 0 and 100%.

[VSD] Command Frequency
Displays the frequency value being sent to the Adaptive Capacity Control.

[VSD] Frequency Control Mode (Manual / Auto)
Displays the present state of the command frequency control.

PROGRAMMABLE

Set
Allows manual programming of the command frequency value. Manually programming this value will put the VSD frequency control into manual mode.

Auto
Following manual programming of the command frequency, this returns the system to automatic control.

Fixed
This key puts the VSD frequency control into fixed speed mode, and constantly sends the maximum frequency to the Variable Speed Drive control.

Incr Amount
Defines the amount by which the Increase and Decrease commands will modify the present VSD command frequency.

Increase
This key puts the VSD frequency control into manual mode, and increases the present command frequency by the defined frequency increment. It will not raise the value above the maximum allowed frequency.

Decrease
This key puts the VSD frequency control into manual mode, and decreases the present command frequency by the defined frequency increment. It will not lower the value below one (1) Hz.

[Pre-Rotation Vanes] Open (Manual)
This key puts the vane control into manual mode and sends an OPEN command to the contacts.

[Pre-Rotation Vanes] Close (Manual)
This key puts the vane control into manual mode and sends a CLOSE command to the contacts.

[Pre-Rotation Vanes] Hold (Manual)
This key puts the vane control into manual mode and sends a HOLD command to the contacts.

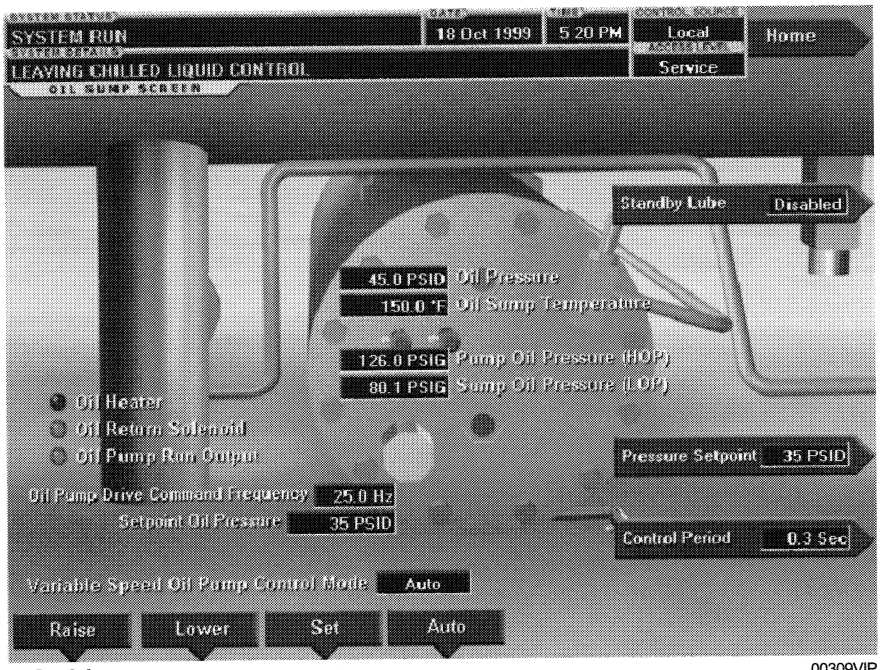
[Pre-Rotation Vanes] Auto
Returns Vane Control to automatic mode.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

Compressor
Access Level Required: VIEW
Return to the Compressor Screen.

OIL SUMP SCREEN



00309VIP

FIG. 14

OVERVIEW

This screen displays a close-up of the chiller oil sump and provides all the necessary setpoints for maintaining the Variable Speed Oil Pump (VSOP). In addition, this screen allows manual control of the frequency command sent to the VSOP.

DISPLAY ONLY

Oil Sump Temperature
Displays the temperature of the oil in the sump.

Sump Oil Pressure (LOP)
Displays the low side Oil Pressure measured at the sump.

Pump Oil Pressure (HOP)
Displays the high side Oil Pressure measured at the compressor bearing input

Oil Pressure
Displays the pressure differential between the high side oil pressure transducer (output of oil filter) and the low side oil pressure transducer (compressor housing). The displayed value includes offset pressure derived from auto-zeroing during the system prelube. (Refer to explanation of auto-zeroing under the Compressor screen). If either of the transducers used to calculate this differential is out of range, the display field will show XX.X.

Oil Pump Run Output (LED)
Indicates whether the Oil Pump is being commanded to operate.

Oil Return Solenoid (LED)
Indicates whether the solenoid is energized.

Oil Heater (LED – Variable Speed Oil Pump Only)
Indicates whether the oil heater output is energized.

Oil Seal Lubrication Time Remaining
Access Level Required: SERVICE
If a seal lubrication is in progress, this will display the amount of time remaining in the lubrication process. Service Technicians refer to YORK Service Manual 160.54-M1.

Next Oil Seal Lubrication
Access Level Required: SERVICE
This display will show the time remaining until the next seal lubrication when this function is enabled. Service Technicians refer to YORK Service Manual 160.54-M1.

Target / Setpoint Oil Pressure (Variable Speed Oil Pump Only)
The Variable Speed Oil Pump (VSOP), if installed, operates to control to a defined Oil Pressure value. During prelube, and for the first 15 seconds after prelube, this setpoint value is 45.0 PSID. During this time, this field

will display the target value. After 15 seconds, this value will display the user-programmed setpoint Oil Pressure.

Pulldown Time Remaining (Variable Speed Oil Pump Only)
Displays the time remaining until the user-programmed Oil Pressure setpoint is used.

Variable Speed Oil Pump Control Mode (Variable Speed Oil Pump Only)
Indicates whether the variable speed oil pump speed is under manual or automatic control.

Oil Pump Drive Command Frequency (Variable Speed Oil Pump Only)
Displays the actual Speed Command being sent to the VSOP. This value could be the result of automatic control based on the Oil Pressure setpoint, or the result of a manual speed command.

Manual Oil Pump Operation Time Left
Displays the time remaining in the 10-minute manual oil pump operation described below.

PROGRAMMABLE

Standby Lube (Enabled / Disabled)
Access Level Required: SERVICE
Allows the user to enable or disable the standby lube operation. When enabled, this function causes the Oil Pump to operate for a period of two (2) minutes at 24-hour intervals from when the oil pump was last run for at least 2 minutes. Service Technicians refer to YORK Service Manual 160.54-M1.

Pressure Setpoint (Variable Speed Oil Pump Only)
Access Level Required: SERVICE
The Variable Speed Oil Pump (VSOP) operates to control to a defined Oil Pressure value. This key allows the user to define the setpoint for the VSOP control. Service Technicians refer to YORK Service Manual 160.54-M1.

Control Period (Variable Speed Oil Pump Only)
Access Level Required: SERVICE
By default, the automatic VSOP control algorithm operates every 300ms. This key allows the user to specify the control period in multiples of 300ms. Service Technicians refer to YORK Service Manual 160.54-M1.

Variable Speed Oil Pump Speed Control:

Set
Access Level Required: SERVICE
This key allows the user to specify a fixed manual speed at which the VSOP will run.

Raise
Access Level Required: SERVICE
This key puts the VSOP control into Manual Mode and increments the present Speed Command by 0.5 Hz.

Lower
Access Level Required: SERVICE
This key puts the VSOP control into Manual Mode and decrements the present Speed Command by 0.5 Hz.

Auto
Access Level Required: SERVICE
This key returns the VSOP to Automatic Mode where control is based on the Oil Pressure setpoint.

Manual Pump
Access Level Required: OPERATOR
This key puts the Oil Pump control in Manual Mode and forces it to RUN. The Oil Pump is limited to running for a maximum of ten (10) minutes. If a longer running time is desired, this key must be pressed again. Manual Oil Pump control is disabled (and the button hidden) during system prelube, system run, proximity probe calibration, seal lubrication, and system coastdown.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

ELECTRO-MECHANICAL STARTER SCREEN

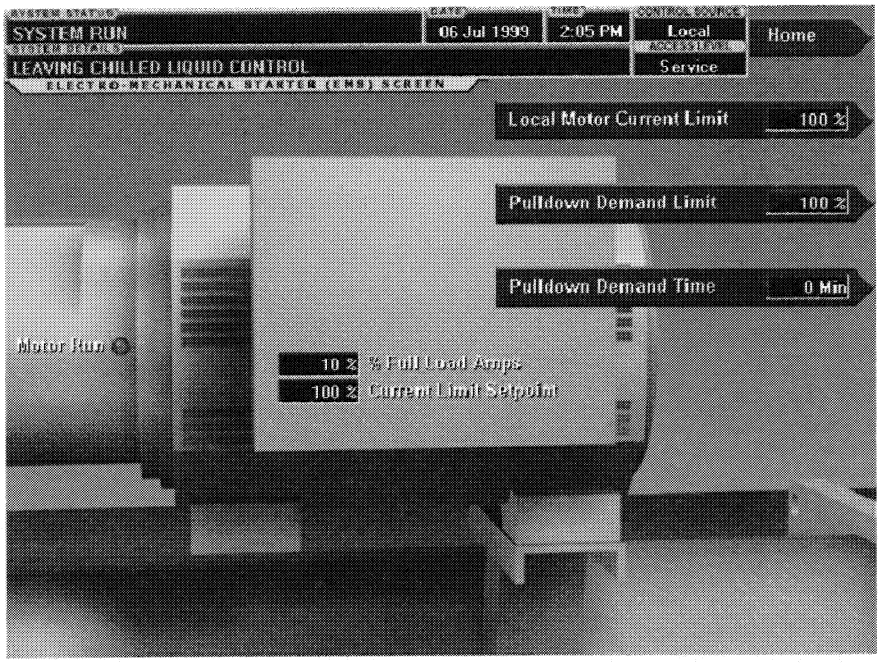


FIG. 15

00310VIP

OVERVIEW

This screen displays all information pertaining to an Electro-Mechanical Starter.

DISPLAY ONLY

Motor Run (LED)
Indicates whether the digital output from the controls is commanding the motor to **RUN**.

Motor Current % Full Load Amps
Displays the motor current as a percentage of the Full Load Amps (FLA) value. For the Electro-Mechanical Starter this is the data returned by the CM-2 board.

Current Limit Setpoint
Displays the current limit value in use. This value could ‡ come from a 0-20mA, 4-20mA, 0-10VDC or 2-10VDC input in Analog Remote mode, PWM signal in Digital Remote mode, ISN/GPIC interface in ISN mode, or a locally programmed value.

Pulldown Demand Time Left
Displays the time remaining in the programmed pulldown period if the value is non-zero.

PROGRAMMABLE

Local Motor Current Limit
Access Level Required: OPERATOR
Allows the user to specify the maximum allowed motor current (as a percentage of FLA). When the motor current reaches this value, the pre-rotation vanes will not be permitted to open further. If the motor current rises above this value, the pre-rotation vanes will close to reduce the current to this value.

Pulldown Demand Limit
Access Level Required: OPERATOR
Allows the user to specify the current limit value (as a percentage of FLA) to which the chiller will be limited during the specified pulldown limit time. This value will override the Motor Current Limit value during this time period. This function is used to provide energy savings following chiller startup.

Pulldown Demand Time
Access Level Required: OPERATOR
Allows the user to set a period of time for which the pulldown demand limit will be in effect after the chiller starts.

NAVIGATION

Home

Access Level Required: VIEW

Causes an instant return to the Home Screen.

‡ MOD "A" SOLID STATE STARTER SCREEN

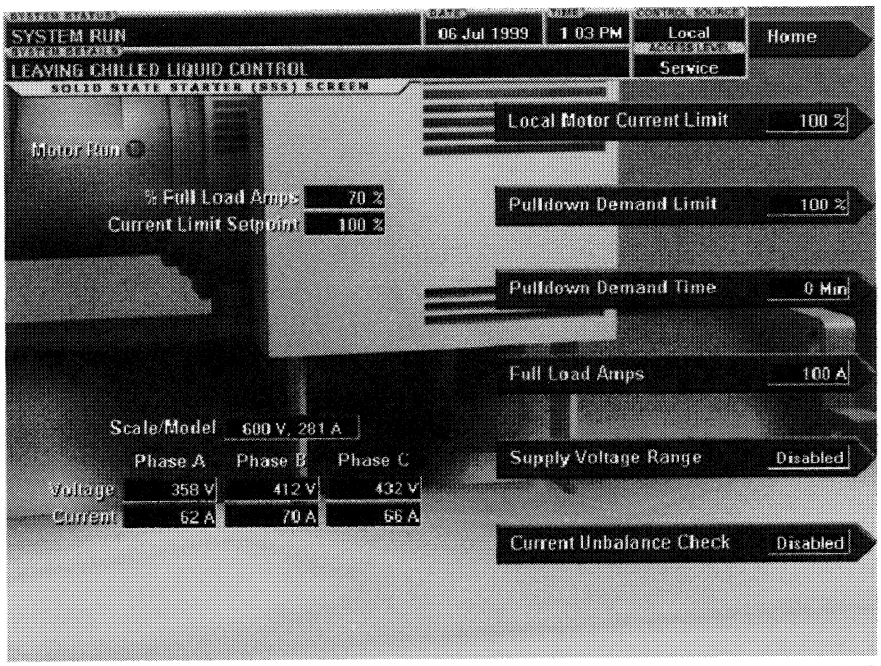


FIG. 16 00311VIP

OVERVIEW

‡ This screen displays all information pertaining to the Mod "A" Solid State Starter.

DISPLAY ONLY

Motor Run (LED)
Indicates whether the digital output from the controls is commanding the motor to RUN.

Motor Current % Full Load Amps
Displays the motor current as a percentage of the Full Load Amps (FLA) value. For the Solid State Starter this is the data returned by the Starter Logic board.

Current Limit Setpoint
Displays the current limit value in use. This value could ‡ come from a 0-20mA, 4-20 mA, 0-10VDC or 2-10VDC input in Analog Remote mode, PWM signal in Digital Remote mode, ISN/GPIC interface in ISN mode, or a locally programmed value.

Pulldown Demand Time Left
Displays the time remaining in the programmed pulldown period if the value is non-zero.

Scale/Model
Display information about the Liquid Cooled-Solid State ‡ Starter Rating and the maximum allowed Full Load Amps.

Voltage - Phase A, B, C
Display the 3-phase input line voltage values being read from the Solid State Starter.

Current - Phase A, B, C
Display the 3-phase motor current values being read from the Solid State Starter.

PROGRAMMABLE

Local Motor Current Limit
Access Level Required: OPERATOR
Allows the user to specify the maximum allowed motor current (as a percentage of FLA). When the motor current reaches this value, the pre-rotation vanes will not be permitted to open further. If the motor current rises above this value, the pre-rotation vanes will close to reduce the current to this value.

Pulldown Demand Limit
Access Level Required: OPERATOR
Allows the user to specify the current limit value (as a percentage of FLA) to which the chiller will be limited during the specified pulldown limit time. This value will override the Motor Current Limit value during this time period. This function is used to provide energy savings following chiller startup.

Pulldown Demand Time
Access Level Required: OPERATOR

Allows the user to set a period of time for which the pulldown demand limit will be in effect after the chiller starts.

Full Load Amps
Access Level Required: SERVICE
Define the maximum amps at which the motor can operate. This value is viewable when logged in under the Operator or View access level. Service Technicians refer to YORK Service Manual 160.54-M1.

Supply Voltage Range
Access Level Required: SERVICE
Allows the user to select a specific voltage range for voltage checking. When not disabled, this line voltage range is used to determine a low line and high line voltage threshold for initiating a shutdown. Service Technicians refer to YORK Service Manual 160.54-M1.

Current Unbalance Check (Enabled / Disabled)
Access Level Required: SERVICE
Allows the user to control whether the logic checks for current unbalance and initiates a shutdown as a result. Service Technicians refer to YORK Service Manual 160.54-M1.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

‡ MOD "B" SOLID STATE STARTER SCREEN

‡

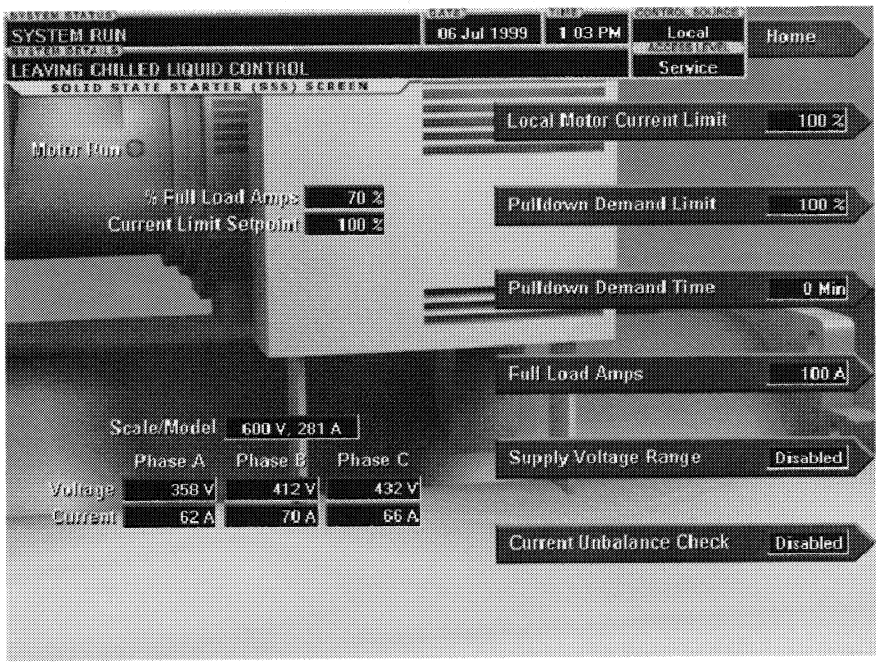


FIG. 17

00329VIP

‡ OVERVIEW

This screen displays all information pertaining to the Mod "B" Solid State Starter.

DISPLAY ONLY

Motor Run (LED)
Indicates whether the digital output from the controls is commanding the motor to RUN.

Motor Current % Full Load Amps
Displays the motor current as a percentage of the Full Load Amps (FLA) value.

Current Limit Setpoint
Displays the current limit in use. This value could come from a 0-20mA, 4-20mA, 0-10VDC or 2-10VDC input in Analog Remote Mode, PWM signal in Digital Remote Mode, ISN/GPIC interface in ISN remote Mode or a locally programmed value in Local Mode.

Pulldown Demand Time Left
Displays the time remaining in the programmed pulldown period.

Input Power
Displays the Kilowatts measured by the Solid State Starter.

KW Hours
Displays the cumulative amount of kilowatts used over time.

Starter Model
Displays the Solid State Starter model that is applied to the chiller. Starter Models are 7L, 14L, 26L or 33L.

Voltage – Phase A, B, C
Displays the 3-phase input line voltage measured by the Solid State Starter.

Current – Phase A, B, C
Displays the 3-phase motor current values measured by the Solid State Starter.

Temperature – Phase A, B, C
Displays the temperatures of the Silicon Controlled Rectifier assemblies.

PROGRAMMABLE

Local Motor Current Limit
Access Level Required: OPERATOR

Allows the user to specify the maximum allowed motor current (as percentage of FLA). When the motor current reaches this value, the Pre-rotation Vanes will not be permitted to open further. If the motor rises above

this value, the Pre-rotation Vanes will close to reduce the current to this value.

Pulldown Demand Limit
Access Level Required: OPERATOR
Allows the user to specify the current limit value (as a percentage of FLA) to which the chiller will be limited during the specified pulldown time. This value will override the Motor Current Limit value during this time period. This function is used to provide energy savings following chiller start.

Pulldown Demand Time
Access Level Required: OPERATOR
Allows the user to set a period of time for which the pulldown demand limit will be in effect after the chiller starts.

Full Load Amps
Access Level Required: SERVICE
Defines the maximum amps at which the motor can operate. This value is viewable when logged in at Operator or View access level. Service technicians refer to YORK Service Manual 160.54-M1.

Voltage Range
Access Level Required: SERVICE
Allows the user to select specific line voltage range for voltage checking. When not disabled, this line voltage range is used to determine a low line and high line voltage threshold for initiating a shutdown. Service Technicians refer to YORK Service Manual 160.54-M1.

Starting Current
Access Level Required: SERVICE
Defines the maximum allowed motor starting amps. The Solid State Starter will limit the motor starting current to this value. Service technicians refer to YORK Service manual 160.54-M1.

Open SCR (Enabled/Disabled)
Access Level Required: SERVICE
Allows the user to enable or disable the Solid State Starter Open SCR safety detection. This must never be disabled unless under advisement of the YORK Factory. Service Technicians refer to YORK Service Manual 160.54-M1.

‡ **Shorted SCR (Enabled/Disabled)**
(Flash Memory Card version C.MLM.01.04 or later)
Access Level required: SERVICE
Allows the user to enable or disable the Solid State Starter Shorted SCR safety detection. This must never be disabled unless under advisement of the York Factory. Service Technicians refer to YORK Service Manual 160.54-M1.

KWH Reset
Access Level Required: SERVICE
Allows the user to reset the cumulative Kilowatt Hours. Service technicians refer to YORK Service Manual 160.54-M1.

NAVIGATION

HOME
Access Level Required: VIEW
Causes an instant return to the HOME Screen.

VARIABLE SPEED DRIVE SCREEN

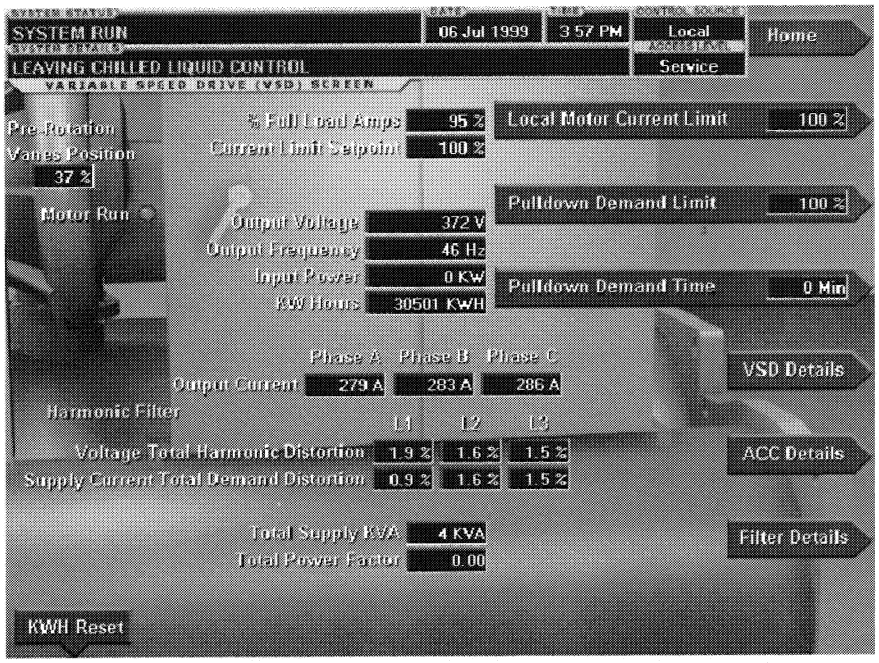


FIG. 18

00312VIP

OVERVIEW

This screen displays information pertaining to a Variable Speed Drive (VSD).

DISPLAY ONLY

Motor Run (LED)
Indicates whether the digital output from the controls is commanding the motor to RUN.

Motor Current % Full Load Amps
Displays the motor current as a percentage of the Full Load Amps (FLA) value. For the Variable Speed Drive this is the data returned by the VSD Logic board.

Current Limit Setpoint
Displays the current limit value in use. This value could ‡ come from a 0-20mA, 4-20 mA, 0-10VDC or 2-10VDC input in Analog Remote mode, PWM signal in Digital Remote mode, ISN/GPIC interface in ISN mode, or a locally programmed value.

Pulldown Demand Time Left
Displays the time remaining in the programmed pulldown period if the value is non-zero.

Output Voltage
Displays the output voltage measured to the motor.

Output Frequency
Displays the present output frequency to the motor.

Current - Phase A, B, C
Displays the phase current measured to the motor.

Input Power
Displays the total Kilowatts measured by the VSD or Harmonic Filter, if installed.

kW Hours
Displays the cumulative amount of kilowatts used over time as the VSD motor controller operates.

Pre-Rotation Vane Position
Displays the pre-rotation vane position as a value between 0 and 100%.

Harmonic Filter Data (Harmonic Filter installed only)

Supply KVA
Displays the supply kva measured by the filter.

Total Power Factor
Displays the relationship between the Input Power and the Supply kVA.

Voltage Total Harmonic Distortion - L1, L2, L3
Displays the Total Harmonic Distortion (THD) for each of the voltage lines as calculated by the filter.

Supply Current Total Demand Distortion - L1, L2, L3
Displays the Total Dynamic Distortion (TDD) for each of the supply current lines as calculated by the filter.

PROGRAMMABLE

Local Motor Current Limit
Access Level Required: OPERATOR
Allows the user to specify the maximum allowed motor current (as a percentage of FLA). When the motor current reaches this value, the pre-rotation vanes will not be permitted to open further. If the motor current rises above this value, the pre-rotation vanes will close to reduce the current to this value.

Pulldown Demand Limit
Access Level Required: OPERATOR
Allows the user to specify the current limit value (as a percentage of FLA) to which the chiller will be limited during the specified pulldown limit time. This value will override the Motor Current Limit value during this time period. This function is used to provide energy savings following chiller startup.

Pulldown Demand Time
Access Level Required: OPERATOR
Allows the user to set a period of time for which the pulldown demand limit will be in effect after the chiller starts.

KWH Reset
Access Level Required: SERVICE
Allows the user to reset the cumulative Kilowatt Hours to zero (0). Service Technicians refer to YORK Service Manual 160.54-M1.

Filter Inhibit (Harmonic Filter installed only)
Access Level Required: SERVICE
Disable the filter logic from activating, although the system will still communicate with the device. Only available when chiller is stopped.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

VSD Details
Access Level Required: VIEW
Moves to the sub-screen which provides more information about the Variable Speed Drive.

ACC Details
Access Level Required: SERVICE
Moves to the sub-screen which provides more information about the Adaptive Capacity Control.

Filter Details (Harmonic Filter installed only)
Access Level Required: VIEW
Moves to the sub-screen which provides more information about the Harmonic Filter.

VARIABLE SPEED DRIVE DETAILS SCREEN

‡

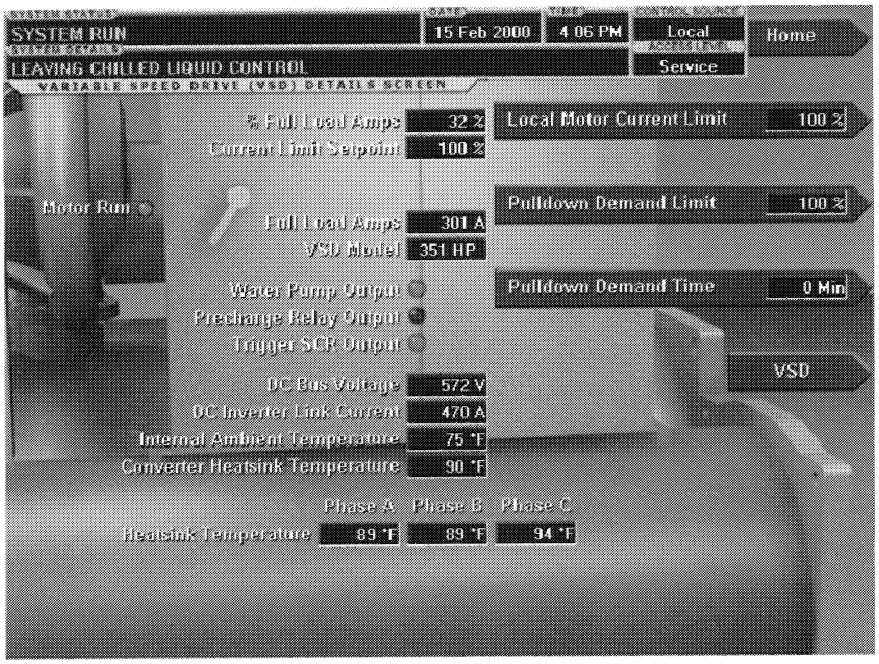


FIG. 19

00313VIP

OVERVIEW

This screen displays more detailed information pertaining to a Variable Speed Drive (VSD). Service Technicians refer to YORK Service Manual 160.54-M1 for operation instructions and explanation of all programmable setpoints and displayed values.

DISPLAY ONLY

Motor Run (LED)
Indicates whether the digital output from the controls is commanding the motor to RUN.

Motor Current % Full Load Amps
Displays the motor current as a percentage of the Full Load Amps (FLA) value. For the Variable Speed Drive this is the data returned by the VSD Logic board.

Current Limit Setpoint
Displays the current limit value in use. This value could ‡ come from a 0-20mA, 4-20mA, 0-10VDC or 2-10VDC input in Analog Remote mode, PWM signal in Digital Remote mode, ISN/GPIC interface in ISN mode, or a locally programmed value.

Pulldown Demand Time Left
Displays the time remaining in the programmed pulldown period if the value is non-zero.

Water Pump Output (LED)
Indicates whether the relay controlling the water pump output is energized.

Precharge Relay Output (LED)
Indicates whether the relay controlling the precharge output is energized.

Trigger SCR Output (LED)
Indicates whether the relay controlling the trigger SCR output is energized.

DC Bus Voltage
Displays the DC Bus voltage as reported by the VSD.

DC Inverter Link Current
Displays the DC Inverter link current as reported by the VSD.

Internal Ambient Temperature
Displays the ambient temperature inside the VSD cabinet as reported by the VSD.

Converter Heatsink Temperature
Displays the heatsink temperature of the converter as reported by the VSD.

Heatsink Temperature - Phase A, B, C
Displays the heatsink temperature of each of the 3-phase voltage regulators as reported by the VSD.

‡ **VSD Model**
Access Level Required: SERVICE
Displays the Horsepower configuration of the Variable Speed Drive control.

100% Full Load Amps
Displays the full load amps value as reported by the VSD.

PROGRAMMABLE

Local Motor Current Limit
Access Level Required: OPERATOR
Allows the user to specify the maximum allowed motor current (as a percentage of FLA). When the motor current reaches this value, the pre-rotation vanes will not be permitted to open further. If the motor current rises above this value, the pre-rotation vanes will close to reduce the current to this value.

Pulldown Demand Limit
Access Level Required: OPERATOR
Allows the user to specify the current limit value (as a percentage of FLA) to which the chiller will be limited during the specified pulldown limit time. This value will override the Motor Current Limit value during this time period. This function is used to provide energy savings following chiller startup.

Pulldown Demand Time
Access Level Required: OPERATOR
Allows the user to set a period of time for which the pulldown demand limit will be in effect after the chiller starts.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

VSD
Access Level Required: VIEW
Returns to the VSD Screen.

ADAPTIVE CAPACITY CONTROL DETAILS SCREEN

‡

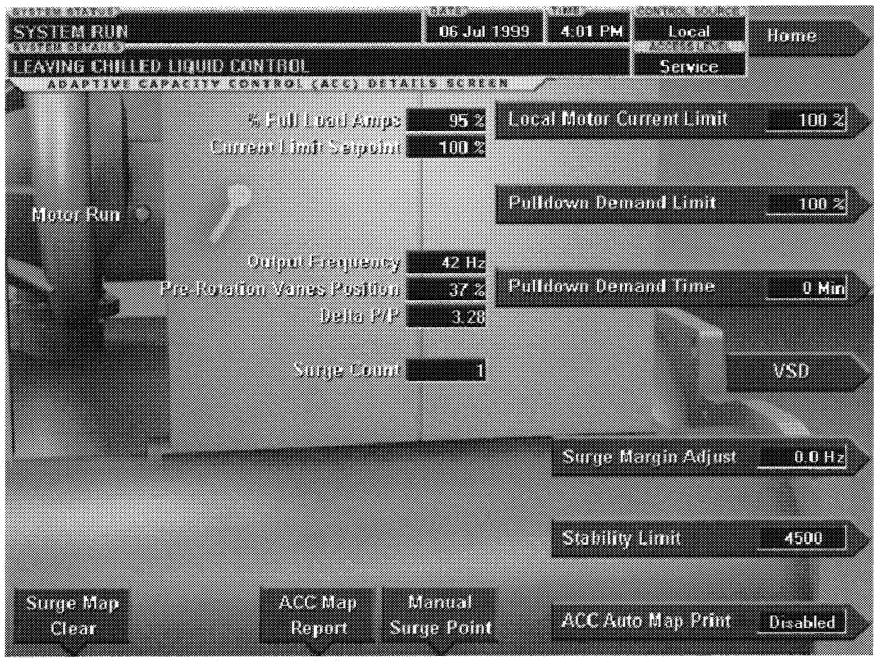


FIG. 20

00314VIP

OVERVIEW

This screen displays more detailed information pertaining to a Adaptive Capacity Control (ACC).

NOTE

Requires a login access level of SERVICE. Service Technicians refer to YORK Service Manual 160.54-M1 for operation instructions and explanation of all programmable setpoints and displayed values.

DISPLAY ONLY

Motor Run (LED)
Indicates whether the digital output from the controls is commanding the motor to RUN.

Motor Current % Full Load Amps
Displays the motor current as a percentage of the Full Load Amps (FLA) value. For the Variable Speed Drive this is the data returned by the VSD Logic board.

Current Limit Setpoint
Displays the current limit value in use. This value could ‡ come from a 0-20mA, 4-20mA, 0-10VDC or 2-10VDC input in Analog Remote mode, PWM signal in Digital Remote mode, ISN/GPIC interface in ISN mode, or a locally programmed value. GPIC interface under ISN Remote Control.

Pulldown Demand Time Left
Displays the time remaining in the programmed pulldown period if the value is non-zero.

VSD Output Frequency
Displays the frequency at which the VSD is operating the motor.

Pre-Rotation Vane Position
Displays the pre-rotation vane position as a value between 0 and 100%.

Surge Count
The total number of surge conditions detected by the Adaptive Capacity Control.

Delta P/P
The value calculated by the Condenser and Evaporator pressures as reported by the Adaptive Capacity Control.

PROGRAMMABLE

Local Motor Current Limit
Allows the user to specify the maximum allowed motor current (as a percentage of FLA). When the motor current reaches this value, the pre-rotation vanes will not be permitted to open further. If the motor current rises above this value, the pre-rotation vanes will close to reduce the current to this value.

Pulldown Demand Limit
Allows the user to specify the current limit value (as a percentage of FLA) to which the chiller will be limited during the specified pulldown limit time. This value will override the Motor Current Limit value during this time period. This function is used to provide energy savings following chiller startup.

Pulldown Demand Time
Allows the user to set a period of time for which the pulldown demand limit will be in effect after the chiller starts.

Stability Limit
Adjusting this value modifies the pre-rotation vane control algorithm when used in conjunction with an ACC.

Surge Margin Adjust
When the ACC maps a surge point, it will begin to adjust the chiller command frequency and vane controls at a certain "margin" from the mapped point. This programmable value allows the service technician to modify the "margin" at which these adjustments will begin to take place.

Manual Surge Point
This key will force the ACC to map a surge detection at the present operating conditions. Mapping a point at these conditions will cause the ACC to make adjustments to the command frequency in the future in order to prevent the chiller from operating at the conditions mapped. ***USE WITH CAUTION.***

‡ **ACC Auto Map Print (Enabled / Disabled)**
The chiller monitors the ACC communications and when a surge point is mapped, a short report of system parameters is printed. *When this function is active, all other printing capability is disabled.*

‡ **ACC Map Report**
The chiller requests the entire surge map from the ACC. As the map is received, the parameters for each point are printed.

Surge Map Clear
This key instructs the ACC to clear all of the surge points presently mapped. This key will require confirmation of its selection by entry of a special password. ***USE WITH CAUTION.***

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

VSD
Access Level Required: VIEW
Returns to the VSD Screen.

HARMONIC FILTER DETAILS SCREEN

‡

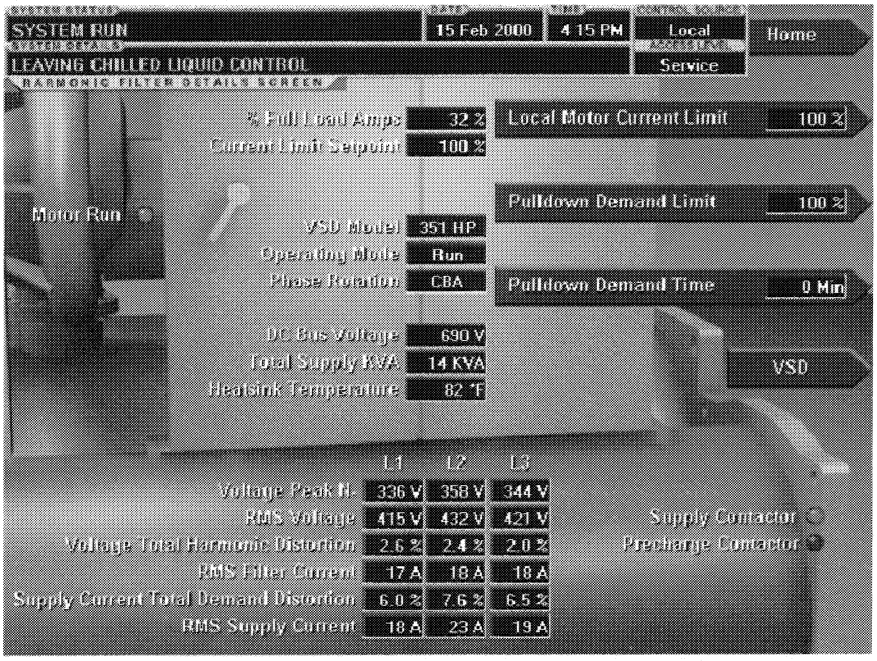


FIG. 21 00315VIP

OVERVIEW

This screen displays more detailed information pertaining to the IEEE-519 Harmonic Filter.

DISPLAY ONLY

Motor Run (LED)
Indicates whether the digital output from the controls is commanding the motor to RUN.

Motor Current % Full Load Amps
Displays the motor current as a percentage of the Full Load Amps (FLA) value. For the Variable Speed Drive this is the data returned by the VSD Logic board.

Current Limit Setpoint
Displays the current limit value in use. This value could
‡ come from a 0-20mA, 4-20mA, 0-10VDC or 2-10VDC input in Analog Remote mode, PWM signal in Digital Remote mode, ISN/GPIC interface in ISN mode, or a locally programmed value.

Pulldown Demand Time Left
Displays the time remaining in the programmed pulldown period if the value is non-zero.

Operating Mode (Run / Stop)
Indicates whether the Harmonic Filter is operating.

‡ **VSD Model**
Access Level Required: SERVICE
Displays the horsepower for which the attached Harmonic Filter is configured.

DC Bus Voltage
Displays the DC Bus voltage as measured by the Harmonic Filter.

Supply Contactor (LED)
Indicates whether the output to the Supply Contactor is energized.

Precharge Contactor (LED)
Indicates whether the output to the Precharge Contactor is energized.

Phase Rotation
Displays the phase rotation detected by the Harmonic Filter (A, B, C or C, B, A)

Total Supply KVA
Displays the total supply Kilovolt-Amps measured by the Harmonic Filter.

Heatsink Temperature
Displays the temperature of the Harmonic Heatsink.

Voltage Peak (N-L1, N-L2, N-L3)
Displays the 3-phase peak voltages as measured by the Harmonic Filter (Neutral to Line).

RMS Voltage (L1-L2, L2-L3, L3-L1)
Displays the 3-phase RMS Voltages across each line.

Voltage Total Harmonic Distortion (L1, L2, L3)
Displays the 3-phase voltage Total Harmonic Distortion (THD) measurements.

RMS Filter Current (L1, L2, L3)
Displays the 3-phase Filter current values as measured by the Harmonic Filter.

Supply Current Total Demand Distortion (L1, L2, L3)
Displays the 3-phase Current Total Demand Distortion (TDD) measurements.

RMS Supply Current L1, L2, L3
Displays the 3-phase RMS Voltages across each line.

PROGRAMMABLE

Local Motor Current Limit
Access Level Required: OPERATOR
Allows the user to specify the maximum allowed motor current (as a percentage of FLA). When the motor current reaches this value, the pre-rotation vanes will not be permitted to open further. If the motor current rises above this value, the pre-rotation vanes will close to reduce the current to this value.

Pulldown Demand Limit
Access Level Required: OPERATOR
Allows the user to specify the current limit value (as a percentage of FLA) to which the chiller will be limited during the specified pulldown limit time. This value will override the Motor Current Limit value during this time period. This function is used to provide energy savings following chiller startup.

Pulldown Demand Time
Access Level Required: OPERATOR
Allows the user to set a period of time for which the pulldown demand limit will be in effect after the chiller starts.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

VSD
Access Level Required: VIEW
Returns to the VSD Screen.

SETPOINTS SCREEN

‡

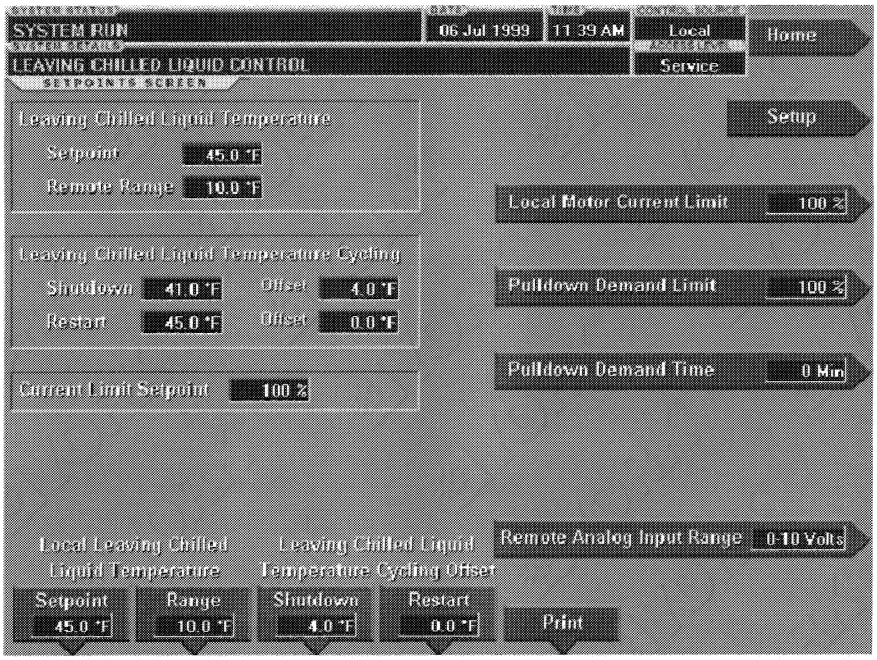


FIG. 22

00316VIP

OVERVIEW

This screen provides a convenient location for programming the most common setpoints involved in the chiller control. This screen also serves as a gateway to a sub-screen for defining the setup of general system parameters.

DISPLAY ONLY

Leaving Chilled Liquid Temperature - Setpoint
Displays the present setpoint to which the chiller is operating whether controlled remotely or locally. This value
‡ could come from a 0-20 mA, 4-20 mA, 0-10VDC or 2-10VDC input in Analog Remote mode, PWM signal in Digital Remote mode, ISN/GPIC interface in ISN mode, or a locally programmed value.

Leaving Chilled Liquid Temperature Cycling - Shutdown
Displays the Leaving Chilled Liquid Temperature at which the chiller will shut down to avoid over-cooling the building. This value is calculated by subtracting the Leaving Chilled Liquid Temperature Cycling Offset – Shutdown from the Leaving Chilled Liquid Temperature – Setpoint. If this value is below the absolute minimum allowed shutdown temperature the minimum value is displayed.

Leaving Chilled Liquid Temperature Cycling – Restart
Displays the Leaving Chilled Liquid Temperature at which the chiller will restart after it has shut down due to over-cooling temperature. This value is calculated by adding the Leaving Chilled Liquid Temperature Cycling Offset – Restart to the Leaving Chilled Liquid Temperature – Setpoint.

‡ **Current Limit Setpoint**
(Flash Memory Card version C.MLM.01.01 or later)
Displays the active Current Limit setpoint. In Local mode, this is the locally programmed Current Limit setpoint. In ISN remote mode, this is the setpoint received from the ISN/GPIC interface. In Analog remote mode, this is the setpoint received via 0-10VDC, 2-10VDC, 0-20mA or 4-20mA input. In Digital remote mode, this is the Pulse width Modulation signal input.

PROGRAMMABLE

Local Leaving Chilled Liquid Temperature - Range
Access Level Required: OPERATOR
‡ This is the range over which an analog signal (0-20 mA, 4-20 mA, 0-10VDC or 2-10VDC) in Analog Remote Mode or a digital signal (PWM) in Digital remote mode can reset the Leaving Chilled Liquid Temperature setpoint above the operator programmed **Base** Setpoint (see below). Programmable as either 10°F or 20°F, with a default of 20°F, it is added to the *BASE* value to create a range over which the remote device can reset the setpoint. For example, if this setpoint is programmed for 10°F and the operator programmed value is 45°F, then the remote device can set the Leaving Chilled Liquid Temperature setpoint over the range 45.0°F - 55.0°F.

Local Leaving Chilled Liquid Temperature - Setpoint

Access Level Required: OPERATOR

This value allows the user to define the Leaving Chilled Liquid Temperature that is to be maintained by the chiller. It is programmable over the range of 38.0°F to 70.0°F (water) or 10.0°F to 70.0°F (brine). If Smart Freeze is enabled, the range is 36.0°F to 70.0°F (water). A remote ‡ device can provide an analog signal (0-20 mA, 4-20 mA, 0-10VDC or 2-10VDC) in Analog Remote mode, or PWM signal in Digital Remote mode that changes the setpoint by creating an offset above the operator programmed *BASE* Leaving Chilled Liquid Temperature setpoint. This offset may be defined up to 10.0°F or 20.0°F above the *BASE* setpoint (see the Remote Leaving Chilled Liquid Temperature Setpoint Range description above). Additionally, a remote GPIC device (in ISN Remote mode) can define the setpoint through a serial data stream. In this case, the incoming setpoint is not an offset that is applied to the locally programmed *BASE* setpoint value, but rather is the setpoint value itself.

Leaving Chilled Liquid Temperature Cycling Offset - Shutdown

Access Level Required: OPERATOR

This value allows the user to specify the Leaving Chilled Liquid Temperature at which the chiller will shut down on a **LEAVING CHILLED LIQUID – LOW TEMPERATURE** cycling shutdown. This is done by defining an offset below the Leaving Chilled Liquid Temperature setpoint. It is programmable over a range of 1°F to 64°F below the setpoint, to a minimum cutout of 36°F (water), 34°F (water with Smart Freeze enabled) or 6°F (brine). It establishes the minimum allowed temperature for the Leaving Chilled Liquid Temperature and prevents over-cooling of the building. Anytime the Leaving Chilled Liquid Temperature setpoint is increased, the shutdown threshold is 36.0°F (water) or 6.0°F (brine) for the next ten (10) minutes. If Smart Freeze is enabled, the threshold is 34.0°F for the next 10 minutes. After ten (10) minutes have elapsed, the shutdown threshold becomes the programmed setpoint value.

Leaving Chilled Liquid Temperature Cycling Offset - Restart

Access Level Required: OPERATOR

This value allows the user to specify the Leaving Chilled Liquid Temperature at which the chiller will restart after a shutdown on a **LEAVING CHILLED LIQUID – LOW TEMPERATURE** cycling shutdown. This is done by defining an offset above the Leaving Chilled Liquid Temperature setpoint. It is programmable over a range of 0°F to 70°F above the setpoint, to a maximum restart value of 80°F. The chiller will automatically restart when this temperature is reached. This setpoint can be used to reduce chiller cycling by delaying the chiller restart until the cooling load has increased.

‡ **Remote Analog Input Range (Flash Memory Card version C.MLM.01.01 or later)**

Access Level Required: OPERATOR

This setpoint defines, for the Control center, the remote signal range applied for remote reset of the Leaving Chilled Liquid temperature Setpoint and Current Limit Setpoint in ANALOG remote mode. If the remote signal is 0-10VDC or 0-20mA, this setpoint must be programmed for 0-10VDC. If the remote signal is 2-10VDC or 4-20mA, this setpoint must be programmed for 2-10VDC.

Motor Current Limit

Access Level Required: OPERATOR

Allows the user to specify the maximum allowed motor current (as a percentage of FLA). When the motor current reaches this value, the pre-rotation vanes will not be permitted to open further. If the motor current rises above this value, the pre-rotation vanes will close to reduce the current to this value.

Pulldown Demand Limit

Access Level Required: OPERATOR

Allows the user to specify the current limit value (as a percentage of Full Load Amps) to which the chiller will be limited during the specified pulldown limit time. This value will override the Motor Current Limit value during this time period. This function is used to provide energy savings following chiller startup.

Pulldown Demand Time

Access Level Required: OPERATOR

Allows the user to set a period of time for which the pulldown demand limit will be in effect after the chiller starts.

Print

Access Level Required: VIEW

Generates **Setpoints** print report.

NAVIGATION

Home

Access Level Required: VIEW

Causes an instant return to the Home Screen.

Setup

Access Level Required: VIEW

Moves to the sub-screen allowing setup of general system parameters.

SETUP SCREEN

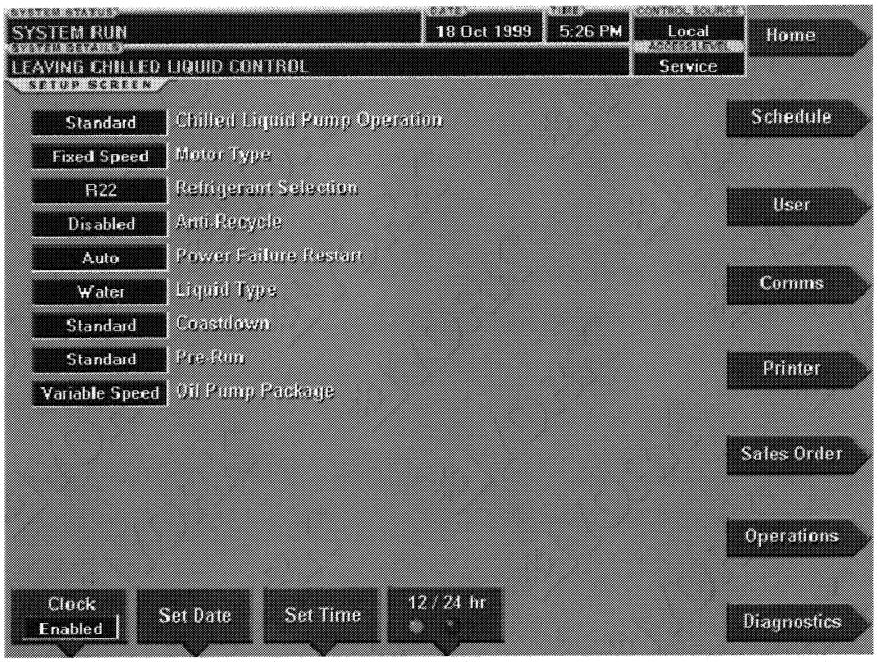


FIG. 23

00330VIP

OVERVIEW

This screen is the top level of the general configuration parameters. It allows programming of the time and date, along with specifications as to how the time will be displayed (12 or 24 hour format). In addition, the chiller configuration, as determined by the state of the Micro Board Program Jumpers and Program Switches is displayed. A qualified Service Technician, following instructions in YORK Service Manual 160.54-M1, establishes this configuration per the desired operation. This screen also serves as a gateway to more sub-screens for defining general system parameters

DISPLAY ONLY

Chilled Liquid Pump Operation:
Displays **Standard** or **Enhanced**

Motor Type:
Displays **Fixed Speed** or **Variable Speed**

Refrigerant Selection:
Displays **R-22** or **R134a**

Anti-Recycle:
Displays **Disabled** or **Enabled**

Power Failure Restart:
Displays **Manual** or **Automatic**

Liquid Type:
Displays **Water** or **Brine**

Coastdown:
Displays **Standard** (150 seconds) or **Enhanced** (15 minutes – Steam Turbine applications)

Pre-Run:
Displays **Standard** (50 seconds) or **Extended** (180 seconds)

Oil Pump Package:
Displays **Fixed Speed** or **Variable Speed**

Power Line Frequency (VSD only):
Displays **60Hz** or **50Hz**

PROGRAMMABLE

Set Date
Access Level Required: OPERATOR
Allows the user to specify the present date. This value is critical to logging system shutdowns accurately and

for utilizing the scheduling capabilities. When prompted to enter a date value, the user must enter the day, month, and four-digit year (using leading zeroes as necessary). If within range, the value will be accepted. If out of range, the user is prompted for the information again. At this point the user may retry the date entry, or cancel the programming attempt.

Set Time
Access Level Required: OPERATOR
Allows the user to specify the present time. This value is critical to logging system shutdowns accurately and for utilizing the scheduling capabilities. When prompted to enter a time value, the user must enter the hour and minute desired (using leading zeroes as necessary). If the chiller is presently set to 24-hour mode, the time must be entered in the 24-hour format. Otherwise, the user must also select AM or PM for the entered time. If out of range, the user is prompted for the information again. At this point the user may retry the time entry, or cancel the programming attempt.

Clock (Enabled / Disabled)
Access Level Required: OPERATOR
Allows the user to enable or disable the real-time clock in order to conserve battery life. The clock will be disabled during manufacturing and must be enabled at system commissioning. In addition, when preparing for prolonged shutdown the clock should once again be disabled.

12/24 Hr
Access Level Required: OPERATOR
Allows the user to specify the format in which the time will be presented to the user. This setpoint will affect the display of the time on the chiller panel and on all reports generated. 12-Hour time format will include the **AM** and **PM** modifiers and show the range of time between 1:00 and 12:59, while the 24-Hour time format will show the range of time between 0:00 and 23:59.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

Schedule
Access Level Required: VIEW
Moves to the sub-screen allowing definition of the chiller operation schedule.

Diagnostics
Access Level Required: SERVICE
Moves to the sub-screen allowing limited diagnostic capability while operating. Refer to YORK Service Manual 160.54-M1

Comms
Access Level Required: VIEW
Moves to the sub-screen allowing configuration of system communications.

Printer
Access Level Required: VIEW
Moves to the sub-screen allowing configuration and control of printer functions.

Sales Order
Access Level Required: VIEW
Moves to the sub-screen displaying the Sales Order information for the chiller system.

Operations
Access Level Required: VIEW
Moves to the sub-screen displaying operating parameters of the chiller system.

User
Access Level Required: VIEW
Moves to the sub-screen allowing configuration of user preferences.

SCHEDULE SCREEN

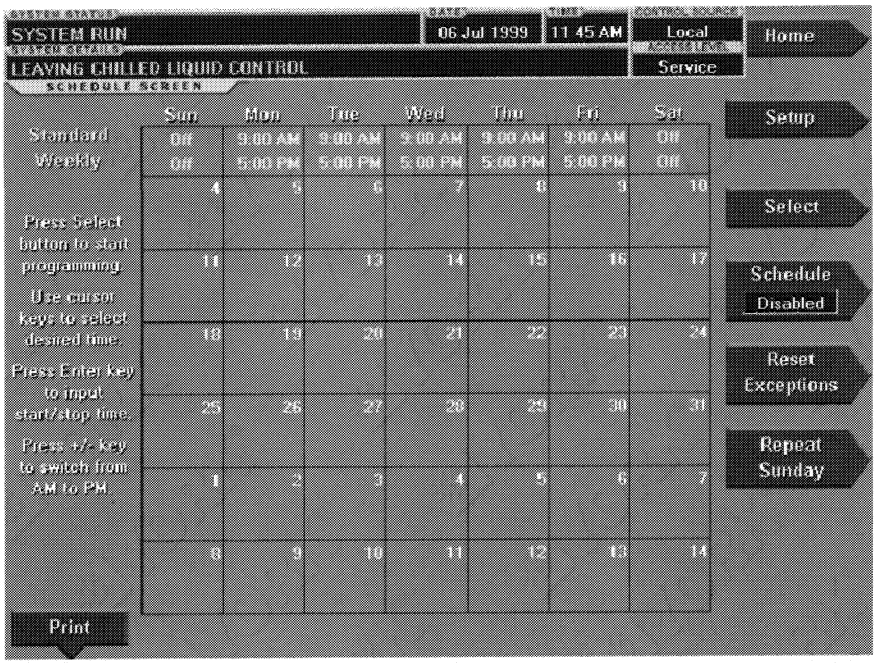


FIG. 24

00331VIP

OVERVIEW

The schedule screen contains more programmable values than a normal display screen. As such, each programmable value is not linked to a specific button. Instead the **Select** key is used to enable the cursor arrows which are used to highlight the day and the start or stop time the user wishes to modify. At this point the user may press the '✓' (**Check**) key to program the Start / Stop times for that day.

In order for the Start / Stop combination to be utilized, each Start time must have a corresponding Stop time ‡ which occurs later in the day. The presently programmed schedule for a given day can be cancelled by setting both the Start time and Stop time to 12:00AM. If the Start time equals the Stop time (with any time other than 12:00AM), the chiller is OFF for that day. If the user desires the chiller to operate continuously through several days, the Stop time of Day 1 can be set to 11:59 PM and the Start time of Day 2 can be set to 12:00 AM. The chiller will not stop but continue to operate until the stop of Day 2.

The user has the ability to define a standard set of Start / Stop times which are utilized every week. The user may then specify *exception* Start / Stop combinations for any day of the week up to 6 weeks in advance. At the end of each week the schedule for the next week is created by combining the standard week definition and the next defined exception week. The schedule is then updated as each of the exception weeks "shifts down", leaving a new, blank exception week in the 6th week slot.

DISPLAY ONLY

None

PROGRAMMABLE

Standard Week Start/Stop Times
Access Level Required: OPERATOR
For each day of the week, the user may specify a time for the chiller to start and a time for the chiller to stop. The times specified in this entry week will be used as the default for every week of chiller operation.

Exception Start/Stop Times
Access Level Required: OPERATOR
For each day of the week, the user may specify a time for the chiller to start and a time for the chiller to stop. These Start / Stop combinations may be scheduled up to five (5) weeks in advance and also for the present week. As each week goes by, the new schedule will be created for the present week using the Exception specification in combination with the Standard week definition, as described above.

Schedule (Enabled / Disabled)
Access Level Required: OPERATOR
Allows the user to enable or disable the monitoring function which enforces the scheduled starting and stopping of the chiller.

Repeat Sunday Schedule
Access Level Required: OPERATOR
Duplicates the schedule defined for Sunday for the remainder of the standard weekdays.

Reset All Exception Days
Access Level Required: OPERATOR
Deletes all programming for exception days within the next 6 weeks.

Select
Access Level Required: OPERATOR
Places a selection box around a start time for a given day. Use ◀, ▶, ▲ or ▼ cursor arrows to place the box around the desired start or stop time for a given day.

Print
Access Level Required: VIEW
Generates a **Schedule** print report.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

Setup
Access Level Required: VIEW
Return to the previous setup screen.

USER SCREEN

‡

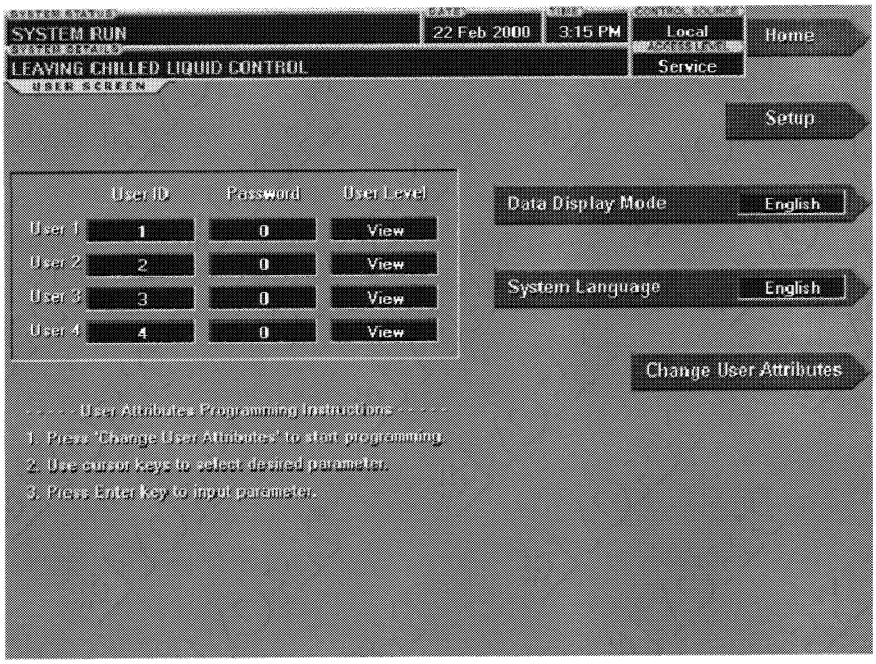


FIG. 25

00317VIP

OVERVIEW

This screen allows definition of custom User ID's and matching passwords. This allows the building administrator to assign custom passwords to those who are authorized to maintain the chiller.

Each Custom User value is not linked to a specific button. Instead, the **Change** button is pressed which enables the cursor arrows which are used to highlight the Custom User parameter the user wishes to modify. At this point the '✓' (**Check**) button is pressed and the value may be entered.

DISPLAY ONLY

None

PROGRAMMABLE

System Language

Access Level Required: OPERATOR

‡ Allows the user to define the language for all Screens. The desired language is selected by scrolling through the list of those available. English is the Default language and is selected by pressing the ▲ key when the dialog box appears during the selection process. The selected language will not be displayed until after the user navigates from the USER Screen to another Screen.

English / Metric Units

Access Level Required: OPERATOR

Define the unit system (English or Metric) used by the chiller display.

Custom User ID (4)

Access Level Required: SERVICE

This allows the user to specify up to four (4) Custom User ID values. Each user ID will then require a corresponding Password and User Level. A User ID can be defined for various maintenance personnel. Service Technicians refer to YORK Service Manual 160.54-M1.

Custom User Password (4)

Access Level Required: SERVICE

This allows the user to specify up to four (4) Custom Password values. Each Password will then require a corresponding User ID and User Level. Service Technicians refer to YORK Service Manual 160.54-M1.

Custom User Access Level (4)

Access Level Required: SERVICE

This allows the user to specify up to four (4) Custom User Access Levels. Each Access Level will then require a corresponding Password and User ID. Service Technicians refer to YORK Service Manual 160.54-M1.

NAVIGATION

Home

Access Level Required: VIEW

Causes an instant return to the Home Screen.

Setup

Access Level Required: VIEW

Return to the Setup Screen.

COMMS SCREEN

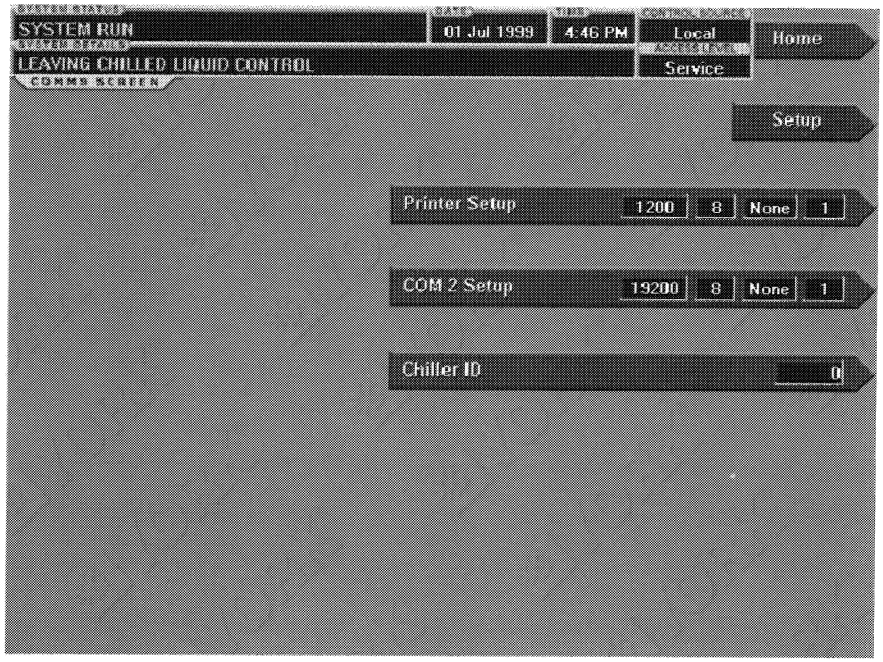


FIG. 26

00318VIP

OVERVIEW

This screen allows definition of the necessary communications parameters. Refer to PRINTER Section of this book for details of the Printer connections and setup. Presently, there are no COM 2 communications features available.

DISPLAY ONLY

None

PROGRAMMABLE

Chiller ID
Access Level Required: OPERATOR
Define the numeric chiller ID when used within an ISN network of chillers. This ID number is also printed at the top of reports obtained with a local printer.

COM 2 Baud Rate
Access Level Required: OPERATOR
Define the baud rate at which the panel shall communicate through the modem port.

COM 2 Data Bit(s)
Access Level Required: OPERATOR
Define the number of data bits with which the panel shall communicate through the modem port.

COM 2 Parity Bit(s)
Access Level Required: OPERATOR
Define the number of parity bits with which the panel shall communicate through the modem port.

COM 2 Stop Bit(s)
Access Level Required: OPERATOR
Define the number of stop bits with which the panel shall communicate through the modem port.

Printer Baud Rate
Access Level Required: OPERATOR
Define the baud rate at which the panel shall communicate to the printer.

Printer Data Bit(s)
Access Level Required: OPERATOR
Define the number of data bits with which the panel shall communicate to the printer.

Printer Parity Bit(s)
Access Level Required: OPERATOR
Define the number of parity bits with which the panel shall communicate to the printer.

Printer Stop Bit(s)
Access Level Required: OPERATOR
Define the number of stop bits with which the panel shall communicate to the printer.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

Setup
Access Level Required: VIEW
Return to the Setup Screen.

PRINTER SCREEN

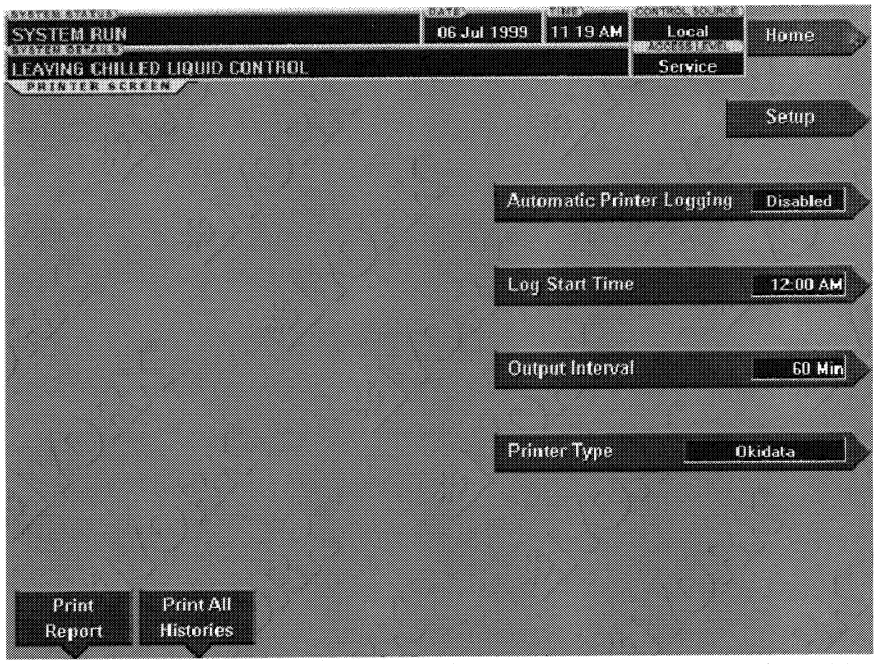


FIG. 27

00319VIP

OVERVIEW

This screen allows definition of the necessary communications parameters for the printer. Refer to PRINTER section of this book for details of the Printer connections and setup.

DISPLAY ONLY

Time Remaining Until Next Print
Displays the time until the next print log will occur, if the function is enabled.

PROGRAMMABLE

Log Start Time
Access Level Required: OPERATOR
Set the time at which scheduled print logs will begin.

Output Interval
Access Level Required: OPERATOR
Define the interval at which log printing will occur.

Automatic Printer Logging (Enabled / Disabled)
Access Level Required: OPERATOR
Enable the printer to begin printing status reports beginning at the programmed start time and recurring at the interval defined above.

Printer Type
Access Level Required: OPERATOR
Define the printer type connected to the chiller system.

ACC Auto Map Print (Enabled / Disabled)
Access Level Required: OPERATOR
Only available if the chiller system utilizes a Variable Speed Drive motor controller. The chiller monitors the ACC communications and when a surge point is mapped, a short report of system parameters is printed. *When this function is active, all other printing capability is disabled.*

ACC Map Report
Access Level Required: OPERATOR
Only available if the chiller system utilizes a Variable Speed Drive motor controller. The chiller requests the entire surge map from the ACC. As the map is received, the parameters for each point are printed.

Print Report
Access Level Required: OPERATOR
Select the report type to print when the Print Report key is selected. This can vary from Status report (present system parameters), Setpoints report (present value of the system setpoints), Schedule report (present value of the system schedule times), or a Sales Order Data report (information provided on the Sales Order screen). A print report is generated upon completion of selection.

Print All Histories
Access Level Required: OPERATOR
Generate a report of the system data at the time of all stored shutdowns.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

Setup
Access Level Required: VIEW
Return to the Setup Screen.

SALES ORDER SCREEN

‡

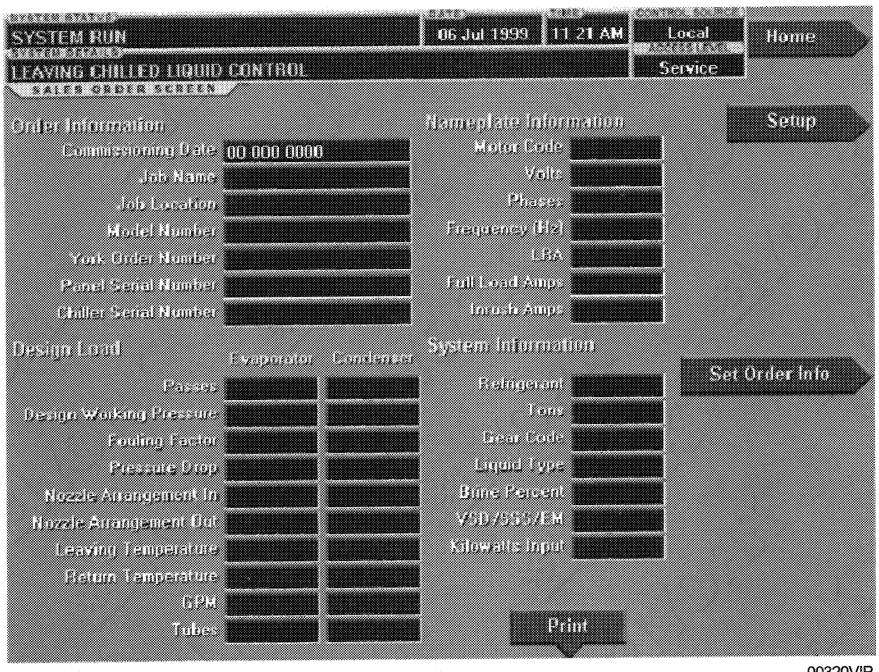


FIG. 28

00320VIP

OVERVIEW

This screen allows definition of the sales order parameters. The Commissioning date is entered by the YORK Service Technician at the time of chiller commissioning. These values should never be changed or entered by anyone other than a qualified Service Technician. Entry instructions are included in the YORK Service Manual 160.54-M1. The remainder of the values are entered at the YORK Factory during the manufacturing of the chiller.

DISPLAY ONLY

Model Number
Factory defined model number of the chiller system.

Panel Serial Number
Factory defined serial number for the micropanel.

Chiller Serial Number
Factory defined serial number for the chiller system.

YORK Order Number
Factory defined order number under which the chiller was sold.

System Information
Factory defined conditions for which the chiller was originally rated and sold.

Condenser and Evaporator Design Load Information
Factory defined description of the condenser and evaporator configuration at time of shipment.

Nameplate Information
Factory defined information about the chiller motor configuration.

PROGRAMMABLE

Commissioning Date
Access Level Required: SERVICE
Define the date at which the chiller was commissioned.

Job Name and Location
Access Level Required: SERVICE
Factory defined job name and location the chiller is destined for.

‡ **Print**
Access Level Required: VIEW
This generates a listing of the Sales Order data

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

Setup
Access Level Required: VIEW
Return to the Setup Screen.

OPERATIONS SCREEN

‡

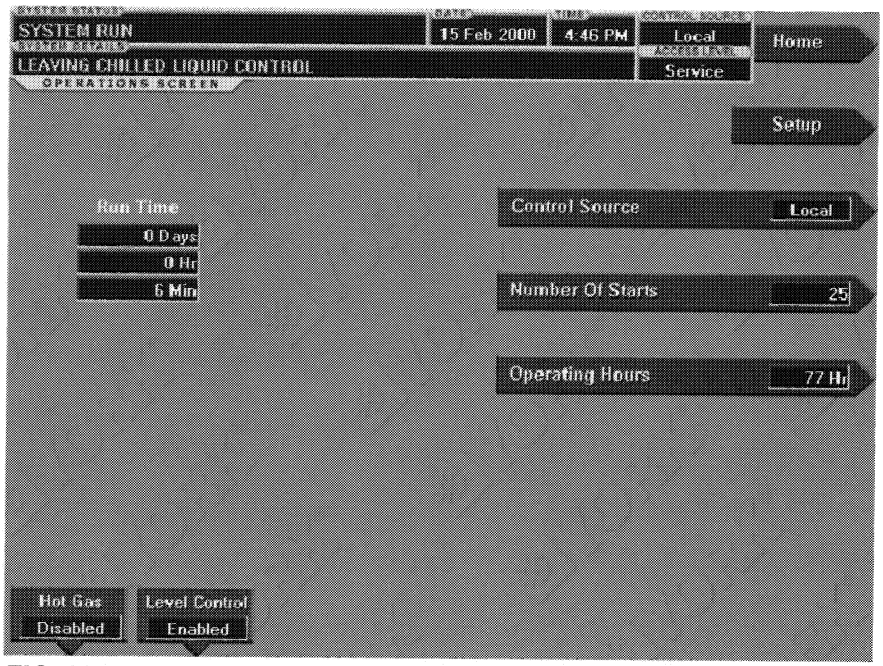


FIG. 29

00321VIP

OVERVIEW

This screen allows definition of general parameters having to do with the operation of the chilller.

DISPLAY ONLY

‡ **Chiller Run Time**
(Flash memory Card version C.MLM.01.04 or later)
Displays the amount of time the chiller has been running since the last start signal was received. Value is reset to zero when the chiller enters Coastdown. It remains at zero while shutdown and during "System Prelube".

PROGRAMMABLE

Control Source
Access Level Required: OPERATOR
Define whether the control of the chiller will be Local, Digital Remote, Analog Remote, Modem Remote or ISN Remote.

Number of Starts
Access Level Required: SERVICE
Displays the number of the starts the chiller has initiated. This may be reprogrammed to a desired value, (generally when this value has been reset due to a Micro Board replacement), but should not be done so arbitrarily.

Operating Hours
Access Level Required: SERVICE
Displays the total accumulated run time of the chiller. This may be reprogrammed to a desired value (generally when this value has been reset due to a Micro Board replacement), but should not be done so arbitrarily.

‡ **Hot Gas Control (Enabled/Disabled)**
Access level required: SERVICE
Enables and disables the optional Hot gas Bypass Control feature.

Refrigerant Level Control (Enabled / Disabled)
Access Level Required: SERVICE
Enables and Disables the Refrigerant Level Control Feature.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

Setup
Access Level Required: VIEW
Return to the Setup Screen.

HISTORY SCREEN

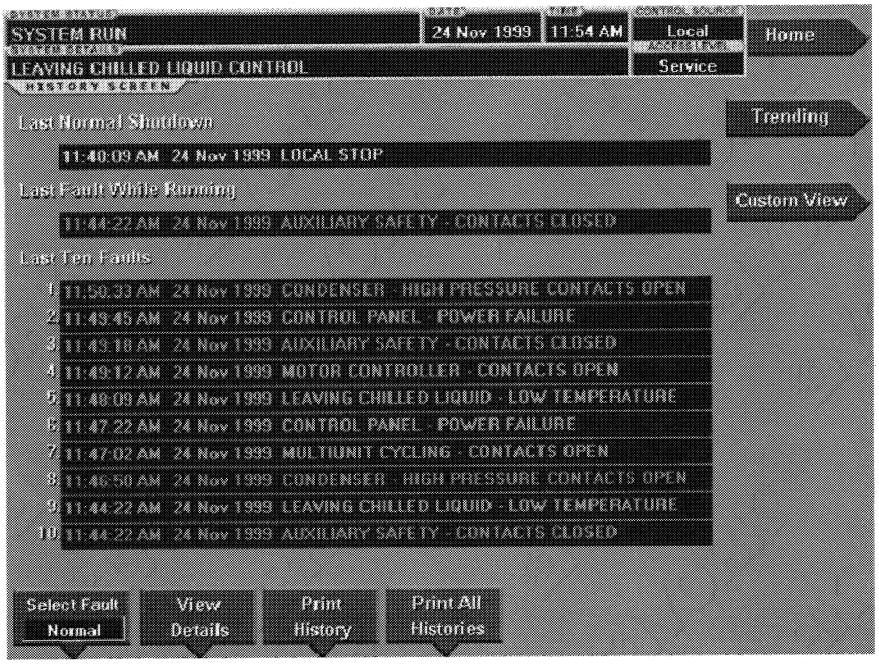


FIG. 30

00322VIP

OVERVIEW

This screen allows the user to browse through the faults. In order to get a more thorough reporting of the system conditions at the time of the recorded shutdown, move to the sub-screen **HISTORY DETAILS.**

The user may use the **Select Fault** button to select the history to view. At this point the **View Details** button is used to jump to a sub-screen containing stored chiller parameters values at the time of the shutdown. Additionally, the **Print History** button can be used to generate a hard-copy report of the parameter values at the time of the shutdown.

DISPLAY ONLY

Last Normal Shutdown
This window displays the date and time and the description of the last normal shutdown. A normal shutdown is defined as:

- Local (Panel rocker switch)
- Remote (Digital, Analog or ISN)

Last Fault While Running
This window displays the date and time and the description of the last safety or cycling shutdown while the system was running.

Last Ten Faults
This window displays a chronological listing (most recent first) of the date and time and the description of the last ten safety or cycling shutdowns that occur while the system is running or stopped.

PROGRAMMABLE

Print History
Access Level Required: VIEW
This generates a report listing the status of the chiller parameters at the time of the selected shutdown.

Print All Histories
Access Level Required: VIEW
This generates a report listing the status of the chiller parameters at the time of each of the stored shutdowns.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

View Details
Access Level Required: VIEW
Causes a move to a sub-screen containing the value of select chiller parameters at the time of the associated shutdown.

Trending
Access Level Required: VIEW
Causes a move to a sub-screen allowing the user to view trending data on selected chiller parameters.

‡ **Custom View**
(Flash memory Card version C.MLM.01.04 or later)
Access Level required: VIEW
Causes a move to a sub-screen allowing the user to view the Custom Setup Screen.

HISTORY DETAILS SCREEN

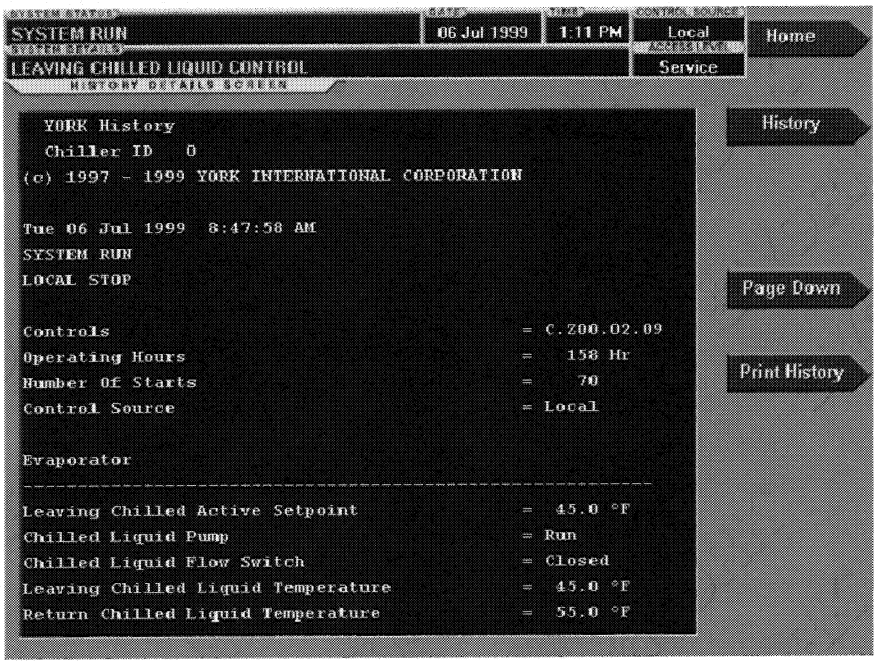


FIG. 31 00323VIP

OVERVIEW

This screen allows the user to see an on-screen printout of all the system parameters at the time of the selected ‡ shutdown. Not all screens are shown above. The number of screens required to display all of the data varies according to type of motor starter and options applied.

DISPLAY ONLY

History Printout
This is the on-screen printout of the system parameters.

PROGRAMMABLE

Page Up
Access Level Required: VIEW
Scroll up in the displayed data (if applicable).

Page Down
Access Level Required: VIEW
Scroll down in the displayed data (if applicable).

Print History
Access Level Required: VIEW
This generates a report listing the status of the chiller parameters at the time of the selected shutdown.

NAVIGATION

Home
Access Level Required: VIEW
Causes an instant return to the Home Screen.

History
Access Level Required: VIEW
Causes a return to the History Screen.

‡ CUSTOM VIEW SCREEN

‡

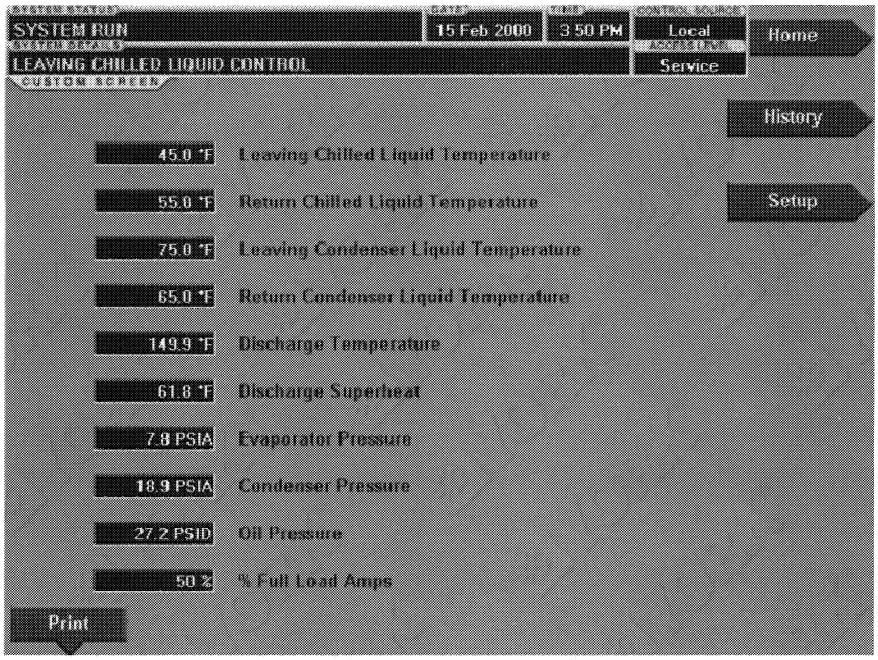


FIG. 32

00324VIP

‡ OVERVIEW

(Flash memory Card version C.MLM.01.04 or later) This screen allows up to 10 Service Technician selected parameters to be displayed. These parameters are selected from a list on the Custom View Setup Screen. This allows the Service Technician to display parameters pertinent to a particular problem during troubleshooting. At completion of the service call, the display can be cleared or the parameters can be left there for monitoring by operations personnel.

DISPLAY ONLY

None

‡ PROGRAMMABLE

Print

Access Level Required: VIEW

This generates a listing of the parameters displayed on this screen.

NAVIGATION

Home

Access Level Required: VIEW

Causes an instant return to the Home Screen.

History

Access Level required: VIEW

Causes an instant return to the History Screen.

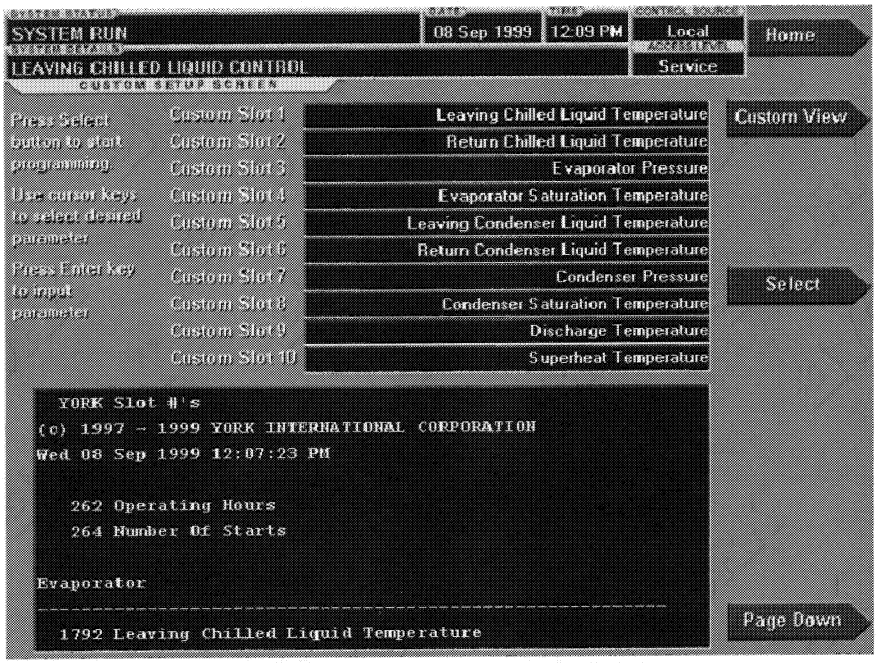
Setup

Access Level required: SERVICE

Causes a jump to the sub-screen that allows selection of the parameters to be displayed.

‡ CUSTOM VIEW SETUP

‡



00325VIP

FIG.33

‡ OVERVIEW

(Flash memory Card version C.MLM.01.04 or later)
This screen allows the Service technician to select up to 10 parameters for display on the Custom View Screen.

NOTE

Requires a login access level of SERVICE. Service Technicians refer to YORK Service Manual 160.54-M1 for operation instructions and explanation of all programmable setpoints and displayed values.

DISPLAY ONLY

Slot Numbers
Lists the available parameters that can be displayed. The desired parameters for display are selected from this list.

PROGRAMMABLE

Page Up
Scroll up through list of available parameters.

Page Down
Scroll down through list of available parameters.

Select
First use the Page Up and Page Down keys to scroll through the Slot Numbers list and note the number of the parameter(s) to be displayed. Pressing the Select key places a green colored selection box around Custom Slot 1. If it is desired to change an already entered parameter, use the 5 and 6 keys to place the selection box around the slot number to be changed. With the selection box around the slot number to be changed or entered, press the ENTER (✓) key. A dialog box is displayed permitting data entry. Using the numeric keypad keys, enter the desired slot number and press the ENTER (✓) key.

Custom Slot (1-10)
Use the Select key and numeric keypad keys as described above and enter the slot number from Slot Numbers list. Setting the Slot number to zero clears the display of this slot number.

Clear Display
Pressing this key clears all selected parameters from the Custom View screen.

NAVIGATION

Home
Access Level Required: VIEW
Causes a return to the Home Screen.

Custom View
Access Level Required: SERVICE
Causes a return to the Custom View Screen.

THIS PAGE INTENTIONALLY LEFT BLANK
TO MAINTAIN FORMAT

TREND SCREEN

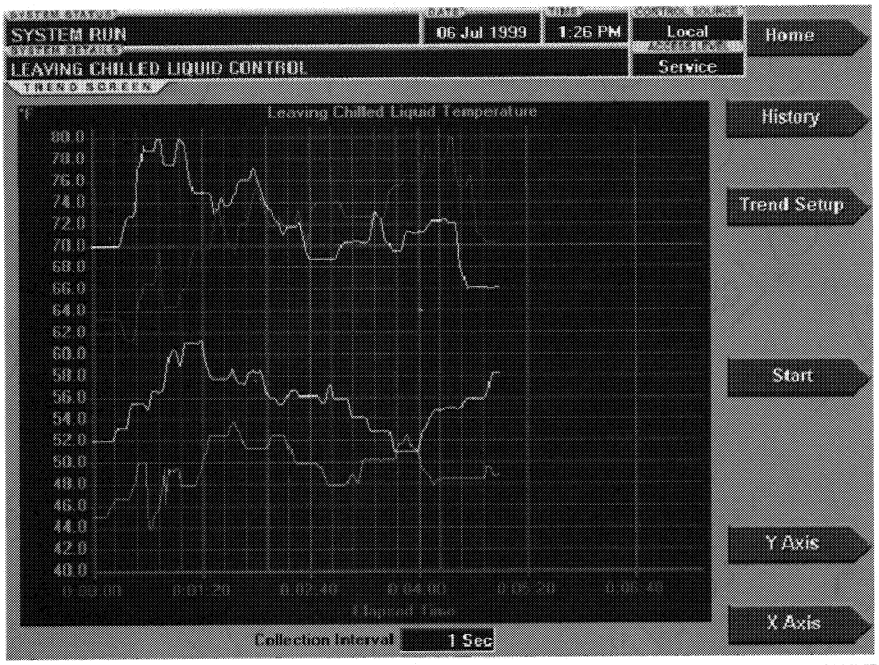


FIG. 34

00326VIP

OVERVIEW

As many as six Operator selected parameters can be plotted in an X/Y graph format. The X-Axis is scaled per the selected Data Collection Interval and displayed in a time of day or elapsed time format, as selected with the X-axis toggle key. The Y-Axis is scaled for each parameter per the selected minimum and maximum value for each parameter. Analog parameters are scaled in pressure, temperature, volts, amps, hertz or time. Digital on/off parameters are scaled as zero (off) and one (on). Only one Y-Axis label is displayed at a time. The Y-Axis Toggle Key is used to toggle the Y-Axis labels through the different parameters. The Y-Axis label that is being displayed is identified at the top of the graph. All parameters are displayed simultaneously. For identification, each plotted parameter and associated Y-Axis labeling is color coordinated.

The parameters are sampled at the selected Data Collection Interval and plotted using 450 data points across the X-Axis. If the actual value of the sampled parameter is less than the Y-Axis label minimum for that parameter, the value will be plotted at the minimum value. Similarly, if the actual value is greater than the Y-Axis label maximum for that parameter, the value will be plotted at the maximum value.

There are two types of charts that can be created: **ONE SCREEN** or **CONTINUOUS**. When the plotting has reached the end of the X-Axis, one of the following will occur, depending on which is selected: If **ONE SCREEN** has been selected, the trending stops and the data is frozen. If **CONTINUOUS** has been selected, the oldest data is dropped from the left-hand side of the graph at the next Data Collection Interval. Thereafter, the oldest data is dropped from left-hand side of the graph at each Data Collection Interval.

If a power failure occurs while the trending is running, the trending is stopped. Upon restoration of power, the last screen of data that was collected will be displayed on the trending screen. The START key must be pressed to initiate a new trend screen.

DISPLAY ONLY

This screen allows the user to view the graphical trending of the selected parameters and is also a gateway to the graph setup screens.

NOTE

A red screen with the words "TREND MAX MUST BE > TREND MIN" will appear if the Y-Axis minimum has been programmed to a value that is greater than the Y-Axis maximum for any parameter. If this appears, proceed to the Trend Setup Screen to change the values.

PROGRAMMABLE

Start
Access Level Required: OPERATOR or Higher
Pressing this key clears the graph, starts a new graph and begins the trending. The trending will continue until the STOP key is pressed, or a power failure occurs. This key is only available if trending is stopped.

Stop
Access Level Required: OPERATOR or Higher
Pressing this key stops the trending. The trend data is frozen on the display until another graph is started with the START key. The STOP key is only available if trending is running.

Y-Axis
Access Level Required: VIEW
This key toggles the Y-Axis labels of the graph. Each key press changes the label to another of the selected parameters.

X-Axis
Access Level Required: VIEW
This key toggles the X-Axis labels of the graph. Each key press alternates the scaling between time of day and elapsed time. The Time of Day scaling is in 24-hour format. The Elapsed Time scaling is the time elapsed since the START key was pressed, starting the trending.

NAVIGATION

Home
Access Level Required: VIEW
Causes a return to the Home Screen.

History
Access Level Required: VIEW
Causes a return to the Home Screen.

Trend Setup
Access Level Required:
Only displayed if the trending is stopped. Causes a jump to a sub-screen for configuring the trending display.

TREND SETUP SCREEN

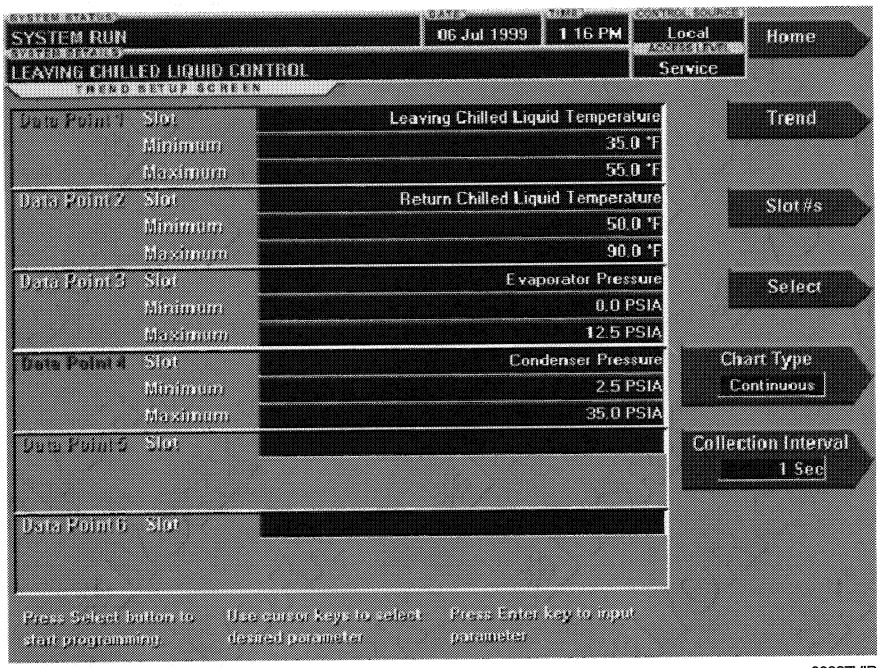


FIG. 35

00327VIP

OVERVIEW

This screen is used to configure the trending screen. The parameters to be trended are selected from the Common Slots Screen or Common Slots Master list and entered as Slot Numbers for Data Points 1 through 6. The Y-Axis minimum and maximum values for each parameter are entered as Data Point Min and Data Point Max for Data Points 1 through 6. The interval at which all the parameters are sampled is selected as the Data Collection Interval.

DISPLAY ONLY

None

PROGRAMMABLE

Chart Type
Access Level Required: OPERATOR or Higher
Selects either CONTINUOUS or ONE SCREEN type of graph.

Collection Interval
Access Level Required: OPERATOR or Higher
Selects the interval at which the parameters are sampled. There are 450 data points displayed across the X-Axis of the graph. Each point represents the instantaneous value of the parameter. The user selects the time interval between these points. This is called the DATA COLLECTION INTERVAL, or the interval at which the parameter is sampled. This interval is programmable over the range of 1 second to 3600 seconds (1 hour), in one second increments. The selected interval not only determines the sample interval, but also the full screen time display. The full screen time display is a result of the selected interval in seconds, multiplied by the 450 data points. For example, if the **Data Collection Interval** is programmed for 900 seconds, the parameter would be sampled every 900 seconds, with the last 112.5 hours (4.7 days) of data viewable on the screen. Therefore, the selected interval is a compromise between resolution and full screen time display. Select the desired **Data Collection Interval** as follows:

1. Determine the desired time interval (in seconds), between data samples.

2. Calculate the full screen time display as follows:
   - 450 x Data Collection Interval = full screen seconds
   - full screen seconds / 60 = full screen minutes
   - full screen minutes / 60 = full screen hours
   - full screen hours / 24 = full screen days

3. Decide if the resultant sample interval and full screen display meet the requirements. If not, select a different sample interval.

Select
Access Level Required: OPERATOR or Higher
This key is used to enter the slot numbers and the minimum and maximum Y-Axis values of each parameter to be trended. Pressing this key places a yellow box around Data Point 1 Slot Number. Use the ▲ and ▼ navigation keys to place the box around the value of Data Points 1 through 6 to be changed. With the desired value selected, press the ✓ key. A dialog box is displayed permitting data entry.

Data Point Slot # (1-6)
Access Level Required: OPERATOR or Higher
Use the SELECT key as described above and enter the slot number from the Common Slots Screen or Master Slot Number List of the desired parameter to be trended. The selected parameter description will be displayed for the Data Point. Setting this slot number to zero will disable trending for that particular Data Point. Any or all points can be disabled.

Data Point Min (1-6)
Access Level Required: OPERATOR or Higher
Only displayed if the Associated Slot Number is not Zero. This is the minimum value displayed for the Y-Axis. Selecting a parameter for a Data Point sets this to the default value, which is the lowest value allowed for that parameter. It can be changed to a value that provides a more appropriate resolution for the parameter being monitored. To change, use the SELECT key as described above and enter the desired value. The value must always be set to a value less than the Data Point Max. Otherwise, a red graph is displayed on the Trend Screen with the words "**TREND MAX MUST BE > TREND MIN**". If the parameter selected for this data point is a digital type (on/off), this value must be set to zero (0). Zero indicates the OFF state.

Data Point Max (1-6)
Access Level Required: OPERATOR or Higher
Only displayed if the associated slot number is not zero. This is the maximum value displayed for the Y-Axis. Selecting a parameter for a Data Point sets this to the default value, which is the highest value allowed for that parameter. It can be changed to a value that provides a more appropriate resolution for the parameter being monitored. To change, use the **SELECT** key as described above and enter the desired value. The value must always be set to a value greater than the Data Point Min. Otherwise, a red graph is displayed on the Trend Screen with the words ‡ "TREND MAX MUST BE > TREND MIN". There are 20 Y-Axis divisions. If a MIN-MAX span is selected that is not evenly divided by 20, the Program will automatically select the next higher MAX value that makes the span evenly divided by 20 (Flash memory card version C.MLM.01.02 or later). For example, if 0.0 is selected as the MIN and 69.0 is selected as the MAX, the Program will insert 70.0 as the MAX value. If the parameter selected for this data point is a digital type (on/off), this value must be set to one (1). One indicates the on state.

NAVIGATION

Home
Causes a return to the Home Screen.

Trending
Causes a return to the Trending Screen.

Slot Numbers
(Flash memory card version C.MLM.01.02 or later)
Causes a jump to a sub-screen that lists the slot numbers of the most commonly monitored parameters. The desired parameters to be plotted are selected from this screen.

COMMON SLOTS SCREEN

‡

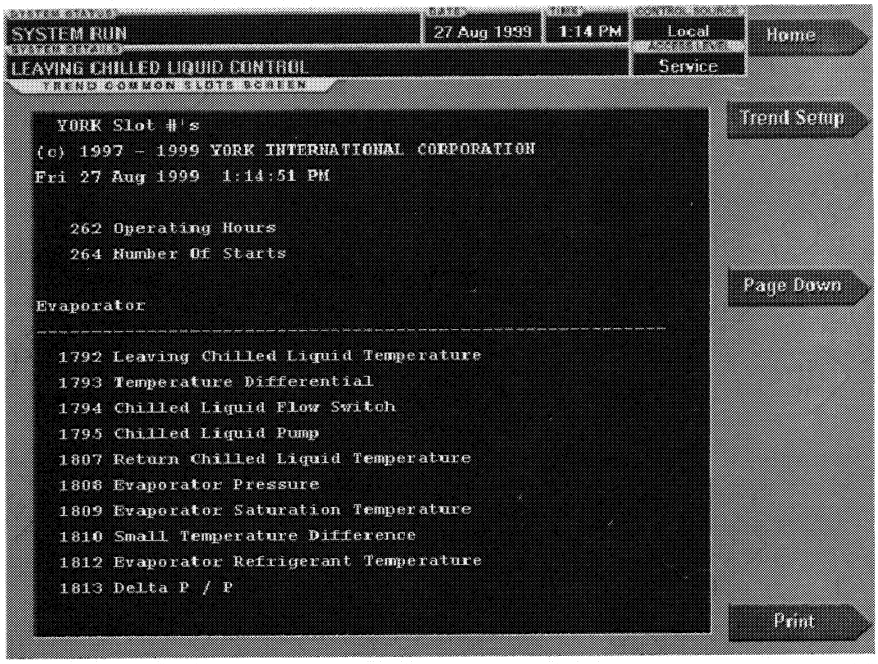
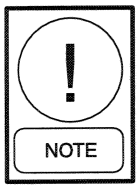


FIG. 36 00328VIP

OVERVIEW

This screen displays the slot numbers of the commonly monitored parameters. The slot numbers for the remainder of the available parameters are listed on the Master Slot Numbers List that follows.

From these lists, select up to six parameters to be trended. Return to the Trend Setup Screen and enter the parameters Slot Numbers into Data Points 1 through 6.



Requires a login access level of OPERATOR or higher.

DISPLAY ONLY

Slot Numbers
These are the slot numbers of the most commonly used parameters.

PROGRAMMABLE

‡ **Page Down**
Access Level required: OPERATOR
Scroll down in the displayed data.

‡ **Page Up**
Access Level Required: OPERATOR
Scroll up in the displayed data.

‡ **Print**
Access Level Required: OPERATOR
Generates a list of the slot numbers of the available parameters.

NAVIGATION

Home
Causes an instant return to the Home Screen.

Trend Setup
Causes a return to the Trend Setup Screen.

MASTER SLOT NUMBERS LIST FOR USE WITH TREND FEATURE

SLOT NO.	DESCRIPTION
256	System: Chiller State
257	System: Coastdown Time Remaining
258	System: Prelube Time Remaining
259	System: Are Safety Shutdown Contacts Closed
260	System: Are Cycling Shutdown Contacts Closed
261	System: Are Anticipatory Alarm Contacts Closed
262	System: Operating Hours
264	System: Number of Starts
265	System: Is Stop Switch Closed
266	System: Is Start Switch Closed
267	System: Is Remote Ready to Start
280	External Contact: Is Remote Stop Closed
281	External Contact: Is Remote Start Closed
282	External Contact: Is MultiUnit Cycling Closed
283	External Contact: Is Remote Cycling Closed
284	External Contact: Is Auxiliary Safety Open
285	Jumper: Is Anti-Recycle Enabled
286	Jumper: Coastdown Operation
287	Jumper: Is Diagnostics Enabled
288	Jumper: Liquid Type
289	Jumper: Chilled Liquid Pump Operation
290	Jumper: Motor Type
291	Jumper: Power Failure Restart
292	Jumper: Pre-Run Operation
293	Jumper: Refrigerant Selection
294	Jumper: VSD Motor Supply Line Frequency
295	Jumper: Oil Pump Package
304	Options: Control Mode
305	Options: System Language
306	Options: Chiller ID Number
307	Options: Display Mode
336	Security: Log In Level
337	Security: Log In User ID
512	Sched: Is Schedule Enabled
1280	Pre-Rotation Vanes: Is Motor Switch Closed
1281	Pre-Rotation Vanes: Position
1282	Pre-Rotation Vanes: Are Vanes Opening
1283	Pre-Rotation Vanes: Are Vanes Closing
1284	Pre-Rotation Vanes: Are Vanes Holding
1285	Pre-Rotation Vanes: Control Mode
1296	Discharge: Temperature
1536	Oil: Differential Pressure
1537	Oil: Sump Temperature

SLOT NO.	DESCRIPTION
1538	Oil Pump: Control Mode
1539	Oil Pump: Is Pump On
1540	Oil Pump: Manual Time Left
1541	Oil Heater: Is Control Enabled
1542	Oil Heater: Is Heater On
1543	Oil Return Solenoid: Is Solenoid On
1792	Leaving Chilled Liquid: Temperature
1793	Leaving Chilled Liquid: Temperature Differential
1794	Leaving Chilled Liquid: Is Flow Switch Closed
1795	Leaving Chilled Liquid: Is Pump On
1796	Leaving Chilled Liquid: Local Temperature Setpoint
1797	Leaving Chilled Liquid: Remote Analog Temperature Setpoint
1798	Leaving Chilled Liquid: Remote ISN Temperature Setpoint
1799	Leaving Chilled Liquid: Remote Modem Temperature Setpoint
1800	Leaving Chilled Liquid: Selected Temperature Setpoint
1801	Leaving Chilled Liquid: Control Sensitivity
1802	Leaving Chilled Liquid: Remote Temperature Range
1803	Leaving Chilled Liquid: Restart Temperature Offset
1804	Leaving Chilled Liquid: Restart Temperature Setpoint
1805	Leaving Chilled Liquid: Shutdown Temperature Offset
1806	Leaving Chilled Liquid: Shutdown Temperature Setpoint
1807	Return Chilled Liquid: Temperature
1808	Evaporator: Pressure
1809	Evaporator: Saturation Temperature
1810	Evaporator: Small Temperature Difference
1811	Evaporator: Is Refrigerant Sensor Present
1812	Evaporator: Refrigerant Temperature
1813	Evaporator: Delta P / P
1814	Evaporator: Brine Low Cutout
1815	Smart Freeze Protection: Is Control Enabled
1816	Liquid Line Solenoid: Is Solenoid Installed
1817	Liquid Line Solenoid: Is Solenoid On
1818	Leaving Chilled Liquid: Remote Digital Temperature Setpoint

SLOT NO.	DESCRIPTION
2048	Leaving Condenser Liquid: Temperature
2049	Leaving Condenser Liquid: Is Flow Switch Closed
2050	Leaving Condenser Liquid: Is Pump On
2051	Return Condenser Liquid: Temperature
2052	Condenser: Pressure
2053	Condenser: Saturation Temperature
2054	Condenser: Small Temperature Difference
2057	Condenser: Is High Pressure Switch Closed
2058	Condenser: High Pressure Warning Threshold
2059	SubCooling: Temperature
2060	Drop Leg Refrigerant: Is Sensor Present
2061	Drop Leg Refrigerant: Temperature
2062	Vent Line Solenoid: Is Solenoid Installed
2063	Vent Line Solenoid: Is Solenoid On
2304	Motor: Starter Type
2305	Motor: Is Motor Starter On
2306	Motor: Current %FLA
2307	Motor: Is Motor Controller Switch Open
2308	Motor: Current Limit Local Setpoint
2309	Motor: Current Limit Remote Analog Setpoint
2310	Motor: Current Limit Remote ISN Setpoint
2311	Motor: Current Limit Remote Modem Setpoint
2312	Motor: Current Limit Selected Setpoint
2313	Motor: Pulldown Demand Time Remaining
2314	Motor: Pulldown Demand Limit Setpoint
2315	Motor: Pulldown Demand Time Setpoint
2316	Motor: Anti-Recycle Time Remaining
2317	Motor: Current Limit Remote Digital Setpoint
	(Mod "A" Solid State Starters)
2560	SSS: Phase A Current
2561	SSS: Phase B Current
2562	SSS: Phase C Current
2563	SSS: Phase A Voltage
2564	SSS: Phase B Voltage
2565	SSS: Phase C Voltage
2566	SSS: Scale/Model
2567	SSS: Full Load Amps
2568	SSS: Supply Voltage Range
2569	SSS: Is Current Unbalance Check Enabled
	(Mod "B" Solid State Starters)
2570	LcSss: Input Power
2571	LcSss: Kilowatt Hours
2572	LcSss: Phase A Current
2573	LcSss: Phase B Current

SLOT NO.	DESCRIPTION
2574	LcSss: Phase C Current
2575	LcSss: Phase A Voltage
2576	LcSss: Phase B Voltage
2577	LcSss: Phase C Voltage
2578	LcSss: Phase A Temperature
2579	LcSss: Phase B Temperature
2580	LcSss: Phase C Temperature
2581	LcSss: Starter Model
2582	LcSss: Full Load Amps
2583	LcSss: Voltage Range
2584	LcSss: Starting Current
2585	LcSss: Is Serial Communications OK
2586	LcSss: Panel to Sss Comm Errors
2587	LcSss: Sss to Panel Comm Errors
2816	VSD: Motor HP
2817	VSD: 100% Full Load Amps
2818	VSD: Input Power
2819	VSD: Kilowatt Hours
2820	VSD: DC Bus Voltage
2821	VSD: DC Inverter Link Current
2822	VSD: Output Frequency
2823	VSD: Output Voltage
2824	VSD: Phase A Current
2825	VSD: Phase B Current
2826	VSD: Phase C Current
2827	VSD: Is Precharge Relay On
2828	VSD: Is Trigger SCR On
2829	VSD: Is Water Pump On
2830	VSD: Control Mode
2831	VSD: Command Frequency
2832	VSD: Manual Frequency Increment
2833	VSD: Internal Ambient Temperature
2834	VSD: Converter Heatsink Temperature
2835	VSD: Phase A Heatsink Temperature
2836	VSD: Phase B Heatsink Temperature
2837	VSD: Phase C Heatsink Temperature
2838	VSD: Is Communications OK
2839	VSD: Panel to ACC Comms Error Count
2840	VSD: ACC to Panel Comms Error Count
2841	VSD: ACC to VSD Comms Error Count
2842	VSD: VSD to ACC Comms Error Count
2843	VSD: VSD to Filter Comms Error Count
2844	VSD: Filter to ACC Comms Error Count
2845	ACC: Delta P/P
2846	ACC: Stability Limit
2847	ACC: Surge Margin
2848	ACC: Manual Surge Command

SLOT NO.	DESCRIPTION
2849	ACC: Surge Map Count
2850	ACC: Surge Type
2857	ACC: Surge Map Point Count
2858	ACC: Surge Map Delta P/P
2859	ACC: Surge Map Output Frequency
2860	ACC: Surge Map PRV Position
2861	Filter: Is Filter Installed
2862	Filter: Is Operation Inhibited
2863	Filter: Is Filter Running
2864	Filter: Is Precharge Contactor Closed
2865	Filter: Is Supply Contactor Closed
2866	Filter: Phase Rotation
2867	Filter: Motor HP
2868	Filter: Supply KVA
2869	Filter: Total Power Factor
2870	Filter: DC Bus Voltage
2871	Filter: Heatsink Temperature
2872	Filter: L1 - L2 RMS Voltage
2873	Filter: L2 - L3 RMS Voltage
2874	Filter: L3 - L1 RMS Voltage
2875	Filter: L1 - N Peak Voltage
2876	Filter: L2 - N Peak Voltage
2877	Filter: L3 - N Peak Voltage
2878	Filter: L1 Total Harmonic Distortion
2879	Filter: L2 Total Harmonic Distortion
2880	Filter: L3 Total Harmonic Distortion
2881	Filter: L1 RMS Filter Current
2882	Filter: L2 RMS Filter Current
2883	Filter: L3 RMS Filter Current
2884	Filter: L1 RMS Supply Current
2885	Filter: L2 RMS Supply Current
2886	Filter: L3 RMS Supply Current
2887	Filter: L1 Total Demand Distortion
2888	Filter: L2 Total Demand Distortion
2889	Filter: L3 Total Demand Distortion
2890	Filter: Maximum Total Harmonic Distortion

SLOT NO.	DESCRIPTION
2891	Filter: Maximum Total Demand Distortion
8192	Oil: Pump Pressure
8193	Oil: Sump Pressure
8194	Oil Seal Lube: Is Control Enabled
8195	Oil Seal Lube: Time To Next Lube
8196	Oil Seal Lube: Time Left
8197	VSOP: Speed Command
8198	VSOP: Control Mode
8199	VSOP: Manual Command Frequency
8200	VSOP: Is Pulldown In Effect
8201	VSOP: Pulldown Time Remaining
8202	VSOP: Target Setpoint
8203	VSOP: Pressure Setpoint
8204	VSOP: Control Period
8205	Refrigerant Level: Is Control Enabled
8206	Refrigerant Level: Position
8207	Refrigerant Level: Is Valve Closing
8208	Refrigerant Level: Is Valve Opening
8209	Refrigerant Level: Control Mode
8210	Refrigerant Level: Is Pulldown In Effect
8211	Refrigerant Level: Pulldown Time Remaining
8212	Refrigerant Level: Target Setpoint
8213	Refrigerant Level: Setpoint
8214	Refrigerant Level: Period
8215	Refrigerant Level: Proportional Limit Close
8216	Refrigerant Level: Proportional Limit Open
8217	Refrigerant Level: Rate Limit Close
8218	Refrigerant Level: Rate Limit Open
‡ 8221	HSTB: Oil Drain Temperature (Before C.MLM.01.03)
8222	HSTB: Is Solenoid Installed
8223	HSTB: Is Solenoid On
8224	HSTB: Proximity Position
8225	HSTB: Proximity Differential
8226	HSTB: Proximity Reference Position

2

DISPLAY MESSAGES

The Status Bar of the Display contains a Status Line and, beneath it a Details Line. The Status Line contains a message describing the operating state of the chiller; whether it is stopped, running, starting or shutting down. The Details Line displays Warning, Cycling, Safety, Start Inhibit and other messages that provide further details of the Status Bar messages. The **Status Messages** listed below are displayed on the Status Line. All other messages are displayed on the Details Line.

To aid in the meaning of the message, messages are displayed in different colors as follows:

Normal Operation messages	-	Green
Warning messages	-	Yellow
Cycling Shutdown messages	-	Orange
Safety Shutdown messages	-	Red

STATUS MESSAGES

"SYSTEM READY TO START"
The chiller is shut down but will start upon receipt of a Local or Remote start signal.

"CYCLING SHUTDOWN – AUTO RESTART"
The chiller is shut down on a **CYCLING** shutdown. The cause of the shutdown is still in effect and is displayed on the Details line of the Status Bar. The chiller will automatically restart when the **CYCLING** condition clears.

"SAFETY SHUTDOWN – MANUAL RESTART"
The chiller is shut down on a **SAFETY** shutdown. The cause of the shutdown is still in effect and is displayed on the Details line of the Status Bar. The chiller can be started after the Safety condition clears and the Operator moves the **COMPRESSOR** switch to the **STOP-RESET** (O) position.

"SYSTEM PRELUBE"
A chiller start has been initiated and the pre-start lubrication is being performed. The Prelube duration is either 50 seconds or 180 seconds, as configured with a Micro Board Program Switch. The Pre-lube duration must never be changed by anyone other than a qualified Service Technician. The standard Prelube duration is 50 seconds.

"SYSTEM RUN"
The chiller is running under the condition described in the Details Line of the Status Bar.

"SYSTEM COASTDOWN"
The chiller has shut down and the Post-run lubrication is being performed. On electric motor drive applications, the Postlube duration is 150 seconds. On Steam Turbine applications, it is 15 minutes. The actual duration is determined by a Micro Board Program Jumper, configured by a qualified Service technician.

"START INHIBIT"
The chiller is prevented from being started due to the reason displayed on the Details Line of the Status bar.

"VANES CLOSING BEFORE SHUTDOWN"
‡ One of the following shutdowns has been initiated. When the Pre-rotation Vanes have fully closed, the chiller will shutdown.

1. Leaving Chilled Liquid – Low Temperature
2. Multiunit Cycling – Contacts Open
3. Control Panel – Schedule
4. System cycling – Contacts Open
5. Remote Stop

RUN MESSAGES

"LEAVING CHILLED LIQUID CONTROL"
The chiller is running, controlling the Leaving Chilled Liquid to the Leaving Chilled Liquid Temperature Setpoint. There are no system conditions inhibiting this operation.

"CURRENT PULLDOWN LIMIT"
The Pulldown Demand Limit Setpoint timer is in effect and the Compressor Motor current is ≥ the Pulldown Demand Current Limit Setpoint value. The Pre-rotation
‡ vane operation is being inhibited as described in "**MOTOR – HIGH CURRENT LIMIT**" message below.

‡ **"MOTOR – HIGH CURRENT LIMIT"**
The Compressor Motor current is ≥ the Local or Remote Current Limit Setpoint. The Current Limit Setpoint is programmed over a range of 30 to 100% of the Chiller Full Load Amps (FLA). When the motor current increases to the "inhibit open" threshold, the Pre-rotation Vanes are inhibited from further opening. This prevents a further current rise. If the current continues to rise to the "start close" threshold, the Vanes begin closing until the current falls to the "stop close" threshold. Automatic Vane operation is resumed and this message automatically clears when the motor current decreases to

the "allow open" threshold. The thresholds are different for the various motor starter applications. To allow field calibration of the CM2 Current Module and Solid State Starter Logic Board, special thresholds are applied when logged in at **SERVICE** (or higher) access level. Refer to table below.

Vane Control	Motor Current (%FLA)		
	Electro-mechanical/ Solid state starter	VSD	Service Mode
On rise, inhibit open	100	100	107
On fall, allow open	98	98	106
On rise, start close	104	103	110
On fall, stop close	102	101	109

An example of current limit is as follows: If a Solid Sate Starter chiller FLA is 100 Amps, and the Current Limit Setpoint is 50%, the following will occur:

50 Amps – inhibit vane open
52 Amps – vanes begin closing
51 Amps – vanes stop closing
49 Amps – allow automatic vane control

START INHIBIT MESSAGES

"ANTI-RECYCLE XXMin/Sec"
The chiller is inhibited from starting because the 30 minute anti-recycle time has not yet elapsed. Time remaining is displayed.

"VANE MOTOR SWITCH OPEN"
The chiller is inhibited from starting because the Prerotation Vanes are not fully closed.

"MOTOR CURRENT >15% FLA"
The Control center has detected a Compressor Motor Current of a magnitude that is >15% of the chiller Full Load Amps for 10 continuous seconds, while the chiller is shutdown. As long as this condition exists, the oil pump is turned on. This is generally indicative of a failure of the motor starter, Control Center start circuits or motor current feedback circuits. After motor current is no longer detected, a **SYSTEM COASTDOWN** is performed. The chiller can be started after motor current is no longer detected, the **SYSTEM COASTDOWN** has completed and the **COMPRESSOR** switch is placed in the **STOP-RESET** (O) position.

‡ **"LCSSS - HIGH TEMPERATURE PHASE X - STOPPED"**
(Mod. "B" Solid State Starter only)
The chiller is stopped and the Liquid Cooled Solid State Starter Logic/Trigger Board has detected that the temperature of phase A, B, or C (designated as X in this message) Silicon Controlled Rectifier (SCR) module is > 110°F. The starter cooling pump will run and the chiller will be inhibited from starting until the temperature decreases to <109°F.

WARNING MESSAGES

"WARNING – REAL TIME CLOCK FAILURE"
During the initialization process that occurs when power is applied to the Control Center, test data is written to a location in the BRAM battery backed memory device (IC location U52 on Micro Board). This data is then read from the BRAM and compared to the test data. If the read data is not the same as that which was written to the device, it is assumed the BRAM and Real time Clock operation is defective and this message is displayed. The BRAM should be replaced by a qualified Service Technician. This message automatically clears when the BRAM problem has been solved.

"WARNING – CONDENSER OR EVAPORATOR XDER ERROR"
The Evaporator pressure Transducer is indicating a higher pressure than the Condenser pressure Transducer after the chiller has been running for 10 minutes. This is indicative of a Condenser or Evaporator Transducer failure. This message will be displayed until the condition clears and the **WARNING RESET** Keypad key is pressed in **OPERATOR** (or higher) access mode. Condition not checked in Brine mode.

"WARNING - REFRIGERANT LEVEL OUT OF RANGE"
The output of the Condenser Refrigerant Level Sensor is > 5.1VDC. This is indicative of a Level Sensor failure. While this condition exists, the Refrigerant Variable Orifice is driven to the full open position. This message automatically clears when the Refrigerant Level sensor output is within range.

"WARNING – STANDBY LUBE - LOW OIL PRESSURE"
A minimum of 15 PSID of oil pressure was not achieved in the first 30 seconds of a Standby Lubrication cycle, or the pressure decreased below this value during the remainder of the cycle. This message will be displayed and no further Standby Lubrications will be performed until the **WARNING RESET** key is pressed in **OPERATOR** (or higher) access mode.

"WARNING – SETPOINT OVERRIDE"
A blank BRAM battery-backed memory device (IC location U52 on Micro Board) or a failure of this device was detected during the initialization process that occurs when power is applied to the Control Center. Due to this failure, any or all of the programmed Setpoints could have been corrupted. Therefore, all Setpoints have been automatically changed to their **Default** values. All Setpoints will have to be programmed to their desired values. This message will clear when the **WARNING RESET** key is pressed in **OPERATOR** (or higher) access mode.

"WARNING – CONDENSER – HIGH PRESSURE LIMIT"
The Condenser Pressure exceeds the High Pressure Warning Setpoint threshold, programmed by a Service technician logged in at **SERVICE** access level. While this condition is in effect, the Pre-rotation Vanes are inhibited from further opening. This message automatically clears and the Vanes are permitted to open when the Condenser pressure decreases to 5 PSIG below the Setpoint.

"WARNING – EVAPORATOR – LOW PRESSURE LIMIT"
The Evaporator pressure has decreased to the Warning threshold. This threshold is fixed in Water cooling applications. In Brine cooling applications, the threshold is a fixed amount above the programmable safety shutdown threshold. The Safety threshold in Brine applications is determined by the Brine solution and is determined by the YORK Factory. While this condition is in effect, the Pre-rotation Vanes are inhibited from further opening. This message automatically clears and the Vanes are permitted to open when the Evaporator pressure increases to the reset value.

	Warning Threshold (PSIG)		Reset Threshold (PSIG)	
	Water	Brine	Water	Brine
R22	56.2	+1.9 >Safety Setpoint	57.5	+3.2>Safety Setpoint
R134a	27.0	+2.0 >Safety Setpoint	28.0	+3.0>Safety Setpoint

‡ **"WARNING – VANES UNCALIBRATED – FIXED SPEED"**
The Compressor Motor Variable Speed Drive (VSD) is operating Fixed Speed (full speed) mode because the Pre-rotation Vanes position potentiometer calibration has not been performed.

"WARNING – HARMONIC FILTER – OPERATION INHIBITED"
The compressor Motor variable Speed Drive (VSD) Harmonic Filter has been inhibited. Refer to VSD Service manual 160.00-M1. Harmonic filter operation should not be altered by anyone other than a qualified Service technician.

"WARNING – HARMONIC FILTER – DATA LOSS"
Communications between the Harmonic Filter Logic Board and the Compressor Motor Variable Speed Drive (VSD) Logic Board or the Adaptive Capacity Control Board is not occurring. While this condition exists, all Filter related parameters are displayed as X's. This message automatically clears when communications are restored.

"WARNING – HARMONIC FILTER – INPUT FREQUENCY RANGE"
The power line frequency detected by the Compressor motor Variable Speed Drive (VSD) Harmonic Filter is outside the range of 58 to 62Hz (60Hz), or 49 to 51Hz (50Hz). While this condition exists, all Filter related parameters are displayed as X's. This message automatically clears when the line frequency is within range.

‡ **"WARNING – VANES UNCALIBRATED"**
The Hot Gas Bypass feature is enabled, but the Pre-rotation vanes calibration procedure has not yet been performed.

‡ **"WARNING – EXTERNAL I/O – SERIAL COMMUNICATIONS"**
Serial communications between the Micro Board and the optional Analog I/O Board has been interrupted for at least 20 seconds.

ROUTINE SHUTDOWN MESSAGES

"REMOTE STOP"
A shutdown command has been received from a remote device. Remote Stop commands can be received in **Digital** Remote mode via I/O Board TB4-7/8 or in ISN (Integrated Systems Network) Remote mode via the General Protocol Interface Card (GPIC) serial communications. If the chiller is running when this occurs, the Pre-rotation Vanes are driven fully closed prior to shutting down the chiller.

"LOCAL STOP"
A local shutdown command has been received by placing the Keypad Start-Run-Stop/Reset Switch in the stop (O) position.

"PLACE COMPRESSOR SWITCH IN RUN POSITION"
The Control Center is in either Digital or ISN (Inte-

grated Systems Network) Remote mode. The Operator is requested to place the **COMPRESSOR** Switch in the **RUN** position. The Control Center will not accept a Remote start/stop command unless the switch is in the **RUN** position.

CYCLING SHUTDOWN MESSAGES

"MULTIUNIT CYCLING – CONTACTS OPEN"
The Multiunit Cycling contacts connected to I/O Board TB4-9, have opened to initiate a cycling shutdown. If the chiller is running when this occurs, the Pre-rotation Vanes are driven fully closed prior to shutting down the chiller. The chiller will automatically restart when the contacts close.

"SYSTEM CYCLING – CONTACTS OPEN"
The System Cycling contacts connected to I/O Board TB4-13, have opened to initiate a cycling shutdown. If the chiller is running when this occurs, the Pre-rotation Vanes are driven fully closed prior to shutting down the chiller. The chiller will automatically restart when the contacts close.

"OIL – LOW TEMPERATURE DIFFERENTIAL"
The chiller is prevented from starting because for one of the following reasons. The chiller will automatically restart when the conditions have been satisfied.

The chiller has been shut down for ≤30 minutes and the oil temperature minus the condenser saturation temperature is <30° F.

-OR-

The chiller has been shut down for > 30 minutes and the oil temperature minus the condenser saturation temperature is < 40° F.

-OR-

Following a Power failure, upon restoration of power, the oil temperature minus the condenser saturation temperature is < 40° F.

"OIL – LOW TEMPERATURE"
The oil temperature has decreased to < 55° F. The chiller will automatically restart when the temperature increases to > 55.0° F and is greater than the Condenser Saturated temperature by 30 or 40° F, as described above in the **OIL – LOW TEMPERATURE DIFFERENTIAL** message description.

"CONTROL PANEL – POWER FAILURE"
A Control Power failure has occurred. If the power failure occurred while the chiller was running, it will automatically restart when power is restored. However, if the power failure duration was < the duration of the applicable "Coastdown" period (2.5 minutes standard; 15 minutes steam turbine) when power is restored, the remainder of the "Coastdown" will be performed, prior to the chiller starting. This message can indicate a Cycling (auto-restart after power failure) or Safety (manual restart after power failure) shutdown, depending upon Control Center configuration. It indicates a cycling shutdown when displayed in orange characters; Safety shutdown when displayed in red characters. The Control Center is configured for auto-restart or manual restart after power failure by a qualified Service Technician following instructions in YORK Service Manual 160.54-M1.

"LEAVING CHILLED LIQUID – LOW TEMPERATURE"
The Leaving Chilled Liquid Temperature has decreased to the programmed Shutdown Temperature Setpoint. If the chiller is running when this occurs, the Pre-rotation Vanes are driven fully closed prior to shutting down the chiller. The chiller will automatically restart when the temperature increases to the programmed Restart Temperature Setpoint.

"LEAVING CHILLED LIQUID – FLOW SWITCH OPEN"
The Chilled Liquid Flow Switch has remained open for 2 continuous seconds while the chiller was running or failed to close during the **System Pre-lube** period. The chiller will automatically restart when the flow switch closes.

"CONDENSER – FLOW SWITCH OPEN"
The Condenser water flow switch has remained open for 2 continuous seconds while the chiller was running. This check is bypassed for the first 30 seconds of "System Run". The chiller will automatically restart when the flow switch closes.

"MOTOR CONTROLLER – CONTACTS OPEN"
‡ The Cm-2 Current module (Electromechanical starter applications) or Solid State Starter Logic Board (Mod "A" Solid State Starter applications) has shutdown the chiller. When detecting a fault condition that places the starter or motor at risk, these devices open the Motor Controller contacts "CM" (located on the respective device and connected between TB6-16 and TB6-53 in the Control Center) to initiate a shutdown. Since there are several different faults that are monitored, LED's on the respective device illuminate to identify the spe-

cific fault that has occurred. Refer to YORK Manual 160.46-OM3.1 for details of Mod "A" Solid State Starter initiated shutdowns and 160.54-M1 for CM-2 initiated shutdowns. The chiller will automatically restart when the Motor Controller contacts close. On some shutdowns, the respective device automatically closes the contacts when the fault condition clears. Other shutdowns require the Operator to perform a Manual Reset at the respective device.

Device	Manual Reset Fault	Automatic Reset Fault
CM-2 Module	Overload	None
Solid State Starter	Overload	Phase Rotation/Loss
	High Temp(>212° F)	High Temp start inhibit (>110° F)
	Fault Current	Trigger Board Out-of-Lock

"MOTOR CONTROLLER – LOSS OF CURRENT"

The Compressor Motor current decreased to 10% Full Load Amps (FLA) for 25 continuous seconds while the chiller was running. This could be caused by the starter de-energizing during run or a defect in the motor current feedback circuitry to the Control Center. The chiller will automatically restart at the completion of "System Coastdown".

"POWER FAULT"

‡ The CM-2 Current Module (Electro-mechanical starter applications) or Solid State Starter Logic Board (Mod "A" Solid State Starter applications) has shutdown the chiller because it detected a fault condition that places the motor at risk. These devices open and close the Motor controller "CM" contacts (located on the respective device and connected between TB6-16 and TB6-53 in the Control Center) in < 3 seconds to initiate the shutdown and produce this message. An LED on the respective device illuminates to identify the specific fault that has occurred. Refer to YORK Manual 160.46-OM3.1 for details of Solid State Starter initiated shutdowns and 160.54-M1 for CM-2 initiated shutdowns. The chiller will automatically restart when the contacts close.

Device	Shutdown
CM-2 Module	Power fault
Solid State Starter	Power Fault
	Half Phase

"CONTROL PANEL – SCHEDULE"

The programmed Daily Schedule Setpoint has shutdown the chiller. If this occurs while the chiller is running, the Pre-rotation Vanes are driven fully closed prior to shutting down the chiller. The chiller will automatically restart at the next scheduled start time.

"STARTER – LOW SUPPLY LINE VOLTAGE" (MOD "A" SOLID STATE STARTER)

‡ The voltage in any phase of the AC Power Line Voltage supplying the Solid State Starter has decreased to the low line voltage threshold for 20 continuous seconds. The chiller will automatically restart when the voltage returns to the restart level. The thresholds are as follows:

Supply Voltage Range (Volts)	Shutdown (Volts)	Restart (Volts)
380	305	331
400	320	349
415	335	362
440-480	370	400
550-600	460	502
Supply Voltage Range disabled	none	N/A

"STARTER – HIGH SUPPLY LINE VOLTAGE" (MOD "A" SOLID STATE STARTER)

‡ The voltage in any phase of the AC Power Line Voltage supplying the Solid State Starter has increased to the high line voltage threshold for 20 continuous seconds. The chiller will automatically restart when the voltage returns to the restart level. The thresholds are as follows:

Supply Voltage Range (Volts)	Shutdown (Volts)	Restart (Volts)
380	415	414
400	436	435
415	454	453
440-480	524	523
550-600	655	654
Supply Voltage Range disabled	none	N/A

"PROXIMITY PROBE – LOW SUPPLY VOLTAGE"

If the chiller is equipped with Proximity Probe Part Number 025-XXXXX-000, this message indicates that the +12VDC power supply voltage to the Proximity Probe has decreased to < +9.5 VDC. This is below the minimum level required for reliable probe operation. The chiller will automatically restart when the voltage increases to > 10.0VDC.

If the chiller is equipped with Proximity Probe Part Number 025-30961-000 or 025-35900-000, this message indicates the +24VDC power supply voltage to the Proximity Probe has decreased to +19.0VDC. This is below the minimum level required for reliable operation. The chiller will automatically restart when the voltage increases to ≥19.7VDC.

"OIL – VARIABLE SPEED PUMP – DRIVE CONTACTS OPEN"
The Oil Pump Variable Speed Drive has shut down the chiller by opening its status contacts connected to the I/O Board TB3-70. The Drive initiates a shutdown anytime its internal protection circuits will not permit the Drive to run. The contacts remain open until its internal protection circuits are satisfied it is safe to operate. Some Drive initiated shutdowns require AC power to be cycled to clear the fault. Refer to YORK Form 160.54-M1. The chiller will automatically restart when the contacts close.

‡ **MOD "B" SOLID STATE STARTER CYCLING SHUTDOWN MESSAGES**

"LCSSS INITIALIZATION FAILED"
When AC Power is restored to the system after a power failure, an initialization process occurs wherein the Control Center attempts to establish communications through the serial communications link with the Liquid Cooled Solid State Starter. If communications are not established within 10 consecutive attempts, a Cycling shutdown is performed and this message is displayed. The Control Center attempts to establish communications until successful.

"LCSSS - SERIAL COMMUNICATIONS"
After communications have been successfully established in the INITIALIZATION process, the Control Center initiates a data transmission to the Liquid Cooled Solid State Starter on the serial communications link every 2 seconds. After these communications have been established, if the Control Center does not receive a reply within 10 consecutive attempts, a Cycling shutdown is performed and this message is displayed. This same Cycling shutdown is performed, along with the same message, if the Liquid Cooled Solid State Starter does not receive a response from the control center after 10 consecutive attempts to communicate with the Control Center after INITIALIZATION has been successfully completed. The Control Center attempts to establish communications until successful.

"LCSSS SHUTDOWN - REQUESTING FAULT DATA..."
The Liquid Cooled State Starter Logic/Trigger Board has shut down the chiller but the Control Center has not yet received the cause of the fault from the LCSSS, via the serial communications link. The LCSSS shuts down the chiller by opening the Motor Controller **LCSSS Stop Contacts** (K1 relay located on the starter Logic/Trigger Board and connected between TB6-16 and TB6-53 in the Control Center). The Micro Board, in the Control Center then sends a request for the cause of the fault to the Logic/Trigger Board over the serial communications link. Since serial communications are initiated every 2 seconds, this message is typically displayed for a few seconds and then replaced with one of the following fault messages.

"LCSSS - STOP CONTACTS OPEN"
Refer to "**LCSSS SHUTDOWN – REQUESTING FAULT DATA ...**" above. If the Control Center's Micro Board does not receive the cause of a starter initiated shutdown with 20 seconds of the shutdown, it is assumed it is not forthcoming and that message is replaced with this message. The chiller can be started when the Motor Controller **LCSSS Stop Contacts** close.

A missing interlock jumper between Starter Logic/Trigger Board J1-1 and J1-12 will also produce this message.

"LCSSS - POWER FAULT"
The Liquid Cooled Solid State Starter Logic/Trigger Board has detected that the compressor motor current in one or more phases has decreased to <10% of the Job FLA for a minimum of 1 line cycle. This check is inhibited during the first 4 seconds of **SYSTEM RUN** and until the motor current is >25% of the Job FLA. The chiller will automatically restart upon completion of **SYSTEM COASTDOWN**.

"LCSSS - LOW PHASE (X) TEMPERATURE SENSOR"
The Liquid Cooled Solid State Starter Logic/Trigger Board has detected that the temperature of the starter phase A, B or C (designated as X in the message) Silicon Controlled Rectifier (SCR) Module has decreased to <37° F. This would generally be indicative of a disconnected or defective sensor. If all three SCR Modules are indicating a temperature of <37° F, the SCR Module cooling pump turns on. This is accomplished by disconnecting all three sensors. This feature allows Service Technicians to run the cooling pump while filling the cooling system by disconnecting plugs P2, P3 and P4 in the LCSSS.

"LCSSS - RUN SIGNAL"
The Liquid Cooled Solid State Starter receives two start signals from the Control Center simultaneously; one via the serial communications link and one via the start relay TB6-24 in the Control Center. If they are not received within 5 seconds of one another, a cycling shutdown is performed and this message is displayed. This is generally indicative of defective wiring.

"LCSSS - INVALID CURRENT SCALE SELECTION"

There is an invalid compressor motor current scale jumper combination installed in the Liquid Cooled Solid Starter Logic/Trigger Board J1. Jumper combination determines allowable "100% Job FLA" setpoint range; 7L-35 to 260A, 14L-65 to 510A, 26L-125 to 850A and 33L-215 to 1050A. The chiller will be permitted to start when the jumpers are configured correctly. Refer to YORK Starter service manual 160.00-O2 for valid jumper configurations.

"LCSSS - PHASE LOCKED LOOP"

The Liquid Cooled Solid State Starter Logic/Trigger Board phase locked loop circuit was not able to maintain lock with phase A of the power line. This could be caused by a power line anomaly such as sag or jitter. A power line frequency jitter of up to 3Hz/second can be tolerated. The chiller will automatically restart when lock has resumed.

"LCSSS - LOW SUPPLY LINE VOLTAGE"

The Liquid Cooled Solid State Starter Logic/Trigger Board has detected that the compressor motor AC power line voltage, in any phase, decreased below the low line voltage threshold continuously for 20 seconds. The chiller will automatically restart when the voltage in all phases returns to the restart level. The thresholds are as follows:

Supply Voltage Range (Volts)	Shutdown(Volts)	Restart(Volts)
Disabled	None	N/A
200-208	160	174
220-240	185	200
380	305	331
400	320	349
415	335	362
440-480	370	400
550-600	460	502

"LCSSS - HIGH SUPPLY LINE VOLTAGE"

The Liquid Cooled Solid State Starter Logic/Trigger Board has detected that the compressor motor AC power line voltage, in any phase, exceeded the high line voltage threshold continuously for 20 seconds. The chiller will automatically restart when the voltage in all phases returns to the restart level. The thresholds are as follows:

Supply Voltage Range (Volts)	Shutdown(Volts)	Restart(Volts)
Disabled	None	N/A
200-208	227	226
220-240	262	261
380	415	414
400	436	435
415	454	453
440-480	524	523
550-600	655	654

"LCSSS - LOGIC BOARD PROCESSOR"

Communication between the V25 Microprocessor and Digital Signal Processor (DSP) on the Liquid Cooled Solid State Starter Logic/Trigger Board has been interrupted. The chiller will automatically restart when communications are restored.

"LCSSS - LOGIC BOARD POWER SUPPLY"

Following application of power, this message is displayed and a snapshot of the LCSSS parameters and time of power failure are sent to the Control Center.

‡ "LCSSS – PHASE ROTATION/LOSS"

(Flash Memory Card version C.MLM.01.03 or earlier)

The Liquid Cooled Solid Starter Logic/trigger Board has detected the three-phase compressor motor power line voltage phase rotation is not correct or the line-to-line voltage in any phase has decreased to <30% of nominal. The chiller will automatically restart when the power line conditions are acceptable.

"LCSSS - PHASE LOSS"

‡ **(Flash memory Card version C.MLM.01.04 or later)**

The Liquid Cooled Solid State Starter Logic/Trigger Board has detected the line-to-line RMS voltage in any phase has decreased to ≤ 30% of the lowest value of the programed voltage range. If the programmed voltage range is "Disabled", a value of 60 Vac is used as the threshold. The chiller will automatically restart when the line voltage is > the shutdown threshold. The voltage range is programmed by a Service technician following instructions in Service Manual 160.54-M1.

COMPRESSOR MOTOR VARIABLE SPEED DRIVE: CYCLING SHUTDOWN MESSAGES

The following Cycling shutdown messages are displayed on Compressor Motor Variable Speed Drive (VSD) applications only. These messages are generated by events that occur within the VSD. The chiller will automatically restart when the cycling condition clears. Service and troubleshooting information is contained in YORK Manual 160.00-M1.

"VSD SHUTDOWN – REQUESTING FAULT DATA"

The VSD has shutdown the chiller and the Control Center has not yet received the cause of the fault from the VSD, via the serial communications link. The VSD shuts down the chiller by opening the Motor Controller **VSD Stop Contacts** (located on the VSD Logic Board and connected between TB6-16 and TB6-53 in the Control

Center). The Micro Board in the Control Center then sends a request for the cause of the fault to the VSD Logic Board via the Adaptive Capacity Control Board, over the serial link. Since serial communications are initiated every 2 seconds, this message is typically displayed for a few seconds and then replaced with one of the below listed fault messages.

"VSD – STOP CONTACTS OPEN"
Refer to "**VSD Shutdown – Requesting Fault Data**" message above. If the Control Center's Micro Board does not receive the cause of the Fault over the Serial Link within 20 seconds, it is assumed it is not forthcoming and that message is replaced with **VSD – STOP CONTACTS OPEN** message.

"VSD INITIALIZATION FAILED"
Upon application of power, all boards go through the initialization process. At this time, memory locations are cleared, program jumper positions are checked and serial communications links are established. There are several causes for an unsuccessful initialization as follows:

- The Control Center and the VSD must be energized at the same time. The practice of pulling the fuse in the Control Center to remove power from the Control Center will create a problem. Power-up must be accomplished by closing the main disconnect on the VSD cabinet with all fuses in place. A power interruption to the VSD Logic board will also generate this message.
- The EPROMs must be of the correct version for each VSD board and they must be installed correctly. The EPROMs are created as a set, and cannot be interchanged between earlier and later versions.
- Serial data communications must be established. Refer to **VSD - Serial Communications** fault. If communications between the VSD Logic Board, Harmonic Filter Logic Board, ACC Board and Control Center Micro Board does not take place during initialization, this message will be generated. The Serial communications can be verified by selecting the **VSD DETAILS** screen from the **MOTOR** screen and observing the Full Load amps value. A zero displayed for this and other VSD parameters, indicates a serial communications link problem.
- If the Harmonic Filter option is included, make sure the Filter Logic Board is not in continuous reset. This condition is evidenced by the Filter Logic Board's LED's alternately blinking. The filter can be eliminated as a cause of initialization failure by disconnecting the Filter by placing switch SW1 on the Filter Logic Board in the **OFF** position and removing the ribbon cable between the Filter Logic Board and the VSD Logic Boards.
- VSD and Harmonic Filter Horsepower ratings do not agree.

"VSD – HIGH PHASE A INSTANTANEOUS CURRENT"
This shutdown is generated by the VSD if the motor current in phase "A" exceeds a given limit. The motor current is sensed by the current transformers on the VSD output pole assemblies and the signals are sent to the VSD Logic Board for processing. Maximum instantaneous permissible currents are:

351/292 HP	=	771 Amps
503/419 HP	=	1200 Amps
790/658 HP	=	1890 Amps

If an overcurrent trip occurs, but the chiller restarts and runs without a problem, the cause may be attributed to a voltage sag on the utility power feeding the VSD that is in excess of the specified voltage range for this product. Thus is especially true if the chiller was running at, or near full load. If there should be a sudden dip in line voltage, the current to the motor will increase, since the motor wants to draw constant horsepower. The chiller Prerotation Vanes cannot close quickly enough to correct for this sudden increase in current, and the chiller will trip on an overcurrent fault.

If the chiller will not restart, but keeps tripping on this same shutdown, an output pole problem is the most likely cause. The VSD would require service under these conditions.

"VSD – HIGH PHASE B INSTANTANEOUS CURRENT"
See "**High Phase A Instantaneous Current**" message above.

"VSD – HIGH PHASE C INSTANTANEOUS CURRENT"
See "**High Phase A Instantaneous Current**" message above.

"VSD – PHASE A GATE DRIVER"
A second level of current protection exists on the VSD driver boards themselves. The collector-to-emitter saturation voltage of each IGBT is checked continuously while the device is gated on. If the voltage across the IGBT is greater than a set threshold, the IGBT is gated off and a shutdown pulse is sent to the VSD logic board shutting down the entire VSD system. A gate driver fault can be initiated when the VSD is not running.

"VSD – PHASE B GATE DRIVER"
See **"Phase A Gate Driver"** message above.

"VSD – PHASE C GATE DRIVER"
See **"Phase A Gate Driver"** message above.

"VSD - SINGLE PHASE INPUT POWER"
This shutdown is generated by the SCR trigger control and relayed to the VSD logic board to initiate a system shutdown. The SCR Trigger control uses circuitry to detect the loss of any one of the three input phases. The Trigger will detect the loss of a phase within one half line cycle of the phase loss. This message is also displayed every time power to the VSD is removed or if the input power dips to a very low level.

"VSD – HIGH DC BUS VOLTAGE"
The VSD's DC link voltage is continuously monitored and if the level exceeds 745 VDC, a Bus Over-Voltage shutdown is initiated. If this shutdown occurs, it will be necessary to look at the level of the 460 VAC applied to the drive. The specified voltage range is 414 to 508 VAC. If the incoming voltage is in excess of 508 VAC, steps should be taken to reduce the voltage to within the specified limits.

"VSD – LOGIC BOARD POWER SUPPLY"
This shutdown is generated by the VSD logic board and it indicates that the low voltage power supplies for the logic boards have dropped below their allowable operating limits. The power supplies for the logic boards are derived from the secondary of the 120 to 24 VAC transformer, which in turn, is derived from the 480 to 120 VAC control power transformer. This message usually means the power to the VSD has been removed.

"VSD – LOW DC BUS VOLTAGE'
If the DC link drops below 500 VDC (or 414 VDC for 50 Hz applications), the drive will initiate a system shutdown. A common cause for this shutdown is a severe sag in the incoming power to the drive. Monitor the incoming three-phase AC line for severe sags and also monitor the DC link with a voltmeter.

"VSD – DC BUS VOLTAGE IMBALANCE"
The DC link is filtered by many large electrolytic capacitors, rated for 450 VDC. These capacitors are wired in series to achieve 900 VDC capability for the DC link. It is important that the voltage be shared equally from the junction of the center, or series capacitor connection, to the negative bus and the positive bus. This center point should be approximately ½ of the total DC link voltage. Most actual bus voltage imbalance conditions are caused by a shorted capacitor or a leaky or shorted IGBT transistor in an output phase bank assembly. This usually indicates the VSD requires service.

"VSD – PRECHARGE – DC BUS VOLTAGE IMBALANCE"
This message indicates the same as the "VSD-DC Bus Voltage imbalance" message above, except the condition occurred during the Pre-lube period.

"VSD – HIGH INTERNAL AMBIENT TEMPERATURE"
The ambient temperature monitored is actually the temperature detected by a component mounted on the VSD logic board. The high ambient trip threshold is set for 140° F. Some potential causes for this shutdown are: internal VSD fan failure, VSD water pump failure or an entering condenser water temperature that exceeds the allowable limit for the job. Additional causes for the shutdown are:

- Plugged Strainer – The standard 1.5" Y-strainer contains a woven mesh element with 20 stainless steel wires per inch. This has been found to work adequately on most applications. Some users may have very dirty condenser water, which can cause the strainer to plug. Locations with special conditions may want to consider a dual strainer arrangement with quarter turn valves, to permit cleaning of one strainer with the unit still on line.
- Plugged Heat-exchanger – In cases where the strainer plugs frequently, the heat-exchanger may eventually plug or become restricted to the point of reduced flow. At this point, we suggest you back-flush the heat-exchanger by reversing the two rubber hoses which supply condenser water to-from the heat-exchanger. If the rust cannot be back-flushed, the heat-exchanger might have to be replaced.
- Low Condenser Flow – The VSD system requires 8 feet of pressure drop across the heat exchanger to maintain adequate GPM. If the pressure drop is less than 8 feet, it will be necessary to correct the flow problem or add a booster pump as is applied on retrofit chillers.

"VSD – INVALID CURRENT SCALE SELECTION"
Since the part number of the VSD Logic Board is the same on all horsepower sizes, the position of Program Jumpers tells the Logic Board the size of the VSD employed. This allows the VSD to properly scale the output current. If the Jumper configuration is invalid, a shutdown is performed and this message is generated. Re-

fer to YORK VSD Service manual 160.00-M1.

"VSD – LOW PHASE A INVERTER HEATSINK TEMPERATURE"
A Heatsink temperature sensor indicating a temperature <37° F will cause the chiller to shut down and display this message. In most cases, the problem will be an open thermistor or broken wiring to the thermistor. The normal thermistor resistance is 10K ohms at 70° F.

"VSD – LOW PHASE B INVERTER HEATSINK TEMPERATURE"
See **"Low Phase A Inverter Heatsink Temperature"** message above.

"VSD – LOW PHASE C INVERTER HEATSINK TEMPERATURE"
See **"Low Phase A Inverter Heatsink Temperature"** message above.

"VSD – LOW CONVERTER HEATSINK TEMPERATURE"
See **"Low Phase A Inverter Heatsink Temperature"** message above.

"VSD – PRECHARGE – LOW DC BUS VOLTAGE"
During Pre-charge, the DC link must be equal to or greater than 50 VDC (41 VDC for 50Hz) within ½ second after the Pre-charge relay is energized. If this condition is not met, a shutdown is performed and this message is generated.

"VSD – LOGIC BOARD PROCESSOR"
This shutdown is generated if a communications problem occurs between the two microprocessors on the VSD Logic Board.

"VSD – RUN SIGNAL"
Redundant RUN signals are generated by the Control Center; one via TB6-24 and the second via the Serial Communications link. Upon receipt of either of the two RUN commands by the VSD, a 5 second timer shall commence timing. If both run commands are not received by the VSD Logic Board within 5 seconds, a shutdown is performed and this message is displayed. This is generally indicative of a wiring problem between the Control Center and the VSD.

"VSD – SERIAL COMMUNICATIONS"
This message is generated when communications between the Adaptive Capacity Control (ACC) Board and the VSD Logic Board, or between the Control Center Micro Board and the VSD Logic Board, is disrupted. This is generally indicative of defective wiring between J11 on the VSD Logic Board and J8 on the ACC Board.

"HARMONIC FILTER – LOGIC BOARD OR COMMUNICATIONS"
This message is generated when communications between the Harmonic filter and the VSD Logic Board, is disrupted. This is generally indicative of defective wiring between the VSD Logic Board and the Harmonic filter Logic Board or a defective Harmonic Filter Logic Board.

"HARMONIC FILTER – HIGH DC BUS VOLTAGE"
The Harmonic filter's DC Link voltage is continuously monitored and if the level exceeds 860 VDC, this shutdown is performed. The Harmonic Filter has its own DC bus as part of the Filter power assembly, and this DC Link is not connected in any way with the VSD's DC link. If this shutdown occurs, it will be necessary to look at the level of 460 VAC applied to the Harmonic Filter. The specified voltage range is 414 to 508. If the incoming voltage is in excess of 508, steps should be taken to reduce the level to within specified limits. The cause of this message is typically high line voltage or a surge on the utility supply.

"HARMONIC FILTER – HIGH PHASE A CURRENT"
The maximum instantaneous harmonic filter current is monitored and compared to a preset limit. If this limit is exceeded, a shutdown is performed and this message is generated. The Filter current is monitored using two DCCT's and these signals are processed by the filter logic board. The preset limits are as follows:

351/292 HP	=	356 Amps
503/419 HP	=	496 Amps
790/658 HP	=	745 Amps

If the VSD automatically restarts after this shutdown and continues to operate properly with the filter operating, it is likely the filter tripped due to a sag or surge in the voltage feeding the VSD. If this message reoccurs, preventing the chiller from starting, the VSD will require service.

"HARMONIC FILTER – HIGH PHASE B CURRENT"
See **"Harmonic Filter – High Phase A Current"** message above.

"HARMONIC FILTER – HIGH PHASE C CURRENT"
See **"Harmonic Filter – High Phase A Current"** message above.

"HARMONIC FILTER – PHASE LOCKED LOOP"
This shutdown indicates that a circuit called "Phase Locked Loop" on the filter logic board has lost synchronization with the incoming power line. This is usually indicative of an open fuse in one of the filter's incoming power line. Filter power fuses 11FU, 12FU and 13FU should be checked.

"HARMONIC FILTER – PRECHARGE – LOW DC BUS VOLTAGE"
During pre-charge, the filter's DC link must be equal to or greater than 50 VDC (41VDC for 50Hz) within 1/10 second after the pre-charge relay is energized. If this condition is not met, a shutdown is performed and this message is generated.

"HARMONIC FILTER – LOW DC BUS VOLTAGE"
The Harmonic Filter generates its own filter DC link voltage by switching its IGBT's. This DC level is actually higher than the level that one could obtain by simply rectifying the input line voltage. Thus, the harmonic filter actually performs a voltage "boost" function. This is necessary in order to permit current to flow into the power line from the filter when the input line is at its peak level. This shutdown occurs when the filter's DC link voltage decreases to a level less than 60 VDC below the filter DC link voltage setpoint. This Setpoint is determined by the filter logic board via the sensing of the three phase input line-to-line voltage. This setpoint is set to the peak of the sensed input line-to-line voltage plus 32 volts, not to exceed 760 volts and it varies with the input line-to-line voltage. If this shutdown occurs occasionally, the likely cause is a severe sag in the input line voltage.

"HARMONIC FILTER – DC BUS VOLTAGE IMBALANCE"
The filter DC link is filtered by large, electrolytic capacitors, rated for 450 VDC. These capacitors are wired in series to achieve a 900 VDC capability for the DC link. It is important the voltage is shared equally from the junction of the center or series capacitor connection, to the negative bus and to the positive bus. This center point should be approximately ½ of the total DC link voltage.

"HARMONIC FILTER – 110% INPUT CURRENT OVERLOAD"
The three phases of RMS filter current are monitored and if any one of the three phases continuously exceeds a given threshold for 7 seconds, a chiller shutdown is performed and this message is displayed. The maximum permissible continuous RMS current ratings for the harmonic filter are:

351/292 HP	=	128 AMPS
503/419 HP	=	176 AMPS
790/658 HP	=	277 AMPS

"HARMONIC FILTER – LOGIC BOARD POWER SUPPLY"
The low voltage power supplies on the filter logic board have decreased below their permissible operating range. The filter logic board receives its power from the VSD logic board via the ribbon cable, connecting the two boards.

"HARMONIC FILTER – RUN SIGNAL"
When a digital run command is received at the filter logic board from the VSD logic board via the 16 position ribbon cable, a 1/10 second timer is started. If a redundant run command does not occur on the serial data link from the VSD logic board before the timer expires, a shutdown is performed and this message is generated.

"HARMONIC FILTER – DC CURRENT TRANSFORMER 1"
During initialization, with no current flowing through the DC Current Transformers (DCCT's), the DCCT output voltages are measured and compared with a preset limit via the filter logic board. If the measured values exceed the preset limits, the DCCT's are presumed to be defective and this shutdown is generated.

"HARMONIC FILTER – DC CURRENT TRANSFORMER 2"
See **"Harmonic Filter – DC Current Transformer 1"** message above.

SAFETY SHUTDOWN MESSAGES

"EVAPORATOR – LOW PRESSURE"
The evaporator pressure, as sensed by the Evaporator Transducer, has decreased to the Safety shutdown threshold. For water cooling applications, the safety shutdown threshold is a fixed value for the respective refrigerant. For Brine cooling applications, the safety shutdown threshold varies according to the concentration of the Brine solution. The Brine shutdown threshold is programmed at the YORK Factory. It should not be changed by anyone other than a qualified Service Technician following instructions in YORK Service Manual 160.54-M1. The chiller can be started after the evaporator pres-

sure increases to the restart threshold and the **COMPRESSOR** switch is placed in the Stop-Reset (O) position.

		Shutdown (PSIG)	Restart (PSIG)
Water cooling -	R22	54.3	54.4
	R134a	25.0	25.1
Brine cooling -	R22	25.0 to 54.3 as programmed	+0.1 > Shutdown threshold
	R134a	6.0 to 25.0 as programmed	+0.1 > Shutdown threshold

‡ **"EVAPORATOR – LOW PRESSURE - SMART FREEZE"**

(Flash memory card version C.MLM.01.02 or later)

Smart Freeze protection is activated and has shutdown the chiller because the evaporator temperature has been below the Smart Freeze threshold for greater than the allowable number of seconds. If the Evaporator Refrigerant Temperature sensor RT7 is Enabled, (using procedure in Service Manual 160.54-M1), this parameter is used as the evaporator refrigerant temperature and the freeze threshold is 32.8° F. If RT7 is not enabled, the evaporator refrigerant temperature used is the Evaporator Saturation Temperature, derived from the Evaporator Pressure Transducer and the freeze threshold is 34.0° F.

The total count is incremented once for every second the evaporator refrigerant temperature is below the freeze threshold (but is never decremented below zero). The number of seconds it will take the chilled liquid to freeze is based on how far the evaporator refrigerant temperature is below the freeze threshold as follows:

seconds to freezing = (4053.7) / (freeze threshold – evap. refrigerant temp.)

Smart Freeze is activated only if the feature has been Enabled by a Service technician **(following instructions in Service Manual 160.54-M1)** and **the Leaving Chilled Liquid** temperature Setpoint is <38.0° F.

"EVAPORATOR – TRANSDUCER OR LEAVING LIQUID PROBE"

A possible defective Evaporator pressure Transducer or Leaving Chilled Liquid temperature Thermistor has been detected. The pressure and temperature that these devices are indicating are not in the correct relationship to each other. The Control Center converts the evaporator pressure to a Saturated Temperature value and compares this value to the Leaving Chilled Liquid temperature (difference = chilled liquid temp – evaporator saturated temp). The difference should not be outside the range of –2.5° F to +25.0° F. If the Transducer and Thermistor are accurate, the Evaporator Saturated temperature should not be > 2.5° F warmer nor > 25.0° F colder than the leaving chilled liquid temperature. In order to initiate a shutdown, the difference must be outside the acceptable range continuously for 10 minutes. For Steam Turbine drive applications, this check is bypassed for the first 20 minutes of chiller operation. The chiller can be started after the **COMPRESSOR** switch is placed in the Stop-Reset (O) position.

"EVAPORATOR – TRANSDUCER OR TEMPERATURE SENSOR"

A possible defective Evaporator pressure Transducer or Refrigerant Temperature Sensor has been detected. The Control Center converts the evaporator pressure to a Saturated Temperature value and compares this value to the optional Evaporator Refrigerant Temperature Sensor. If the difference between these temperatures is greater than 3.0° F, continuously for 1 minute, this shutdown is performed. This check is not performed until the chiller has been running for at least 10 minutes. ‡ It is also not performed in brine mode (Flash memory card version C.MLM.01.02 or later). The chiller can be started after the temperatures are within 3.0° F of one another and the **COMPRESSOR** switch is placed in the Stop-reset (O) position.

"CONDENSER – HIGH PRESSURE CONTACTS OPEN"

The contacts of the electro-mechanical high pressure safety device, located on the condenser shell, have opened because this device has detected a pressure > 180.0 PSIG (R134a), >265.0 (R22). The contacts will automatically close when the condenser pressure decreases to < 120.0 PSIG (R134a), < 205 PSIG (R22). The chiller can be started after the contacts close and the **COMPRESSOR** switch is placed in the Stop-Reset (O) position.

"CONDENSER – HIGH PRESSURE"

The condenser pressure, as sensed by the Condenser Transducer, has increased to >180.0 PSIG (R134a), >265.0 PSIG (R22). The chiller can be started after the pressure decreases to < 120.0 PSIG (R134a), < 205 PSIG (R22) and the **COMPRESSOR** switch is placed in the Stop-reset (O) position.

"CONDENSER – PRESSURE TRANSDUCER OUT OF RANGE"

The Condenser Pressure Transducer is indicating a pressure that is < 6.8 PSIG (R134a), < 24.2 PSIG (R22) or > 300.0 PSIG (R134a or R22). This is outside the normal operating range of the transducer. This is generally

indicates a defective transducer. The chiller can be started after the transducer is indicating a pressure that is within range and the **COMPRESSOR** switch is placed in the Stop-Reset (O) position.

"AUXILIARY SAFETY – CONTACTS CLOSED"
The Auxiliary Safety shutdown contacts, connected to I/O Board TB4-31 have closed, initiating a safety shutdown. This input is a general-purpose, user defined safety shutdown input. The chiller can be started after the contacts open and the **COMPRESSOR** switch is placed in the Stop-Reset (O) position.

"DISCHARGE – HIGH TEMPERATURE"
The discharge temperature, as sensed by the Discharge Temperature Thermistor, has increased to > 220.0° F. The chiller can be started after the temperature decreases to < 220.0° F and the **COMPRESSOR** switch is placed in the Stop-Reset (O) position.

"DISCHARGE – LOW TEMPERATURE"
The discharge temperature, as sensed by the Discharge Temperature Thermistor, has decreased to < 30.0° F. The chiller can be started after the temperature increases to > 30.0° F and the **COMPRESSOR** switch is placed in the Stop-Reset (O) position.

"OIL – HIGH TEMPERATURE"
The oil temperature, as sensed by the Oil Temperature Thermistor, has increased to > 180.0° F. The chiller can be started after the temperature decreases to < 180.0° F and the Compressor switch is placed in the Stop-Reset (O) position.

"OIL – LOW DIFFERENTIAL PRESSURE"
The differential oil pressure decreased to < 15.0 PSID while the chiller was running or failed to achieve 25.0 PSID by the last 5 seconds of the "System Prelube" period. The differential oil pressure is the difference between the output of the Sump Oil Pressure Transducer (system low pressure) and the output of the Pump Oil Pressure Transducer (system high pressure). The chiller can be started after the **COMPRESSOR** switch is placed in the Stop-Reset (O) position.

"OIL - HIGH DIFFERENTIAL PRESSURE"
The differential oil Pressure increased to > 90.0 PSID while the oil pump was running. The differential oil pressure is the difference between the output of the Sump Oil Pressure Transducer (system low pressure) and the output of the Pump Oil Pressure Transducer (system high pressure). The chiller can be started after the differential oil pressure decreases to < 90.0 PSID and the **COMPRESSOR** switch is placed in the Stop-reset (O) position.

"OIL – PUMP PRESSURE TRANSDUCER OUT OF RANGE"
The Pump Oil Pressure Transducer (system high pressure) is indicating a pressure that is <0.0 PSIG or >315.0 PSIG. This is outside the normal operating range of the transducer. This generally indicates a defective transducer. The chiller can be started after the transducer is indicating a pressure that is within range and the **COMPRESSOR** switch is placed in the Stop-reset (O) position.

"OIL – SUMP PRESSURE TRANSDUCER OUT OF RANGE"
The Sump Oil Pressure Transducer (system low pressure) is indicating a pressure that is outside the normal operating range of the transducer as follows: R134a - <0.0 PSIG or >315.0 PSIG, R22 - <23.2 PSIG or >271.8 PSIG. This generally indicates a defective transducer. The chiller can be started after the transducer is indicating a pressure that is within range and the **COMPRESSOR** switch is placed in the Stop-reset (O) position.

"OIL - DIFFERENTIAL PRESSURE CALIBRATION"
The Sump and Pump oil pressure Transducers indicated a differential oil pressure of >15.0 PSID during the oil pressure transducer Auto-Zeroing period that begins 10 seconds into "System Pre-lube" and lasts for 3 seconds. This is indicative of a defective Sump or Pump Transducer, since the oil pump is not running during this period and the actual differential oil pressure is 0 PSID. The transducers are sensing the same pressure during this period and their outputs should be similar. The chiller can be started after the **COMPRESSOR** switch is placed in the stop-reset (O) position.

"OIL – VARIABLE SPEED PUMP – SETPOINT NOT ACHIEVED"
This is only applicable to chillers equipped with the Oil Pump Variable Speed Drive. One of the following conditions have occurred while in "System Prelube", "System Run" or "System Coastdown". The chiller can be started after the **COMPRESSOR** switch is placed in the Stop-reset (O) position.

1. The differential oil pressure was < 35.0 PSID for 5 continuous seconds during the last 10 seconds of the "System Prelube" period or during the first 15 seconds of "System Run".

   -OR-

2. Anytime after the first 30 seconds of "System run", the differential oil pressure was < the Oil Pressure Setpoint with the speed command from the Micro

Board at 60 Hz for 5 continuous seconds.

"CONTROL PANEL – POWER FAILURE"
A Control Power failure has occurred. If the power failure duration was < the duration of the applicable "Coastdown" period (2.5 minutes standard; 15 minutes steam turbine), the remainder of the "Coastdown" is performed upon restoration of power. The chiller can be started after the **COMPRESSOR** switch is placed in the Stop-reset (O) position. This message can indicate a Cycling (auto-restart after power failure) or Safety (manual restart after power failure) shutdown, depending upon Control Center configuration. It indicates a Cycling shutdown when displayed in orange characters; Safety shutdown when displayed in red characters. The Control center is configured for auto-restart or manual restart after power failure by a qualified Service technician following instructions in YORK Service Manual 160.54-M1.

"MOTOR OR STARTER – CURRENT IMBALANCE"
‡ Mod "A" Solid State Starter applications only. While the chiller was loaded to ≥ 80% Full Load Amps (FLA), the motor current in phase A, B or C was > or < 30% of the average of all three phase currents for 45 continuous seconds. This condition is not checked for the first 45 seconds of "System Run". To allow the chiller to run in extreme abnormal conditions, this check can be disabled by a qualified Service Technician following instructions in YORK Service Manual 160.54-M1.

"THRUST BEARING – PROXIMITY PROBE CLEARANCE"
The clearance between the compressor high speed thrust collar and the tip of the Proximity Probe has increased ≥ +10 mils or decreased ≥ -25 mils (for 2 continuous seconds) from the Reference Position. The minimum allowed clearance is 23 mils. Therefore, if the Reference position is < 47 mils, the shutdown will occur when the actual clearance is ≤ 22 mils.



This shutdown must be evaluated by a qualified Service Technician prior to starting the chiller. Starting the chiller without this evaluation could result in severe compressor damage. To prevent the chiller from starting without the proper evaluation, restart is inhibited until the clearance is within acceptable limits and a special reset procedure is performed by the Service Technician. The evaluation and reset procedure are contained in YORK Service Manual 160.54-M1.

"THRUST BEARING – PROXIMITY PROBE OUT OF RANGE"
The clearance between the compressor high speed thrust collar and the tip of the Proximity Probe has decreased to < 17 mils.



This shutdown must be evaluated by a qualified Service Technician prior to starting the chiller. Starting the chiller without this evaluation could result in severe compressor damage. To prevent the chiller from starting without the proper evaluation, restart is inhibited until the clearance is within +10 to -25 mils of the Reference Position and a special reset procedure is performed by the Service Technician. The evaluation and reset procedure are contained in YORK Service Manual 160.54-M1.

"THRUST BEARING – HIGH OIL TEMPERATURE"
(Not applicable to chillers equipped with Flash Memory Card version C.MLM.01.03 and higher)
The temperature of the oil in the High Speed Drain Line, as sensed by the Proximity Probe, has increased to ≥ 250.0° F.



This shutdown must be evaluated by a qualified Service Technician prior to starting the chiller. Starting the chiller without this evaluation could result in severe compressor damage. To prevent the chiller from starting without the proper evaluation, restart is inhibited until the temperature decreases to < 180.0° F and a special reset procedure is performed by the Service technician. The evaluation and reset procedure are contained in YORK Service Manual 160.54-M1.

"THRUST BEARING – OIL TEMPERATURE SENSOR"
‡ (Not applicable to chillers equipped with Flash Memory Card version C.MLM.01.03 and higher)
The temperature of the oil in the High Speed Drain Line, as sensed by the Proximity Probe, has decreased to < 50.0° F during "System Run" or the last 10 seconds of "System Prelube".



This shutdown must be evaluated by a qualified Service Technician prior to starting the chiller. Starting the chiller without this evaluation could result in severe compressor damage. To prevent the chiller from starting without the proper evaluation, restart is inhibited until the temperature increases to >50.0° F and a special reset procedure is performed by the Service Technician. The evaluation and reset procedure are contained in YORK Service Manual 160.54-M1.

"WATCHDOG – SOFTWARE REBOOT"
The Micro Board's software Watchdog initiated a Microprocessor reset because it detected that a portion of the chiller operating Program was not being executed. The result of this reset is a Safety shutdown and re-initialization of the Program. This is generally indicative of a severe electrical power disturbance or impending Micro Board Failure. The chiller can be started after the **COMPRESSOR** switch is placed in the Stop-Reset (O) position.

‡ **MOD "B" SOLID STATE STARTER SAFETY SHUTDOWN MESSAGES**

"LCSSS SHUTDOWN - REQUESTING FAULT DATA..."
The Liquid Cooled Solid State Starter Logic/Trigger Board has shut down the chiller but the Control Center has not yet received the cause of the fault from the LCSSS, via the serial communications link. The LCSSS shuts down the chiller by opening the Motor Controller **LCSSS Stop Contacts** (K1 relay located on the Logic/Trigger Board and connected between TB6-16 and TB6-53 in the Control Center). The Micro Board, in the Control Center, then sends a request for the cause of the fault to the Logic/Trigger Board over the serial communications link. Since serial communications are initiated every 2 seconds, this message is typically displayed for a few seconds and then replaced with one of the following fault messages.

"LCSSS - HIGH INSTANTANEOUS CURRENT"
The Liquid Cooled Solid State Starter Logic/Trigger Board detected that the compressor motor current in any phase exceeded 1.1(1.414 x RMS value of the programmed Start Current) for a minimum of 1 second. The chiller can be started after the **COMPRESSOR** switch is placed in the Stop-Reset (O) position.

"LCSSS - HIGH PHASE (X) HEATSINK TEMPERATURE - RUNNING"
The Liquid Cooled Solid State Starter Logic/Trigger Board has detected the temperature of phase A, B or C (designed as X in the message) Silicon Controlled Rectifier (SCR) Modules has exceeded 212° F while the chiller was running. The safety can be reset after all SCR temperatures are < 210° F and the COMPRESSOR switch is placed in the Stop-Reset position (O). However, the chiller cannot be started until all SCR temperatures are < 109° F. During the shutdown, the starter cooling pump runs until the temperature is < 109° F.

"LCSSS - 105% MOTOR CURRENT OVERLOAD"
The highest phase of the compressor motor current increased to > 105% of the programmed 100% chiller Full Load Amps continuously for 40 seconds. The chiller can be started after the COMPRESSOR switch is placed in the Stop-Reset (O) position.

"LCSSS - MOTOR OR STARTER - CURRENT IMBALANCE"
The Liquid Cooled Solid State Starter Logic/Trigger Board detected that the three phase compressor motor current imbalance was > 30% continuously for 45 seconds. The imbalance is not checked until the chiller has been running for at least 45 seconds and the average of the three phases of motor current is > 80% of the programmed 100% chiller Full Load Amps. The average is calculated as: Iave = (Ia+Ib+Ic) / 3. The imbalance is calculated as:

$$\frac{(Ia-Iave) + (Ib-Iave) + (Ic-Iave)}{2(Iave)} \times 100$$

"LCSSS - PHASE (X) SHORTED SCR"
‡ **(Flash memory Card version C.MLM.01.04 or later)**
A shorted Silicon Controlled Rectifier (SCR) in phase A, B or C (designated as X in the message) has been detected by the Liquid Cooled Solid State Starter Logic/Trigger Board. The voltage across each SCR in monitored to detect the shorted condition. The shorted condition must exist continuously for 5 seconds in order to annunciate the fault. This check is disabled while the chiller is running. The chiller can be started after the condition has been corrected and the COMPRESSOR switch is placed in the Stop-Reset (O) position.

"LCSSS - OPEN SCR"
An open Silicon Controlled Rectifier (SCR) has been detected by the Liquid Cooled Solid State Starter Logic/

Trigger Board. The open condition must exist continuously for 5 seconds in order to annunciate the fault. The chiller can be started after the condition has been corrected and the **COMPRESSOR** switch is placed in the Stop-Reset (O) position. This check is disabled when the chiller is shut down. In certain applications, local power line conditions could interfere with the open SCR detection technique. This requires a qualified Service Technician to disable this check. Refer to YORK Service Manual 160.54-M1.

"LCSSS - PHASE ROTATION"

‡ **(Flash memory Card version C.MLM.01.04 or later)**

The Liquid Cooled Solid State Starter Logic/Trigger Board has detected the three phase compressor motor power line voltage phase rotation is not correct. The chiller can be started after the phase rotation is correct and the COMPRESSOR Switch is placed in the Stop-Reset (O) position.

COMPRESSOR MOTOR VARIABLE SPEED DRIVE: SAFETY SHUTDOWN MESSAGES

The following Safety shutdown messages are displayed on Compressor Motor variable Speed Drive (VSD) applications only. These messages are generated by events that occur within the VSD. The chiller can be started after manual resets are performed as detailed below. Service and troubleshooting information is contained in YORK Manual 160.00-M1.

"VSD SHUTDOWN – REQUESTING FAULT DATA"

The VSD has shut down the chiller and the control center has not yet received the cause of the fault from the VSD, via the serial communications link. The VSD shuts down the chiller by opening the Motor Controller "VSD Stop Contacts" (located on the VSD Logic Board and connected between TB6-16 and TB6-53 in the Control Center). The Micro Board in the Control Center then sends a request for the cause of the fault to the VSD Logic Board via the Adaptive Capacity Control Board, over the serial link. Since serial communications are initiated every 2 seconds, this message is typically displayed for a few seconds and then replaced with one of the following fault messages.

"VSD – STOP CONTACTS OPEN"

Refer to 'VSD Shutdown – Requesting Fault Data" above. If the Control Center's Micro Board does not receive the cause of the Fault over the serial Link within 20 seconds, it is assumed it is not forthcoming and that message is replaced with "VSD – Stop Contacts Open" message.

"VSD – 105% MOTOR CURRENT OVERLOAD"

This shutdown is generated by the VSD Logic Board and it indicates that a motor overload has occurred. The shutdown is generated when the VSD Logic Board has detected that at least 1 of the 3 output phase currents has exceeded 105% of the chiller Full Load Amps (FLA) value for > 7 seconds. The chiller FLA value is set by adjustment of the FLA potentiometer on the VSD Logic Board. The chiller can be started after the RESET push-button on the VSD Logic Board is pressed and the **COMPRESSOR** switch is placed in the Stop-reset position (O).

"VSD – HIGH PHASE A INVERTER HEATSINK TEMPERATURE"

This shutdown will occur if the heatsink temperature exceeds 158° F on any of the output pole assemblies. This shutdown will seldom occur. In most cases where the coolant temperature has risen abnormally, the VSD will shut down on "Ambient Temperature" @ 140.0 °F before the heatsinks can reach 158° F. If this message is displayed, make sure there is adequate coolant level, ascertain the pump is operating when the chiller is running, and check the strainer in the primary of the heat exchanger for clogs and silt. The chiller can be started after the fault condition clears, the **RESET** button on the VSD Logic Board is pressed and the **COMPRESSOR** switch is placed in the Stop-reset position (O).

"VSD – HIGH PHASE B INVERTER HEATSINK TEMPERATURE"

See Phase A message above.

"VSD – HIGH PHASE C INVERTER HEATSINK TEMPERATURE"

See Phase A message above.

"VSD – HIGH CONVERTER HEATSINK TEMPERATURE"

See Phase A message above.

"VSD – PRECHARGE LOCKOUT"

If the VSD fails to make Pre-charge, the Pre-charge relay shall drop out for 10 seconds during which time the VSD's fans and water pumps shall remain energized in order to permit the Pre-charge resistors to cool. Following this 10-second cool down period, Pre-charge shall again be initiated. The VSD shall attempt to make

Pre-charge 3 consecutive times. If the VSD fails to make Pre-charge on 3 consecutive tries, the unit will shut down, lockout and display this message. The chiller can be started after the **COMPRESSOR** switch is placed in the Stop-reset (O) position.

"HARMONIC FILTER – HIGH HEATSINK TEMPERATURE"

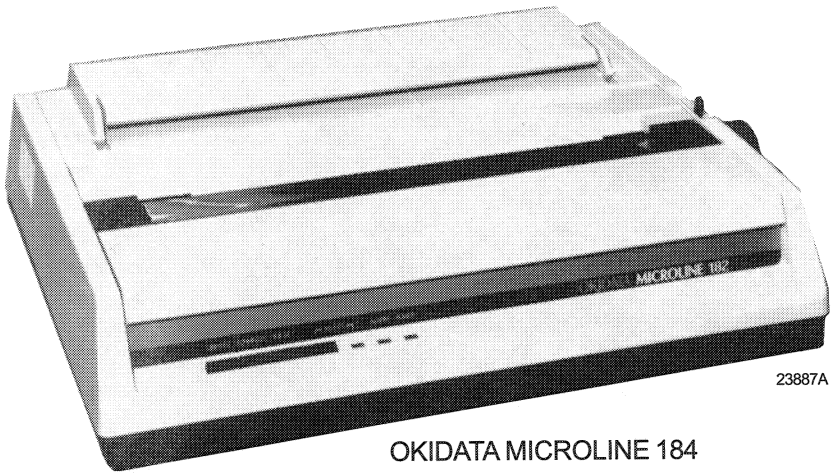
The Harmonic Filter power assembly has one heatsink thermistor on the 351 and 503 HP units, and two heatsink thermistors on the 790 HP units. If the temperature on any heatsink exceeds 167° F, the unit will shut down. This message is usually an indication of a low coolant level in the VSD cooling loop. The chiller can be started after the fault condition clears, the **OVERTEMP RESET** button on the Filter Logic Board is pressed and the **COMPRESSOR** switch is placed in the Stop-reset (O) position.

"HARMONIC FILTER – HIGH TOTAL DEMAND DISTORTION"

This shutdown indicates the filter is not operating correctly and the input current to the VSD/Filter is not sinusoidal. This shutdown will occur if the TDD exceeds 25% continuously for 45 seconds. TDD is an acronym for Total Demand Distortion, a term defined by the IEEE Std 519-1992 standard as the "total root-sum-square harmonic current distortion, in percent of the maximum demand load current (15 or 30 min demand)". In the Filter option supplied by YORK, the displayed TDD is the total RMS value of all the harmonic current supplied by the main power to the VSD divided by the chiller Full Load Amps, in percent. A standard VSD, less the optional filter typically has an input current TDD level on the order of 28-30%. The chiller can be started after the **COMPRESSOR** switch is placed in the Stop-reset position (O).

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SECTION 3
PRINTERS



23887A

OKIDATA MICROLINE 184



23889A

WEIGH-TRONIX



00085VIP

SEIKO DPU-414

FIG. 37– PRINTERS

PRINTERS

A printer can be connected to the Control Center's Micro Board to print the following reports. The screen from which each report can be generated is listed in parenthesis.

- **Status** - Present system parameters (Printer, Home)
- **Setpoints** - Present programmed values of all setpoints (Printer, Setpoints)
- **Schedule** - Present value of programmed daily schedule (Printer, Schedule)
- **Sales Order** - Information on Sales Order Screen (Printer, Sales Order)
- **History** - System parameters at the time of the last normal stop, last fault while running and last 10 faults, whether running or not (Printer, History)
- **Cycling or Safety shutdown initiated Print** - Snapshot of all system parameters at instant of shutdown. Automatically occurs if printer is connected at time of shutdown.
- **Adaptive Capacity Control (ACC) surge Map** - System conditions at instant all surge points were mapped. (Compressor Motor Variable Speed Drive applications; requires **SERVICE** access level) (Printer, ACC)

The printer can be permanently connected to the Control Center or connected as required to produce a report. If permanently connected, a **DATA LOGGING** feature can produce a Status report automatically, beginning at an Operator selected start time and occurring at an Operator selected interval thereafter.

The following figures are examples of the different print reports. Solid State Starter application print reports shown. Electro-mechanical starter and Variable Speed Drive reports are similar but print parameters applicable to those devices.

- Figure 35 - Status
- Figure 36 - Setpoints
- Figure 37 - Schedule
- Figure 38 - Sales Order
- Figure 39 - History
- Figure 40 - Cycling or Safety shutdown initiated print

PRINTERS

The following Printers can be used. **Printers must be equipped with an RS-232 Serial interface**.

- **Okidata** –

  Models: 182,182 turbo, 184 turbo

  Dimensions: 14 in. wide x 10.5 in. deep

  Paper: 8.5 in. wide

  Type: Dot matrix impact

  Purchase: 800-OKIDATA

- **Weigh-Tronix** –

  Models: 2600, 1220

  Dimensions: 2.3 in. wide x 2.8 in. deep

  Paper: 2.25 in. wide

  Type: Dot matrix impact

  Purchase: USA 800-982-6622
  International 707-527-5555

- **Seiko** –

  Model: DPU414-30B (Power supply PW4007-U I required)

  Dimensions: 6.3 in. wide x 6.7 in. deep

  Paper: 4.4 in. wide

  Type: Thermal

  Purchase: Sager Electronics
  2270 Cabot Boulevard West
  Suite #2
  Langhorne, Pa. 19047-1807
  Att: Ed D'Alessandro
  Phone: 215-750-7778
  Fax: 215-750-8327

The Control Center provides the required formatting control codes for the printers above when the printer is selected on the PRINTER Screen in the instructions below. These codes are transmitted through the serial interface to the printer to provide a proper print format. Different printers require different formatting control codes. Other printers might provide proper operation when connected to the Control Center. However, the print format may not be correct or as desired. Proceed with caution and use the following guidelines if an unlisted printer is selected:

1. All must be capable of RS-232 Serial communications.
2. Primary differences between printers involve the formatting control codes required by the printer. These codes are sent from the Control Center to the printer. For example, Weigh-Tronix printers require a con-

trol code to select 40 column width. This same code is interpreted by the Okidata printer as an instruction to print wide characters. In some instances, a printer will ignore a code it cannot interpret.

3. The Control Center requires a busy signal from the printer when the printer receive buffer is full. This causes the Control Center to momentarily terminate data transmission until the printer can accept more data. The busy signal polarity must be asserted low when busy.

PRINTER CONNECTIONS

Connect the printers to the Control Center Micro Board as follows. Only one printer can be connected at a time.

• OKIDATA 182, 182 turbo, 184 turbo

Micro Board	Printer	Function
J2-4	pin 3	Tx (data to printer)
J2-2	pin 11	DSR (busy signal from printer)
J2-9	pin 7	Gnd
Cabinet		shield

• WEIGH-TRONIX

Micro Board	Printer	Function
J2-4	pin 2	Tx (data to printer)
J2-2	pin 5	DSR (busy signal from printer)
J2-9	pin 7	Gnd
Cabinet		shield

• SEIKO

Micro Board	Printer	Function
J2-4	pin 3	Tx (data to printer)
J2-2	pin 8	DSR (busy signal from printer)
J2-9	pin 5	Gnd
Cabinet		shield

Hardware required:

Cable – #18 AWG stranded 50ft. maximum length.

Connectors –

- Micro Board: None. Strip 1/4" insulation from wire and insert into screw terminal block.

- Printers: Okidata - 25 pin plug DB-25P or equivalent; Shell DB-C2-J9 or equivalent. Weigh-Tronix - Same as Okidata. Cable assembly available from Weigh-Tronix. Seiko - 9-Pin D-type Subminiature (DB-9 pin male).

PRINTER SETUP

The selected printer must be configured as follows. Refer to manual provided by Printer manufacturer with respective Printer.

• OKIDATA 182, 182 turbo, 184 turbo Printer

CONTROL BOARD Switch settings:

SW1 - on Unslashed 0
2 - off Unslashed 0
3 - off Unslashed 0
4 - off Form Length 11 in.
5 - on Form Length 11 in.
6 - off Auto Line Feed off
7 - on 8 bit data
8 - off Enable front panel

If equipped with a SUPER SPEED serial Board:

SW1-1 - on Odd or even parity
1-2 - on No parity
1-3 - on 8 bit data
1-4 - on Protocol ready/busy
1-5 - on Test select
1-6 - on Print mode
1-7 - off SDD(-) pin 11
1-8 - on SDD(-) pin 11
2-1 - on 1200 Baud*
2-2 - on 1200 Baud*
2-3 - off 1200 Baud*
2-4 - off DSR active
2-5 - on Buffer threshold 32 bytes
2-6 - on Busy signal 200ms
2-7 - on DTR space after power on
2-8 - not used

If equipped with HIGH SPEED serial board:

SW1 - off (-) Low when busy
2 - off 1200 Baud*
3 - off 1200 Baud*
4 - on 1200 Baud*
5 - not used
6 - off no parity
7 - off Pin 20 & pin 11 act as busy line

• WEIGH-TRONIX Printer

- IMP-24 Model 2600

SW1 - off 1200 Baud*
2 - on 1200 Baud*

Model 1220

- Configure Menu
  - Baud= 1200
  - Data Bits = 8
  - Stop Bits = 1
  - Hshake = Busy-Line
  - Cols = 32
  - Invert = No
  - Font = 5 x 8
  - Mag = None

- Custom Menu
  - Auto Seq = No
  - Zero = 0
  - Pound sign = #
  - _(Underscore)
  - Busy invert = no
  - Online/offline = yes
  - Ext Ch Set = no
  - Print ready = yes

Set Clock = not used
Reset Seq = not used

- **SEIKO**

DipSW1-1 = off Input-Serial
1-2 = on Printing speed high
1-3 = on Auto loading - on
1-4 = off Auto LF - off
1-5 = on Setting Command - Enable
1-6 = off Printing density - 100%
1-7 = on Printing density - 100%
1-8 = on Printing, density - 100%

DipSW 2-1 = on Printing Columns - 40
2-2 = on User Font Back-up - on
2-3 = on Character Select - normal
2-4 = off Zero - slash
2-5 = on International character set - American
2-6 = on International character set - American
2-7 = on International character set - American
2-8 = off International character set - American

DipSW 3-1 = on Data length - 8 bits
3-2 = on Parity Setting - no
3-3 = on Parity condition - odd
3-4 = on Busy control - H/W busy
3-5 = on Baud rate select - 1200*
3-6 = off Baud rate select - 1200*
3-7 = on Baud rate select - 1200*
3-8 = off Baud rate select - 1200*

* Settings shown for 1200 Baud. Other Baud rates can be selected. Refer to Printer manufacturer's manual supplied with Printer.

CONTROL CENTER SETUP

Chiller ID

Access Level Required: OPERATOR or Higher
Using the COMMS Screen, assign an Identification number to the chiller. This number will appear at the top of each report.

Printer Setup

Access Level Required: OPERATOR or Higher
Using the COMMS Screen, the Control Center must be configured to transmit data in the same format as the Printer is configured to receive the data. The following values must be entered.

- Baud Rate - Set as desired. Value selected must be the same as Printer configuration above.
- Data Bits - 8
- Parity - None
- Stop Bits - 1

Printer Type

Access Level required: OPERATOR or Higher
Using the PRINTER Screen, the actual Printer type connected to the Control Center must be entered. Selection determines the control codes that are sent to the Printer. These codes determine such things as lines per inch, character width and general formatting. Available selections are: Okidata, Weigh-Tronix and Seiko.

Automatic Data Logging

Access Level required: OPERATOR or Higher.
If automatic data logging is desired, a Status Report can be automatically printed at a specified interval beginning at a specified time, using the PRINTER Screen. The interval is programmable over the range of 1 minute to 1440 minutes in 1 minute increments. The first print will occur at the programmed START time and occur at the programmed OUTPUT INTERVAL thereafter. The time remaining until the next print is displayed on the PRINTER Screen.

- Automatic Printer Logging - Enables and disables automatic data logging
- Log Start Time - Enter the time the first print is desired.
- Output Interval - Enter the desired interval between prints.

YORK UPDATE
CHILLER ID 3

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MON 29 MAR 1999 1 25 PM
SYSTEM RUN
LEAVING CHILLED LIQUID CONTROL

CONTROLS	=	C.Z00.01.33
OPERATING HOURS	=	67 HR
NUMBER OF STARTS	=	6
CONTROL SOURCE	=	LOCAL

EVAPORATOR

LEAVING CHILLED ACTIVE SETPOINT	=	45.0 ° F
CHILLED LIQUID PUMP	=	ON
CHILLED LIQUID FLOW SWITCH	=	CLOSED
LEAVING CHILLED LIQUID TEMPERATURE	=	45.1° F
RETURN CHILLED LIQUID TEMPERATURE	=	52.9 ° F
EVAPORATOR PRESSURE	=	39.4 PSIG
EVAPORATOR SATURATION TEMPERATURE	=	44.4 ° F
SMALL TEMPERATURE DIFFERENCE	=	0.7 ° F

CONDENSER

CONDENSER LIQUID PUMP	=	ON
CONDENSER LIQUID FLOW SWITCH	=	CLOSED
LEAVING CONDENSER LIQUID TEMPERATURE	=	82.2 ° F
RETURN CONDENSER LIQUID TEMPERATURE	=	69.1 ° F
CONDENSER PRESSURE	=	78.5 PSIG
CONDENSER SATURATION TEMPERATURE	=	74.9 ° F
SMALL TEMPERATURE DIFFERENCE	=	-7.3 ° F

COMPRESSOR

DISCHARGE TEMPERATURE	=	114.7 ° F

OIL SUMP

OIL PUMP RUN OUTPUT	=	OFF
SUMP OIL PRESSURE (LOP)	=	2.7 PSIG
PUMP OIL PRESSURE (HOP)	=	66.4 PSIG
OIL PRESSURE	=	61.0 PSID
OIL SUMP TEMPERATURE	=	149.8 ° F
OIL HEATER	=	OFF
OIL RETURN SOLENOID	=	ON

VARIABLE SPEED OIL PUMP

OIL PUMP DRIVE COMMAND FREQUENCY	=	25.0 HZ

REFRIGERANT LEVEL CONTROL

REFRIGERANT LEVEL POSITION	=	80 %

PROXIMITY PROBE

HIGH SPEED THRUST BEARING PROXIMITY DIFFERENT = 0 MILS

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT EM]
ELECTRO-MECHANICAL STARTER

MOTOR RUN	=	ON
% FULL LOAD AMPS	=	94 %

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT MOD "A" SSS]
LIQUID-COOLED SOLID STATE STARTER

MOTOR RUN	=	ON
% FULL LOAD AMPS	=	94 %
PHASE A VOLTAGE	=	447 V
PHASE B VOLTAGE	=	409 V
PHASE C VOLTAGE	=	442 V

FIG. 38 – SAMPLE PRINTOUT (STATUS)

PHASE A CURRENT	=	193	A
PHASE B CURRENT	=	204	A
PHASE C CURRENT	=	190	A

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT SERIAL MOD "B" SSS]

LIQUID-COOLED SOLID STATE STARTER

MOTOR RUN	=	ON	
% FULL LOAD AMPS	=	94	%
STARTER MODEL	=	33L	
KW HOURS	=	20723	
KWH			
INPUT POWER	=	145	KW
PHASE A VOLTAGE	=	447	V
PHASE B VOLTAGE	=	409	V
PHASE C VOLTAGE	=	442	V
PHASE A CURRENT	=	193	A
PHASE B CURRENT	=	204	A
PHASE C CURRENT	=	190	A
PHASE A TEMPERATURE	=	88	° F
PHASE B TEMPERATURE	=	89	° F
PHASE C TEMPERATURE	=	75	° F

FIG. 38 – (CONT'D) SAMPLE PRINTOUT (STATUS)

YORK SETPOINTS
CHILLER ID 3

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MON 29 MAR 1999 1 26 PM

SOFTWARE VERSIONS

CONTROLS	= C.ZOO.01.33
BIOS	= C.ZOO.00.25
KERNEL	= 0.17
SIO	= 0.20
GUI	= 0.24
SPIC	= 0.02

SYSTEM INFORMATION

SYSTEM LANGUAGE	= ENGLISH
DATA DISPLAY MODE	= ENGLISH
CONTROL SOURCE	= LOCAL
CLOCK	= ON

JUMPER SETTINGS

PRE-RUN	= STANDARD
COASTDOWN	= STANDARD
CHILLED LIQUID PUMP OPERATION	= STANDARD
REFRIGERANT SELECTION	= R134A
LIQUID TYPE	= WATER
POWER FAILURE RESTART	= ENGLISH
ANTI-RECYCLE	= OFF
MOTOR TYPE	= FIXED SPEED

PRINTER SETUP

AUTOMATIC PRINTER LOGGING	= OFF
LOG START TIME	= 12:00 AM
OUTPUT INTERVAL	= 60 MIN
PRINTER TYPE	= OKIDATA
BAUD	= 9600 BAUD
PARITY	= NONE
DATA BITS	= 3
STOP BITS	= 0

COM 2 SETUP

BAUD	= 19200 BAUD
PARITY	= ODD
DATA BITS	= 3
STOP BITS	= 0

EVAPORATOR

LEAVING CHILLED LOCAL SETPOINT	= 45.0 ° F
LEAVING CHILLED ISN SETPOINT	= 45.0 ° F
LEAVING CHILLED MODEM SETPOINT	= 45.0 ° F
LEAVING CHILLED ANALOG SETPOINT	= 45.0 ° F
LEAVING CHILLED DIGITAL SETPOINT	= 45.0 ° F
REMOTE RANGE	= 10.0 ° F
SENSITIVITY	= NORMAL
RESTART OFFSET	= 0. 0 ° F
RESTART SETPOINT	= 45.0 ° F
SHUTDOWN OFFSET	= 4.0 ° F
SHUTDOWN SETPOINT	= 41.0 ° F
BRINE LOW EVAPORATOR CUTOUT	= 12.5 PSIG
SMART FREEZE	= OFF
REFRIGERANT	= OFF

CONDENSER

HIGH PRESSURE WARNING THRESHOLD	= 162.5 PSIG
DROP LEG	= OFF

OIL SUMP

OIL PUMP PACKAGE	= VARIABLE SPEED
STANDBY LUBE	= ON

VARIABLE SPEED OIL PUMP

PRESSURE SETPOINT	= 35 PSID
CONTROL PERIOD	= 0.9 SEC

PROXIMITY PROBE

HIGH SPEED THRUST BEARING PROXIMITY REFERENCE = 50 MILS

REFRIGERANT LEVEL CONTROL

LEVEL CONTROL	= ON
SETPOINT	= 50 %
PERIOD	= 3.5 SEC
PROPORTION LIMIT OPEN	= 15 %
PROPORTION LIMIT CLOSE	= 45 %
RATE LIMIT OPEN	= 10 %
RATE LIMIT CLOSE	= 10 %

FIG. 39– SAMPLE PRINTOUT (SETPOINTS)

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT EM]
ELECTRO MECHANICAL STARTER

LOCAL MOTOR CURRENT LIMIT	=	100	%
REMOTE ISN CURRENT LIMIT	=	100	%
REMOTE ANALOG CURRENT LIMIT	=	100	%
REMOTE DIGITAL CURRENT LIMIT	=	100	%
REMOTE MODEM CURRENT LIMIT	=	100	%
PULLDOWN DEMAND LIMIT	=	100	%
PULLDOWN DEMAND TIME	=	0	MIN

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT MOD "A" SSS]
LIQUID-COOLED SOLID STATE STARTER

LOCAL MOTOR CURRENT LIMIT	=	100	%
REMOTE ISN CURRENT LIMIT	=	100	%
REMOTE ANALOG CURRENT LIMIT	=	100	%
REMOTE DIGITAL CURRENT LIMIT	=	100	%
REMOTE MODEM CURRENT LIMIT	=	100	%
PULLDOWN DEMAND LIMIT	=	100	%
PULLDOWN DEMAND TIME	=	0	MIN
SCALE/MODEL	=	600 V, 281	A
SUPPLY VOLTAGE RANGE	=	DISABLED	
FULL LOAD AMPS	=	150	A
CURRENT IMBALANCE CHECK	=	DISABLED	

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT SERIAL MOD "B" SSS]
LIQUID-COOLED SOLID STATE STARTER

LOCAL MOTOR CURRENT LIMIT	=	100	%
REMOTE ISN CURRENT LIMIT	=	100	%
REMOTE ANALOG CURRENT LIMIT	=	100	%
REMOTE DIGITAL CURRENT LIMIT	=	100	%
REMOTE MODEM CURRENT LIMIT	=	100	%
PULLDOWN DEMAND LIMIT	=	100	%
PULLDOWN DEMAND TIME	=	0	MIN
STARTER MODEL	=	33L	
VOLTAGE RANGE	=	DISABLED	
FULL LOAD AMPS	=	215	A
STARTING CURRENT	=	1460	A
OPEN SCR	=	DISABLED	

FIG. 39 – (CONT'D) SAMPLE PRINTOUT (SETPOINTS)

YORK SCHEDULE
CHILLER ID 3
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MON 29 MAR 1999 1 27 PM

SCHEDULE = OFF

STANDARD SCHEDULE

SUN	START	=	OFF	STOP	=	OFF
MON	START	=	8:00 AM	STOP	=	5:00 PM
TUE	START	=	8:00 AM	STOP	=	5:00 PM
WED	START	=	8:00 AM	STOP	=	5:00 PM
THU	START	=	8:00 AM	STOP	=	5:00 PM
FRI	START	=	8:00 AM	STOP	=	5:00 PM
SAT	START	=	OFF	STOP	=	OFF

EXCEPTION DAYS

02 APR 1999	START	=	OFF	STOP	=	OFF
13 APR 1999	START	=	8:00 AM	STOP	=	10:00 PM

FIG. 40 – SAMPLE PRINTOUT (SCHEDULE)

YORK SALES ORDER
CHILLER ID 3

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MON 29 MAR 1999 1 28 PM

ORDER INFORMATION

COMMISSIONING DATE	=	01 JAN 1999
JOB NAME	=	
JOB LOCATION	=	
MODEL NUMBER	=	
YORK ORDER NUMBER	=	
PANEL SERIAL NUMBER	=	
CHILLER SERIAL NUMBER	=	

DESIGN LOAD - CONDENSER =

PASSES	=	
DESIGN WORKING PRESSURE	=	
FOULING FACTOR	=	
PRESSURE DROP	=	
NOZZLE ARRANGEMENT IN	=	
NOZZLE ARRANGEMENT OUT	=	
LEAVING TEMPERATURE	=	
RETURN TEMPERATURE	=	
GPM	=	
TUBES	=	

DESIGN LOAD - EVAPORATOR

PASSES	=	
DESIGN WORKING PRESSURE	=	
FOULING FACTOR	=	
PRESSURE DROP	=	
NOZZLE ARRANGEMENT IN	=	
NOZZLE ARRANGEMENT OUT	=	
LEAVING TEMPERATURE	=	
RETURN TEMPERATURE	=	
GPM	=	

NAMEPLATE INFORMATION

MOTOR CODE	=	
POWER (VOLTS)	=	
PHASES	=	
FREQUENCY (HZ)	=	
LOOKED ROTOR AMPS	=	
FULL LOAD AMPS	=	
INRUSH AMPS	=	

SYSTEM INFORMATION

REFRIGERANT	=	
TONS	=	
GEAR CODE	=	
LIQUID TYPE	=	
BRINE PERCENT	=	
KILOWATTS INPUT	=	
VSD / SSS / EM	=	

3

FIG. 41 – SAMPLE PRINTOUT (SALES ORDER)

YORK HISTORY
CHILLER ID 3
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MON 29 MAR 1999 1 29 PM
SYSTEM RUN
AUXILIARY SAFETY – CONTACTS CLOSED

CONTROLS	=	C.ZOO.01.33
OPERATING HOURS	=	67 HOURS
NUMBER OF STARTS	=	6
CONTROL SOURCE	=	LOCAL

EVAPORATOR

LEAVING CHILLED ACTIVE SETPOINT	=	45.0 °F
CHILLED LIQUID PUMP	=	ON
CHILLED LIQUID FLOW SWITCH	=	CLOSED
LEAVING CHILLED LIQUID TEMPERATURE	=	45.1 °F
RETURN CHILLED LIQUID TEMPERATURE	=	52.9 °F
EVAPORATOR PRESSURE	=	39.4 PSIG
EVAPORATOR SATURATION TEMPERATURE	=	44.4 °F
SMALL TEMPERATURE DIFFERENCE	=	0.7 °F

CONDENSER

CONDENSER LIQUID PUMP	=	ON
CONDENSER LIQUID FLOW SWITCH	=	CLOSED
LEAVING CONDENSER LIQUID TEMPERATURE	=	82.2 °F
RETURN CONDENSER LIQUID TEMPERATURE	=	69.1 °F
CONDENSER PRESSURE	=	78.5 PSIG
CONDENSER SATURATION TEMPERATURE	=	74.9 °F
SMALL TEMPERATURE DIFFERENCE	=	-7.3 °F

COMPRESSOR

DISCHARGE TEMPERATURE	=	114.7 °F

OIL SUMP

OIL PUMP RUN OUTPUT	=	OFF
SUMP OIL PRESSURE (LOP)	=	2.7 PSIG
PUMP OIL PRESSURE (HOP)	=	66.4 PSIG
OIL PRESSURE	=	61.0 PSID
OIL SUMP TEMPERATURE	=	149.8 °F
OIL HEATER	=	OFF
OIL RETURN SOLENOID	=	ON

VARIABLE SPEED OIL PUMP

OIL PUMP DRIVE COMMAND FREQUENCY	=	25.0 HZ

REFRIGERANT LEVEL CONTROL

REFRIGERANT LEVEL POSITION	=	80 %

PROXIMITY PROBE

HIGH SPEED THRUST BEARING PROXIMITY DIFFERENT = 0 MILS

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT EM]
ELECTRO-MECHANICAL STARTER

MOTOR RUN	=	ON
% FULL LOAD AMPS	=	94 %

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT SSS]
LIQUID-COOLED SOLID STATE STARTER

MOTOR RUN	=	ON
% FULL LOAD AMPS	=	94 %
PHASE A VOLTAGE	=	447 V
PHASE B VOLTAGE	=	409 V
PHASE C VOLTAGE	=	442 V
PHASE A CURRENT	=	193 A
PHASE B CURRENT	=	204 A
PHASE C CURRENT	=	190 A

FIG. 42 – SAMPLE PRINTOUT (HISTORY)

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT SERIAL SSS]

LIQUID-COOLED SOLID STATE STARTER

MOTOR RUN	=	ON
% FULL LOAD AMPS	=	94 %
STARTER MODEL	=	33L
KW HOURS	=	20723 KWH
INPUT POWER	=	145 KW
PHASE A VOLTAGE	=	447 V
PHASE B VOLTAGE	=	409 V
PHASE C VOLTAGE	=	442 V
PHASE A CURRENT	=	193 A
PHASE B CURRENT	=	204 A
PHASE C CURRENT	=	190 A
PHASE A TEMPERATURE	=	88 ° F
PHASE B TEMPERATURE	=	89 ° F
PHASE C TEMPERATURE	=	75 ° F

3

FIG. 42 – (CONT'D) SAMPLE PRINTOUT (HISTORY)

YORK HISTORY 1
CHILLER ID 3

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MON 29 MAR 1999 1 29 PM
SYSTEM RUN
AUXILIARY SAFETY – CONTACTS CLOSED

CONTROL	= C.ZOO.01.33
OPERATING HOURS	= 67 HOURS
NUMBER OF STARTS	= 6
CONTROL SOURCE	= LOCAL

EVAPORATOR

LEAVING CHILLED ACTIVE SETPOINT	= 45.0 °F
CHILLED LIQUID PUMP	= ON
CHILLED LIQUID FLOW SWITCH	= CLOSED
LEAVING CHILLED LIQUID TEMPERATURE	= 45.1 °F
RETURN CHILLED LIQUID TEMPERATURE	= 52.9 °F
EVAPORATOR PRESSURE	= 39.4 PSIG
EVAPORATOR SATURATION TEMPERATURE	= 44.4 °F
SMALL TEMPERATURE DIFFERENCE	= 0.7 °F

CONDENSER

CONDENSER LIQUID PUMP	= ON
CONDENSER LIQUID FLOW SWITCH	= CLOSED
LEAVING CONDENSER LIQUID TEMPERATURE	= 82.2 °F
RETURN CONDENSER LIQUID TEMPERATURE	= 69.1 °F
CONDENSER PRESSURE	= 78.5 PSIG
CONDENSER SATURATION TEMPERATURE	= 74.9 °F
SMALL TEMPERATURE DIFFERENCE	= -7.3 °F

COMPRESSOR

DISCHARGE TEMPERATURE	= 114.7 °F

OIL SUMP

OIL PUMP RUN OUTPUT	= OFF
SUMP OIL PRESSURE (LOP)	= 2.7 PSIG
PUMP OIL PRESSURE (HOP)	= 66.4 PSIG
OIL PRESSURE	= 61.0 PSID
OIL SUMP TEMPERATURE	= 149.8 °F
OIL HEATER	= OFF
OIL RETURN SOLENOID	= ON

VARIABLE SPEED OIL PUMP

OIL PUMP DRIVE COMMAND FREQUENCY	= 25.0 HZ

REFRIGERANT LEVEL CONTROL

REFRIGERANT LEVEL POSITION	= 80 %

PROXIMITY PROBE

HIGH SPEED THRUST BEARING PROXIMITY DIFFERENT = 0 MILS

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT EM]
ELECTRO-MECHANICAL STARTER

MOTOR RUN	= ON
% FULL LOAD AMPS	= 94 %

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT SSS]
LIQUID-COOLED SOLID STATE STARTER

MOTOR RUN	= ON
% FULL LOAD AMPS	= 94 %
PHASE A VOLTAGE	= 447 V
PHASE B VOLTAGE	= 409 V
PHASE C VOLTAGE	= 442 V
PHASE A CURRENT	= 193 A
PHASE B CURRENT	= 204 A
PHASE C CURRENT	= 190 A

FIG. 43– SAMPLE PRINTOUT (CYCLING OR SAFETY SHUTDOWN INITIATED PRINT)

[SKIP THE FOLLOWING SECTION IF MOTOR TYPE IS NOT SERIAL SSS]

LIQUID-COOLED SOLID STATE STARTER

MOTOR RUN	=	ON
% FULL LOAD AMPS	=	94 %
STARTER MODEL	=	33L
KW HOURS	=	20723 KWH
INPUT POWER	=	145 KW
PHASE A VOLTAGE	=	447 V
PHASE B VOLTAGE	=	409 V
PHASE C VOLTAGE	=	442 V
PHASE A CURRENT	=	193 A
PHASE B CURRENT	=	204 A
PHASE C CURRENT	=	190 A
PHASE A TEMPERATURE	=	88 ° F
PHASE B TEMPERATURE	=	89 ° F
PHASE C TEMPERATURE	=	75 ° F

3

FIG. 43– (CONT'D) SAMPLE PRINTOUT (CYCLING OR SAFETY SHUTDOWN INITIATED PRINT)

SECTION 4
SYSTEM OPERATING PROCEDURES

OIL HEATERS

If the oil heater is de-energized during a shutdown period, it must be energized for 12 hours prior to starting compressor, or remove all oil and recharge compressor with new oil. (See "Oil Charging Procedure", page 122.)

OIL HEATER OPERATION

The oil heater operation is controlled by the Microcomputer Control Center. The heater is turned on and off to maintain the oil temperature to a value 50 degrees F above the condenser saturation temperature. This is the target value and if the oil temperature falls to 4 degrees F or more below the target, the heater is turned on. It is turned off when the oil temperature increases to 3 degrees F above the target value.

If the target value is greater than 160°F (71°C), the target defaults to 160°F (71°C). If the target value is less than 110°F (43.3°C), it defaults to 110°F (43.3°C). To prevent overheating of the oil in the event of a control center component failure, the oil heater thermostat (1HTR) is set to open at 180°F (82°C).

CHECKING THE OIL LEVEL IN THE OIL RESERVOIR

Proper operating oil level – the upper and lower sight glasses.
If the oil is excessively high after start-up, the excess oil may be drained from the oil filter drain valve while the compressor is running.
If oil level is low, oil should be added to the compressor. (See "Oil Charging Procedure", page 122.)



Comply with EPA and Local regulations when removing or disposing of Refrigeration System oil!

START-UP PROCEDURE

Pre-Starting
Prior to starting the chiller, observe the Microcomputer Control Center. Make sure the display reads **SYSTEM READY TO START**.

To pre-start the chiller, use the following procedure:

1. **Oil Heater** – The oil heater must be energized for 12 hours prior to starting the chiller. The unit will not start if the oil is less than 71°F (22°C). If not possible, the compressor oil should be drained and new oil must be charged into the oil sump. (See "Oil Charging Procedure", page 122.)
2. **Oil Pump** – To check, press and release the **MANUAL OIL PUMP** key under **Service** on the Control Center. The oil pump will run for 10 minutes and shut down. Press and release the **MANUAL OIL PUMP** key to stop the operation of the oil pump for less than 10 minutes of operation.
3. All Control Center setpoints should be programmed before the chiller is started. (Refer to "Section 2".)

Prior to start, the clock must be programmed for the proper day and time. Any setpoints which are desired to be changed may be programmed. If not programmed the "default" value setpoints are as follows:

LCWT = 45°F (7.2°C)
% Current Limit = 100% FLA
Pulldown Demand = None
Clock = Sun 12:00 A.M.
Daily Schedule = None
Holiday = None
Remote Reset Temp. Range = 20°F (11°C)
Data Logger = No operation

START-UP

1. If the chilled water pump is manually operated, start the pump. The Control Center will not allow the chiller to start unless chilled liquid flow is established through the unit. (A field supplied chilled water flow switch is required.) If the chilled liquid pump is wired to the Microcomputer Control Center the pump will automatically start, therefore, this step is not necessary.

2. To start the chiller, press the **COMPRESSOR START** switch. This switch will automatically spring return to the **RUN** position. (If the unit was previously started, press the **STOP/RESET** side of the **COMPRESSOR** switch and then press the **START** side of the switch to start the chiller.) When the start switch is energized, the Control Center is placed in an operating mode and any malfunction will be noted by messages on a graphic display. (See Fig. 3.)

NOTE

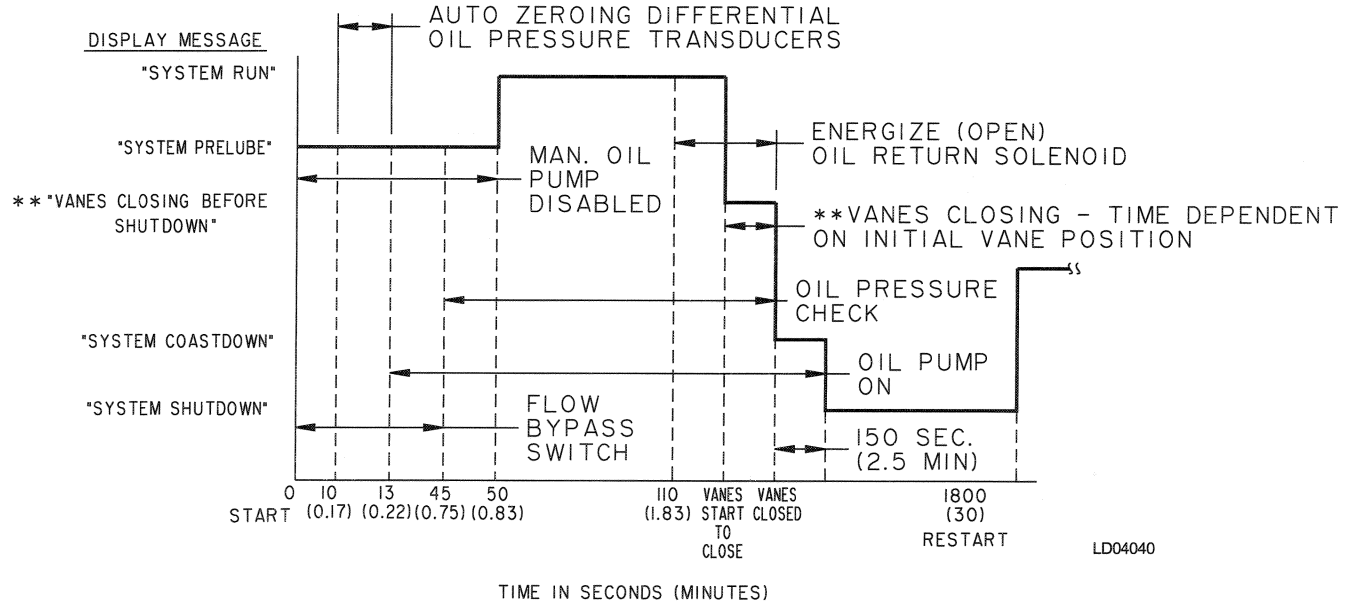
Any malfunctions which occur during STOP/RESET are also displayed.

When the chiller is shut down, the prerotation vanes will close automatically to prevent loading the compressor on start-up.

When the chiller starts to operate, the following automatic sequences are initiated: (Refer to Fig. 44 & 45, "Chiller Starting & Shutdown Sequence Chart".)

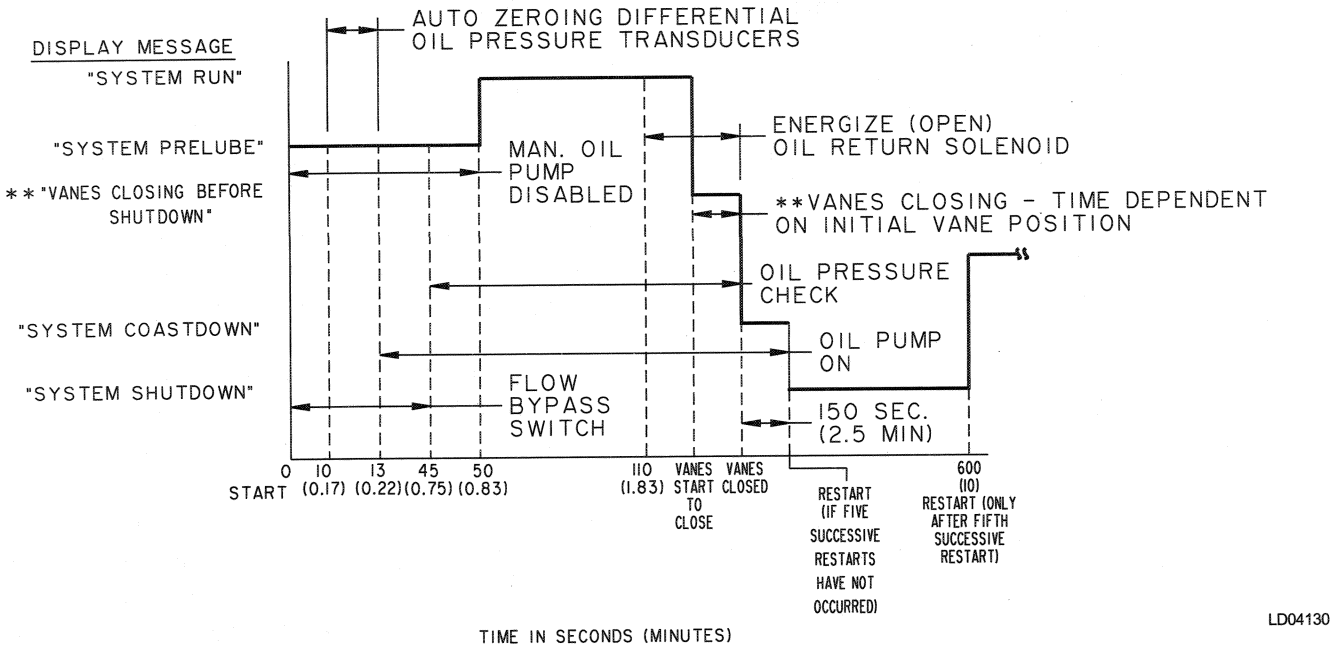
1. The OptiView Control Center display message will read **SYSTEM PRELUBE** for the first 50 seconds of the starting sequence.
2. The oil pump will start to circulate oil for a 50 second pre-run to establish oil flow and adequate lubrication to all bearings, gears, and rotating surfaces within the compressor.

   The high and low oil pressure transducers (OP) and the oil temperature sensor (RT3) will sense any malfunction in the lubrication system.
3. The anti-recycle timer software function will operate after the 50 seconds of pre-run time. At this time, the timer will be initiated and will run for 30 minutes after the compressor starts. If the chiller shuts down during this period of time, it cannot be started until the timer completes the 30 minute cycle.
4. The chilled liquid pump contacts will close, starting the chilled liquid pump, to allow liquid flow through the cooler when the **COMPRESSOR** start switch is energized.
5. After the first 50 seconds of operation, the compressor will start.
6. For display messages and information pertaining to the operation of the Microcomputer Control Center, refer to "Section 2".



** NOT FOR ALL SHUTDOWNS. REFER TO "DISPLAY MESSAGES" SECTION OF THIS MANUAL.

FIG. 44 – CHILLER STARTING SEQUENCE & SHUTDOWN SEQUENCE (EM STARTER & SOLID STATE STARTER)



** NOT FOR ALL SHUTDOWNS. REFER TO "DISPLAY MESSAGES" SECTION OF THIS MANUAL.

FIG. 45– CHILLER STARTING SEQUENCE & SHUTDOWN SEQUENCE (VARIABLE SPEED DRIVE)

CHILLER OPERATION

After the compressor reaches its operating speed, the Prerotation Vanes will begin to open under the control of the Microprocessor Board which senses the leaving chilled liquid temperature. The unit capacity will vary to maintain the leaving **CHILLED LIQUID TEMPERATURE** setpoint. The Prerotation Vanes are modulated by an actuator under the control of the Microprocessor Board. The vane control routine employs proportional plus derivative (rate) control action. A drop in chilled liquid temperature will cause the actuator to close the Prerotation Vanes to decrease chiller capacity. When the chilled liquid temperature rises, the actuator will open the Prerotation Vanes to increase the capacity of the chiller.

However, the current draw (amperes) by the compressor motor cannot exceed the setting of the **% CURRENT LIMIT** at any time during the unit operation, since the Microcomputer Control Center 40 to 100% three-phase peak current limit software function, plus the 3-phase 100% solid state overload current limiter (CM-2), on Electro-Mechanical Starter applications, or the Solid State Starter current Limit function will override the temperature control function and prevent the Prerotation Vanes from opening beyond the **% CURRENT LIMIT** setting.

If the load continues to decrease, after the Prerotation Vanes are entirely closed, the chiller will be shut down by the Leaving Chilled Liquid – Low Temperature Control.

CONDENSER WATER TEMPERATURE CONTROL

The YORK Millennium chiller is designed to use less power by taking advantage of lower than design temperatures that are naturally produced by cooling towers throughout the operating year. Exact control of condenser water such as a cooling tower bypass, is not necessary for most installations. The chiller requires only that the minimum condenser water temperature be no lower than the value determined by referring to the formula below:

$$\text{Min. ECWT} = \text{LCWT} - \text{C RANGE} + 5 + \left(\frac{15 \times \%\ \text{LOAD}}{100}\right)$$

where:

ECWT = Entering Condenser Water Temperature
LCHWT = Leaving Chilled Water Temperature
C RANGE = Condensing Water Temperature Range

At start-up, the entering condenser water temperature may be as much as 25°F (14°C) colder than the standby return chilled water temperature. Cooling tower fan cycling will normally provide adequate control of the entering condenser water temperature on most installations.

OPERATING LOG SHEET

A permanent daily record of system operating conditions (temperatures and pressures) recorded at regular intervals throughout each 24 hour operating period should be kept.

An optional status printer is available for this purpose or Fig. 46 shows a log sheet used by YORK Personnel for recording test data on chiller systems. It is available from the factory in pads of 50 sheets each under Form 160.44-F6 and may be obtained through the nearest YORK office. Automatic data logging is possible by connecting the optional printer and programming the **DATA LOGGER** function.

An accurate record of readings serves as a valuable reference for operating the system. Readings taken when a system is newly installed will establish normal conditions with which to compare later readings.

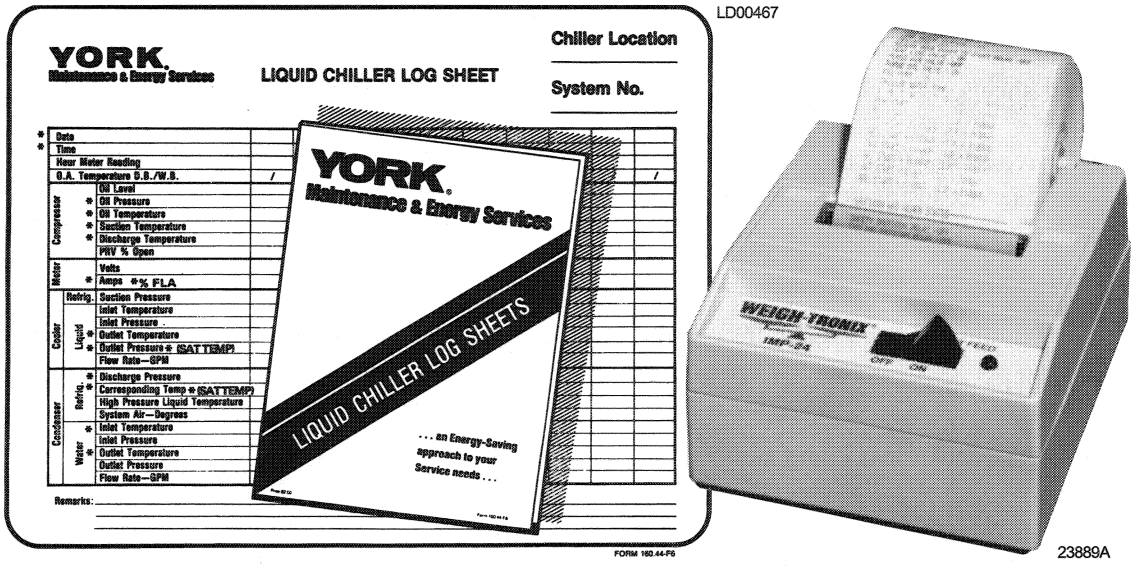
For example, an increase in condenser approach temperature (condenser temperature minus leaving condenser water temperature) may be an indication of dirty condenser tubes.

OPERATING INSPECTIONS – See Section 2

By following a regular inspection using the display readings of the Microcomputer Control Center, and maintenance procedure, the operator will avoid serious operating difficulty. The following list of inspections and procedures should be used as a guide.

Daily

1. Check Microcomputer Control Center displays.
2. If the compressor is in operation, check the bearing oil pressure on the **SYSTEM** Screen. Also check the oil level in the oil reservoir. Operating oil level should be between the upper and lower sight glasses. Drain or add oil if necessary.
3. Check entering and leaving condenser water pressure and temperatures for comparison with job design conditions. Condenser water temperatures can be checked on the **SYSTEM** Screen.
4. Check the entering and leaving chilled liquid temperatures and evaporator pressure for comparison with job design conditions on the **SYSTEM** Screen.
5. Check the condenser saturation temperature (based upon condenser pressure sensed by the condenser transducer) on the **SYSTEM** Screen.
6. Check the compressor discharge temperature on the **SYSTEM** Screen. During normal operation discharge temperature should not exceed 220°F (104°C).



*NOTE: These items can be printed by an electronic printer connected to the Micro Board and pressing the **PRINT** key on the Keypad, or automatically using the Data Logger feature.

FIG. 46 – LIQUID CHILLER LOG SHEETS

7. Check the compressor motor current on the **SYSTEM** Screen.
8. Check for any signs of dirty or fouled condenser tubes. (The temperature difference between water leaving condenser and saturated condensing temperature should not exceed the difference recorded for a new unit by more than 4°F; 2.2°C).

Weekly

1. Check the refrigerant charge. (See "Checking The Refrigerant Charge", page 128.)

Quarterly

1. Perform chemical analysis of oil.

Semi-Annually (or more often as required)

1. Change and inspect compressor oil filter element.
2. Oil return system.
   a. Change dehydrator.
   b. Check nozzle of eductor for foreign particles.
3. Check controls and safety cutouts.

Annually (more often if necessary)

1. Drain and replace the oil in the compressor oil sump. (See "Oil Charging Procedure page 122.)
2. Cooler and Condenser.
   a. Inspect and clean water strainers.
   b. Inspect and clean tubes as required.
   c. Inspect end sheets.
3. Compressor Drive Motor (See motor manufacturers maintenance and service instruction supplied with unit)
   a. Clean air passages and windings per manufacturers instructions.
   b. Meg motor windings – See Fig. 56 for details.
   c. Lubricate ball bearings.
4. Inspect and service electrical components as necessary.
5. Perform chemical analysis of system.

NEED FOR MAINTENANCE OR SERVICE

If the system is malfunctioning in any manner or the unit is stopped by one of the safety controls, consult the "Operation Analysis Chart", (Fig. 51), pages 123 through 124 of this instruction. After consulting this chart, if you are unable to make the proper repairs or adjustments to start the compressor or the particular trouble continues to hinder the performance of the unit, please call the nearest YORK District Office. Failure to report constant troubles could damage the unit and increase the cost of repairs.

‡

STOPPING THE SYSTEM

The Microcomputer Control Center can be programmed to start and stop automatically (maximum, once each day) whenever desired. Refer to Section 2. To stop the chiller, proceed as follows:

1. Push the **COMPRESSOR STOP/RESET** switch. The compressor will stop automatically. The oil pump will continue to run for coastdown period. The oil pump will then stop automatically.
2. Stop the chilled water pump (if not wired into the Microcomputer Control Center, in which case it will shut off automatically simultaneously with the oil pump.) (The actual water pump contact operation is dependent upon the position of Micro Board jumper J54.)
3. Open the switch to the cooling tower fan motors, if used.
4. The compressor sump oil heater (thermostatically controlled) is energized when the unit is stopped.

PROLONGED SHUTDOWN

If the chiller is to be shut down for an extended period of time (for example, over the winter season), the following paragraphs outline the procedure to be followed.

1. Test all system joints for refrigerant leaks with a leak detector. If any leaks are found, they should be repaired before allowing the system to stand for a long period of time.

   During long idle periods, the tightness of the system should be checked periodically.
2. If freezing temperatures are encountered while the system is idle, carefully drain the cooling water from

the cooling tower, condenser, condenser pump, and the chilled water system-chilled water pump and coils.

Open the drains on the cooler and condenser liquid heads to assure complete drainage. (If a Variable Speed Drive, drain its water cooling system. If Solid State Starter. drain water from starter cooling loop.)

3. On the **SETUP** Screen, disable the clock. This conserves the battery.

4. Open the main disconnect switches to the compressor motor, condenser water pump and the chilled water pump. Open the 115 volt circuit to the Control Center.

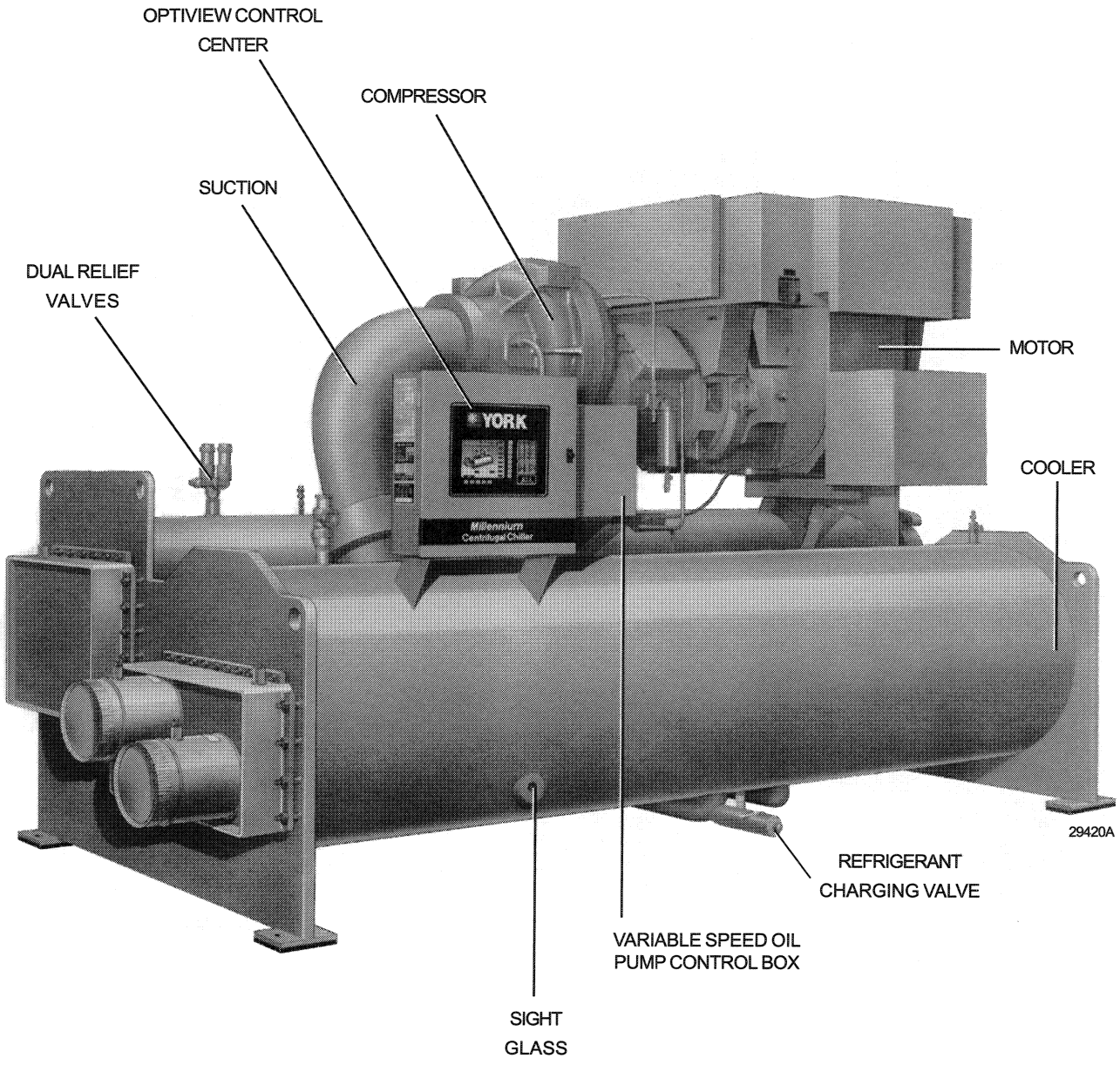
START-UP AFTER PROLONGED SHUTDOWN

1. When putting the system into operation after prolonged shutdown (during the winter), remove all oil from the compressor. Install a new filter element and charge compressor with fresh oil. On the **SETUP** Screen, enable the clock. Energize the 115 volt circuit to the Control Center to energize the compressor sump oil heater for at least 12 hours.

2. Operate the Oil Pump (press and release the **MANUAL OIL PUMP** key) until steady oil pressure is established. Then press and release the **OIL PUMP** key to stop operation of the oil pump. If the water systems were drained, fill the condenser water circuit and chilled liquid circuit.

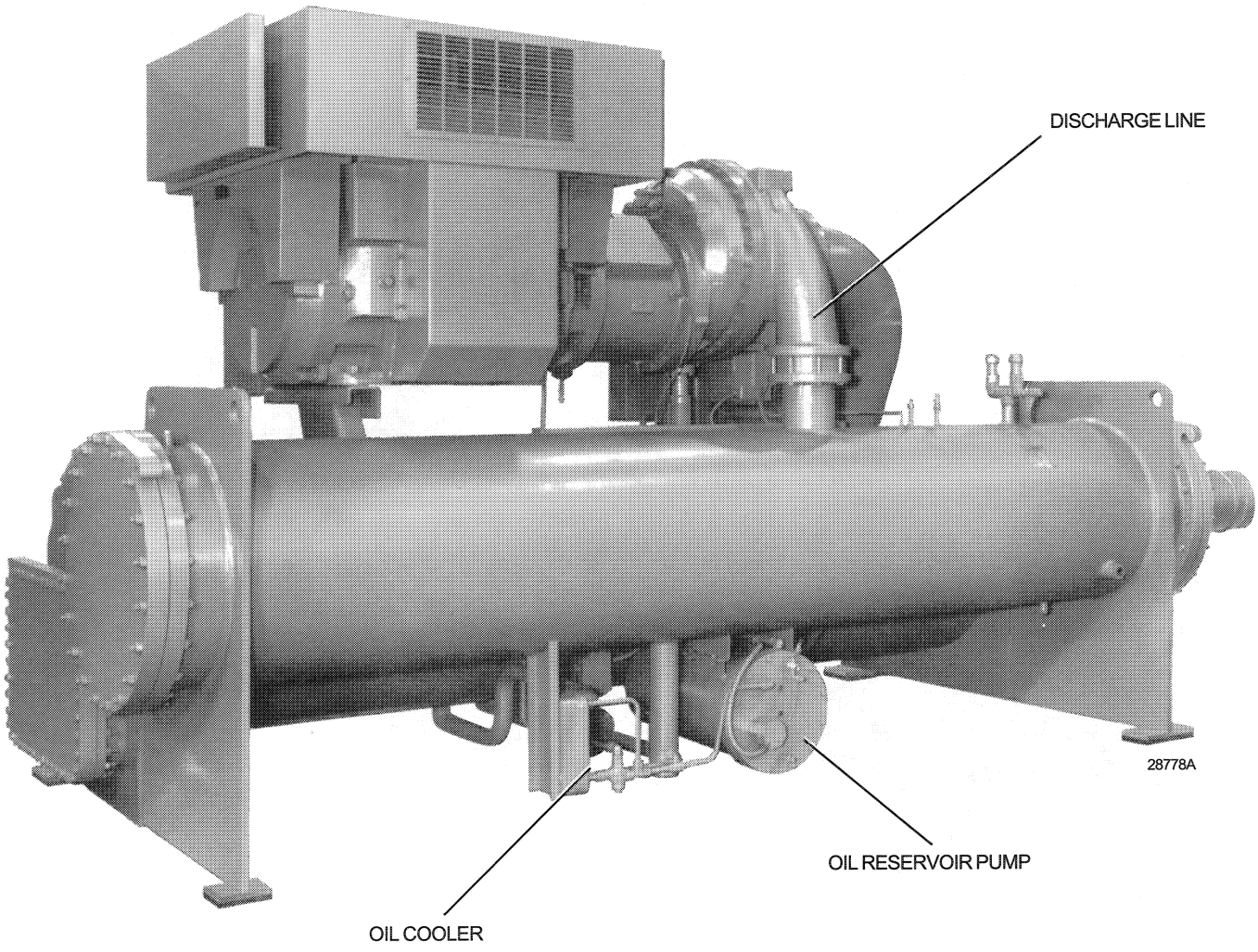
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SECTION 5
SYSTEM COMPONENTS DESCRIPTION



FRONT VIEW

FIG. 47– SYSTEM COMPONENTS



REAR VIEW

FIG. 44 – SYSTEM COMPONENTS (CONT'D)

GENERAL

The YORK Model YK Millennium Centrifugal Liquid Chiller is completely factory-packaged including cooler, condenser, compressor, motor, lubrication system, OptiView Control Center, and all interconnecting unit piping and wiring.

The initial charge of refrigerant and oil is supplied for each unit. Oil is shipped in containers with the chiller. Refrigerant is shipped to the jobsite in cylinders at the time of installation.

The services of a YORK factory-trained, field service representative are included to supervise the final leak testing, charging and the initial start-up and concurrent operator instructions.

COMPRESSOR

The compressor is a single-stage centrifugal type powered by an open-drive electric motor.

The rotor assembly consists of a heat-treated alloy steel drive shaft and impeller shaft with a cast aluminum, fully shrouded impeller. The impeller is designed for balanced thrust and is dynamically balanced and over-speed tested. The inserted type journal and thrust bearings are fabricated of aluminum alloy. Single helical gears with crowned teeth are designed so that more than one tooth is in contact at all times. Gears are integrally assembled in the compressor rotor support and are film lubricated. Each gear is individually mounted in its own journal and thrust bearings.

The open-drive compressor shaft seal consists of a spring-loaded, precision carbon ring, high temperature elastomer "O" ring static seal, and stress-relieved, precision lapped collars. The seal is oil-flooded at all times and is pressure-lubricated during operation.

CAPACITY CONTROL

Prerotation vanes (PRV) modulate chiller capacity from 100% to as low as 15% of design for normal air conditioning applications. Operation is by an external, electric PRV actuator which automatically controls the vane position to maintain a constant leaving chilled liquid temperature.

COMPRESSOR LUBRICATION SYSTEM (See Fig. 48)

The chiller lubrication system consists of the oil pump, oil filter, oil cooler and all interconnecting oil piping and passages. There are main points within the motor-compressor which must be supplied with forced lubrication as follows:

1. **Compressor Drive Shaft (Low Speed)**
   a. Shaft seal.
   b. Front and rear journal bearings – one on each side of driving gear.
   c. Low speed thrust bearing (forward and reverse).
2. **Compressor Driven Shaft (High Speed)**
   a. Forward and reverse high speed thrust bearing.
   b. Two journal bearings.
3. **Speed Increasing Gears**
   a. Meshing surfaces of drive and pinion gear teeth.

To provide the required amount of oil under the necessary pressure to properly lubricate these parts, a motor driven submersible oil pump is located in a remote oil sump.

Upon pressing of the **COMPRESSOR START** switch on the Control Center, the oil pump is immediately energized. After a 50 second pre-lube period, the compressor motor will start. The oil pump will continue to run during the entire operation of the compressor, and for 150 seconds during compressor coastdown.

The submerged oil pump takes suction from the surrounding oil and discharges it to the oil cooler where heat is rejected. The oil flows from the oil cooler to the oil filter. The oil leaves the filter and flows to the emergency oil reservoir where it is distributed to the compressor bearings. The oil lubricates the compressor rotating components and is returned to the oil sump.

There is an emergency oil reservoir located at the highest point in the lubrication system internally in the compressor. It provides an oil supply to the various bearings and gears in the event of a system shutdown due to power failure. The reservoir, located on the top of the compressor, allows the oil to be distributed through the passages by gravity flow, thus providing necessary lubrication during the compressor coastdown.

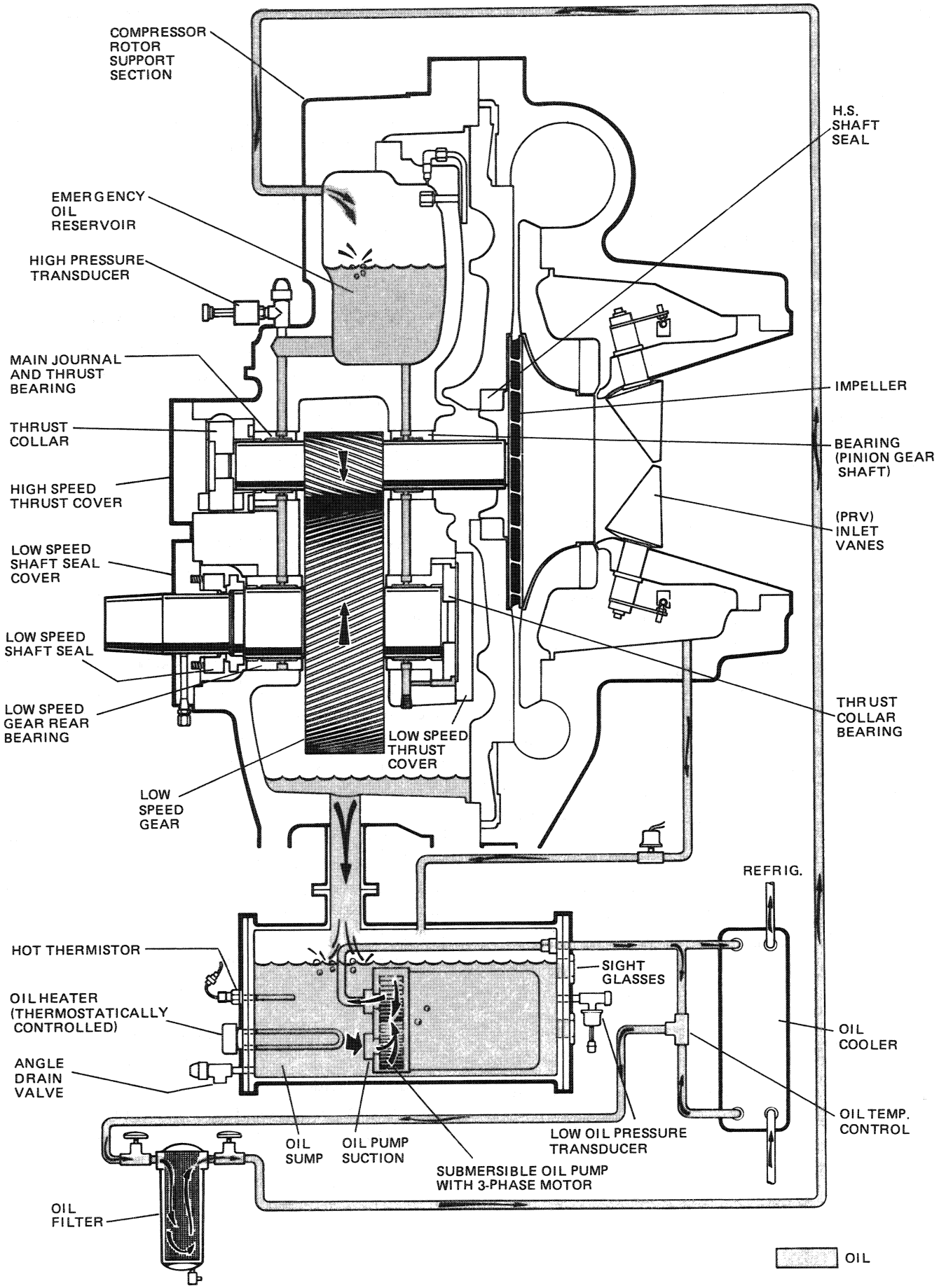


FIG. 48– SCHEMATIC DRAWING – (YK) COMPRESSOR LUBRICATION SYSTEM

LD03278

OIL PUMP

For normal operation, the oil pump should operate at all times during chiller operation. Manual pump operation may be used to establish stable oil pressure before starting. When depressed and released, the **MANUAL OIL PUMP** key will operate the oil pump for 10 minutes and then automatically shut off. To stop the oil pump sooner, depress the **MANUAL OIL PUMP** key again.

On shutdown of the system for any reason, the oil pump operates and continues to run for 150 seconds. The system cannot restart during that time interval.

OIL HEATER

During long idle periods, the oil in the compressor oil reservoir tends to absorb as much refrigerant as it can hold, depending upon the temperature of the oil and the pressure in the reservoir. As the oil temperature is lowered, the amount of refrigerant absorbed will be increased. If the quantity of refrigerant in the oil becomes excessive, violent oil foaming will result as the pressure within the system is lowered on starting. This foaming is caused by refrigerant boiling out of the oil as the pressure is lowered. If this foam reaches the oil pump suction, the bearing oil pressure will fluctuate with possible temporary loss of lubrication, causing the oil pressure safety cutout to actuate and stop the system. See "Control Center, Section 2".

MOTOR DRIVELINE

The compressor motor is an open-drip-proof, squirrel cage, induction type constructed to YORK design specifications. 60 hertz motors operate at 3570 rpm. 50 hertz motors operate at 2975 rpm.

The open motor is provided with a D-flange, cast iron adapter mounted to the compressor and supported by a motor support.

Motor drive shaft is directly connected to the compressor shaft with a flexible disc coupling. This coupling has all metal construction with no wearing parts to assure long life, and no lubrication requirements to provide low maintenance.

For units utilizing remote electro-mechanical starters, a terminal box is provided for field connected conduit. Motor terminals are brought through the motor casing into the terminal box. Jumpers are furnished for three-lead type of starting. Motor terminal lugs are not furnished. Overload/overcurrent transformers are furnished with all units. For units furnished with factory packaged Solid State Starters, (optional) see page 116.

HEAT EXCHANGERS

Evaporator and condenser shells are fabricated from rolled carbon steel plates with fusion welded seams.

Heat exchanger tubes are internally enhanced type.

The evaporator is a shell and tube, flooded type heat exchanger. A distributor trough provides uniform distribution of refrigerant over the entire shell length. Stainless steel mesh eliminators or suction baffles are located above the tube bundle to prevent liquid refrigerant carryover into the compressor. A 2" liquid level sight glass is located on the side of the shell to aid in determining proper refrigerant charge. The evaporator shell contains dual refrigerant relief valves.

The condenser is a shell and tube type, with a discharge gas baffle to prevent direct high velocity impingement on the tubes. A separate subcooler is located in the condenser to enhance performance. Dual refrigerant relief valves are located on condenser shells with optional isolation refrigerant isolation valves.

The removable compact water boxes are fabricated of steel. The design working pressure is 150 PSIG (1034 kPa) and the boxes are tested at 225 PSIG (1551 kPa). Integral steel water baffles provide the required pass arrangements. Stub-out water nozzle connections with Victaulic grooves are welded to the water boxes. These nozzle connections are suitable for Victaulic couplings, welding or flanges, and are capped for shipment. Plugged 3/4" drain and vent connections are provided in each water box.

REFRIGERANT FLOW CONTROL

Refrigerant flow to the evaporator is controlled by a variable orifice.

A level sensor senses the refrigerant level in the condenser and outputs an analog voltage to the Micro Board that represents this level (0% = empty; 100% = full). Under program control, the Micro Board modulates a variable orifice to control the condenser refrigerant level to a programmed setpoint. Other setpoints affect the control sensitivity and response. These setpoints must

be entered at chiller commissioning by a qualified service technician. Only a qualified service technician may modify these settings. Manual operation of the refrigerant level control can be selected. This allows the prerotation vanes keypad keys to manually control the variable orifice. This manual control can also be used to position the variable orifice in a fixed position. Instructions for selecting manual level control and entering the level control setpoints are contained in the "Special Setpoints and Programming Procedures" section of Service Manual, Form 160.54-M1.

While the chiller is shut down, the orifice will be in the fully open position causing the sensed level to be approximately 0%. When the chiller is started, after the vane motor end switch (VMS) opens when entering **SYSTEM RUN**, if actual level is less than the level setpoint, a linearly increasing ramp is applied to the level setpoint. This ramp causes the setpoint to go from the initial refrigerant level (approximately 0%) to the programmed setpoint over a period of 15 minutes.

If the actual level is greater than the setpoint when the VMS opens, there is no pulldown period, it immediately begins to control to the programmed setpoint.

While the chiller is running, the refrigerant level is normally controlled to the level setpoint. However, anytime the vanes fully close (VMS closes), normal level control is terminated, any refrigerant level setpoint pulldown in effect is cancelled and the outputs to the level control will be opposite that which is supplied to the vane motor (i.e., when a close pulse is applied to the vane motor, an open pulse is applied to the level control, etc.). When the VMS opens, if the refrigerant level is less than the level setpoint, a refrigerant level setpoint pulldown is initiated as described above. Otherwise, the level is controlled to the programmed setpoint.

OPTIONAL SERVICE ISOLATION VALVES

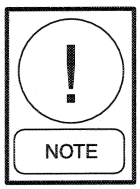
If your chiller is equipped with optional service isolation valves on the discharge and liquid line, these valves must remain open during operation. These valves are used for isolating the refrigerant charge in either the evaporator or condenser to allow service access to the system. A refrigerant pump-out unit will be required to isolate the refrigerant.



Isolation of the refrigerant in this system must be performed by a qualified service technician.

OPTIONAL HOT GAS BYPASS

Hot gas bypass is optional and is used to eliminate compressor surge during light load or high head operation. The OptiView control panel will automatically modulate the hot gas valve open and closed as required. Adjustment of the hot gas control valve must be performed by a qualified service technician following the Hot Gas Set-up procedure.



Changes in chilled water flow will require readjustment of the hot gas control to insure proper operation.

OPTIVIEW CONTROL CENTER (See Section 2)

The OptiView Control Center is factory mounted, wired and tested. The electronic panel automatically controls the operation of the unit in meeting system cooling requirements while minimizing energy usage. For detailed information on the Control Center, refer to "Section 2" of this manual.

SOLID STATE STARTER (Optional)

The Solid State Starter is a reduced voltage starter that controls and maintains a constant current flow to the motor during start-up. It is mounted on the chiller. Power and control wiring between the starter and chiller are factory installed. Available for 380-600 volts, the starter enclosure is NEMA-1 with a hinged access door with lock and key. Electrical lugs for incoming power wiring are provided.

VARIABLE SPEED DRIVE (Optional)

A 460V – 3-Ph – 60/50Hz Variable Speed Drive can be factory packaged with the chiller. It is designed to vary the compressor motor speed and prerotation vane position by controlling the frequency and voltage of the electrical power to the motor. Operational information is contained in Form 160.00-O1. The control logic automatically adjusts motor speed and compressor prerotation vane position for maximum part load efficiency by analyzing information fed to it by sensors located throughout the chiller.

SECTION 6
OPERATIONAL MAINTENANCE

OIL RETURN SYSTEM

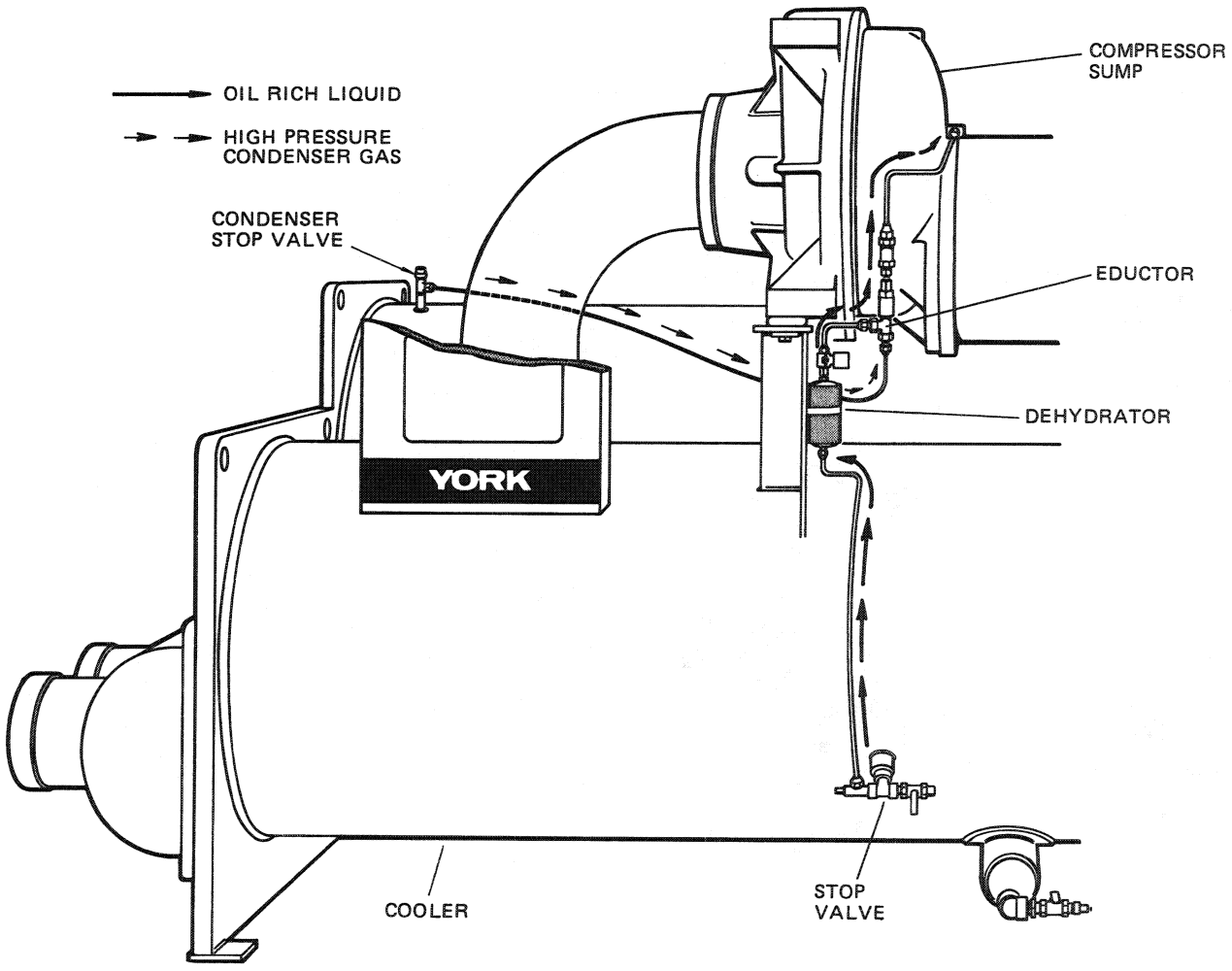
The oil return system continuously maintains the proper oil level in the compressor oil sump. (See Fig. 49.)

High pressure condenser gas flows continuously through the eductor inducing the low pressure, oil rich liquid to flow from the evaporator, through the dehydrator to the compressor sump.

CHANGING THE DEHYDRATOR

To change the dehydrator, use the following procedure:

1. Shut the stop valves on the condenser gas line, oil return line to rotor support and inlet end of the dehydrator.
2. Remove the dehydrator. Refer to Fig. 49.
3. Assemble the new filter-drier.
4. Open condenser stop valve and check dehydrator connections for refrigerant leaks.
5. Open all the dehydrator stop valves to allow the liquid refrigerant to flow through the dehydrator and condenser-gas through the eductor.



LD00950

FIG. 49 – OIL RETURN SYSTEM

THE OIL CHARGE

The nominal oil charge for the compressor is 20 gal., type "K" for R-134a application.

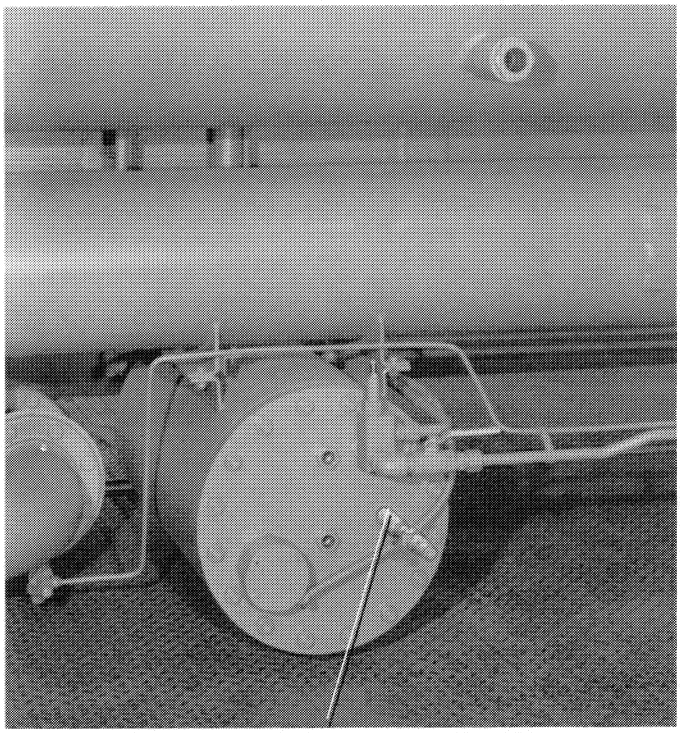
New YORK Refrigeration oil must be used in the centrifugal compressor. Since oil absorbs moisture when exposed to the atmosphere, it should be kept tightly capped until used.

OIL CHARGING PROCEDURE

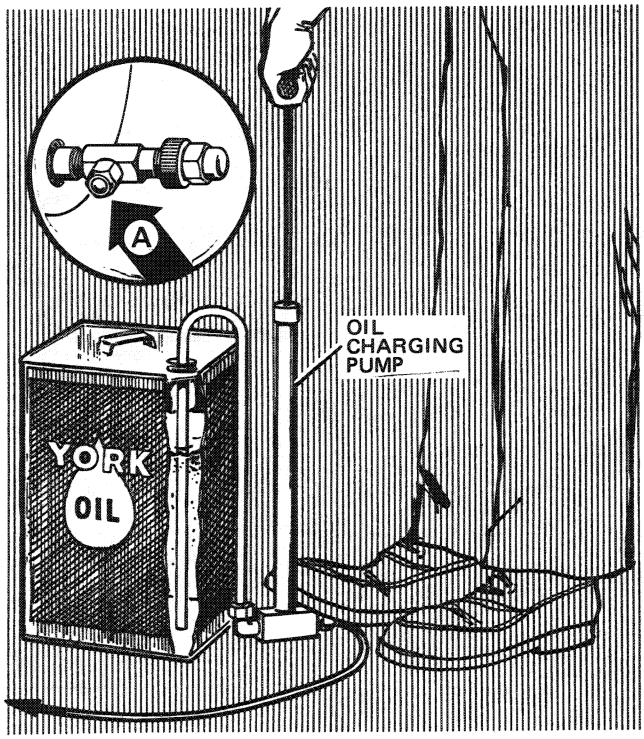
The compressor oil level must be maintained between the oil reservoir's upper and lower sight glasses. If the oil level falls into the lower sight glass, it is necessary to add oil to the compressor oil reservoir. The oil should be charged into the oil reservoir using the YORK Oil Charging Pump – YORK Part No. 070-10654. To charge oil into the oil reservoir, proceed as follows:

1. The unit must be shut down.
2. Immerse the suction connection of the oil charging pump in a clean container of new oil and connect the pump discharge connection to the oil charging valve (A) located on the remote oil reservoir cover plate. (See Fig. 50.) Do not tighten the connection at the charging valve until after the air is forced out by pumping a few strokes of the oil pump. This fills the lines with oil and prevents air from being pumped into the system.
3. Open the oil charging valve and pump oil into the system until oil level in the compressor oil reservoir is about midway in the upper sight glass. Then, close the charging valve and disconnect the hand oil pump.
4. As soon as oil charging is complete, close the power supply to the starter to energize the oil heater. This will keep the concentration of refrigerant in the oil to a minimum.

When the oil reservoir is initially charged with oil, the oil pump should be started manually to fill the lines, passages, oil cooler and oil filter. This will lower the oil level in the reservoir. It will then be necessary to add oil to bring the level back to the center of the upper sight glass.



OIL CHARGING VALVE 25721A



LD00472

FIG. 50 – CHARGING OIL RESERVOIR WITH OIL

SECTION 7 – TROUBLESHOOTING

FIG. 51– OPERATION ANALYSIS CHART

RESULTS	POSSIBLE CAUSE	REMEDY
1. SYMPTOM: ABNORMALLY HIGH DISCHARGE PRESSURE		
Temperature difference between condensing temperature and water off condenser higher than normal.	Air in condenser.	
High discharge pressure.	Condenser tubes dirty or scaled	Clean condenser tubes. Check water conditioning.
	High condenser water temperature.	Reduce condenser water inlet temperature. (Check cooling tower and water circulation.)
Temperature difference between condenser water on and water off higher than normal, with normal cooler pressure.	Insufficient condensing water flow.	Increase the quantity of water through the condenser to proper value.
2. SYMPTOM: ABNORMALLY LOW SUCTION PRESSURE		
Temperature difference between leaving chilled water and refrigerant in cooler greater than normal with high discharge temperature.	Insufficient charge of refrigerant.	Check for leaks and charge refrigerant into system.
	Variable orifice problem.	Remove obstruction.
Temperature difference between leaving chilled water and refrigerant in the cooler greater than normal with normal discharge temperature.	Cooler tubes dirty or restricted.	Clean cooler tubes.
Temperature of chilled water too low with with low motor amperes.	Insufficient load for system capacity.	Check prerotation vane motor operation and setting of low water temperature cutout.
3. SYMPTOM: HIGH COOLER PRESSURE		
High chilled water temperature.	Prerotation vanes fail to open.	Check the prerotation vane motor positioning circuit.
	System overload.	Be sure the vanes are wide open (without overloading the motor) until the load decreases.
4. SYMPTOM: NO OIL PRESSURE WHEN SYSTEM START BUTTON PUSHED		
Low oil pressure displayed on control center; compressor will not start.	Oil pump running in wrong direction.	Check rotation of oil pump (Electrical Connections).
	Oil pump not running.	Check electrical connections to oil pump and press manual reset on oil pump starter mounted on condenser shell.
5. SYMPTOM: COMPRESSOR STARTS, NORMAL OIL PRESSURE DEVELOPS, FLUCTUATES FOR SHORT WHILE, THEN COMPRESSOR STOPS ON OIL PRESSURE CUTOUT		
Oil pressure normal, fluctuates then compressor stops on Oil Pressure Cutout. Display reading: **LOW OIL PRESSURE**	Unusual starting conditions exist, i.e., oil foaming in reservoir and piping due to lowered system pressure.	Drain the oil from the compressor and charge new oil into the compressor. (Refer to "Oil Charging Procedure", page 122.)
	Burned out oil heater.	Replace oil heater.

FIG. 48 – OPERATING ANALYSIS CHART (CONTINUED)

RESULTS	POSSIBLE CAUSE	REMEDY
6. SYMPTOM: UNUSUALLY HIGH OIL PRESSURE DEVELOPS WHEN OIL PUMP RUNS		
Unusually high oil pressure is displayed when the oil pressure display key is pressed when the oil pump is running.	High oil pressure. Transducer defective. Relief valve is misadjusted.	Replace low or high oil pressure transducer. Adjust external relief valve.
7. SYMPTOM: OIL PUMP VIBRATES OR IS NOISY		
Oil pump vibrates or is extremely noisy with some oil pressure when pressing **OIL PRESSURE** display key.	Oil not reaching pump suction inlet in sufficient quantity.	Check oil supply and oil piping.
8. SYMPTOM: OIL PRESSURE GRADUALLY DECREASES (Noted by Observation of Daily Log Sheets)		
Oil pressure (noted when pressing **OIL PRESSURE** display key) drops to 70% of oil pressure when compressor was originally started.	Oil filter is dirty.	Change oil filter.
	Extreme bearing wear.	Inspect compressor.
9. SYMPTOM: OIL PRESSURE SYSTEM CEASES TO RETURN AN OIL/REFRIGERANT SAMPLE		
Oil refrigerant return not functioning.	Filter-drier in oil return system dirty.	Replace old filter-drier with new.
	Jet or orifice of oil return jet clogged.	Remove jet, inspect for dirt. Remove dirt using solvent and replace.
10. SYMPTOM: OIL PUMP FAILS TO DELIVER OIL PRESSURE		
No oil pressure registers when pressing **OIL PRESSURE** display key when oil pump runs.	Faulty oil pressure transducer Faulty wiring/connectors.	Replace oil pressure transducer.
11. SYMPTOM: REDUCED OIL PUMP CAPACITY		
Oil pump pumping capacity.	Excessive end clearance pump. Other worn pump parts.	Inspect and replace worn parts.
	Partially blocked oil supply inlet.	Check oil inlet for blockage.

NOTE

When oil pump is run without an oil supply it will vibrate and become extremely noisy.

SECTION 8
MAINTENANCE

RENEWAL PARTS

For any required Renewal Parts, refer to YORK Renewal Parts Unit Components Manual 160.49-RP4.

CHECKING SYSTEM FOR LEAKS

Leak Testing During Operation

The refrigerant side of the system is carefully pressure tested and evacuated at the factory.

After the system has been charged, the system should be carefully leak tested with a R-134a compatible leak detector to be sure all joints are tight.

If any leaks are indicated, they must be repaired immediately. Usually, leaks can be stopped by tightening flare nuts or flange bolts. However, for any major repair, the refrigerant charge must be removed. (See "Handling Refrigerant for Dismantling and Repair", page 129.)

CONDUCTING R-22 PRESSURE TEST

With the R-134a charge removed and all known leaks repaired, the system should be charged with a small amount of R-22 mixed with dry nitrogen so that a halide torch or electronic leak detector can be used to detect any leaks too small to be found by the soap test.

To test with R-22, proceed as follows:

1. With no pressure in the system, charge R-22 gas into the system through the charging valve to a pressure of 2 PSIG.

2. Build up the system pressure with dry nitrogen to approximately 25 to 50 PSIG (172 to 344 kPa). To be sure that the concentration of refrigerant has reached all part of the system, slightly open the oil charging valve and test for the presence of refrigerant with a leak detector.

3. Test around each joint and factory weld. It is important that this test be thoroughly and carefully done, spending as much time as necessary and using a good leak detector.

4. To check for refrigerant leaks in the cooler and condenser, open the vents in the cooler and condenser heads and test for the presence of refrigerant. If no refrigerant is present, the tubes and tube sheets may be considered tight. If refrigerant is detected at the vents, the heads must be removed, the leak located (by means of soap test or leak detector) and repaired.

EVACUATION AND DEHYDRATION OF UNIT

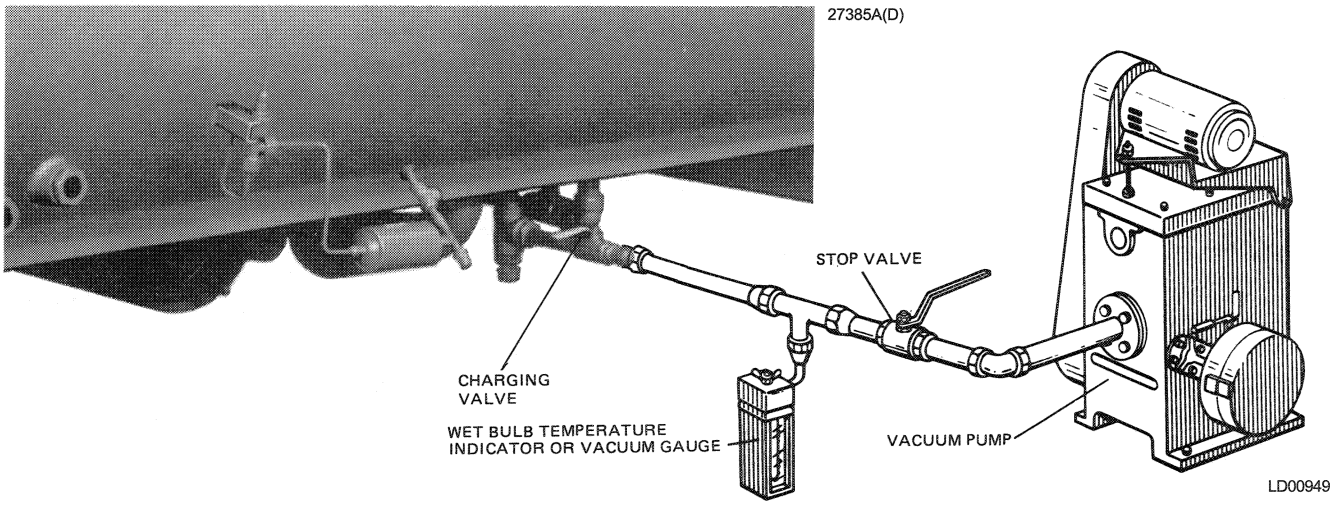


FIG. 52 – EVACUATION OF CHILLER

*GAUGE	ABSOLUTE			BOILING TEMPERATURES OF WATER °F
INCHES OF MERCURY (HG) BELOW ONE STANDARD ATMOSPHERE	PSIA	MILLIMETERS OF MERCURY (HG)	MICRONS	
0	14.696	760.	760,000	212
10.24"	9.629	500.	500,000	192
22.05"	3.865	200.	200,000	151
25.98"	1.935	100.	100,000	124
27.95"	.968	50.	50,000	101
28.94"	.481	25.	25,000	78
29.53"	.192	10.	10,000	52
29.67"	.122	6.3	6,300	40
29.72"	.099	5.	5,000	35 — WATER FREEZES
29.842"	.039	2.	2,000	15
29.882"	.019	1.0	1,000	+1
29.901"	.010	.5	500	−11
29.917"	.002	.1	100	−38
29.919"	.001	.05	50	−50
29.9206"	.0002	.01	10	−70
29.921"	0	0	0	

*One standard atmosphere = 14.696 PSIA
= 760 mm Hg. absolute pressure at 32°F
= 29.921 inches Hg. absolute at 32°F

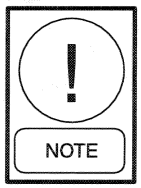
NOTES: PSIA = Lbs. per sq. in. gauge pressure
= Pressure above atmosphere
PSIA = Lbs. per sq. in. absolute pressure
= Sum of gauge plus atmospheric pressure

FIG. 53 – SYSTEM PRESSURES

VACUUM TESTING

After the pressure test has been completed, the vacuum test should be conducted as follows:

1. Connect a high capacity vacuum pump, with indicator, to the system charging valve as shown in Fig. 49 and start the pump. (See "Vacuum Dehydration".)
2. Open wide all system valves. Be sure all valves to the atmosphere are closed.
3. Operate the vacuum pump in accordance with **VACUUM DEHYDRATION** until a wet bulb temperature of +32°F or a pressure of 5 mm Hg is reached. See Fig. 50 for corresponding values of pressure.
4. To improve evacuation circulate hot water (not to exceed 125°F) through the cooler and condenser tubes to thoroughly dehydrate the shells. If a source of hot water is not readily available, a portable water heater should be employed. **DO NOT USE STEAM.** A suggested method is to connect a hose between the source of hot water under pressure and the cooler head drain connection, out the cooler vent connection, into the condenser head drain and out the condenser vent. To avoid the possibility of causing leaks, the temperature should be brought up slowly so that the tubes and shell are heated evenly.
5. Close the system charging valve and the stop valve between the vacuum indicator and the vacuum pump. Then disconnect the vacuum pump leaving the vacuum indicator in place.
6. Hold the vacuum obtained in Step 3 in the system for 8 hours; the slightest rise in pressure indicates a leak or the presence of moisture, or both. If, after 8 hours the wet bulb temperature in the vacuum indicator has not risen above 40°F (4.4°C) or a pressure of 6.3 mm Hg, the system may be considered tight.



Be sure the vacuum indicator is valved off while holding the system vacuum and be sure to open the valve between the vacuum indicator and the system when checking the vacuum after the 8 hour period.

7. If the vacuum does not hold for 8 hours within the limits specified in Step 6 above, the leak must be found and repaired.

VACUUM DEHYDRATION

To obtain a sufficiently dry system, the following instructions have been assembled to provide an effective method for evacuating and dehydrating a system in the field. Although there are several methods of dehydrating a system, we are recommending the following, as it produces one of the best results, and affords a means of obtaining accurate readings as to the extent of dehydration.

The equipment required to follow this method of dehydration consists of a wet bulb indicator or vacuum gauge, a chart showing the relation between dew point temperature and pressure in inches of mercury (vacuum), (see Fig. 53) and a vacuum pump capable of pumping a suitable vacuum on the system.

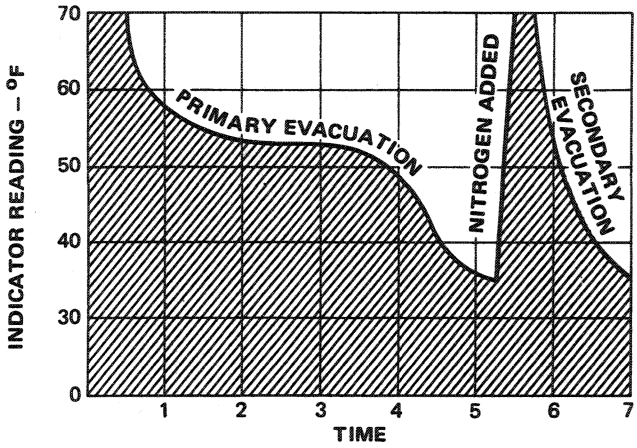


FIG. 54 – SATURATION CURVE

OPERATION

Dehydration of a refrigerant system can be obtained by this method because the water present in the system reacts much as a refrigerant would. By pulling down the pressure in the system to a point where its saturation temperature is considerably below that of room temperature, heat will flow from the room through the walls of the system and vaporize the water, allowing a large percentage of it to be removed by the vacuum pump. The length of time necessary for the dehydration of a system is dependent on the size or volume of the system, the capacity and efficiency of the vacuum pump, the room temperature and the quantity of water present in the system. By the use of the vacuum indicator as suggested, the test tube will be evacuated to the same pressure as the system, and the distilled water will be maintained at the same saturation temperature as any free water in the system, and this temperature can be observed on the thermometer.

If the system has been pressure tested and found to be tight prior to evacuation, then the saturation temperature recordings should follow a curve similar to the typical saturation curve shown as Fig. 54.

The temperature of the water in the test tube will drop as the pressure decreases, until the boiling point is reached, at which point the temperature will level off and remain at this level until all of the water in the shell is vaporized. When this final vaporization has taken place the pressure and temperature will continue to drop until eventually a temperature of 35°F (1.6°C) or a pressure of 5 mm Hg. is reached.

When this point is reached, practically all of the air has been evacuated from the system, but there is still a small amount of moisture left. In order to provide a medium for carrying this residual moisture to the vacuum pump, nitrogen should be introduced into the system to bring it to atmospheric pressure and the indicator temperature will return to approximately ambient temperature. Close off the system again, and start the second evacuation.

The relatively small amount of moisture left will be carried out through the vacuum pump and the temperature or pressure shown by the indicator should drop uniformly until it reaches a temperature of 35°F (1.6°C) or a pressure of 5 mm Hg.

When the vacuum indicator registers this temperature or pressure, it is a positive sign that the system is evacuated and dehydrated to the recommended limit. If this level cannot be reached, it is evident that there is a leak somewhere in the system. Any leaks must be corrected before the indicator can be pulled down to 35°F or 5 mm Hg. in the primary evacuation.

During the primary pulldown, keep a careful watch on the wet bulb indicator temperature, and do not let it fall below 35°F (1.6°C). If the temperature is allowed to fall to 32°F (0°C), the water in the test tube will freeze, and the result will be a faulty temperature reading.

REFRIGERANT CHARGING

To avoid the possibility if freezing liquid within the cooler tubes when charging an evacuated system, only refrigerant vapor from the top of the drum or cylinder must be admitted to the system pressure until the system pressure is raised above the point corresponding to the freezing point of the cooler liquid. For water, the pressure corresponding to the freezing point is 8.54 PSIG (58.9 kPa) for R-134a (at sea level).

While charging, every precaution must be taken to prevent moisture laden air from entering the system. Make up a suitable charging connection from new copper tubing to fit between the system charging valve and the fitting on the charging drum. This connection should be as short as possible but long enough to permit sufficient flexibility for changing drums. The charging connection should be purged each time a full container of refrigerant is connected and changing containers should be done as quickly as possible to minimize the loss of refrigerant.

Refrigerant may be furnished in cylinders containing either 30, 50, 125 or 1750 lbs. (207, 345, 862, or 12,066 kg) of refrigerant.

R-134a		
SHELL CODES		LBS. / KG
COOLER	COND.	
C	C	1350 / 612
C	D	1400 / 635
D	C	1420 / 644
D	D	1470 / 666
D	E	1590 / 721
E	D	1590 / 721
E	E	1690 / 766
E	F	1790 / 811
F	E	1900 / 861
F	F	2020 / 916
F	G	2150 / 975
G	F	2290 / 1038
G	G	2415 / 1095
H	G	2625 / 1190
G	H	2560 / 1161
H	H	2825 / 1285
H	J	3010 / 1365
J	H	3310 / 1501
J	J	3495 / 1585
T	T	3995 / 1812
T	V	4290 / 1945
V	T	3820 / 1732
V	V	4150 / 1882
W	V	4460 / 2023

FIG. 55 – REFRIGERANT CHARGE

CHECKING THE REFRIGERANT CHARGE DURING UNIT SHUTDOWN

The refrigerant charge is specified for each chiller model (see Fig. 55). Charge the correct amount of refrigerant and record the level in the cooler sight glass.

The refrigerant charge should always be checked and trimmed when the system is shut down.

The refrigerant charge level must be checked after the pressure and temperature have equalized between the condenser and cooler. This would be expected to be 4 hours or more after the compressor and water pumps are stopped. The level should visible in the sight glass.

Charge the refrigerant in accordance with the method shown under the "Refrigerant Charging", above. The refrigerant level should be observed and the level recorded after initial charging.

HANDLING REFRIGERANT FOR DISMANTLING AND REPAIRS

If it becomes necessary to open any part of the refrigerant system for repairs, it will be necessary to remove the charge before opening any part of the unit. If the chiller is equipped with optional valves, the refrigerant can be isolated in either the condenser or evaporator / compressor while making any necessary repairs.

MEGGING THE MOTOR

While the main disconnect switch and compressor motor starter are open, meg the motor as follows:

1. Using a megohm meter (megger), meg between phases and each phase to ground (see Fig. 56); these readings are to be interpreted using the graph shown in Fig. 57.
2. If readings fall below shaded area, remove external leads from motor and repeat test.

NOTE

Motor is to be megged with the starter at ambient temperature after 24 hours of idle standby.

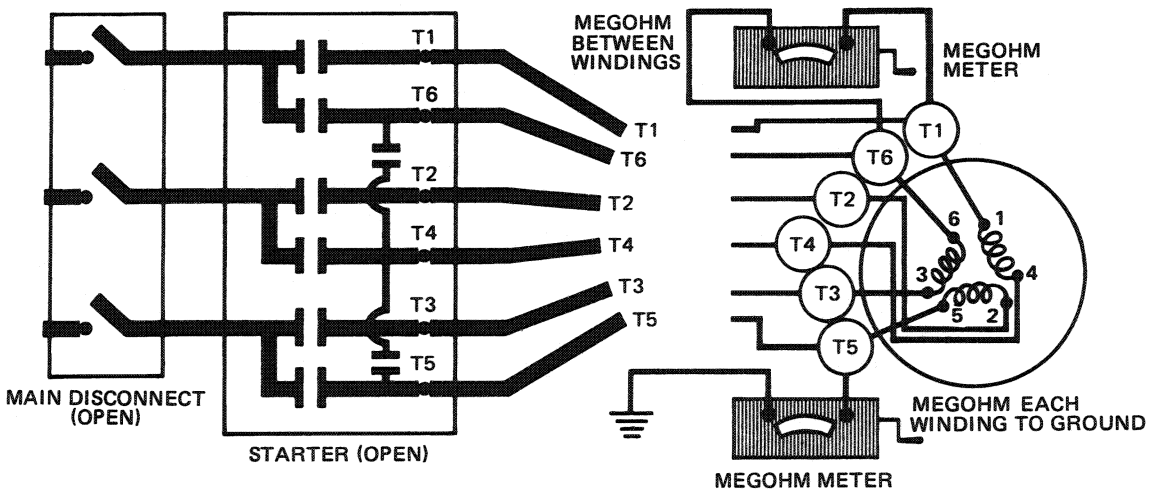


FIG. 56 – DIAGRAM, MEGGING MOTOR WINDINGS

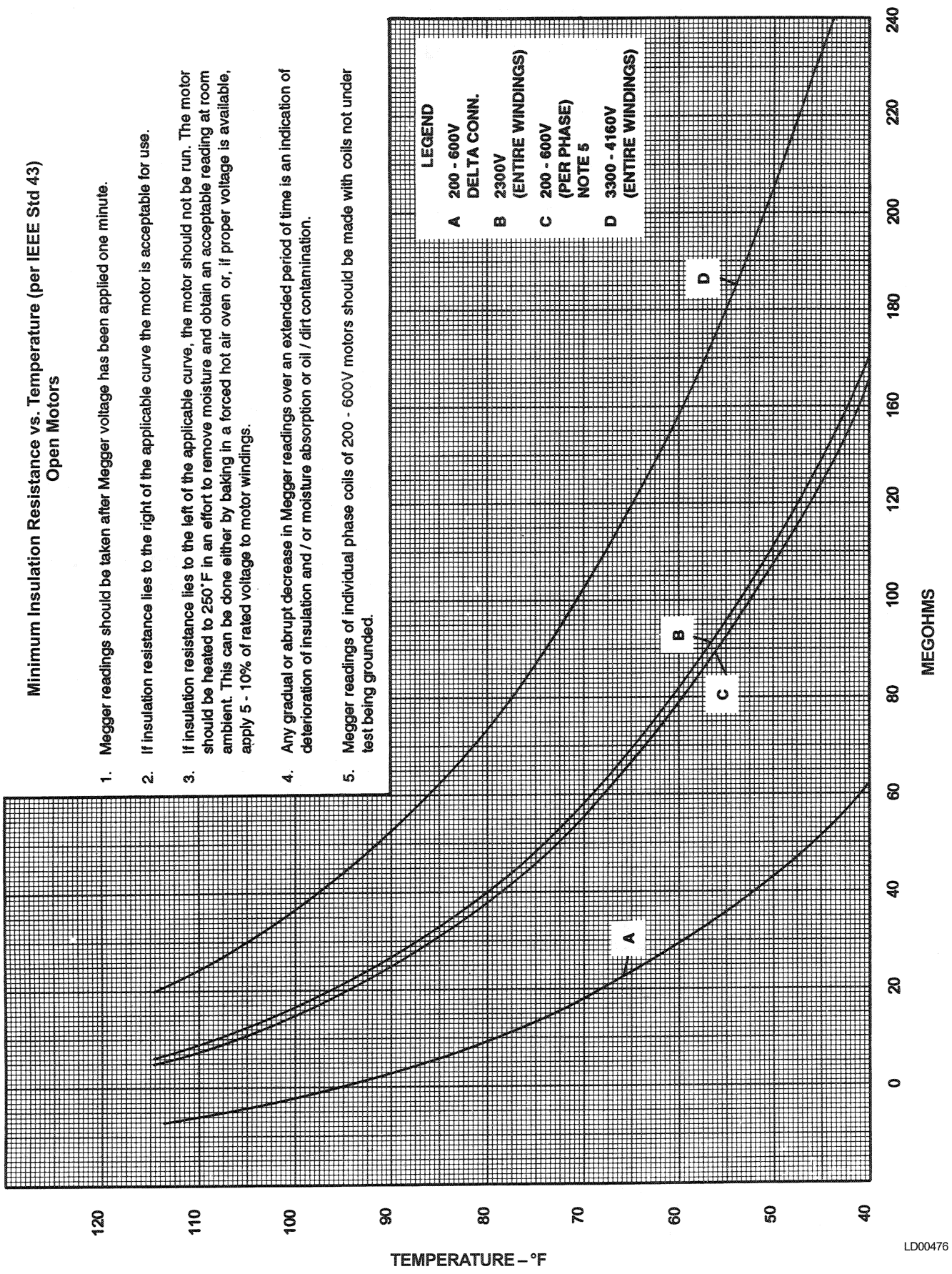


FIG. 57 – MOTOR STARTER TEMPERATURE AND INSULATION RESISTANCES

CONDENSERS AND COOLERS

GENERAL

Maintenance of condenser and cooler shells is important to provide trouble free operation of the chiller. The water side of the tubes in the shell must be kept clean and free from scale. Proper maintenance such as tube cleaning, and testing for leaks, is covered on the following pages.

CHEMICAL WATER TREATMENT

Since the mineral content of the water circulated through coolers and condensers varies with almost every source of supply, it is possible that the water being used may corrode the tubes or deposit heat resistant scale in them. Reliable water treatment companies are available in most larger cities to supply a water treating process which will greatly reduce the corrosive and scale forming properties of almost any type of water.

As a preventive measure against scale and corrosion and to prolong the life of cooler and condenser tubes, a chemical analysis of the water should be made preferably before the system is installed. A reliable water treatment company can be consulted to determine whether water treatment is necessary, and if so, to furnish the proper treatment for the particular water condition.

CLEANING COOLER AND CONDENSER TUBES

Cooler

It is difficult to determine by any particular test whether possible lack of performance of the water cooler is due to fouled tubes alone or due to a combination of troubles. Trouble which may be due to fouled tubes is indicated when, over a period of time, the cooling capacity decreases and the split (temperature difference between water leaving the cooler and the refrigerant temperature in the cooler) increases. A gradual drop-off in cooling capacity can also be caused by a gradual leak of refrigerant from the system or by a combination of fouled tubes and shortage of refrigerant charge. An excessive quantity of oil in the cooler can also contribute to erratic performance.

Condenser

In a condenser, trouble due to fouled tubes is usually indicated by a steady rise in head pressure, over a period of time, accompanied by a steady rise in condensing temperature, and noisy operation. These symptoms may also be due to foul gas buildup. Purging will remove the foul gas revealing the effect of fouling.

TUBE FOULING

Fouling of the tubes can be due to deposits of two types as follows:

1. **Rust or sludge** – which finds its way into the tubes and accumulates there. This material usually does not build up on the inner tube surfaces as scale, but does interfere with the heat transfer. Rust or sludge can generally be removed from the tubes by a thorough brushing process.
2. **Scale** – due to mineral deposits. These deposits, even though very thin and scarcely detectable upon physical inspection, are highly resistant to heat transfer. They can be removed most effectively by circulating an acid solution through the tubes.

TUBE CLEANING PROCEDURES

Brush Cleaning of Tubes

If the tube consists of dirt and sludge, it can usually be removed by means of the brushing process. Drain the water sides of the circuit to be cleaned (cooling water or chilled water) remove the heads and thoroughly clean each tube with a soft bristle bronze or nylon brush. **DO NOT USE A STEEL BRISTLE BRUSH.** A steel brush may damage the tubes.

Improved results can be obtained by admitting water into the tube during the cleaning process. This can be done by mounting the brush on a suitable length of 1/8" pipe with a few small holes at the brush end and connecting the other end by means of a hose to the water supply.

The tubes should always be brush cleaned before acid cleaning.

ACID CLEANING OF TUBES

If the tubes are fouled with a hard scale deposit, they may require acid cleaning. It is important that before acid cleaning, the tubes be cleaned by the brushing process described above. If the relatively loose foreign material is removed before the acid cleaning, the acid solution will have less material to dissolve and flush from the tubes with the result that a more satisfactory cleaning job will be accomplished with a probable saving of time.



Acid cleaning should only be performed by an expert. Please consult your local water treatment representative for assistance in removing scale build-up and preventative maintenance programs to eliminate future problems.

8

COMMERCIAL ACID CLEANING

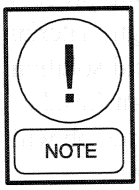
In many major cities, commercial organizations now offer a specialized service of acid cleaning coolers and condensers. If acid cleaning is required, YORK recommends the use of this type of organization. The Dow Industries Service Division of the Dow Chemical Company, Tulsa, Oklahoma, with branches in principal cities is one of the most reliable of these companies.

TESTING FOR COOLER AND CONDENSER TUBE LEAKS

Cooler and condenser tube leaks in R-134a systems may result in refrigerant leaking into the water circuit, or water leaking into the shell depending on the pressure levels. If refrigerant is leaking into the water, it can be detected at the liquid head vents after a period of shutdown. If water is leaking into the refrigerant, system capacity and efficiency will drop off sharply. If a tube is leaking and water has entered the system, the cooler and condenser should be valved off from the rest of the water circuit and drained immediately to prevent severe rusting and corrosion. The refrigerant system should then be drained and purged with dry nitrogen to prevent severe rusting and corrosion. If a tube leak is indicated, the exact location of the leak may be determined as follows:

1. Remove the heads and listen at each section of tubes for a hissing sound that would indicate gas leakage. This will assist in locating the section of tubes to be further investigated. If the probable location of the leaky tubes has been determined, treat that section in the following manner (if the location is not definite, all the tubes will require investigations).

2. Wash off both tube heads and the ends of all tubes with water.



Do not use carbon tetrachloride for this purpose since its fumes give the same flame discoloration that the refrigerant does.

3. With nitrogen or dry air, blow out the tubes to clear them of traces of refrigerant laden moisture from the circulation water. As soon as the tubes are clear, a cork should be driven into each end of the tube. Pressurize the dry system with 50 to 100 PSIG of nitrogen. Repeat this with all of the other tubes in the suspected section or, if necessary, with all the tubes in the cooler or condenser. Allow the cooler or condenser to remain corked up to 12 to 24 hours before proceeding. Depending upon the amount of leakage, the corks may blow from the end of a tube, indicating the location of the leakage. If not, if will be necessary to make a very thorough test with the leak detector.
4. After the tubes have been corked for 12 to 24 hours, it is recommended that two men working at both ends of the cooler carefully test each tube – one man removing corks at one end and the other at the opposite end to remove corks and handle the leak detector. Start with the top row of tubes in the section being investigated. Remove the corks at the ends of one tube simultaneously and insert the exploring tube for 5 seconds – this should be long enough to draw into the detector any refrigerant gas that might have leaked through the tube walls. A fan placed at the end of the cooler opposite the detector will assure that any leakage will travel through the tube to the detector.
5. Mark any leaking tubes for later identification.
6. If any of the tube sheet joints are leaking, the leak should be indicated by the detector. If a tube sheet leak is suspected, its exact location may be found by using a soap solution. A continuous buildup of bubbles around a tube indicates a tube sheet leak.

COMPRESSOR

Maintenance for the compressor assembly consists of checking the operation of the oil return system and changing the dehydrator, checking and changing the oil, checking and changing the oil filters, checking the operation of the oil heater, checking the operation of the oil pump, and observing the operation of the compressor.

Internal wearing of compressor parts could be a serious problem caused by improper lubrication, brought about by restricted oil lines, passages, or dirty oil filters. If the unit is shutting down on (HOT) High Oil Temperature or Low Oil Pressure (OP), change the oil filter element. Examine the oil filter element for the presence of aluminum particles. Aluminum gas seal rings can contact the impeller and account for some aluminum particles to accumulate in the oil filter, especially during the initial start up and first several months of operation. However, if aluminum particles continue to accumulate and the same conditions continue to stop the unit operation after a new filter is installed, notify the nearest YORK office to request the presence of a YORK Service Technician.

ELECTRICAL CONTROLS

For information covering the OptiView Control Center operation, refer to "Section 2".

The operating points of the pressure and temperature cut outs are shown in the Wiring Diagrams (see page 4). These diagrams also contain a starting and stopping sequence diagram as shown in Fig. 44 and Fig. 45.

SECTION 9
PREVENTIVE MAINTENANCE

It is the responsibility of the owner to provide the necessary daily, monthly and yearly maintenance requirements of the system. *IMPORTANT – If a unit failure occurs due to improper maintenance during the warranty period; YORK will not be liable for costs incurred to return the system to satisfactory operation.*

In any operating system it is most important to provide a planned maintenance and inspection of its functioning parts to keep it operating at its peak efficiency. Therefore, the following maintenance should be performed when prescribed.

COMPRESSOR

1. **Oil Filter** – The oil filter must be changed when the oil pressure drops 30% or semi-annually if not required earlier.

   When the oil filter is changed, it should be inspected thoroughly for any aluminum particles which would indicate possible bearing wear. If aluminum particles are found this should be brought to the attention of the nearest YORK office for their further investigation and recommendations.
2. **Oil Changing** – The oil in the compressor must be changed annually or earlier if it becomes dark or cloudy. However, quarterly oil analysis can eliminate the need for an annual change provided the analysis indicates there is no problem with the oil.

COMPRESSOR MOTOR

1. Check motor mounting screws frequently to insure tightness.
2. Meg motor windings annually to check for deterioration of windings.

GREASED BEARINGS ON RELIANCE Q5800 MOTORS

Reliance motors in the 5800 frame size are equipped entirely with grease-lubricated ball-bearings. The following outlines the lubrication requirements for these bearings:

- The motor bearings are properly lubricated as received from YORK. There is no need to add lubricant to the motor bearings at start-up. Too much grease in the motor bearing cavity may cause excessive bearing temperature.
- If the motor has been in storage for 6 months prior to commissioning, lubricate the motor bearings per the following instructions prior to start-up.
- If the motor is inactive for 30 days, the motor shaft is to be rotated 15 revolutions in order to distribute the grease within the bearing.
- Some bearing squeal may be noted at start-up. This is often due to the bearing cage, as it vibrates against the moving bearing elements. This noise should subside after a few days of operation. Intermittent bearing squeal is not cause for alarm.
- **Use only Texaco Premium RB (Code 1939) grease** to lubricate the motor bearings, as indicated in Reliance literature for these motors. The grease is readily available throughout most of the world, from Texaco distributors — and in Africa, Australia, and the Pacific Rim countries from Caltex distributors. Other types of grease may be chemically and mechanically incompatible with this Texaco Premium RB grease, and **are not to be used.**
- Add 1.5 cubic inches of **Texaco Premium RB grease** every 1800 hours of operation of the motor. Do not expect to see grease exiting the grease relief port during these re-lubrications.

Additional information on motor lubrication and other service issues can be found in the Reliance Electric A-C Motors Instruction Manual.

LEAK TESTING

The unit should be leak tested quarterly. Any leaks found must be repaired immediately.

COOLER AND CONDENSER

The major portion of maintenance on the condenser and cooler will deal with the maintaining the water side of the condenser and cooler in a clean condition.

The use of untreated water in cooling towers, closed water systems, etc. frequently results in one or more of the following:

1. Scale Formation.
2. Corrosion or Rusting.
3. Slime and Algae Formation.

It is therefore to the benefit of the user to provide for proper water treatment to provide for a longer and more economical life of the equipment. The following recommendation should be followed in determining the condition of the water side of the condenser and cooler tubes.

1. The condenser tubes should be cleaned annually or earlier if conditions warrant. If the temperature difference between the water off the condenser and the condenser liquid temperature is more than 4° greater than the difference recorded on a new unit, it is a good indication that the condenser tubes require cleaning. They should be cleaned as instructed on pages 131 to 132 of this manual.
2. The cooler tubes under normal circumstances will not require cleaning. If however the temperature difference between the refrigerant and the chilled water increases slowly over the operating season, it is an indication that the cooler tubes may be fouling or that there may be a water by-pass in the water box requiring gasket replacement or refrigerant may have leaked from the chiller.

OIL RETURN SYSTEM

1. Change the dehydrator in the oil return system semi-annually or earlier if the oil return system fails to operate.
2. When the dehydrator is changed, the nozzle of the eductor should be checked for any foreign particles that may be obstructing the jet.

ELECTRICAL CONTROLS

1. All electrical controls should be inspected for obvious malfunctions.
2. It is important that the factory settings of controls (operation and safety) not be changed. If the settings are changed without YORK's approval, the warranty will be jeopardized.

SI Metric Conversion

The following factors can be used to convert from English to the most common SI Metric values.

MEASUREMENT	MULTIPLY THIS *ENGLISH* VALUE	BY	TO OBTAIN THIS *METRIC* VALUE
CAPACITY	TONS REFRIGERANT EFFECT (ton)	3.516	KILOWATTS (kW)
POWER	KILOWATTS (kW)	NO CHANGE	KILOWATTS (kW)
	HORSEPOWER (hp)	0.7457	KILOWATTS (kW)
FLOW RATE	GALLONS / MINUTE (gpm)	0.0631	LITERS / SECOND (L/s)
LENGTH	FEET (ft)	304.8	MILLIMETERS (mm)
	INCHES (in)	25.4	MILLIMETERS (mm)
WEIGHT	POUNDS (lb)	0.4536	KILOGRAMS (kg)
VELOCITY	FEET / SECOND (fps)	0.3048	METERS / SECOND (m/s)
PRESSURE DROP	FEET OF WATER (ft)	2.989	KILOPASCALS (k Pa)
	POUNDS / SQ. INCH (psi)	6.895	KILOPASCALS (k Pa)

TEMPERATURE

To convert degrees Fahrenheit (°F) to degrees Celsius (°C), subtract 32° and multiply by 5/9 or 0.5556.

To convert a temperature range (i.e., 10°F or 12°F chilled water range) from Fahrenheit to Celsius, multiply by 5/9 or 0.5556.

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Tele. 717-771-7890
www.york.com

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