MULTI-UNIT SEQUENCING INSTALLATION, OPERATION AND MAINTENANCE

INSTALLATION, OPERATION & MAINTENANCE	New Release	Form 201.18-NM1.1 (100)

29540A

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GENERAL

GENERAL

A microprocessor based Multiple Unit Sequencer [Part Number 371-02558-008 (60 Hz) and 371-02558-009 (50 Hz)] is available for applications where the user desires sequencing from two to eight chillers to control mixed supply chilled liquid temperature. The chillers **MUST** be piped in parallel serving a common load/water loop.

The sequencer is capable of displaying; status, daily start/stop schedules, and allows selection of the chiller to be operated in the lead. The lead chiller may be changed at any time by reprogramming the lead chiller on the control panel.

The Multiple Unit Sequencer consists of 4 basic components; microprocessor board, transformer, 2 line, 40 character liquid crystal display, and keypad for programming options, accessing setpoints, and daily schedule. A master ON/OFF switch is provided to activate and de-activate the controller.

Control is achieved via a mixed chilled liquid sensor placed in a common supply chilled liquid line.

The microprocessor board contains a Real Time Clock with a battery back up. The purpose of the battery is to assure that setpoints, programmed options, etc., are not lost during a power failure.

A 40VA, 120/24VAC 50/60 Hz transformer, U.L. listed as class 2 is supplied with each panel to provide power to the sequencer. An onboard switching power supply converts 24VAC to +5VDC REG and +12VDC REG. +24VDC UNREG is provided to connect to the MUS flow switch circuitry.

A flow switch (supplied by others) is required in the mixed supply chilled liquid. Flow switch contacts must be wired to the sequencer to assure flow is present before operating the chiller system.

Multiple types of chillers (centrifugal, recip, and screw) can be controlled by wiring dry (voltage free) contacts of the Multi-Unit Sequencer to the start/stop circuit of each chiller. The microprocessor will cycle chillers on and off to control mixed supply (leaving) chilled liquid temperature. Individual compressor cycling and loading/unloading of compressors is provided by individual chiller microprocessors/controllers.

The option includes a microprocessor panel and mixed chilled liquid sensor. The user must supply the interconnection wiring and temperature wells. The user will also be responsible for suppling power to the electronics, wiring the sensor, and wiring to the chillers.

Contacts are rated for 115VAC.

The mixed water sensor well location must be placed in a location in the mixed water piping to sense a true representation of the supply mixed leaving chilled liquid temperature.

If 3-way valves are utilized, throttling should be very gradual to assure water temperature fluctuations do not result. Acceptable throttling will vary on each application. Under no circumstances should any flow bypass the mixed chilled liquid temperature sensor.

INSTALLING THE HARDWARE

Mounting the Sequencer

The sequencer should be mounted securely to the wall using the 4 holes provided in the rear of the box. Plug the 115VAC or 240VAC line cord into the proper outlet.

Mixed Supply (Leaving) Water Temperature Sensor Installation

Install the mixed supply leaving water temperature sensor in a common portion of the mixed supply (leaving) chilled liquid from all the chillers. The location of the well should provide sensing of the average supply chilled liquid temperature for the entire chilled liquid system. See Fig. 1.

Assure the well is filled with heat conductive compound (Minnesota Paints type #11149 or equiv.) before the sensor is inserted. Do not place water into the temperature well. Connect a shielded cable to the sensor and route the cable back to the MUS Panel and connect it to terminals 17 and 18 as shown in Fig. 2 and 3. Connect the shield to terminal 19 only and not to the sensor. This wiring should be run in separate grounded conduit.

Mixed Return Temperature Sensor Installation (Optional)

Install the mixed return water temperature sensor in a common portion of the mixed return liquid from all the chillers. The location of the well should provide sensing of the average return chilled liquid temperature for the entire chilled liquid system. See Fig. 1.

Assure the well is filled with heat conductive compound (Minnesota Paints type #11149 or equiv.) before the sensor is inserted. Do not place water into the temperature well. Connect the cable to the sensor and route the cable back to the MUS Panel and connect to terminals 20 and 21 as shown in Fig. 2 and 3. Connect the shield to terminal 22 only and not to the sensor. This wiring should be run in separate grounded conduit.

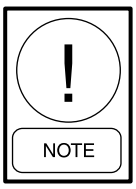
Sequenced Chiller START/STOP Control Wiring

Connect chiller start/stop control wiring to the sequencer outputs as shown in Fig. 2 and 3. Up to eight chillers can be sequenced from the MUS panel.

The sequencer supplies a dry contact to each of up to eight the chillers. The contacts are normally open and close to energize (activate) a chiller.

The contact terminals for each of the eight chillers are listed below:

Chiller #1:	71A and 71B
Chiller #2:	72A and 72B
Chiller #3:	73A and 73B
Chiller #4:	74A and 74B
Chiller #5:	75A and 75B
Chiller #6:	76A and 76B
Chiller #7:	77A and 77B
Chiller #8:	78A and 78B



If the sequencer contacts are connected to inductive devices on the chillers (relays/contactors), the inductive device must have a suppressor placed across it's coil. Use YORK p/n 031-00808-000.

Wire type is dependent upon local and N.E.C. codes in regards to voltage requirements that are unique to each chiller's start/stop circuitry. Codes also determine whether a ground wire is needed and the need for conduit. Start/stop control wiring MUST NOT be run in conduit or close proximity with high voltage wiring. Wire type should also be selected to assure minimal voltage drop over long wire runs.

Flow Switch and Remote START/STOP Wiring

Individual flow switches **MUST** be present to protect each individual chiller. A mixed supply chilled liquid flow switch (supplied by others) is also **REQUIRED** in the leaving supply mixed water line (Fig. 1). This mixed water flow switch should be wired into the Sequencer terminals 13 and 14 as shown in Fig. 2 and 3.

A remote start/stop device may be wired in series with the flow switch to allow start/stop by an external device. This contact must be a dry contact. **If a relay/ contactor is used to activate this contact, it must be suppressed with a suppressor YORK p/n 031-00808-000.**

Evaporator Pump Control

Evaporator pump dry contacts are available for use to start a pump system on a group of chillers. Since only one pump contact is available, all pumps will be started simultaneously. Pump contacts are energized (closed) when any of the following conditions are true:

1. Any chiller is enabled by the sequencer.
2. The Daily Schedule Switch is ON and the Unit Switch is ON.

Even though one of the above conditions are satisfied, the pump contacts will not be activated unless the sequencer has been powered up for 30 secs. The pump contacts will also not energize if the pump contacts have opened in the last 30 seconds for any reason. This is to avoid overheating the pump motor.

The evaporator pump contacts are available on terminals 23 and 24. The location of these contacts is shown in Fig. 2 and 3.

Always connect a suppressor (YORK p/n 031-00808-000 across the pump contactor coil. Otherwise, damage may result to the micro electronics or operation problems may result.

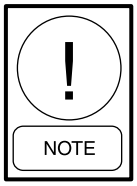
OPERATION AND CHILLER CONTROL SEQUENCE

The Multi-Unit Sequencer sequences multiple chillers to control mixed supply chilled liquid temperature according to the programmed setpoint and +/- cooling range which establishes the "control range." The "control range" is considered to be the mixed supplied chilled liquid temperature range that is acceptable to the user for normal sustained operation.

When temperature exceeds the high end of the programmed control range, the sequencer provides a run permissive contact closure to the lead chiller if the flow switch is closed, daily schedule permits, and any remote cycling contacts in series with the flow switch are closed. A programmable load timer is initiated when the lead chiller is commanded to run.

If temperature continues to exceed the high end of the "control range" (Programmed Setpoint + Range), the next chiller in the sequence will be commanded to run after the load timer times out. Chillers will continue to be sequenced by the load timer as long as chilled liquid temperature remains above the "control range." The load timer may be programmed from 180 seconds to 600 seconds in 15 second intervals depending on the system requirements.

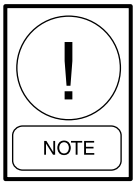
As long as supply chilled liquid temperature falls within the programmed high and low limits of the "control range," no further chillers will be called to operate or turn off.



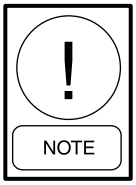
This does not affect individual chiller loading and unloading according to individual chiller setpoints which may continue to take place. It is recommended that individual chiller setpoint tolerances should be set tighter than the control range programmed into the sequencer. In some cases it is also advisable to set individual control points on chillers below those programmed on the sequencer, if chilled liquid mixing often occurs from chillers that are not operating. It is important and the responsibility of the user to adjust individual chilled liquid control points of each chiller to minimize cycling and achieve acceptable chilled liquid control.

Once the chiller system has gained control of the supply water temperature, fixed unload timers allow the chillers to turn off in the reverse sequence in which they were turned on. If temperature falls between the low end of the "control range" (Programmed Setpoint – Range) and 0.5 degrees below the "control range," the sequencer will shut chillers off every 300 seconds until temperature rises to within the "control range." If mixed chilled liquid temperature falls between 0.5 and 1.5 degrees below the low end of the "control range," the sequencer will shut chillers off every 150 seconds until chilled liquid temperature rises above 0.5 degrees below the "control range." If chilled liquid temperature falls 1.5 degrees or more below the "control range," the sequencer will shut chillers down every 60 seconds until the temperature rises above 1.5 degrees below the "control range."

Sequencing of chillers is performed according to several variables programmed under the PROGRAM key. These variables allow the user to select chiller anti-recycle time to avoid chiller cycling and program the loading timer to avoid cycling and premature or late starting of chillers. The number of chillers is also programmable as well as the sequence in which the chillers are enabled.



Individual chillers do not need to be fully unloaded for the sequencer to shut them off. The sequencer has no way of knowing chiller loading status. To either reduce chiller cycling or speed up chiller loading, programming changes will need to be made to the load and anti-recycle timers. These changes must be made by the operator after evaluating system performance.



Individual chiller liquid setpoints must be set below the sequencer setpoint to assure proper mixed chilled liquid temperatures are achieved. Typically, chiller setpoints should be set 3-4 degrees below the sequencer setpoint.

PROGRAMMING THE SEQUENCER

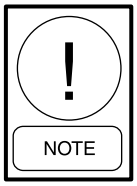
PROGRAM Key:

The Program Mode is accessed by pressing the PROGRAM Key. Four programmable values can be viewed and changed by pressing the ENTER/ADV Key. After a programmable value is changed, the ENTER/ADV Key must be pressed to store the new value in memory.

The following displays will show up under the PROGRAM Key:

```
ANTI RECYCLE TIME
= 600 SECS
```

The anti-recycle timer selection allows the user to select an anti-recycle time to best suit his control needs and prevent rapid cycling of chillers. The micro will accept a range of programmable values between 300 and 600 seconds in 15-second increments. The default value is 600 seconds.



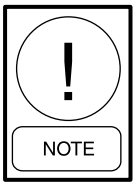
The sequencer may start a chiller out of sequence, if the anti-recycle for a particular chiller (internal to the sequencer and starts counting when a chiller is cycled off) is still timing out. If a chiller is skipped and the next sequential chiller is turned on, the sequencer will not start the chiller which was skipped until demand allows and all other chillers have been sequenced on.

```
LOAD TIMER
= 300 SECS
```

The load timer adjusts the time the last sequenced chiller is allowed to run before the next chiller is started, if mixed leaving chilled liquid temperature is above the control range. The timer can be adjusted from 180 to 600 seconds. The default value is 300 seconds.

```
NUMBER OF CHILLERS
TO SEQUENCE = 8
```

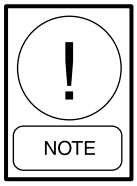
This programs the microprocessor for the number of chillers that must be controlled. The value may be programmed for 2 to 8 chillers. The default value is 8.



This must be properly programmed for the correct number of chillers to be controlled.

```
FIRST CHILLER IN
SEQUENCE=UNIT1
```

This feature permits the user to select which chiller to be brought on first when demand is present. MANUAL Lead/Lag must be selected under the OPTIONS Key for this feature to operate. This value may be programmed from 1 to 8 with chiller number one being the default.



1 . The maximum value will be dictated by the value programmed for the number of chillers to sequence.

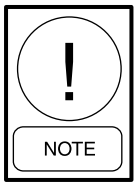
2. Run time will not be balanced among the sequenced chillers in this mode.

Cooling Setpoints Programming

Cooling setpoints and ranges may be programmed by pressing the COOLING SETPOINTS Key. The following message will be displayed:

```
SETPOINT = 44.0°F
RANGE = ±2.0°F
```

Mixed Leaving Chilled Liquid **SETPOINT** may be programmed between 40.0 - 70.0 °F (4.4 - 21.1 °C) in the Water Cooling mode and 10.0 - 70.0 °F (-12.2 -21.1 °C) in the Glycol Cooling mode. Default values are 44 °F (6.7 °C).



Water or Glycol mode is selected under the OPTIONS Key discussed below.

The Mixed Chilled Liquid Control **RANGE** may be programmed from 1.5 - 2.5 ºF (0.8 - 1.4 °C). The default Control Range is 2.0 °F (1.1 °C). The **RANGE** is the maximum desirable chilled liquid temperature deviation from setpoint.

OPTIONS Key Programming:
The OPTIONS Key allows configuring of the unit for various language displays, type of chilled liquid control required, type of units displayed, type of lead/lag (auto/manual), and enabling/disabling manual override.

When the OPTIONS Key is pressed the first display will appear. The displays may be viewed by repetitively pressing the OPTIONS Key. The options may be changed by pressing the UP and DOWN arrow key to change the desired selection. The ENTER/ADV Key must be pressed to store the change in memory.

The available options are shown below:

```
DISPLAY LANGUAGE
ENGLISH
```

The panel may be programmed to display messages in English, Spanish, French, Italian, and German.

```
CHILLED LIQUID
GLYCOL
```

```
CHILLED LIQUID
WATER
```

The panel may be programmed for glycol or water chilling. In glycol mode the chilled liquid temperature setpoint can be programmed from 10 - 70 ºF. In chilled liquid mode it is programmable for 40 - 70 ºF .

```
DISPLAY UNITS
IMPERIAL
```

```
DISPLAY UNITS
SI
```

The displays may be programmed to show Imperial units (ºF or PSI) or SI units (ºC or Bar).

```
LEAD/LAG CONTROL
MANUAL
```

```
LEAD/LAG CONTROL
AUTOMATIC
```

Manual or auto lead lag may be selected. Manual lead/lag sequences chillers in the order they are connected to the Sequencer selecting the designated load chiller first. Auto lead/lag assigns a new "lead" chiller whenever all chillers are shut down. The micro will then assign the "lead" to the chiller with the shortest average run enabled time which helps to balance run time among all chillers.

```
MANUAL OVERRIDE MODE
DISABLED
```

```
MANUAL OVERRIDE MODE
ENABLED
```

The Manual Override feature enables the Daily Schedule to be overridden, which allows chiller operation when the Daily Schedule requires a shutdown. Manual Override enabled allows disabling the Daily Schedule for 30 minutes for servicing purposes. After 30 minutes in Manual operation, the sequencer will revert back to the daily schedule.

CLOCK Key (Programming the Date, Time, and Holiday)
This feature must be programmed to allow the Daily Schedule to function properly and the History display/printout to be accurate.

To change the date and time, press the CLOCK Key. The following display will appear:

```
TODAY IS WED 08:51 AM
        18 JUN 97
```

The cursor will first stop on the day. If the day is correct, press the ENTER/ADV Key. If the day is incorrect, press the UP or DOWN Arrow Keys until the desired day appears and press ENTER/ADV to store the day in memory. The cursor will then advance to the hour.

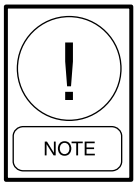
The hour, minute, am/pm, day, month, and year should be programmed the same as the day. The UP/DOWN Arrow Keys will allow increasing/decreasing numerical values of hours, minutes, day and year. The UP/DOWN Arrow Keys also allow changing the word values of the day, am/pm, and month. The ENTER/ADV key stores the selection and advances the cursor.

Daily Schedule Key
The Daily Schedule must be programmed for the system start and stop time. Press the SCHEDULE/ADVANCE DAY Key will provide the following display:

```
MON START = 08:00 AM
    STOP  = 06:00 PM
```

The MON START Time will be the first display. The time may be changed by pressing the UP and DOWN arrow keys. When the desired hour appears, press the ENTER/ADV Key. The cursor will then move to the minute display. The minute display may be programmed identical to the hour display. After the minute selection is entered, AM/PM can be selected, again with the UP and DOWN arrow Key. After the START time is entered, the same procedure is used to program the STOP time.

Pressing the SCHEDULE/ADVANCE DAY Key advances the display to the next day until all the days of the week are programmed.

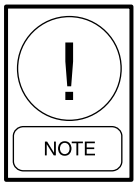


The program times for the Monday schedule are stored for each of the remaining days when the Monday schedule is ENTERED. Keep this in mind any time the Monday schedule is changed. If different times are required for other days, the desired times for each of the individual days must be programmed.

After the Sunday Schedule is programmed, pressing the SCHEDULE/ADVANCE DAY Key will cause the Holiday (HOL) START and STOP times to appear. This is the first of a two part display that allows the actual time and day where special start/stop times may be programmed that would deviate from times normally programmed on typical days. Once the microprocessor executes the special holiday schedule, it is erased from memory. The following week will resume with the daily programmed schedule.

```
HOL START = 00:00AM
      STOP = 00:00AM
```

Start/stop times may be programmed for the special holiday schedule by pressing the UP or DOWN Arrow Keys until the desired start hour is reached. The ENTER/ADV key stores the selection in memory. The minute is then programmed using the same procedure as the hour. The AM/PM selection can be changed by Pressing the UP or DOWN Arrow Keys and stored with the ENTER/ADV Key. STOP time is programmed in the same manner as the START time.



A start time of 00:00 AM and a Stop time of 00:00AM will allow operation 24 hours a day.

After the START/STOP times are programmed, pressing the SCHEDULE/ADVANCE DAY Key causes the display to read out the days of the week.

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

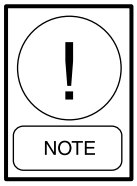
Individual days may be programmed to follow the holiday schedule by pressing the UP arrow key which places an * behind the day. Pressing the ENTER/ADV Key allows the cursor to move to the next day and at the same time enter the * (day selected as holiday) or blank (day not selected as holiday). A day selected as a holiday (*) may be changed by pressing the DOWN Arrow Key to eliminate the asterisk. The ENTER/ADV Key must then be pressed to move the cursor to the next day and to enter the new selection into memory.

DISPLAY MESSAGES

Status Messages

Status messages describe the overall chiller system operating conditions. Individual system status messages describe system conditions on specific chillers connected to the sequencer.

Unless a STATUS message indicates a SHUTDOWN, NO RUN PERM, or FAULT, repetitively pressing the STATUS key will provide individual system status.



Individual system status displays are only available for the actual number of chiller programmed to operate from the sequencer.

A detailed description of the status messages are outlined below:

```
UNIT SWITCH OFF
SHUTDOWN
```

This message indicates the Unit Switch on the Sequencer control panel is in the OFF position and will not allow the chillers to run.

```
DAILY SCHEDULE
SHUTDOWN
```

The Daily Schedule Shutdown message informs the operator that the daily or holiday schedule programmed is keeping all of the chillers from running or that the time is incorrectly set.

```
F L O W  S W I T C H / R E M  S T O P
      N O  R U N  P E R M
```

This message informs the operator that the mixed supply chilled liquid line flow switch contacts to the Sequencer or remote cycling contacts in series with the flow switch contacts are open causing the chillers in the system to be shut down by the Sequencer. This situation is referred to as a no run permissive condition.

```
U N I T  1  N O  C O O L  L O A D
U N I T  2  N O  C O O L  L O A D
```

This message informs the operator that chilled liquid temperature is below the high end of the "control range" (Setpoint + Range) and no further loading is required. The message may also mean that the sequencer has not sequenced steps to the point where the individual chiller unit(s) displayed is designated to start.

```
U N I T  1  R U N  E N A B L E D
U N I T  2  R U N  E N A B L E D
```

The RUN ENABLED message indicates that the respective unit has been allowed to run due to demand.

```
U N I T  1  T M R  X X X  S
U N I T  2  T M R  X X X  S
```

The anti-recycle message shows the amount of time left on the respective systems anti-recycle timer. This message is only displayed when the system anti-recycled timer is active.

```
M A N U A L  O V E R R I D E  M O D E
      E N A B L E D
```

The Manual Override function activated under the OPTIONS key indicates that the Daily Schedule is being ignored (Manual override mode enabled). This is a priority Status Message and overrides all others.

Fault Status Messages

Unit safeties are faults that cause all running chillers to shut down. These faults are auto-reset faults, which allow the system to restart automatically after the condition causing the fault is no longer present. Unit safety messages will appear when the STATUS Key is pressed. Whenever a fault message appears, the safety thresholds on the sequencer have been exceeded and the unit (all systems) will be shut down and in some cases locked out. Presently only one unit safety (Under voltage cutout), applies. Undervoltage cutouts are logged into the HISTORY Buffer.

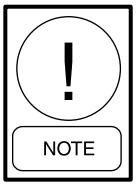
Under Voltage Fault

```
U N I T  F A U L T :
1 1 5 V A C  U N D E R  V O L T A G E
```

The Under Voltage Cutout shuts down all chillers when the sequencer detects a 115VAC undervoltage condition or a total power interruption. This ensures that temperature control of the chillers is not lost due to low voltage conditions. The fault will automatically reset when normal voltage conditions return.

UNIT WARNINGS

A Unit Warning is caused by a condition, which requires operator intervention to run the sequencer.



All setpoints and programmable values must be checked when a warning message appears.

Unit warnings will appear when the STATUS Key is pressed. Presently, only a low battery condition on the sequencer microboard will cause a warning to be displayed.

```
! !  L O W  B A T T E R Y  ! !
C H E C K  P R O G / S E T P / O P T N
```

The Low Battery Warning can only occur on sequencer power-up. On power-up the RTC (Real Time Clock) battery is checked by the micro to assure that it is still good. If the battery is determined to be low, the low battery message will be displayed indefinitely.

If the low battery message appears, all programmed setpoints, options, time, schedule, and history will be lost. The values will have been set to "default" values by the micro. Once a low battery is detected, the sequencer will prevent operation until the PROGRAM Key is pressed. Once the PROGRAM Key is pressed, the chiller anti-recycle timers will be set to the programmed anti-recycle time to allow the operator sufficient time to check and reprogram Setpoints, Program values, and Options.

When a low battery condition is detected, the RTC chip (U17 on the microboard) should be replaced with part number 031-00955-000. Assure power is off when replacing the part. Be sure that pin 1 of the new RTC chip lines up with pin 1 silk-screened on the circuit board.

If the battery is not replaced, any new values programmed into the panel will be lost if another power loss occurs.

Warnings are not logged into the HISTORY Buffer.

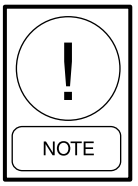
OPER DATA KEY:

Operating Parameter Displays

System operating parameters may be displayed by pressing the OPER DATA Key. Displays showing leaving and entering mixed water temperature, chiller run hours, load/unload timers, cooling demand (number of chillers selected to run at the moment), chiller sequence, and evaporator pump status are available.

Pressing the UP/DOWN ARROW Keys allows the operator to scroll through the OPER DATA displays.

```
LCHLT  =  43.8°F
RCHLT  =  49.2°F
```



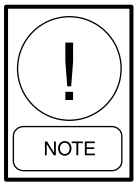
The chilled liquid display temperature limits are 9.2 °F - 85.4 °F.

```
CHILLER RUN HOURS
1 = 942, 2 = 942
```

```
CHILLER RUN HOURS
3 = 860, 4 = 715
```

```
CHILLER RUN HOURS
5 = 508, 6 = 320
```

```
CHILLER RUN HOURS
7 = 0, 8 = 0
```



Chiller run hours will only be displayed for actual chillers that are operating (programmed) on the sequencer.

```
LOAD TIMER 120 SEC
UNLOAD TIMER 120 SEC
```

```
COOLING DEMAND
3 OF 8 CHILLERS
```

```
CHILLER SEQUENCE
12345678
```

```
EVAP PUMP IS        ON
```

HISTORY DATA DISPLAYS

Presently, no History displays are available under the HISTORY key. Currently, there is no History buffer in the software.

PRINTING

Operating Data Printout

Pressing the PRINT key and then the OPER DATA key (individually and not at the same time) allows the operator to obtain a printout of current MUS system parameters which includes operating conditions and panel programming selections. A sample printout is shown below:

```
        YORK INTERNATIONAL CORPORATION
           MULTIPLE UNIT SEQUENCER

                UNIT STATUS
             6:18PM      18 JUN 99

CHILLER 1                              ENABLED
CHILLER 2                             DISABLED
CHILLER 3                             DISABLED
CHILLER 4                             DISABLED
CHILLER 5                             DISABLED
CHILLER 6                             DISABLED
CHILLER 7                             DISABLED
CHILLER 8                             DISABLED

                   OPTIONS

CHILLED LIQUID                          WATER
LEAD/LAG CONTROL                     AUTOMATIC

               PROGRAM VALUES

ANTI RECYCLE TIME                    600 SECS
LOAD TIMER                           300 SECS
CHILLERS TO SEQUENCE                       8
FIRST CHILLER IN SEQUENCE                  1

                 UNIT DATA

RETURN LIQUID TEMP                  58.2 DEGF
LEAVING LIQUID TEMP                 48.0 DEGF
COOLING RANGE              42.0 +/- 2.0 DEGF
CHILLER SEQUENCE             1 2 3 4 5 6 7 8
EVAPORATOR PUMP                           ON
SOFTWARE VERSION                C.MUS.01.00

               DAILY SCHEDULE

S  M  T  W  T  F  S                 *=HOLIDAY
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
```

History Printout

Presently no History printout is available since a history buffer is not present in software.

SOFTWARE VERSION

The software version programmed into the EPROM may be accessed by pressing the HISTORY Key and then repeatedly pressing the DOWN arrow key until the display scrolls past the first history buffer choice. A display similar to the one below will be observed:

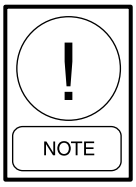
```
C . M X X . 0 1 . Y Y
```

Clearing History Buffers

The history buffers, when available, may be cleared by pressing the HISTORY key and then repeatedly pressing the UP arrow until you scroll past the last history buffer choice. The following message will be displayed:

```
I N I T I A L I Z E   H I S T O R Y ?
E N T E R   =   Y E S
```

Pressing the ENTER/ADV key will cause the history buffers to be cleared. Pressing any other key will cancel the operation.



Clearing the HISTORY Buffer, when available, is not recommended. Valuable data may be lost.

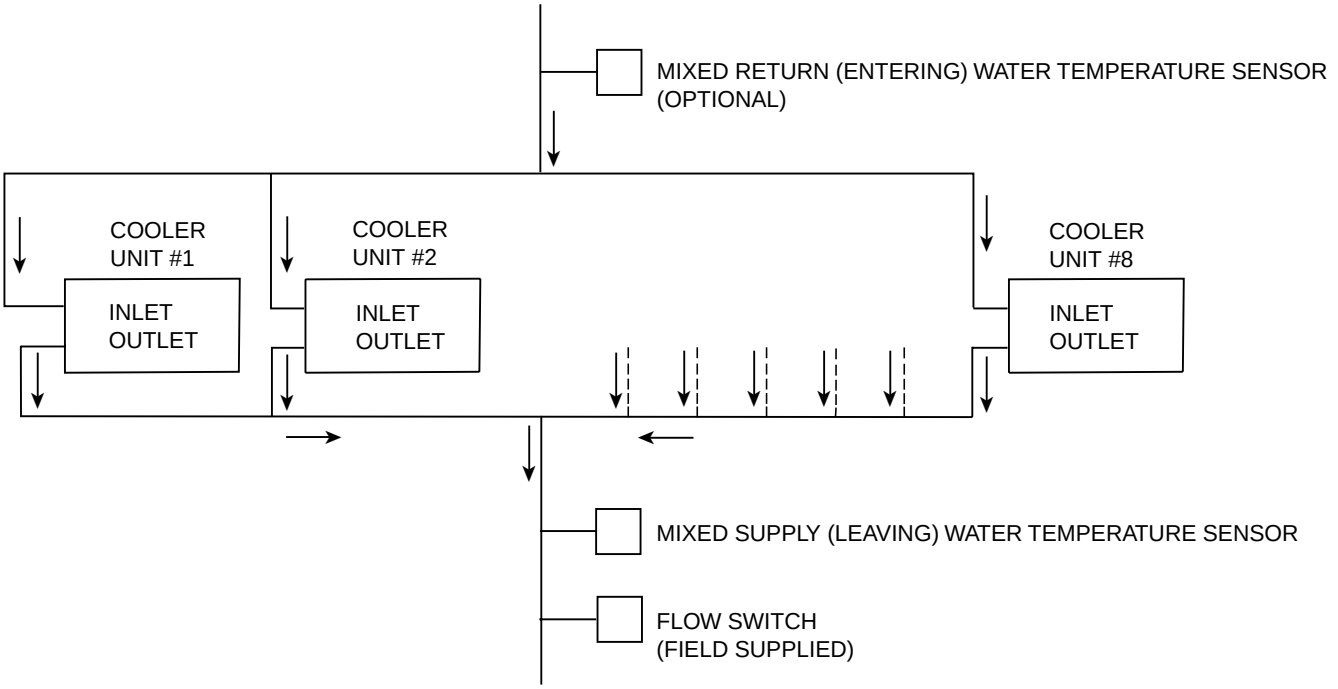
OPTIONS

Mixed Return Chilled Liquid Sensor

An optional Mixed Return Chilled Liquid sensor is available which provides readout of the mixed return liquid temperature.

REPLACEMENT PARTS

Microprocessor Board: 031-01793-001
Control Transformer (60 Hz): 025-34444-000
Control Transformer (50 Hz): 025-18452-000
Keypad: 024-27838-000
EPROM: 031-02018-010
Display: 031-01110-000
ON/OFF Switch: 024-25517-000
Mixed Leaving Chilled Liquid Sensor: 025-29964-000
Mixed Return Chilled Liquid Sensor: 025-29964-000
Real Time Clock (RTC): 031-00955-000
Fuse IFU: 025-34483-000



LD05123

FIG. 1 – MIXED WATER TEMPERATURE SENSOR LOCATIONS

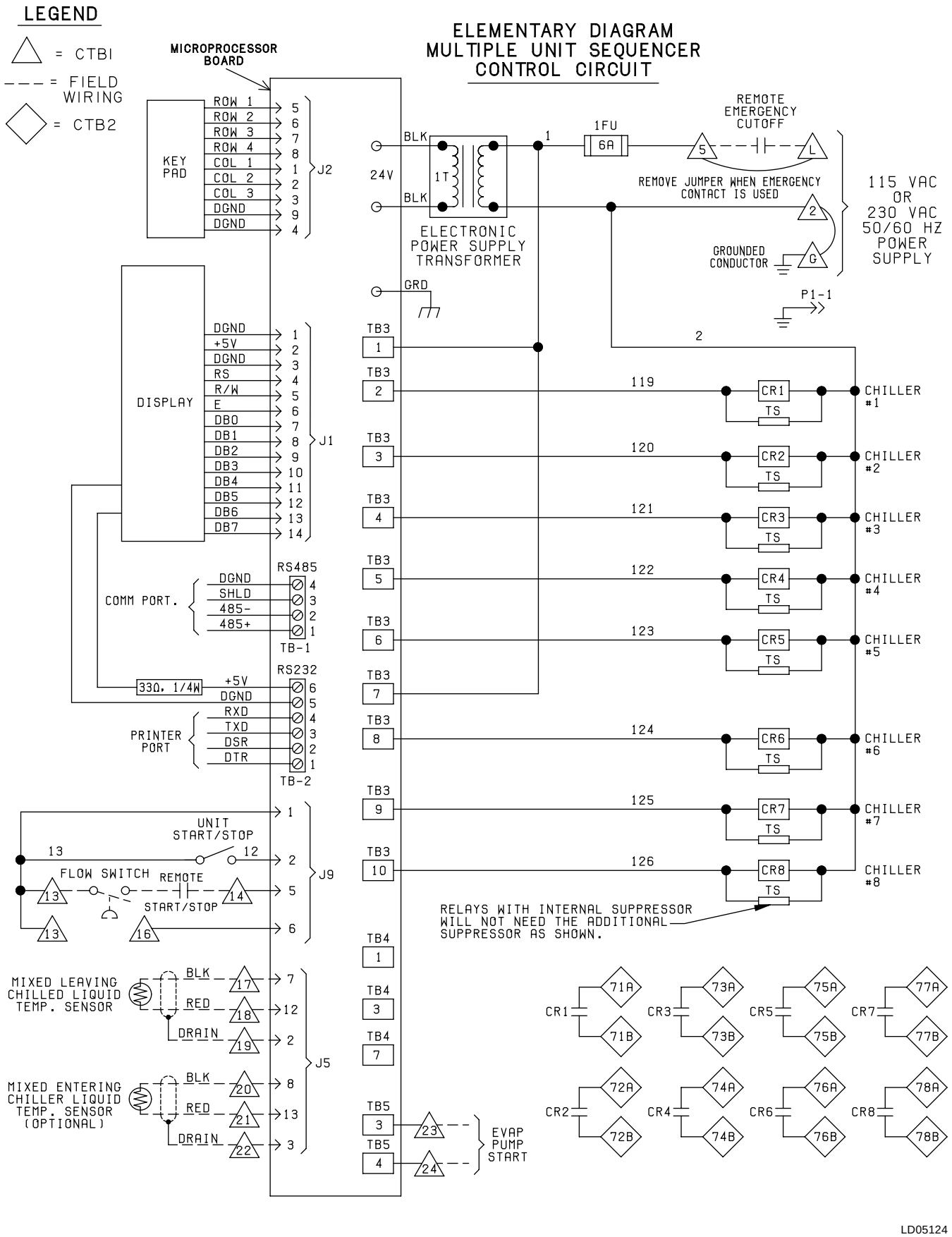


FIG. 2 – WIRING DIAGRAM

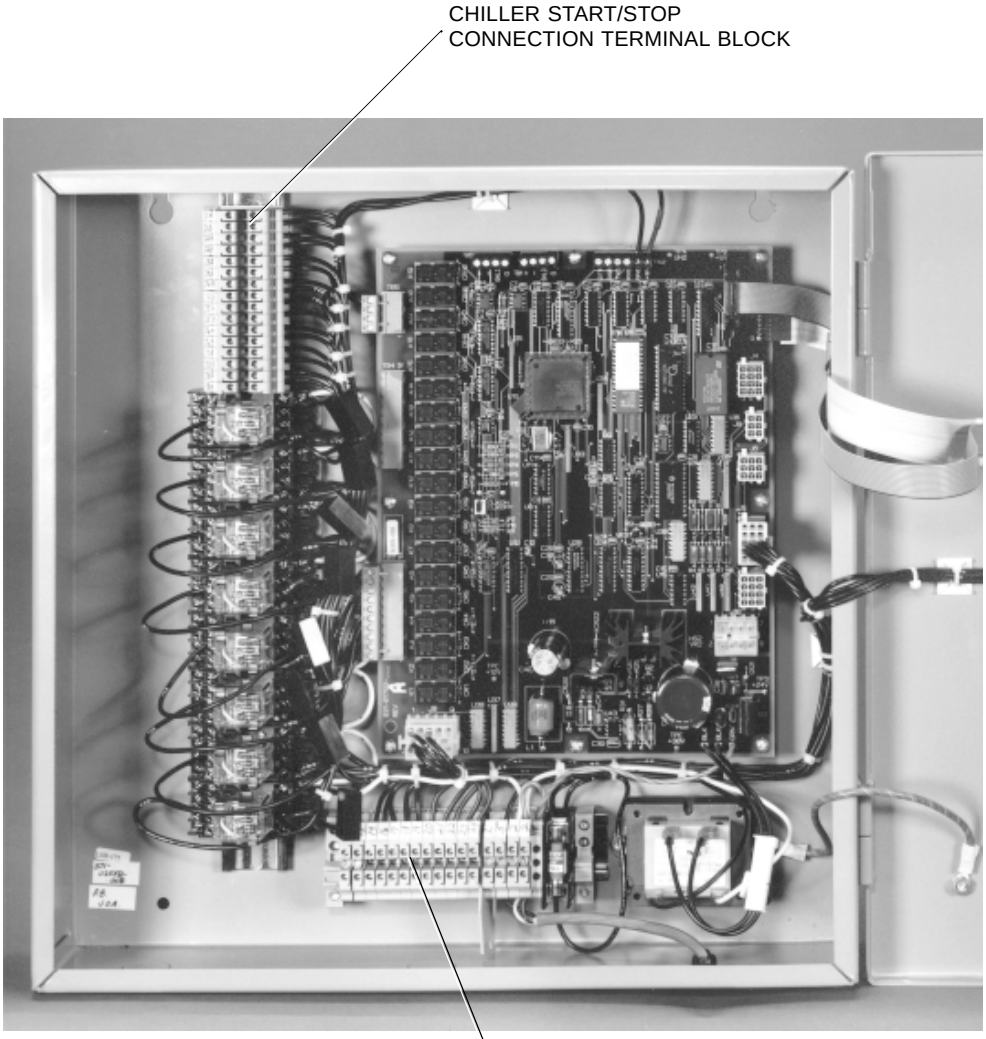


FIG. 3 – TERMINAL LOCATIONS

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