

YORK REMOTE CHILLER COMMUNICATIONS FOR STYLE "A" SCREW CHILLERS 125 THRU 675 TONS

TABLE OF CONTENTS

INTRODUCTION	2
INTERFACE	2
OPERATION	4
Anticipatory Alarm Transmissions	4
Safety Shutdown Transmissions	8
Auto-Log Transmissions	8
On-Demand Transmissions	12
Programming the Microcomputer Control Center	14
Displaying Setpoints	15
PHONE LINE REQUIREMENTS	16
DATA TERMINAL & SET-UP	16

INTRODUCTION

Remote Chiller Communications provides for two-way communications with a centrifugal chiller that is equipped with a York Microcomputer Control Center. This communication takes place over telephone lines and can be intra-building, inter-building, inter-city or inter-state.

There are four modes of communication as follows:

1. Anticipatory alarm transmissions
2. Safety shutdown transmissions
3. Auto-log transmissions
4. On-Demand transmissions

Anytime the chiller is operating and a chiller parameter exceeds a programmed threshold, the control center will initiate an *anticipatory alarm transmission*. Similarly, anytime the chiller is operating and shuts down on a safety shutdown, the control center initiates a *safety shutdown transmission*. Service personnel can view chiller real-time operating parameters and status from a remote location by requesting an *on-demand transmission*. Finally, the chiller control center can be programmed, from a local or remote location, to initiate *auto-log transmissions* that occur automatically at regular intervals. All of the above transmissions contain the following data:

- Present auto-log interval and interval start time (only transmitted when calling in to chiller)
- Day, time, calendar date (of communication)
- Unit ID number
- Phone number of chiller
- Cooling application (water or brine)
- Programmed anticipatory alarm thresholds
- Day, time, calendar date (of data)
- Chiller operating hours and starts counter
- Chiller operating parameters (pressures, temps, etc.)
- Programmed system setpoints
- 3Ø Power line voltage } Liquid cooled solid state
● 3Ø Motor current } starter applications only
- Compressor cycles
- Status of anticipatory alarm checking
- Status of safety and cycling shutdown relays
- Day, time, and cause of anticipatory alarm (if any)
- Day, time, and cause of safety or cycling shutdown (if any)

WARNING! Keypad must never be left in "Program" mode as it inhibits communications.

INTERFACE

Figures 1 and 2 describe the interface with Remote Chiller Communications.™

An RS-232C Port (TB8) on the micro board is connected to a modem that is mounted inside the Microcomputer Control Center. The modem is connected to a standard modular voice-grade telephone jack (Ref. Fig. 1). Telephone company telephone lines provide the middle portion of the interface. At the remote location another modem is plugged into a standard voice-grade telephone jack RJ11. This modem is then connected to a teleprinter terminal.

If it is desired to have a local printer (Ref. Form 160.47-NO1.2) permanently connected to the Microcomputer Control Center at the same time that a modem is connected, a modem/printer interface adapter (Part No. 031-01103) is required (Ref. Fig. 2).

This device is mounted inside the Microcomputer Control Center. It allows the micro board to automatically switch between modem transmissions and data dumps to the local printer.

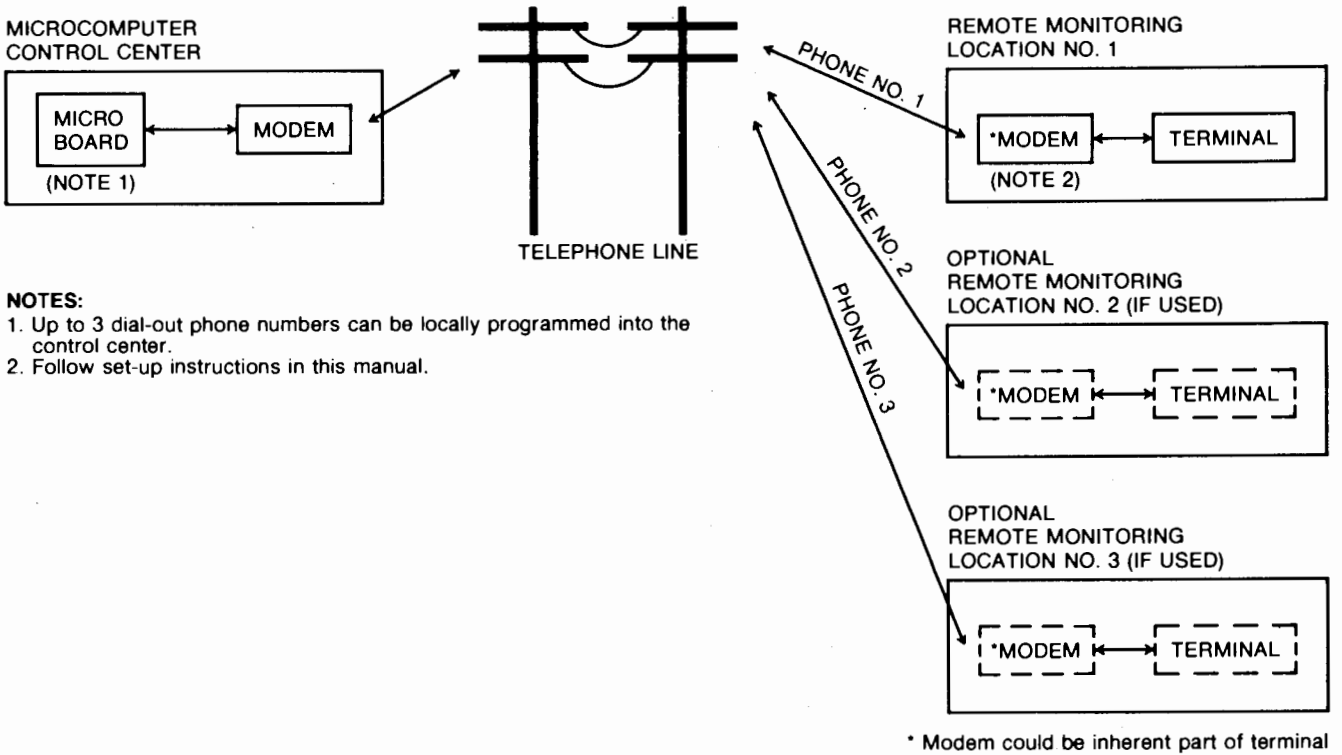


FIG. 1 — COMMUNICATIONS INTERFACE (without local printer)
 "REMOTE CHILLER COMMUNICATIONS"

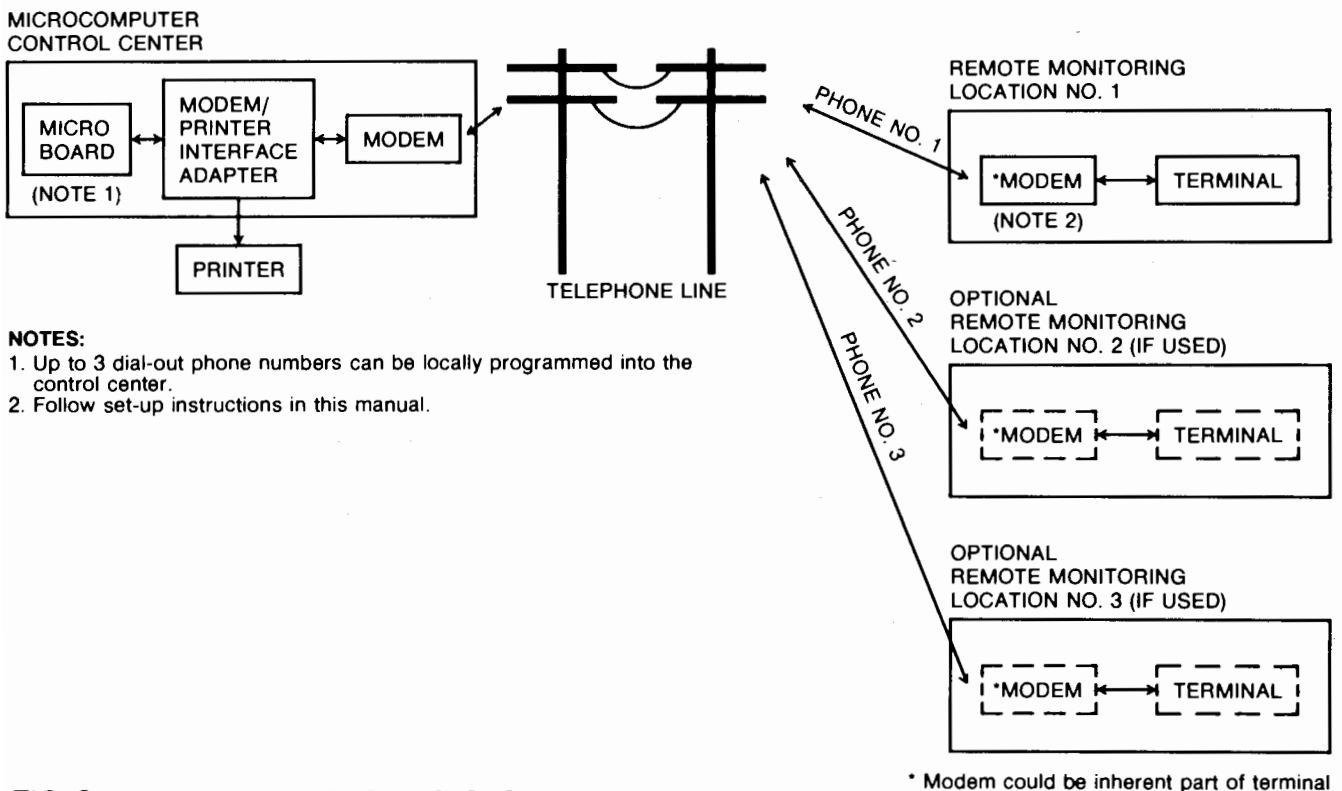


FIG. 2 — COMMUNICATIONS INTERFACE (with local printer)
 "REMOTE CHILLER COMMUNICATIONS"

OPERATION

Anticipatory Alarm Transmissions

There are certain chiller operating parameters that are critical to the well being and proper operation of the chiller. Each of these parameters are continuously monitored. If any are greater than or equal to a predetermined threshold while the chiller is running, (high pressure and low evap pressure alarms are sent if chiller is running or not) an alarm transmission is automatically sent. These thresholds are values that are close to the point at which the control center would initiate a safety shutdown. Typically, the alarm transmission would precede the safety shutdown by several hours or days. In this way we can anticipate and react to chiller problems before they occur. The alarm thresholds are operator programmable at the Microcomputer Control Center keypad. Each threshold has a specified range (minimum/maximum) in which it can be programmed. However, if the operator does not program a particular threshold, the Microcomputer Control Center will automatically select a value (default value). The anticipatory alarms and their minimum, maximum, and default values are as in Table 1.

An example of an alarm transmission is provided in Fig. 3, page 6. In this instance, it is a "high pressure" (condenser pressure) alarm. Note that the alarm threshold setting is the default value (260 PSIG). The actual condenser pressure is 261.5 PSIG. Since the actual pressure is greater than the alarm threshold setting, an anticipatory alarm was sent. The reason for the alarm is always printed as the last line of text at the bottom of Fig. 3, page 5.

The actual chiller parameter must equal or exceed the alarm threshold setting continuously for one minute.

At the end of the one-minute interval, the chiller data is frozen and the alarm will be sent. No subsequent alarms will be sent until personnel reset the alarm. This can be accomplished either locally at the Microcomputer Control Center keypad or from a remote location via a data terminal per below. If a power failure occurs after an anticipatory alarm transmission, the alarm will be *automatically* reset.

- **Local Reset**—In typical operations, the local anticipatory alarm reset function is not used. The alarms should be reset from a remote location via the data terminal. The local reset capability exists as a service feature to be used as required. To use, proceed as follows:

1. Place Microcomputer Control Center in "Program" mode. "Program Mode—"Select Setpoint" is displayed.
2. Press keypad **OPTIONS** key. This key is covered with a "Remote Chiller Communications" label. "For Next Setpoint, Press Advance Day Key" is displayed.
3. Press **ADVANCE DAY/SCROLL** key on keypad. "0 = Disable or 1 = Enable Alarm Function _____" is displayed.
4. Using the keypad entry keys, press "1" key then the **ENTER** key.
5. Place the Microcomputer Control Center in *Local, Remote or Service* mode as required.

- **Remote Reset**—The typical method of resetting an anticipatory alarm is from a remote location via a data terminal as follows: Ref. Fig. 4.

TABLE 1 — ANTICIPATORY ALARMS

Alarm	Minimum	Maximum	Default
Low Evap Pressure	57 PSIG (water) 35 PSIG (brine)	90 PSIG (water) 75 PSIG (brine)	57 PSIG (water) 35 PSIG (brine)
High Cond. Pressure	100 PSIG	260 PSIG	260 PSIG
Low Oil Pressure (Note 1)	17 PSID	50 PSID	17 PSID
Dirty Oil Filter	18 PSID	20 PSID	20 PSID
High Discharge Temperature	100 F	200 F	200 F
High Oil Temperature	100 F	165 F	165 F
Excess Refrigerant Charge	None	None	Note 3
Compressor Cycling (Note 2)	1	10	10
Battery Voltage	Digital on/off	—	—

Notes:

1. This alarm bypassed for 5 minutes @ chiller start.
2. Number of starts in a six-hour period.
3. Refer to York Form 160.47-O1.1 for description of message "WARNING: Excess Refrigerant Charge."

*VERSION S.01T.02

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REMOTE CHILLER COMMUNICATIONS
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TODAY IS MON 11:18AM 04/22/91 ← TIME & DATE OF TRANSMISSION

UNIT ID NUMBER 000023
PHONE NUMBER #7177716449XXXXXXXXXXXXXX

----- ALARM SETTINGS -----

WATER COOLING APPLICATION
 EVAP = 57.0 psis; COND = 260.0 psis ← ALARM THRESHOLD
 LOW OIL PRESSURE ALARM @ 17.0psid
 DIRTY OIL FILTER ALARM @ 20.0psid
 DISCHARGE TEMP=200.0°F, OIL TEMP=165.0°F
 COMPRESSOR ALARM @ 10 CYCLES/6 HRS

----- UNIT STATUS -----

AS OF MON 11:18AM 04/22/91 ← TIME & DATE OF DATA

OPER. HOURS = 2004; START COUNTER = 260
 LEAVING SETPOINT = 46.0°F
 REMOTE TEMP SETPOINT RANGE = 20°F
 CHILLED LEAVING= 46.1°F; RETURN= 52.2°F
 COND LEAVING = 99.0°F; RETURN = 77.0°F
 EVAP = 70.7 psis; COND = 261.5 psis ← CONDENSER PRESSURE
 SAT TEMPS EVAP = 41.2°F, COND= 119.6°F
 COND LIQUID TEMP = 91.3°F
 SOLID STATE STARTER NOT INSTALLED
 CURRENT LIMIT=100% FLA
 MOTOR CURRENT= 39% FLA; SLIDE VALVE= 42%

SETPOINT= 30MIN @ 99%FLA, 0 MIN LEFT
 DIFF OIL= 33.1psid;DIFF FLTR= 7.7psid
 DISCHARGE TEMP=138.6°F, OIL TEMP=105.1°F
 OIL = 100.0psis; FILTER = 107.3psis
 COMP CYCLES = 1
 COMP MOTOR STARTER - ON
 SLIDE VALVE UNLOAD - OFF
 REMOTE MODE READY TO START RELAY - OFF
 SUCTION TROUGH EDUCTOR SOLENOID - OFF
 OIL LINE SOL - ON
 HOT GAS BY-PASS - NOT INSTALLED
 CHILLED WATER PUMP - ON
 S M T W T F S HOLIDAY NOTED BY *
 SUN START = 00:00AM, STOP = 00:00AM
 MON START = 00:00AM, STOP = 00:00AM
 TUE START = 00:00AM, STOP = 00:00AM
 WED START = 00:00AM, STOP = 00:00AM
 THU START = 00:00AM, STOP = 00:00AM
 FRI START = 00:00AM, STOP = 00:00AM
 SAT START = 00:00AM, STOP = 00:00AM
 HOL START = 00:00AM, STOP = 00:00AM

----- SHUTDOWN AND ALARM STATUS -----

ANTICIPATORY ALARM -INACTIVE UNTIL RESET ← INDICATES ALARM NEEDS TO BE RESET
 SAFETY SHUTDOWN RELAY - OFF
 CYCLING SHUTDOWN RELAY - OFF
 HIGH PRESSURE ALARM ← ALARM DESCRIPTION

FIG. 3 – ANTICIPATORY ALARM TRANSMISSION

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PRESENT AUTO-LOG INTERVAL IS
000 HOURS/ 00 MINUTES ; START @ 12:00PM

ENTER NEW AUTO-LOG INTERVAL
(000 - 255 HOURS / 15 - 59 MINUTES)
(PRESS CENTER) KEY FOR DEFAULT TIMES.)
HOURS =
MINUTES =

PRESS "RETURN" KEY
PRESS "RETURN" KEY

ENTER NEW AUTO-LOG START TIME
(HOURS:MINUTES AM/PM)
(EG. 12:00PM)
START TIME =
RESET ANTICIPATORY ALARMS (Y/(ENTER))?

PRESS "RETURN" KEY
PRESS "Y" THEN "RETURN" KEY

TODAY IS MON 11:20AM 04/22/91

TIME & DATE OF TRANSMISSION

UNIT ID NUMBER 000023
PHONE NUMBER #7177716449XXXXXXXXXXXX

----- ALARM SETTINGS -----

WATER COOLING APPLICATION
EVAP = 57.0 psid; COND = 260.0 psid
LOW OIL PRESSURE ALARM @ 17.0psid
DIRTY OIL FILTER ALARM @ 20.0psid
DISCHARGE TEMP=200.0°F, OIL TEMP=165.0°F
COMPRESSOR ALARM @ 10 CYCLES/8 HRS

----- UNIT STATUS -----

AS OF MON 11:20AM 04/22/91
OPER. HOURS = 2004; START COUNTER = 260
LEAVING SETPOINT = 46.0°F
REMOTE TEMP SETPOINT RANGE = 20°F
CHILLED LEAVING= 46.2°F; RETURN= 52.2°F
COND LEAVING = 99.3°F; RETURN = 77.2°F
EVAP = 70.7 psid; COND = 192.6 psid
SAT TEMPS EVAP = 41.2°F, COND= 98.2°F
COND LIQUID TEMP = 91.3°F
SOLID STATE STARTER NOT INSTALLED
CURRENT LIMIT=100% FLA
MOTOR CURRENT= 39% FLA; SLIDE VALVE= 42%

TIME & DATE OF DATA

SETPOINT= 30MIN @ 99%FLA, 0 MIN LEFT
DIFF OIL= 33.1psid;DIFF FLTR= 7.3psid
DISCHARGE TEMP=138.6°F, OIL TEMP=105.1°F
OIL = 99.6psid; FILTER = 107.3psid
COMP CYCLES = 1
COMP MOTOR STARTER - ON
SLIDE VALVE UNLOAD - OFF
REMOTE MODE READY TO START RELAY - OFF
SUCTION TROUGH EJECTOR SOLENOID - OFF
OIL LINE SOL - ON
HOT GAS BY-PASS - NOT INSTALLED
CHILLED WATER PUMP - ON
S M T W T F S HOLIDAY NOTED BY *
SUN START = 00:00AM, STOP = 00:00AM
MON START = 00:00AM, STOP = 00:00AM
TUE START = 00:00AM, STOP = 00:00AM
WED START = 00:00AM, STOP = 00:00AM
THU START = 00:00AM, STOP = 00:00AM
FRI START = 00:00AM, STOP = 00:00AM
SAT START = 00:00AM, STOP = 00:00AM
HOL START = 00:00AM, STOP = 00:00AM

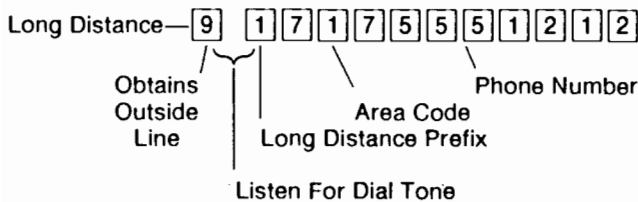
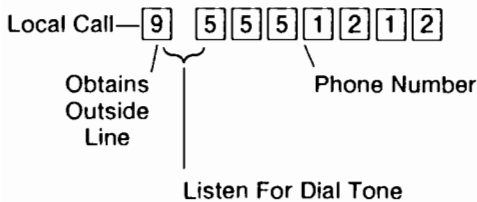
----- SHUTDOWN AND ALARM STATUS -----

ANTICIPATORY ALARM - ACTIVE & MONITORING
SAFETY SHUTDOWN RELAY - OFF
CYCLING SHUTDOWN RELAY - OFF

INDICATES ALARM HAS BEEN RESET

FIG. 4 - RESETTING AN ANTICIPATORY ALARM

1. Become familiar with the instructions for using the remote data terminal-printer device.
2. Dial the phone number of the Microcomputer Control Center as follows: (Note: Some phone systems place a maximum limit on the amount of time that a telephone or data terminal can be "off-hook." The time limit is determined by the phone system. If dialing has not been completed within this limit the phone system will disconnect.)
 - a.) **INSIDE LINE**—type the desired phone number into the keyboard. Typically, only a 4-digit extension number is required.
 - b.) **OUTSIDE LINE**—type the desired phone number into the keyboard. If one or more prefix digits are required to obtain an outside line, pause momentarily between digit entry to assure an audible dial tone is heard before proceeding. Use area code if required. For example:



3. When the Microcomputer Control Center answers the call, it transmits the heading, present auto-log interval, interval start time and a series of prompts. Respond to the prompts as follows: Ref. Fig. 4.

Prompt	Response
• "Hours" auto-log interval	Press <input type="text" value="RETURN"/> key
• "Minutes" auto-log interval	Press <input type="text" value="RETURN"/> key
• Auto-log "start" time	Press <input type="text" value="RETURN"/> key
• Anticipatory alarm "reset"	Press <input type="text" value="Y"/> key then <input type="text" value="RETURN"/> key

Note: If each response is not made within 15 seconds, the call will be terminated. You must then re-dial.

4. The Microcomputer Control Center then transmits the remainder of the system data.

The following is a description of each of the anticipatory alarms:

- **Evap Pressure**—The evaporator pressure (PSIG) as measured by the Microcomputer Control Center

evaporator transducer. The purpose of this alarm is to detect an abnormally low evaporator pressure. This provides warning of an impending safety shutdown.

- **Cond Pressure**—The condenser pressure (PSIG) is measured by the Microcomputer Control Center condenser transducer. The purpose of this alarm is to detect an abnormally high condenser pressure. This provides warning of an impending safety shutdown.
- **Low Oil Pressure**—The differential oil pressure (PSID) as measured by the Microcomputer Control Center. Diff Oil Pressure = Oil Pressure - Evaporator Pressure. The oil pressure in the formula is that which is measured at the compressor input. The evaporator pressure is that which is measured at the evaporator. The purpose of this alarm is to detect an abnormally low oil pressure condition. This provides warning of an impending safety shutdown. The alarm is bypassed for the first 5 minutes of chiller run time.
- **Dirty Oil Filter**—The purpose of this alarm is to detect a dirty oil filter. The Microcomputer Control Center monitors the differential pressure across the oil filter.
- **Discharge Temp**—The discharge temperature (F) as measured by the Microcomputer Control Center discharge temp thermistor. The purpose of this alarm is to detect an abnormally high discharge temperature. This provides warning of an impending safety shutdown.
- **Oil Temp**—The oil temperature (F) as measured by the Microcomputer Control Center oil temp thermistor. The purpose of this alarm is to detect an abnormally high oil temperature. This provides warning of an impending safety shutdown.

- **Excess Refrigerant Charge**—Anytime "WARNING: Excess Refrigerant Charge" is displayed on the Microcomputer Control Center keypad display, an alarm is sent after a 1 minute delay. Refer to Form 160.47-O1.1 (operation manual) for details of this warning message. The purpose of this alarm is to detect an excess refrigerant charge condition.

- **Compressor Cycling**—The purpose of this alarm is to detect excessive cycling of the compressor. The Microcomputer Control Center software counts the number of compressor starts in a six-hour period and if it equals the operator programmed alarm threshold, an "excess cycling" alarm is sent (one-minute delay). It is not necessary to reset this alarm. This alarm is automatically reset when the alarm is sent.

The six-hour period is divided into three each two-hour intervals (Ref. Fig. 5). All of the compressor starts in each interval are summed to produce the total compressor cycling count for the six-hour period. Each time the compressor starts, the cycle count increments. At the end of the six-hour interval, the first two-hour interval of the preceding six-hour period is eliminated from the total

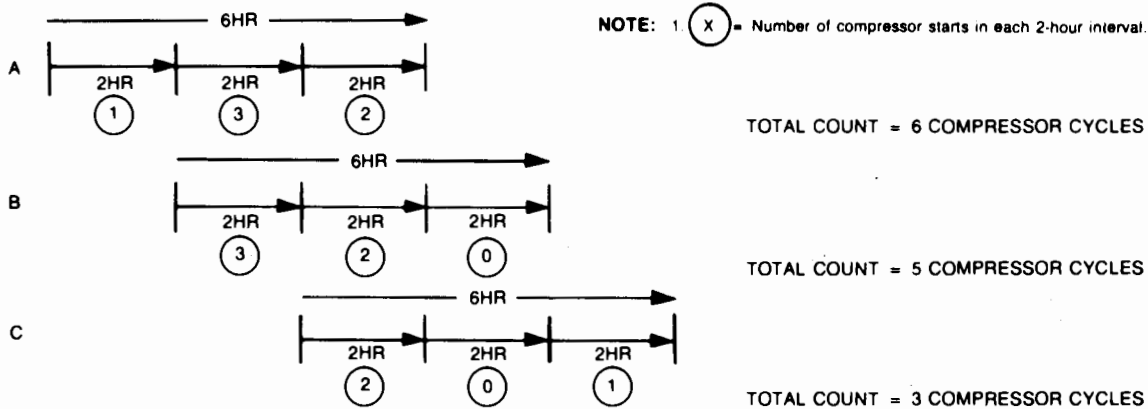


FIG. 5 — COMPRESSOR CYCLING ALARM—TIMING DIAGRAM

count. In the example given in Fig. 5, period "A" had one start in the first two-hour interval, three starts in the second interval, and two starts in the third interval. The total cycle count then equals six for period "A." At the beginning of period "B", the quantity of start (1) in the first interval of period "A" are eliminated from the cumulative total.

When a cycling alarm is sent in a given six-hour period, no more cycling alarms will be sent until the total cycle count equals the alarm threshold in a new six-hour period.

- **Battery Voltage** — This alarm monitors the voltage of the on board battery that provides back-up power to the micro board RTC chip. When the voltage falls below 3.5VDC an alarm is sent.

Note: Anticipatory alarms (except "LEP" and "HP") will not be transmitted if chiller is shutdown by keypad compressor switch, remote stop or cycling shutdown.

Safety Shutdown Transmissions

Anytime the chiller is running and shuts down on a safety shutdown, the Microcomputer Control Center sends a safety shutdown transmission. There is no 1 minute delay as with anticipatory alarm transmissions. The transmissions are initiated coincident with chiller shutdown. The chiller data is frozen at the instant the safety condition occurs. It is not necessary to reset safety shutdown transmissions from a remote location. They are automatically reset after the transmission. An example of this transmission is shown in Fig. 6, page 9.

The following safety shutdowns are annunciated: (Ref. to Form 160.47-NO1 for details of each)

- **Low Evap Pressure**
- **Low Oil Pressure**
- **High Cond Pressure**
- **Evap Trans or Probe Error**
- **High Discharge Temp**
- **High Oil Temp**
- **Oil Pressure Transducer**

- **Faulty Discharge Temp Sensor**
- **Aux Safety Shutdown**
- **Faulty Oil or Condenser XDCR**
- **Low Separator Oil Level**
- **Clogged Oil Filter**
- **Power Failure** (when configured for manual restart after power failure)
- **Motor Phase Current Unbalance** (liquid cooled solid state starter applications only)
- **Motor Controller** (a motor controller shutdown does not initiate a dial-out until the shutdown has existed for at least 30 minutes. Motor controller shutdowns that exist for less than 30 minutes do not transmit. Since motor controller shutdowns are considered to be "cycling" shutdowns, no manual reset of the keypad compressor switch is required for chiller restart. However, certain motor controller shutdowns could require a manual reset of the CM-2 board (electro-mechanical starter applications), liquid cooled solid state starter logic board or turbo-modulator II logic board. Those motor controller shutdowns that do not require a manual reset of the above PC boards would usually be of less than 30 minutes duration. Therefore, the purpose of this alarm is to notify personnel that the chiller shutdown most likely requires a manual reset of the motor controller PC board and will not automatically restart.)

Note: Safety shutdowns will not be transmitted if chiller is down on cycling shutdown, by keypad compressor switch or remote stop.

Auto-Log Transmissions

The Microcomputer Control Center can be programmed to automatically send a transmission at a specified interval beginning at a specified time. Fig. 7 is an example of an auto-log transmission. For example, if the interval "start" time is 8:00 am and the interval is 12 hours, then the data transmissions would occur at 8:00 am and 8:00 pm daily. The "interval" and interval "start time" can be entered locally at the Microcomputer Control Center keypad or from a remote location via a data terminal. The interval values are selectable from 0-255 hours and 15-59 minutes.

*VERSION 5.01T.02

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TODAY IS MON 11:52AM 04/22/91 ← TIME & DATE OF TRANSMISSION

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UNIT ID NUMBER 000023
PHONE NUMBER #7177716449XXXXXXXXXXXXXX

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----- ALARM SETTINGS -----

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WATER COOLING APPLICATION
EVAP = 57.0 psid; COND = 260.0 psid
LOW OIL PRESSURE ALARM @ 17.0psid
DIRTY OIL FILTER ALARM @ 20.0psid
DISCHARGE TEMP=200.0~F,OIL TEMP=165.0~F
COMPRESSOR ALARM @ 10 CYCLES/6 HRS

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----- UNIT STATUS -----

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AS OF MON 11:51AM 04/22/91 ← TIME & DATE OF DATA

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OPER. HOURS = 2004; START COUNTER = 260
LEAVING SETPOINT = 46.0~F
REMOTE TEMP SETPOINT RANGE = 20~F
CHILLED LEAVING= 46.1~F; RETURN= 52.2~F
COND LEAVING = 99.3~F; RETURN = 77.0~F
EVAP = 53.7 psid; COND = 192.3 psid
SAT TEMPS EVAP = 28.7~F, COND= 98.1~F
COND LIQUID TEMP = 91.3~F
SOLID STATE STARTER NOT INSTALLED
CURRENT LIMIT=100% FLA
MOTOR CURRENT= 39% FLA; SLIDE VALVE= 42%

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SETPOINT= 30MIN @ 99%FLA, 0 MIN LEFT
DIFF OIL= 50.1psid;DIFF FLTR= 7.3psid
DISCHARGE TEMP=138.6~F,OIL TEMP=105.1~F
OIL = 100.0psid; FILTER = 107.3psid
COMP CYCLES = 1
COMP MOTOR STARTER - ON
SLIDE VALVE UNLOAD - OFF
REMOTE MODE READY TO START RELAY - OFF
SUCTION TROUGH EJECTOR SOLENOID - OFF
OIL LINE SOL - ON
HOT GAS BY-PASS - NOT INSTALLED
CHILLED WATER PUMP - ON
S M T W T F S HOLIDAY NOTED BY *
SUN START = 00:00AM, STOP = 00:00AM
MON START = 00:00AM, STOP = 00:00AM
TUE START = 00:00AM, STOP = 00:00AM
WED START = 00:00AM, STOP = 00:00AM
THU START = 00:00AM, STOP = 00:00AM
FRI START = 00:00AM, STOP = 00:00AM
SAT START = 00:00AM, STOP = 00:00AM
HOL START = 00:00AM, STOP = 00:00AM

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----- SHUTDOWN AND ALARM STATUS -----

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ANTICIPATORY ALARM - ACTIVE & MONITORING
SAFETY SHUTDOWN RELAY - ON
CYCLING SHUTDOWN RELAY - OFF

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MON 11:51AM LOW EVAP PRESSURE ← DAY, TIME & CAUSE OF SHUTDOWN

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FIG. 6 -- SAFETY SHUTDOWN TRANSMISSION

If it is desired to enter the auto-log values locally at the Microcomputer Control Center, follow the instructions under "Programming the Microcomputer Control Center" on page 15. If it is desired to enter the values from a remote data terminal, proceed as follows: (Ref. Fig. 8).

1. Become familiar with the instructions for using the remote data terminal-printer device.
2. Dial the phone number of the Microcomputer Control Center as follows: (Note: Some phone systems place a maximum limit on the amount of time that a

telephone or data terminal can be "off-hook." The time limit is determined by the phone system. If dialing has not been completed within this limit the phone system will disconnect.)

- a.) INSIDE LINE—type the desired phone number into the keyboard. Typically, only a 4-digit extension number is required.
- b.) OUTSIDE LINE—type the desired phone number into the keyboard. If one or more prefix digits are required to obtain an outside line, pause momen-

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PRESENT AUTO-LOG INTERVAL IS
 0 2 HOURS/ 00 MINUTES | START @ 09:15AM ← PREVIOUSLY ENTERED INTERVAL & START TIME

ENTER NEW AUTO-LOG INTERVAL
 (000 - 255 HOURS / 15 - 59 MINUTES)
 (PRESS <ENTER> KEY FOR DEFAULT TIMES.) ← DEFAULT TIME IS THAT WHICH WAS PREVIOUSLY ENTERED
 HOURS = 024 } ← ENTER NEW INTERVAL
 MINUTES = 00 }

ENTER NEW AUTO-LOG START TIME
 (HOURS:MINUTES AM/PM)
 (EG. 12:00PM) ← ENTER NEW START TIME
 START TIME = 09:30AM ←
 RESET ANTICIPATORY ALARMS (Y/(ENTER))/? ← PRESS RETURN KEY

 TODAY IS TUE 9:23AM 04/23/91

UNIT ID NUMBER 000023
 PHONE NUMBER #7177716449XXXXXXXXXXXXXX

----- ALARM SETTINGS -----

WATER COOLING APPLICATION
 EVAP = 57.0 psid; COND = 260.0 psid
 LOW OIL PRESSURE ALARM @ 17.0psid
 DIRTY OIL FILTER ALARM @ 20.0psid
 DISCHARGE TEMP=200.0-F,OIL TEMP=165.0-F
 COMPRESSOR ALARM @ 10 CYCLES/6 HRS

----- UNIT STATUS -----

AS OF TUE 9:23AM 04/23/91-
 OPER. HOURS = 91 START COUNTER = 4
 LEAVING SETPOINT = 46.0-F
 REMOTE TEMP SETPOINT RANGE = 20-F
 CHILLED LEAVING= 46.2-F; RETURN= 52.2-F
 COND LEAVING = 99.0-F; RETURN = 77.0-F
 EVAP = 73.0 psid; COND = 193.0 psid
 SAT TEMPS EVAP = 42.8-F, COND= 98.2-F
 COND LIQUID TEMP = 91.3-F
 SOLID STATE STARTER NOT INSTALLED
 CURRENT LIMIT=100% FLA
 MOTOR CURRENT= 39% FLA; SLIDE VALVE= 36%

SETPOINT= 30MIN @ 99%FLA, 28 MIN LEFT
 DIFF OIL= 28.3psid;DIFF FLTR= 8.8psid
 DISCHARGE TEMP=154.1-F,OIL TEMP=111.1-F
 OIL = 100.0psid; FILTER = 108.0psid
 COMP CYCLES = 3
 COMP MOTOR STARTER - ON
 SLIDE VALVE UNLOAD - OFF
 REMOTE MODE READY TO START RELAY - OFF
 SUCTION TROUGH EDUCTOR SOLENOID - OFF
 OIL LINE SOL - ON
 HOT GAS BY-PASS - NOT INSTALLED
 CHILLED WATER PUMP - ON
 S M T W T F S HOLIDAY NOTED BY *
 SUN START = 00:00AM, STOP = 00:00AM
 MON START = 00:00AM, STOP = 00:00AM
 TUE START = 00:00AM, STOP = 00:00AM
 WED START = 00:00AM, STOP = 00:00AM
 THU START = 00:00AM, STOP = 00:00AM
 FRI START = 00:00AM, STOP = 00:00AM
 SAT START = 00:00AM, STOP = 00:00AM
 HOL START = 00:00AM, STOP = 00:00AM

----- SHUTDOWN AND ALARM STATUS -----

ANTICIPATORY ALARM - ACTIVE & MONITORING
 SAFETY SHUTDOWN RELAY - OFF
 CYCLING SHUTDOWN RELAY - OFF

FIG. 8 — AUTO-LOG INTERVAL AND INTERVAL "START" TIME ENTRY

tarily between digit entry to assure an audible dial tone is heard before proceeding. Use area code if required. For example:

Local Call—9 5 5 5 1 2 1 2

Obtains Outside Line

Phone Number

Listen For Dial Tone

Long Distance—9 1 7 1 7 5 5 5 1 2 1 2

Obtains Outside Line

Long Distance Prefix

Area Code

Phone Number

Listen For Dial Tone

- When the Microcomputer Control Center answers the call, it transmits the heading, present auto-log interval, interval start time and a series of prompts. Respond to the prompts as follows: Refer to Fig. 8.

Prompt	Response
• "Hours" auto-log interval	Using leading zeroes, enter the desired interval (0-255) and press RETURN key. If entry is not made within 15 seconds, the call will be terminated. You must then re-dial. If the desired interval is less than 1 hour, enter "00".
• "Minutes" auto-log interval	Enter the desired interval (15-59) and press the RETURN key. If only an "hours" interval is desired, enter "00". If this entry is not made within 15 seconds, the call will be terminated. You must then re-dial.
• Auto-log "start" time	Enter the time of day that is desired to have the above interval begin. Then press the RETURN key. Use leading zeroes. Type the colon and am or pm. For example, type 08:00am. If the above interval is 12 hours, then a data transmission would occur daily @ 8:00am and 8:00pm. If this entry is not made within 30 seconds, the call will be terminated. You must then re-dial.
• Anticipatory alarm "reset"	Press RETURN key

- The Microcomputer Control Center then transmits the remainder of the system data.

Notes:

- If an auto-log is transmitted while the chiller is down on a cycling or safety shutdown, the data is that which was valid at the instant of the cycling or safety shutdown.
- If an auto-log is transmitted while the chiller is shutdown by the compressor start/run/stop-reset switch or remote stop in remote mode the data is real-time (i.e. — data valid at time of transmission).
- If an auto-log is transmitted while the chiller is running, the data will be real-time (i.e. — data valid at time of transmission).
- If a power failure occurs after the programmed auto-log start time, no auto-logs will be transmitted until the start-time rolls around again.

On-Demand Transmissions

Personnel can call the chiller at any time from a remote location to view the chiller operating parameters. Ref. Fig. 9.

To contact the chiller and request a data transmission perform the following:

- Become familiar with the instructions for using the remote data terminal-printer device.
- Dial the phone number of the Microcomputer Control Center as follows: (Note: Some phone systems place a maximum limit on the amount of time that a telephone or data terminal can be "off-hook". The time limit is determined by the phone system. If dialing has not been completed within this limit the phone system will disconnect.)
 - INSIDE LINE—type the desired phone number into the keyboard. Typically, only a 4-digit extension number is required.
 - OUTSIDE LINE—type the desired phone number into the keyboard. If one or more prefix digits are required to obtain an outside line, pause momentarily between digit entry to assure an audible dial tone is heard before proceeding. Use area code if required. For example:

Local Call—9 5 5 5 1 2 1 2

Obtains Outside Line

Phone Number

Listen For Dial Tone

Long Distance—9 1 7 1 7 5 5 5 1 2 1 2

Obtains Outside Line

Long Distance Prefix

Area Code

Phone Number

Listen For Dial Tone

*VERSION S.01T.02

```

-----
|
|   YORK GUARDIAN SERVICE
|   REMOTE CHILLER COMMUNICATIONS
|   (C) YORK INTERNATIONAL CORPORATION
|
|
-----
    
```

PRESENT AUTO-LOG INTERVAL IS
000 HOURS/ 00 MINUTES : START @ 12:00PM

ENTER NEW AUTO-LOG INTERVAL
(000 - 255 HOURS / 15 - 59 MINUTES)
(PRESS <ENTER> KEY FOR DEFAULT TIMES.)
HOURS = }
MINUTES = }

PRESS RETURN KEY

ENTER NEW AUTO-LOG START TIME
(HOURS:MINUTES AM/PM)
(EG. 12:00PM)

START TIME = ←
RESET ANTICIPATORY ALARMS (Y/(ENTER))?

PRESS RETURN KEY

PRESS RETURN KEY

TODAY IS MON 1:00PM 04/22/91 ←

TIME OF TRANSMISSION

UNIT ID NUMBER 000023
PHONE NUMBER #7177716449XXXXXXXXXXXX

```

----- ALARM SETTINGS -----
WATER COOLING APPLICATION
EVAP = 57.0 psig; COND = 260.0 psig
LOW OIL PRESSURE ALARM @ 17.0psid
DIRTY OIL FILTER ALARM @ 20.0psid
DISCHARGE TEMP=200.0~F,OIL TEMP=165.0~F
COMPRESSOR ALARM @ 10 CYCLES/6 HRS
    
```

----- UNIT STATUS -----

AS OF MON 1:01PM 04/22/91 ←
OPER. HOURS = 2004; START COUNTER = 263
LEAVING SETPOINT = 46.0~F
REMOTE TEMP SETPOINT RANGE = 20~F
CHILLED LEAVING= 46.2~F; RETURN= 52.4~F
COND LEAVING = 99.0~F; RETURN = 77.0~F
EVAP = 70.3 psig; COND = 193.0 psig
SAT TEMPS EVAP = 41.3~F, COND= 98.2~F
COND LIQUID TEMP = 91.3~F
SOLID STATE STARTER NOT INSTALLED
CURRENT LIMIT=100% FLA
MOTOR CURRENT= 39% FLA; SLIDE VALVE= 38%

TIME OF DATA

SETPOINT= 30MIN @ 99%FLA, 28 MIN LEFT
DIFF OIL= 32.8psid;DIFF FLTR= 6.3psid
DISCHARGE TEMP=128.6~F,OIL TEMP=105.1~F
OIL = 100.0psig; FILTER = 105.5psig
COMP CYCLES = 3
COMP MOTOR STARTER - ON
SLIDE VALVE UNLOAD - OFF
REMOTE MODE READY TO START RELAY - OFF
SUCTION TROUGH EDUCTOR SOLENOID - OFF
OIL LINE SOL - ON
HOT GAS BY-PASS - NOT INSTALLED
CHILLED WATER PUMP - ON
S M T W T F S HOLIDAY NOTED BY *
SUN START = 00:00AM, STOP = 00:00AM
MON START = 00:00AM, STOP = 00:00AM
TUE START = 00:00AM, STOP = 00:00AM
WED START = 00:00AM, STOP = 00:00AM
THU START = 00:00AM, STOP = 00:00AM
FRI START = 00:00AM, STOP = 00:00AM
SAT START = 00:00AM, STOP = 00:00AM
HOL START = 00:00AM, STOP = 00:00AM

----- SHUTDOWN AND ALARM STATUS -----

ANTICIPATORY ALARM - ACTIVE & MONITORING
SAFETY SHUTDOWN RELAY - OFF
CYCLING SHUTDOWN RELAY - OFF

FIG. 9 – ON-DEMAND DATA TRANSMISSION

- When the Microcomputer Control Center answers the call, it transmits the heading, present auto-log interval, interval start time and a series of prompts as follows: Ref. Fig. 9.

Prompt	Response
• "Hours" auto-log interval	Press RETURN key
• "Minutes" auto-log interval	Press RETURN key
• Auto-log "start" time	Press RETURN key
• Anticipatory alarm "reset"	Press RETURN key

Note: Each response must be made within 15 seconds. If not, the call will be terminated. You must then re-dial.

- The Microcomputer Control Center then transmits the remainder of the system data.

Notes:

- If an on-demand transmission is executed while the chiller is shutdown on a safety or cycling shutdown, the data is that which was valid at the instant of the safety or cycling shutdown.
- If an on-demand transmission is executed while the chiller is shutdown by the compressor start/run/stop-reset switch or by a remote stop signal in remote mode the data will be real-time data (i.e. — data valid at time of transmission).
- If an on-demand transmission is executed while the chiller is running, the data will be real-time (i.e. — data valid at time of transmission).

Programming The Microcomputer Control Center

Personnel must program the variables at the Microcomputer Control Center keypad as follows:

- Select *Program* mode at keypad. (Refer to Operation Manual Form 160.47-O1.1)
- "Program mode, select setpoint" is displayed.
- Press the **OPTIONS** key. This is the key over which the "Remote Chiller Communications" label was installed.
- "For next setpoint, press **ADVANCE DAY/SCROLL** key" is displayed.

Note: To enter a desired value for each of the following setpoints, simply press the **ENTER** key after each entry. To return a previously entered value to the "default" value, press **CANCEL** key and then the **ENTER** key.

- Press **ADVANCE DAY/SCROLL** key.
- "0=Disable or 1=Enable Alarm Function?___" is displayed. Using the **ENTRY** keys, enter a "0" to disable the anticipatory alarm function or a "1" to enable the anticipatory alarm function. Typically, the alarm function should be "enabled". The serviceman would intentionally disable the alarm function only when performing

maintenance on the chiller. This entry also allows anticipatory alarms to be locally reset at the keypad. However, typically anticipatory alarms should be reset by calling the chiller from a remote location and performing the reset via the remote data terminal. Finally, if an anticipatory alarm has been sent, but not yet reset, this value will be "0". However, after it has been reset via the remote terminal, it will automatically return to a "1".

- Press **ENTER** key.
- Press the **ADVANCE DAY/SCROLL** key.
- "Unit ID Number _ _ _ _ _" is displayed. Using the entry keys, enter the six-digit chiller identification number. This number uniquely identifies this chiller. The number can be selected by the customer personnel.
- Press **ENTER** key.
- Press **ADVANCE DAY/SCROLL** key.
- Unit's phone #XXXXXXXXXX. Using the entry keys, enter the phone number of the chiller. Leave no spaces. Use no hyphens. Include the area code.
- Press **ENTER** key.
- Press **ADVANCE DAY/SCROLL** key.
- "0= Tone or 1=Pulse Dialing Method?___" is displayed. Enter a "0" if the local phone system requires *tone* dialing. Enter a "1" if the local phone system requires *pulse* (Rotary) dialing.
- Press **ENTER** key.
- Press **ADVANCE DAY/SCROLL** key.
- "Caller 1 phone # XXXXXXXXXXX" is displayed. Using the entry keys, enter the phone number that the MicroComputer Control Center is to call first. Use no hyphens. Leave no spaces. Include the area code. Include any prefix digits that are required, such as those required to obtain an outside line. Use a "*" (asterisk) after each prefix digit. This provides a 2 second delay for each asterisk used. More than one asterisk may be required. For example, if it is required to dial "9" to obtain an outside line, "9*5551212" would be entered.
- Press **ENTER** key.
- Press **ADVANCE DAY/SCROLL** key.
- "Caller 2 phone # XXXXXXXX" is displayed. Using the entry keys, enter the phone number that the Microcomputer Control Center is to call second. Follow the guidelines in step 18. The programming on this number is optional.
- Press **ENTER** key.
- Press **ADVANCE DAY/SCROLL** key.
- "Caller 3 phone # XXXXXXXX" is displayed. Using the entry keys, enter the phone number that the Microcomputer Control Center is to call third.

Follow the guidelines in step 18. This phone number is optional.

25. Press **ENTER** key.
 26. Press **ADVANCE DAY/SCROLL** key.

Note: Personnel will now program the anticipatory alarm thresholds. It is recommended that the default values are used. The procedure below enters the default values. However, certain applications may require different values. If different values are desired, enter the desired value using the entry keys, then press the **ENTER** key. If the value entered is not within the minimum/maximum range, "out of range—try again" will be displayed. Refer to Table 1, page 5 for minimum/maximum values.

27. "Low Oil Pressure Alarm @ 17.0 PSID" is displayed.
 28. Press **CANCEL** key.
 29. Press **ENTER** key.
 30. Press **ADVANCE DAY/SCROLL** key.
 31. "Dirty Oil Filter @ 20.0 PSID" is displayed.
 32. Press **CANCEL** key.
 33. Press **ENTER** key.
 34. Press **ADVANCE DAY/SCROLL** key.
 35. "High Oil Temp Alarm @ 165.0 is displayed.
 36. Press **CANCEL** key.
 37. Press **ENTER** key.
 38. Press **ADVANCE DAY/SCROLL** key.
 39. "High Discharge Temp Alarm @ 200.0°F" is displayed.
 40. Press **CANCEL** key.
 41. Press **ENTER** key.
 42. Press **ADVANCE DAY/SCROLL** key.
 43. "Compressor Alarm @ 10 cycles/2 hrs" is displayed.
 44. Press **CANCEL** key.
 45. Press **ENTER** key.
 46. Press **ADVANCE DAY/SCROLL** key.
 47. "Low Evap Pressure Alarm @ 57.0 PSIG is displayed. (35.0 PSIG if brine application)
 48. Press **CANCEL** key.
 49. Press **ENTER** key.
 50. Press **ADVANCE DAY/SCROLL** key.
 51. "High Cond Pressure Alarm @ 260.0 PSIG is displayed.

52. Press **CANCEL** key.
 53. Press **ENTER** key.
 54. Press **ADVANCE DAY/SCROLL** key.
 55. "Auto-Dial Start = 12:00 pm Int = _ _ _ hrs/ _ _ mins" is displayed.

The Auto-Dial (Log) start time and interval can be entered locally at the Microcomputer Control Center keypad using the above prompt or remotely via a data terminal. Enter the customer desired interval start time and interval value. Entries are limited to 0-255 hours, 15-59 minutes. Use leading zeroes where necessary. Enter as follows:

- Using the entry keys, enter the desired interval start time.
- Press the **AM/PM** key to change "am" to "pm" or "pm" to "am" if necessary.
- Using the entry keys, enter the desired interval.
- Press **ENTER** key.

Note: If no auto-log is desired, press **CANCEL** then **ENTER** key. If an auto-log interval is entered locally at the keypad it overrides any previously entered interval that was entered remotely.

60. Press **ADVANCE DAY/SCROLL** key.
 61. "Oper. Hrs. = _ _ _ _ , Start Counter = _ _ _ _ " is displayed.

When the *Remote Chiller Communications* EPROM is installed at commissioning, the accumulated operating hours remain. However, the start counter is a new feature and will therefore be zero. Both the operating hours and the start counter can be zeroed at any time by pressing the **CANCEL** then **ENTER** key. Values can be entered by using the entry keys to enter the desired values and pressing the **ENTER** key. Both values will automatically reset at 65535.

62. Select *Local, Service or Remote* operating modes as required.
 63. Monitor the keypad display while pressing the **OPTIONS** key. The setpoints will scroll on the display. Verify the desired setpoints have been entered.

Displaying Setpoints

Personnel can display the previously entered setpoints as follows:

- Press and hold the **OPTIONS** key.
- All of the variables (setpoints) will scroll sequentially on the display.

Keypad Operation Changes

The installation of the *Remote Chiller Communications* EPROM causes the following changes in operation.

1. **PRINT** key — If the **PRINT** key is pressed while

the Microcomputer Control Center's modem is on-line with another modem the data dump to the printer will be delayed until modem communications have been completed. "Print Enable Delayed — Modem Active" is displayed.

PHONE LINE REQUIREMENTS

1. The telephone line need only be a standard voice-grade direct dial line. It must be a dedicated line with no extension phones attached. The calls to and from the modem must *not* go through an operator or operator assisted switchboard.
2. The telephone company must be notified that you intend to connect a modem to the phone line. They will need the following information:
 - a. The phone number to which the modem will be connected.
 - b. The modem FCC registration number and ringer equivalence (both of these are shown on the bottom of the modem).
3. The phone jack should be an RJ-11.
4. The phone jack should be mounted on the right-hand side of the outside of the Microcomputer Control Center per Fig. 10.

DATA TERMINAL SET-UP

PREPARATION

Because the recommended data terminal may change periodically, it is impossible to issue specific instructions here. The best procedure is to read and familiarize yourself with the manufacturer's operating instructions. Supplemental instructions may be issued by York from time to time, but should not be the primary source.

KEYBOARD KEY SETTINGS

The following keys are usually located on the data terminal keyboard and should be set as follows:

1. **DUPLEX** — set to "FULL."
2. **COLUMN** — set to "80."
3. **AUTO ANSWER** — set to "AUTO ANSWER."

COMMUNICATION PARAMETERS

The following parameters must be programmed into the data terminal when beginning usage. Refer to programming procedure in your Data Terminal Owner's Manual for specific information.

Parameter Listing ...

ITEM	SYSTEM
Baud rate	1200
Parity	ODD
Word length	7
Stop bits	1
Duplex	FULL
LF on receiving 'CR'	NO
CR on receiving 'LF'	NO
Transmit code on 'RETURN'	8
Transmit code on 'BACK SPACE'	BS
Detect XON/XOFF busy code	NO
Transmit XON/XOFF busy code	NO
XON/XOFF busy code	4.5
Transmit manual keyin 'CR' in logon seq.	YES
Auto logon abort timer	120
Auto logon abort redial	0
Convert tab & left margin to space	NO
Place 'RETURN' code at the end of the line	NO
Printer on at start of communication	YES

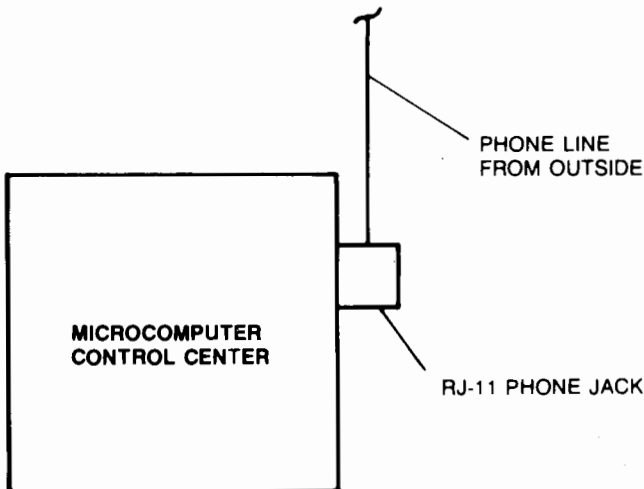


FIG. 10 — PHONE JACK LOCATION

YORK[®]