 <b>YORK</b> <sup>®</sup> PRODUCT DRAWING	Supersedes: 160.67-PW2 (204) <span style="float: right;">Form 160.67-PW2 (1007)</span>  <b style="text-align: center;">WIRING DIAGRAM          FIELD CONTROL MODIFICATIONS          MAXE™ MODEL YST CHILLERS (STYLE F)</b>	
CONTRACTOR _____ ORDER NO. _____ YORK CONTRACT NO. _____ YORK ORDER NO. _____	PURCHASER _____ JOB NAME _____ LOCATION _____ ENGINEER _____	
<input type="checkbox"/> REFERENCE    DATE _____	<input type="checkbox"/> APPROVAL    DATE _____	<input type="checkbox"/> CONSTRUCTION DATE _____

**JOB DATA:**

CHILLER MODEL NO. YST _____	CHILLER MODEL NO. YST _____
NO. OF UNITS _____	NO. OF UNITS _____

**Included by YORK® for Field Installation (by others) are:**

	YES	NO	PER UNIT
Condenser Liquid Low Pressure Differential	<input type="checkbox"/>	<input type="checkbox"/>	_____
Chilled Liquid Low Pressure Differential Switch	<input type="checkbox"/>	<input type="checkbox"/>	_____
Tachometer (On Optional Turbine Gaugeboard)	<input type="checkbox"/>	<input type="checkbox"/>	_____
_____	<input type="checkbox"/>	<input type="checkbox"/>	_____

### ENERGY MANAGEMENT SYSTEMS

MaxE™ chiller design allows for ease of interfacing with Energy Management Systems (EMS). The OptiView™ Control Center includes unit status contacts, provisions for remote control inputs and provisions for remote setpoint reset of leaving chilled liquid temperature and horsepower limit for EMS interfacing. Refer to paragraph 4 on page 2.

Five sets of unit status contacts are factory furnished through a field wiring terminal board in the OptiView™ Control Center. Each set of contacts are single pole, normally open, rated at 5 amperes resistive at 240VAC. Chiller status contacts are provided for the unit:

- Remote Mode Ready to Start - Refer to FIG. 1.
- Cycling Shutdown - Refer to FIG. 2.
- Safety Shutdown - Refer to FIG. 3.
- Run (System Operating) - Refer to FIG. 4.
- Anticipatory Alarm - Refer to FIG. 5.

Three sets of inputs are available to the EMS, allowing for remote control of unit operation. Input device contact rating shall be 5 milliamperes at 115 VAC. Field wiring terminal board (TB4) in the OptiView™ Control Center permits connection for the following operation:

- Remote Stop Contacts - Refer to FIG. 6.
- Remote Start Contacts - Refer to FIG. 6.
- Remote/Local Cycling Devices (Controlled Shutdown) Refer to FIG. 7.

It is possible to limit the power consumption of the chiller indirectly or directly by the following methods.

1. Chilled liquid pump control contacts (Refer to Notes 7 & 8 on Page 15) are provided, allowing for efficient automatic operation of the chilled liquid pump to reduce energy. The chilled liquid pump is not started until after the turbine has been slow rolled, when the ramp-to-rated speed is initiated. It is run during operation and coast down then automatically stopped 70 seconds after the drivetrain has coasted to a complete stop.

## ENERGY MANAGEMENT SYSTEMS (CON'T)

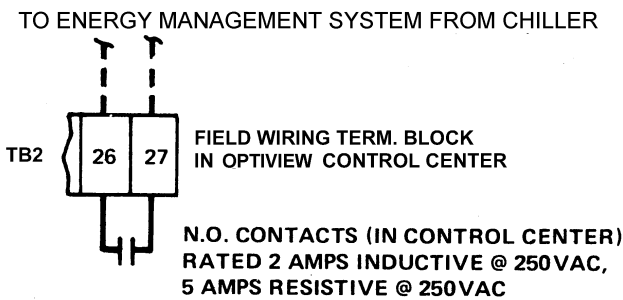
2. Reduce the steam turbine load (as well as the steam usage) by raising the leaving chilled liquid temperature through remote temperature control setpoint in the "remote" operating mode. Refer to FIG. 14 when the remote temperature reset is accomplished by supplying a 1 to 11 second pulse-width modulated signal. Jumper configurable analog inputs are available for remote temperature reset via a 0 to 20 or 4 to 20mA DC current signal (FIG.13), and a 0 to 10 or 2 to 10VDC signal (FIG.12).
3. Control the maximum allowable turbine horsepower from 30% to 100% through remote horsepower limit setpoint. Refer to FIG. 11 when the remote horsepower limit is accomplished by supplying a 1 to 11 second pulse-width modulated signal in the "remote" operating mode. Jumper configurable analog inputs are available for remote horsepower limit setpoint via a 0 to 20 or 4 to 20mA DC current signal (FIG. 10), and a 0 to 10 or 2 to 10 VDC signal (FIG. 9).
4. A Johnson Controls Metasys or other 3rd Party Control System may be interfaced with the chiller OptiView™ Control Center via the MicroGateway card which may be installed in the Control Center. All temperatures, pressures, safety alarms and cycling information known to the OptiView™ Control Center are then available to the 3rd Party System for integrated chiller plant control, data logging, and Local/Remote operator displays. The YORK® MicroGateway card also allows the remote stop/start, and reset of the chillers's horsepower limit and leaving chilled liquid temperature setpoints.



***External wiring, unless specified as an optional connection in the manufacturer's product literature, is NOT to be connected inside this cabinet. Furthermore, auxiliary devices such as relays, switches, transducers and controls may NOT be installed inside this enclosure. All wiring must be in accordance with YORK's published specifications and must be performed only by qualified personnel. YORK will NOT be responsible for damages resulting from improper connection to these controls or application of improper control signals. Failure to follow this warning will void the manufacturer's warranty and may cause serious damage to property or injury to persons.***

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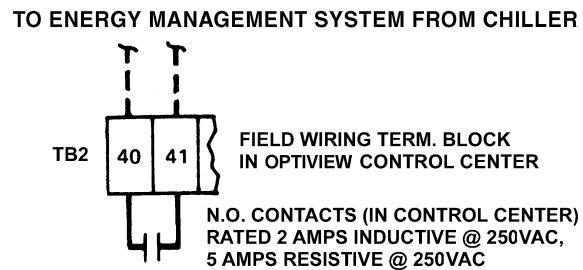


**FIG. 1 – REMOTE MODE READY TO START CONTACTS**

**REMOTE MODE READY TO START CONTACTS**

When closed, these contacts signify the following:

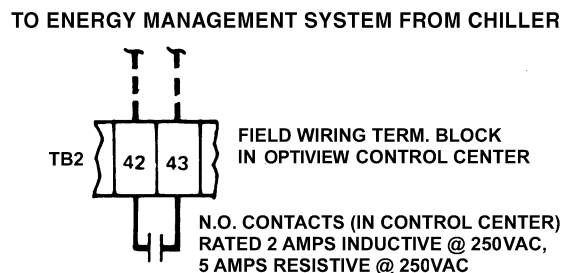
1. The OptiView™ Control center is in "Digital", "Analog" or "ISN" remote operating mode, allowing for energy management system or remote start/stop control (FIG. 6).
2. All chiller safety cutout control are in the normal position, so they will allow the unit to start.
3. All chiller cycling shutdown controls are in the normal position, so they will allow the unit to start.
4. The OptiView™ Control Center COMPRESSOR switch is in the "RUN" ( I ) position.
5. A closure of the Remote Ready to Start Contacts then signifies that the unit shall start when the Energy Management System maintains the Remote Stop Contact (FIG. 6) open and momentarily closes the Remote Start Contacts (FIG. 6). When the Remote Mode Ready to Start contacts close, the OptiView™ Control Center will display the following message: "SYSTEM READY TO START".



**FIG. 2 – CYCLING SHUTDOWN CONTACTS**

**CYCLING SHUTDOWN CONTACTS**

When closed, these contacts signify the unit is NOT permitted to start due to a CYCLING shutdown condition. The unit will automatically restart after the cycling condition is NO longer present. YORK Operating and Maintenance Manual 160.67-O1 provides a list and explanation of all cycling shutdowns. While these contacts are closed, the OptiView™ control Center will display "CYCLING SHUTDOWN - AUTO RESTART" on the System Status Bar and the cause of the shutdown on the Systems Details Bar of the display. Cycling Shutdown contacts function in all operating modes.



**FIG. 3 – SAFETY SHUTDOWN CONTACTS**

**SAFETY SHUTDOWN CONTACTS**

When closed, these contacts signify the unit is NOT permitted to start due to a SAFETY shutdown condition. Safety shutdowns require a manual reset procedure performed before the unit can be restarted. YORK Operating and Maintenance Manual 160.67-O1 provides a list and explanation of all Safety shutdowns. While these contacts are closed, the OptiView™ Control Center will display "Safety Shutdown - Manual Restart" on the System Status Bar and the cause of the shutdown on the System Details Bar of the display. These contacts will remain closed until the safety condition NO longer exists and a manual reset is performed by placing the OptiView™ Control Center COMPRESSOR Switch in the Stop-Rest position (O). The unit can then be restarted. Safety Shutdown contacts function in all operating modes.

TO ENERGY MANAGEMENT SYSTEM FROM CHILLER

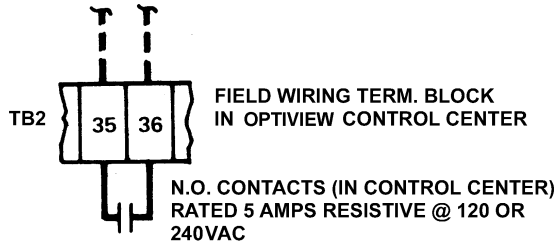


FIG. 4 – RUN CONTACTS

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**RUN CONTACTS**

When closed, these contacts signify that the unit has been started, the prelube has been completed, and the turbine slow roll may be started. If the turbine trip valve has opened, the OptiView™ Control Center will display the message "READY TO BEGIN SLOW ROLL".

TO ENERGY MANAGEMENT SYSTEM FROM CHILLER

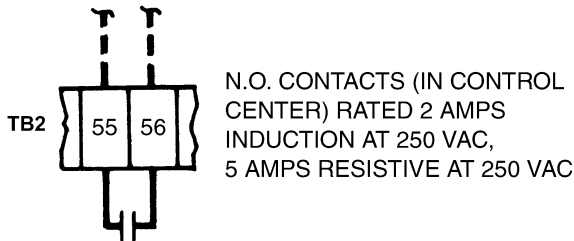


FIG. 5 – ANTICIPATORY ALARM CONTACTS

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**ANTICIPATORY ALARM CONTACTS**

These contacts will close whenever one or more WARNING condition occurs. They will remain closed as long as the condition is in effect. On most warnings, the contacts automatically open when the condition is NO longer present. On some Warnings, the contacts will open only after the condition is NO longer present and the WARNING RESET Key is pressed in Operator (or higher) access level.

YORK Operating and Maintenance Manual 160.67-01 provides a list and explanation of all WARNING conditions that will close these contacts.

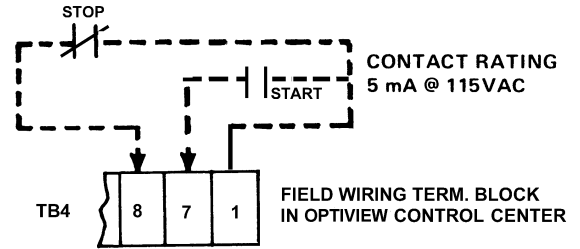


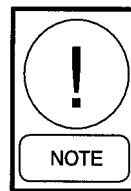
FIG. 6 – REMOTE START-STOP CONTACTS FROM ENERGY MANAGEMENT SYSTEM

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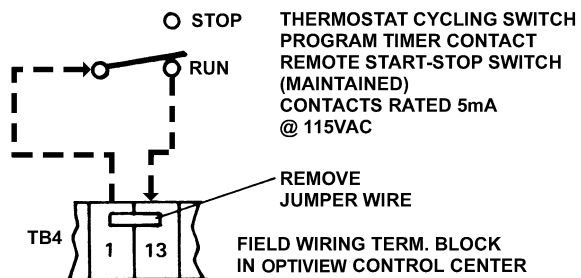
**REMOTE START AND STOP CONTACTS FROM ENERGY MANAGEMENT SYSTEM**

When the OptiView™ Control Center is in the "Digital", "Analog" or "ISN" remote operating mode and the COMPRESSOR switch is in the "RUN" (I) position, with the Remote Stop Contacts open, and the Remote Mode Ready to Start Contacts closed (FIG. 1), the unit will start via a closure of the Remote Start Contacts. A subsequent closure of the Energy Management System Remote Stop Contacts causes the chiller to shutdown after a controlled shutdown sequence has been completed. The OptiView™ Control Center will display "REMOTE STOP" because the Energy Management System Remote Stop Contacts has commanded the unit to shutdown.

It is recommended that maintained contacts be used for both START and STOP.



*Even when the chiller is applied with Remote Start-Stop (when the Control Center is in the "Remote Operating Mode"), an EMERGENCY STOP by an operator or others can STOP the compressor from the OptiView Control Center and prevent the chiller from restarting. However, the operator cannot locally start the compressor using "Compressor" start switch, when the Control Center is in the "Remote"*

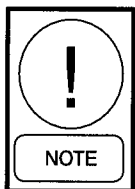


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FIG. 7 – REMOTE/LOCAL CYCLING DEVICES (CONTROLLED SHUTDOWN)

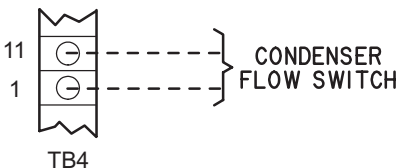
**REMOTE/LOCAL CYCLING DEVICES (CONTROLLED SHUTDOWN)**

The closure of an automatic reset device across this input will permit the unit to operate in all operating modes. Conversely, an opening of the device contacts will inhibit the unit from operating; the OptiView™ Control Center will then display the following messages: "CYCLING SHUTDOWN - AUTO RESTART" and "SYSTEM CYCLING - CONTACTS OPEN".



*A "Controlled Shutdown" initiated by the opening of these contacts while the chiller is running causes the speed to be reduced, the compressor pre-rotation vanes to close, and the hot gas bypass valve to open prior to tripping the turbine. A subsequent closure of these contacts will initiate a start sequence.*

**I/O BOARD PADDLE-TYPE FLOW SENSOR OR DIFFERENTIAL PRESSURE SWITCH**



**CONDENSER FLOW SENSORS**

The chiller is supplied with a thermal conductivity type flow sensor factory installed in the condenser liquid outlet nozzle.

The Thermal-Type flow sensor interfaces with the microboard. The paddle type flow sensor or Differential Pressure Switch interfaces with the I/O board.

For the program to read the appropriate inputs for the flow sensor status, the actual flow sensor type used must be entered at the keypad using Service Access Level. Enter "Analog" for thermal-type or "Digital" for paddle-type or differential pressure switch. Refer to Operation manual 160.67-O1.

With any of the flow sensors, when condenser liquid is flowing, the Flow Switch contact will close. Opening of the condenser liquid flow switch contacts for 30 continuous seconds will cause unit shutdown. The Flow Switch Status is checked 45 seconds into "System Pre-lube" and continuously thereafter. The OptiView™ Control Center will display the following message: "CYCLING SHUTDOWN - AUTO RESTART" and "CONDENSER FLOW SWITCH OPEN".

**THERMAL TYPE FLOW SENSOR**

When the Thermal-type flow switch is used, the flow switch uses the cooling effect of liquid to sense flow.

When the flow of liquid is sensed, the solid-state relay output is turned ON conduction current through the microboard load resistor to the +5Vdc Applying >+4Vdc to the microboard input J7-16.

When no flow of liquid is sensed, the solid state relay output is turned off, this results in <1Vdc to the microboard input and a unit shutdown after a 30 second delay.

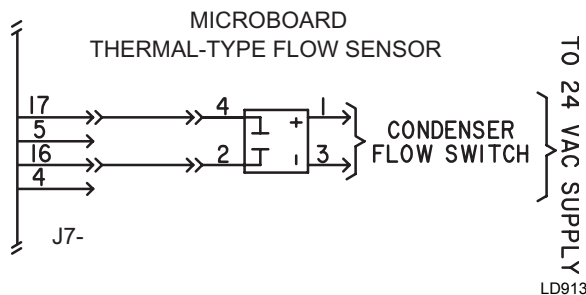
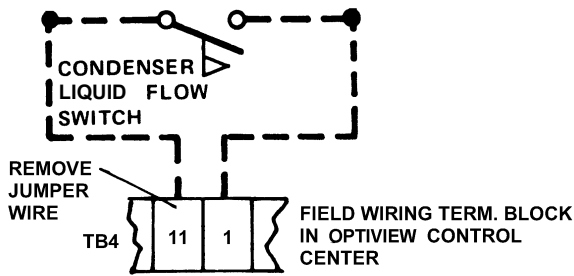


FIG. 8 – CONDENSER FLOW SENSORS

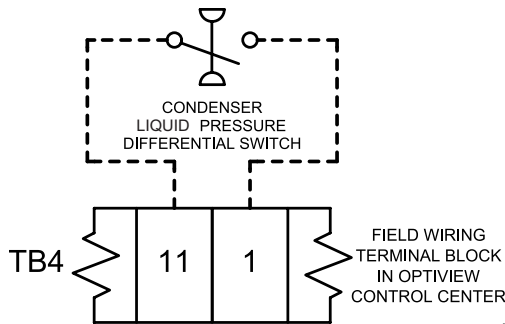


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**FIG. 8A – PADDLE TYPE FLOW SENSOR**

**PADDLE TYPE FLOW SENSORS**

If desired, a paddle type flow switch can be applied. Flow Switch - Johnson Controls type F61MG-1C, max. 150 psi (YORK P/N 024-26116-000) available at additional cost.



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**FIG. 8B – CONDENSER LIQUID PRESSURE DIFFERENTIAL SWITCH**

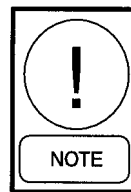
**CONDENSER LIQUID PRESSURE DIFFERENTIAL SWITCH**

If desired, a condenser liquid pressure differential switch can be applied:- Pretempco DPS300A or Potter 1382, max. 300 psi (YORK P/N 025-30919-000).

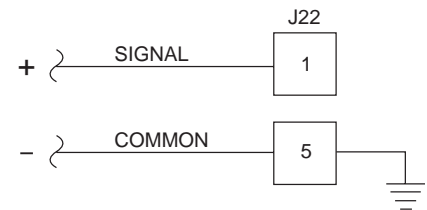
**REMOTE HORSEPOWER LIMIT SETPOINT with 0-10 VDC, 0-20mA or Pulse Width Modulation Signal**

The remote Horsepower Limit setpoint can be reset over the range of 100% to 30% of the Horsepower Limit PID Local Setpoint by supplying (by others) a 0-10VDC, 2-10VDC, 0-20mA, 4-20mA or 1 to 11 second Pulse Width Modulation (PWM) signal to the OptiView™ Control Center. The OptiView™ Control Center must be configured appropriately to accept the desired signal type as follows:

- The appropriate Remote Mode must be selected: "**Analog**" Remote Mode **MUST** be selected when using a voltage or signal input. "**Digital Remote Mode**" **MUST** be selected when using a PWM input.
- If "**Analog**" Remote Mode is selected, the **Remote Analog Input Range** setpoint **MUST** be set to "0-10VDC" or "2-10VDC" as detailed below, regardless of whether the signal is a voltage or current input signal type.
- Microboard Program Jumper JP23 must be positioned appropriately per the input signal type as detailed below. It is recommended that a qualified Service Technician position this jumper.



**IMPORTANT!!** The signal type used for Remote Horsepower Limit Setpoint reset and the signal type used for Remote Leaving Chilled Liquid Temperature setpoint reset must be the same. for example, if a 0-10VDC signal is being used for Remote Leaving Chilled Liquid Temperature Reset, then a 0-10VDC signal must be used for Remote Horsepower Limit Reset.



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**FIG. 9 – REMOTE HORSEPOWER LIMIT SETPOINT WITH 0-10VDC OR 2-10VDC SIGNAL**

**0-10 VDC** - As shown in FIG. 9 connect input to Microboard J22-1 (signal) and J22-5 (gnd). The setpoint varies linearly from 100% to 30% as the input varies from 0-10VDC. This input will only be accepted when "**Analog**" Remote Mode is selected, the "**Remote Analog Input Range**" setpoint is set for 0-10 Volts, and Microboard Program Jumper JP23 has been removed. Calculate the setpoint for various inputs as follows:

$$\text{SETPOINT (\%)} = 100 - (\text{VDC} \times 7)$$

For example, if the input is 5 VDC, the setpoint would be set to 65% as follows:

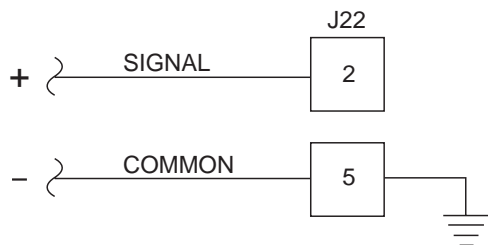
$$\text{SETPOINT (\%)} = 100 - (5 \times 7) = 100 - 35 = 65\%$$

**2-10 VDC** - As shown in FIG. 9 connect input to Microboard J22-1 (signal) and J22-5 (gnd). The setpoint varies linearly from 100% to 30% as the input varies from 2 to 10VDC. This input will only be accepted when "Analog" Remote Mode is selected, the "Remote Analog Input Range" setpoint is set for 2-10 Volts, and Microboard Program Jumper JP23 has been removed. Calculate the setpoint for various inputs as follows:

$$\text{SETPOINT (\%)} = 100 - [(\text{VDC} - 2) \times 8.75]$$

For example, if the input is 5 VDC, the setpoint would be set to 74% as follows:

$$\begin{aligned} \text{SETPOINT (\%)} &= 100 - [(5 - 2) \times 8.75] \\ &= 100 - (3 \times 8.75) \\ &= 100 - 26.25 = 74\% \end{aligned}$$



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**FIG. 10 – REMOTE HORSEPOWER LIMIT SETPOINT WITH 0-20mA OR 4-20mA SIGNAL**

**0-20mA** - As shown in FIG. 10 connect input to microboard J22-2 (signal) and J2-5 (gnd). The setpoint varies linearly from 100% to 30% of the Horsepower Limit PID Local Setpoint as the input varies from 0mA - 20mA. This input will only be accepted when "Analog" remote Mode is selected, the "Remote Analog Input Range" setpoint is set for 0-10 Volts, and Microboard Program Jumper JP23 has been placed on pins 1 and 2. Calculate the setpoint for various inputs as follows:

$$\text{SETPOINT (\%)} = 100 - (\text{mA} \times 3.5)$$

For example, if the setpoint is 8mA the setpoint would be as follows:

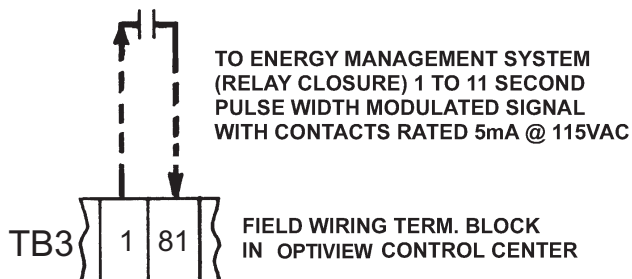
$$\begin{aligned} \text{SETPOINT (\%)} &= 100 - (8 \times 3.5) \\ &= 100 - 28 = 72\% \end{aligned}$$

**4-20mA** - As shown in FIG. 10, connect input to microboard J22-2 (signal) and J2-5 (gnd). The setpoint varies linearly from 100% to 30% as the input varies from 4mA to 20mA. This input will only be accepted when "Analog" Remote Mode is selected, the "Remote Analog Input Range" setpoint is set for 2 - 10 Volts and Microboard Program Jumper JP23 has been placed on pins 1 and 2. Calculate the setpoint for various inputs as follows:

$$\text{SETPOINT (\%)} = 100 - [(\text{MA} - 4) \times 4.375]$$

For example, if the input is 8mA, the setpoint would be set to 83% as follows:

$$\begin{aligned} \text{SETPOINT (\%)} &= 100 - [(8 - 4) \times 4.375] \\ &= 100 - (4 \times 4.375) \\ &= 100 - 17.5 \\ &= 82.5 \\ &= 83\% \end{aligned}$$



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**FIG. 11 – REMOTE HORSEPOWER LIMIT SETPOINT WITH PWM SIGNAL**

**PWM** - The Pulse Width Modulation input is in the form of a 1 to 11 second relay contact closure that applies 115VAC to the I/O Board TB3-81 (signal) for 1 to 11 seconds. As shown in FIG. 11, connect dry closure relay contacts between I/O Board TB3-81 (signal) and TB4-1 (115 VAC). The setpoint varies linearly from 100% to 30% as the relay contact closure time changes from 1 to 11 seconds. The relay contacts should close for 1 to 11 seconds at least once every 30 minutes to maintain the setpoint to the desired value. If a 1 to 11 second closure is not received within 30 minutes of the last closure, the setpoint is defaulted to 100%. A closure is only accepted at rates not to exceed once every 70 seconds. This input will only be accepted in "Digital" Remote Mode. Calculate the setpoint for various pulse widths as follows:

$$\text{SETPOINT (\%)} = 100 - [(\text{Pulse Width in Seconds} - 1) \times 7]$$

For example, if the relay contacts close for 3 seconds, the setpoint would be set to 86% as follows:

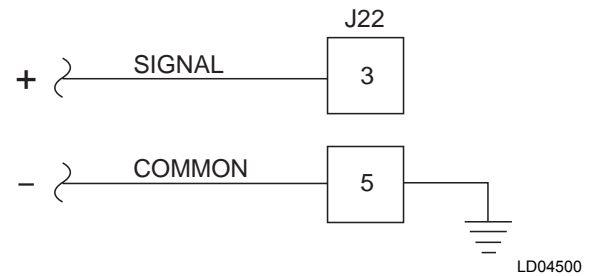
$$\begin{aligned}\text{SETPOINT} &= 100 - [(3-1) \times 7] \\ &= 100 - (2 \times 7) \\ &= 100 - 14 \\ &= 86\%\end{aligned}$$

### REMOTE LEAVING CHILLED LIQUID SETPOINT with 0-10VDC, 2-10VDC, 0-20mA, 4-20 mA or Pulse Width Modulation Signal

Remote Leaving Chilled Liquid Temperature Setpoint Reset can be accomplished by supplying (by others) a 0-10VDC, 2-10VDC, 0-20mA, 4-20 mA or 1 to 11 second Pulse Width Modulated (PWM) signal to the Control Center. The Leaving Chilled Liquid Temperature Setpoint is programmable over the range of 38°F to 70°F (water applications), 36°F to 70°F (water applications with Smart Freeze Protection enabled) or 10°F to 70°F (brine applications).

The Remote Input Signal changes the setpoint by creating an offset above the locally programmed Leaving Chilled Liquid Temperature Base Setpoint value. The setpoint can be remotely changed over the range of 10° or 20°F (as per the locally programmed **Remote Reset Temperature Range** setpoint) above the Local Leaving Chilled Liquid Temperature Setpoint. For example, if the Local Setpoint is 40°F and the **Remote Reset Temperature Range** setpoint is programmed for 10°F, the Leaving Chilled Liquid Temperature setpoint can be remotely reset over the range of 40°F to 50°F. The Control Center must be configured appropriately to accept the desired signal type as follows:

- The appropriate Remote Mode must be selected: **Analog Remote Mode** must be selected when using a voltage or current signal input. **Digital Remote Mode** must be selected when using a PWM input.
- If **Analog Remote Mode** is selected, the **Remote Analog Input Range** setpoint must be set to "0-10VDC" or "2-10VDC" as detailed below, regardless of whether the signal is a voltage or current signal type.
- Microboard Program Jumper JP24 must be positioned appropriately per the input signal type as detailed below. It is recommended a qualified Service Technician position this jumper.



**FIG. 12 – REMOTE LEAVING CHILLED LIQUID TEMP. SETPOINT WITH 0-10VDC OR 2-10VDC SIGNAL**

**0-10VDC** - As shown in FIG. 12, connect input to Microboard J22-3 (signal) and J22-5 (gnd). A 0VDC signal produces a 0°F offset. A 10VDC signal provides the maximum offset (10°F or 20°F above the local setpoint value). The setpoint is changed linearly between these extremes as the input varies linearly over the range of 0VDC to 10VDC. This input will only be accepted when "**Analog**" Remote Mode is selected, the "**Remote Analog Input Range**" setpoint is set for 0 - 10 Volts, and Microboard Program Jumper JP24 has been removed. Calculate the setpoint for various inputs as follows:

$$\text{OFFSET (}^\circ\text{F)} = \frac{(\text{VDC})(\text{REMOTE RESET TEMP. RANGE})}{10}$$

$$\text{SETPOINT (}^\circ\text{F)} = \text{LOCAL SETPOINT} + \text{OFFSET}$$

For example, if the input is 5VDC and the remote Reset Temperature Range setpoint is programmed for 10°F and the Local Leaving Chilled Liquid Temperature setpoint is programmed for 40°F, the setpoint would be set to 45°F as follows:

$$\begin{aligned}\text{OFFSET (}^\circ\text{F)} &= \frac{5 \times 10}{10} \\ &= \frac{50}{10} \\ &= 5^\circ\text{F}\end{aligned}$$

$$\begin{aligned}\text{SETPOINT (}^\circ\text{F)} &= 40 + 5 \\ &= 45^\circ\text{F}\end{aligned}$$

**2-10VDC** - As shown in FIG. 12, connect input to Microboard J22-3 (signal) and J2-5 (gnd). A 2VDC signal produces a 0°F offset. A 10 VDC signal produces the maximum allowed offset (10°F or 20°F above the Local Setpoint Value). The setpoint is change linearly between these extremes as the input varies over the range of 2VDC to 10VDC. This input will only be accepted when "**Analog**" Remote Mode is

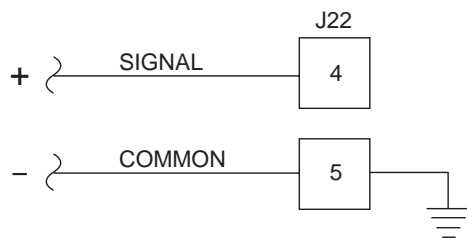
selected, the "**Remote Analog Input Range**" setpoint is set for "2-10VDC" and the Microboard Program Jumper JP24 has been removed. Calculate the setpoint for various inputs as follows:

$$\text{OFFSET (}^\circ\text{F)} = \frac{(\text{VDC} - 2)(\text{Remote Reset Temp. Range})}{8}$$

$$\text{SETPOINT (}^\circ\text{F)} = \text{Local Setpoint} + \text{Offset}$$

For example, if the input is 5VDC and the Remote Reset Temp. Range Setpoint is programmed for 40°F, the setpoint would be set to 43.8°F.

$$\begin{aligned}\text{OFFSET (F)} &= \frac{(5 - 2)(10)}{8} \\ &= \frac{(3)(10)}{8} \\ &= \frac{30}{8} \\ \text{SETPOINT (}^\circ\text{F)} &= 40 + 3.8 \\ &= 43.8^\circ\text{F}\end{aligned}$$



LD04501

**FIG. 13 – REMOTE LEAVING CHILLED LIQUID TEMP. SETPOINT WITH 0-20mA OR 4-20mA SIGNAL**

**0-20mA** - As shown in FIG. 13, connect input to Microboard J22-4 (signal) and J22-5 (gnd). A 0mA signal produces a 0°F offset. A 20mA signal produces the maximum allowed offset (10 or 20°F above the local setpoint value). The setpoint is changed linearly between these extremes as the input varies over the range of 0-20mA. This input will only be accepted when "**Analog**" Remote Mode is selected, the "**Remote Analog Input Range**" setpoint is set for "0-10VDC" and microboard Program Jumper J24 has been placed on pins 1 and 2. calculate the setpoint for various inputs as follows:

$$\text{OFFSET (}^\circ\text{F)} = \frac{(\text{mA})(\text{Remote Reset Temp. Range})}{20}$$

$$\text{SETPOINT (}^\circ\text{F)} = \text{Local Setpoint} + \text{Offset}$$

For example, if the input is 8mA, the Remote Reset Temp. Range Setpoint is programmed for 10°F and the Local Leaving Chilled Liquid Temperature setpoint is programmed for 40°F, the setpoint would be set to 44°F as follows:

$$\text{OFFSET (F)} = \frac{(8)(10)}{20}$$

$$= \frac{(80)}{20}$$

$$= 4\text{F}$$

$$\begin{aligned}\text{SETPOINT (}^\circ\text{F)} &= 40 + 4 \\ &= 44^\circ\text{F}\end{aligned}$$

**4-20mA** - As shown in FIG. 13, connect input to Microboard J22-4 (signal) and J22-5 (gnd). A 4mA signal produces a 0°F offset. A 20mA signal produces the maximum allowed offset (10 or 20°F above the Local Setpoint Value). The setpoint is changed linearly between these extremes as the input varies over the range of 4-20mA. This input will only be accepted when "**Analog**" Remote Mode is selected, the "**Remote Analog Input Range**" setpoint is set for "2-10VDC" and Microboard jumper JP24 has been placed on pins 1 and 2. Calculate the setpoint for various inputs as follows:

$$\text{OFFSET (F)} = \frac{(\text{mA}-4)(\text{Remote Temp. Reset Range})}{16}$$

$$\text{SETPOINT (F)} = \text{Local Setpoint} + \text{Offset}$$

For example, if input is 8mA, and the Remote Reset Temp. Range Setpoint is programmed for 10°F and the Local Leaving Liquid Temperature setpoint is programmed to 40°F, the setpoint could be set to 42.5°F as follows:

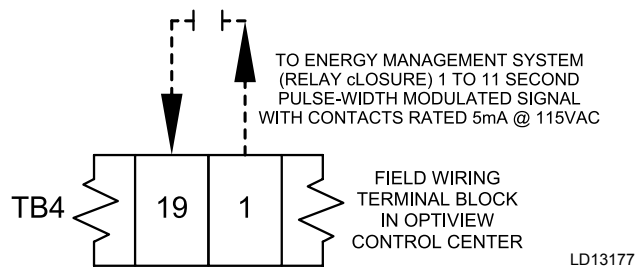
$$\text{OFFSET (}^\circ\text{F)} = \frac{(8-4)(10)}{16}$$

$$= \frac{(4)(10)}{16}$$

$$= \frac{40}{16}$$

$$= 2.5^\circ\text{F}$$

$$\begin{aligned}\text{SETPOINT (}^\circ\text{F)} &= 40 + 2.5 \\ &= 42.5^\circ\text{F}\end{aligned}$$



**FIG. 14 – REMOTE LEAVING CHILLED LIQUID TEMP. SETPOINT WITH PWM SIGNAL**

**PWM** - The Pulse Width Modulation is in the form of a 1 to 11 second relay contact closure that applies 115VAC to the I/O Board TB4-19 for 1- 11 seconds. As shown in FIG. 14, connect dry closure relay contacts between I/O Board TB4-19 (input) and TB4-1 (115VAC). A contact closure time (Pulse Width) of 1 second produces a 0°F offset. An 11 second closure produces the maximum allowed offset (10 of 20°F above the local setpoint value). The relay contacts should close for 1 to 11 seconds at least every 30 minutes to maintain the setpoint to the desired value. If a 1 to 11 second closure is NOT received within 30 minutes of the closure, the setpoint is defaulted to the local setpoint value. A closure is only accepted at rates NOT to exceed once every 70 Seconds. This input will only be accepted in "Digital" Remote Mode. Calculate the setpoint for various pulse widths as follows:

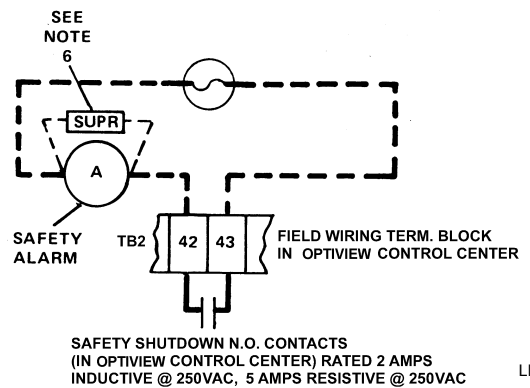
$$\text{OFFSET (°F)} = \frac{(\text{Pulse Width})(\text{Remote Reset Temp. Range})}{10}$$

$$\text{SETPOINT (°F)} = \text{LOCAL SETPOINT} + \text{OFFSET}$$

For example, if the relay contacts close for 5 seconds and the Remote Reset Temperature Range setpoint is programmed for 10°F, and the Local Leaving Chilled Liquid Temperature setpoint is programmed for 40°F, the setpoint would be set to 44°F as follows:

$$\begin{aligned} \text{OFFSET (°F)} &= \frac{(5-1)(10)}{10} \\ &= \frac{(4)(10)}{10} \\ &= \frac{40}{10} \\ &= 4^\circ\text{F} \end{aligned}$$

$$\begin{aligned} \text{SETPOINT (°F)} &= 40 + 4 \\ &= 44^\circ\text{F} \end{aligned}$$



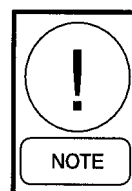
**FIG. 15 – EXTERNAL SIGNAL FOR REFRIGERATION UNIT FAILURE**

**EXTERNAL SIGNAL FOR REFRIGERATION UNIT FAILURE**

**EXTERNAL SIGNAL FOR REFRIGERATION UNIT FAILURE** - When the Safety Shutdown Contacts (FIG. 3) are NOT connected to an Energy Management System they may be employed to energize a local or remote safety alarm (by others). When the normally open Safety Shutdown Contacts close, the alarm will indicate shutdown of the unit.

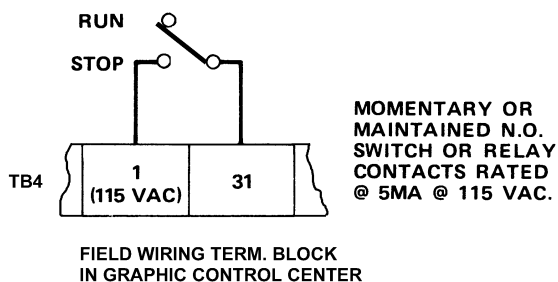
The OptiView™ Control Center Operation Manual provides a list and explanation of all safety shutdowns that will close the contacts.

When all safety controls are satisfied, and the OptiView™ Control Center COMPRESSOR switch has been manually "Reset" (de-energizing alarm) and returned to the RUN position (I), the unit may be restarted, if the panel is in "Remote" mode, and the Remote Start contacts are closed (FIG. 6); or, if the panel is in "Local" mode by momentarily pressing the keypad compressor switch to the START (◀) position.



*If the unit was shutdown because of Cycling Shutdown Contacts (see FIG. 2) the alarm will NOT be energized, but the unit will have been shutdown. A closure of the safety alarm contacts means that an operator must manually reset the safety after the condition has returned to normal.*

When the Safety Shutdown Contacts close, the OptiView™ Control Center will display the following message: "SAFETY SHUTDOWN - MANUAL RESTART", and cause of shutdown.

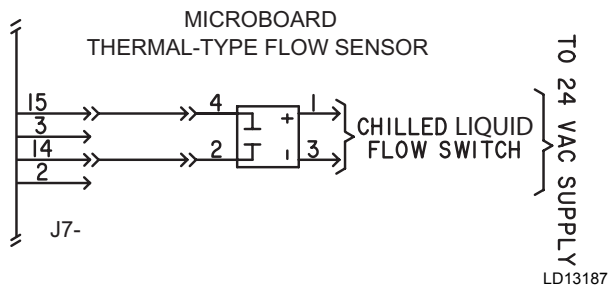
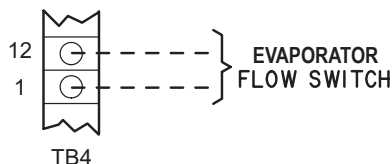


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**FIG. 16 – AUXILIARY SAFETY SHUTDOWN INPUT**

**AUXILIARY SAFETY SHUTDOWN** - The closure of a Momentary or Maintained N.O. Switch or Relay Contacts will cause the unit to shutdown and display: "SAFETY SHUTDOWN - MANUAL RESTART" and "AUXILIARY SAFETY - CONTACTS CLOSED". The unit may NOT be restarted until the contacts open and the keypad COMPRESSOR switch is moved to the "STOP-RESET" position (O) and then to the "START" (◀) position.

I/O BOARD  
PADDLE-TYPE FLOW SENSOR  
OR DIFFERENTIAL PRESSURE SWITCH



**FIG. 17 – EVAPORATOR FLOW SENSORS**

**EVAPORATOR FLOW SENSORS** - The chiller is supplied with a thermal conductivity type flow sensor factory installed in the evaporator liquid outlet nozzle.

The Thermal-type flow sensor interfaces with the Microboard. The Paddle-type flow sensor of Differential Pressure Switch interfaces with the I/O board.

For the program to read the appropriate inputs for the flow sensor status, the actual flow sensor type used must be en-

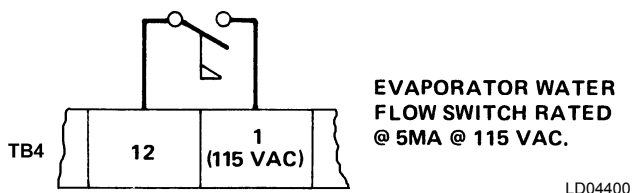
tered at the keypad using the Service Access Level. Enter "Analog" for Thermal-type or "Digital" for Paddle-type or Differential Pressure Switch. Refer to the Operation Manual 160.67 O1.

With any type of Flow Switch Sensor, when the Evaporator Liquid is flowing, the flow switch contacts will close. If the flow switch opens for 5 seconds, the unit shuts down and displays "CYCLING SHUTDOWN" and "LEAVING CHILLED LIQUID - FLOW SWITCH OPEN". The chiller may be restarted when the switch again closes. The flow switch status is checked 10 seconds (programmable up to 60 seconds) after the turbine slow roll has been completed and the chilled liquid pump contacts have been closed, and continuously thereafter.

**THERMAL-TYPE FLOW SENSORS** - When the Thermal-type flow switch is used, the flow switch uses the cooling effect of liquid to sense flow.

When the flow of liquid is sensed, the relay output is turned ON conducting current through the microboard load resistor to the +5VDC applying >+4VDC to the microboard input J7-14.

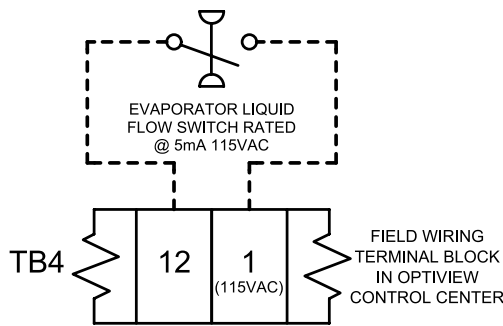
When NO flow of liquid is sensed, the relay output is turned OFF, this results in <1VDC to the microboard input and a unit shutdown after a 5 second delay.



LD04400

**FIG. 17A – PADDLE-TYPE FLOW SENSOR**

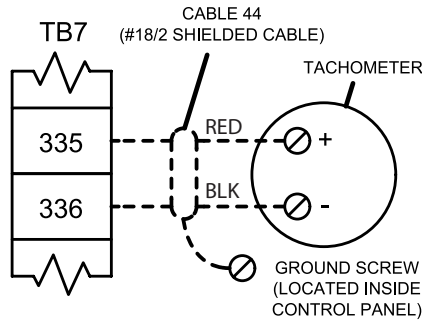
**PADDLE-TYPE FLOW SENSOR** - If desired, a paddle-type flow sensor can be applied. Flow Switch - Johnson Controls type F61MG-1C, max. 150 psi (YORK P/N 024-26116-000) is available at an additional cost.



**FIG. 17B – EVAPORATOR LIQUID PRESSURE DIFFERENTIAL SWITCH**

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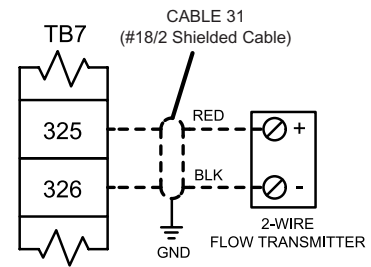
**EVAPORATOR LIQUID PRESSURE DIFFERENTIAL SWITCH** - If desired, an evaporator Liquid Pressure Differential Switch can be applied; - Pretempco DPS300A or Potter 1382, max. 300 psi (YORK P/N 025-30919-000) is available at an additional cost.



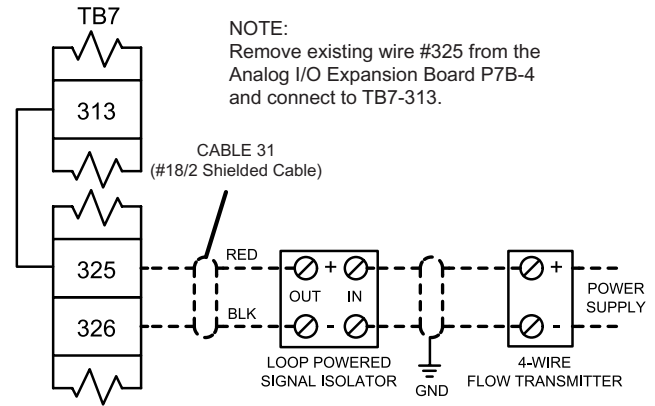
**FIG. 18 – TACHOMETER**

LD13179

**TACHOMETER** - If desired, a tachometer can be used for remote indication of the turbine speed; Dynalco LMD-120A (YORK P/N 025-40250-000) is available at an additional cost as part of the optional Turbine Gaugeboard. The tachometer receives a 4-20mA signal from the Analog I/O board, analog output channel #4 representing a speed of 0-5000 rpm.



**NOTE:**  
Remove existing wire #325 from the Analog I/O Expansion Board P7B-4 and connect to TB7-313.



LD13180

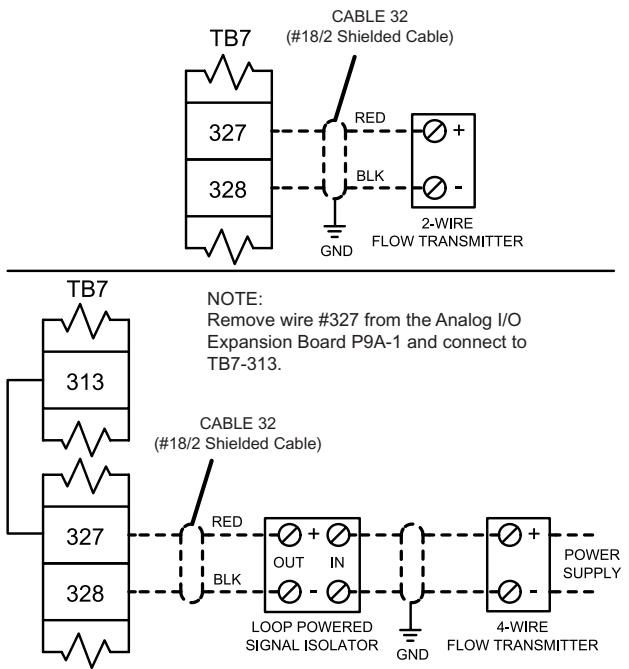
**FIG. 19 – CHILLED LIQUID FLOW TRANSMITTER**

**CHILLED LIQUID FLOW TRANSMITTER** - If desired, a flow transmitter may be connected to the chiller control panel to display the rate of chilled liquid flowing through the evaporator. The flow transmitter (supplied by others) may be a 2-wire or 4-wire device. If a 4-wire device is used, a loop powered signal isolator must be supplied by others and wired as shown.

Depending on the type of flow measuring element and transmitter used, the 4-20mA input signal may be a non-linear (square root) signal. This input must be enabled and the calibrated full scale range and the signal type must be entered at the keypad using the Service Access Level. Refer to Configuration Screen 2 in the Operation Manual 160.67-01.



**Do NOT apply voltage on field instrument wiring terminal block TB7. Instrument loop power is supplied from terminals 313 or 325.**



**FIG. 20 – CONDENSER LIQUID FLOW TRANSMITTER**

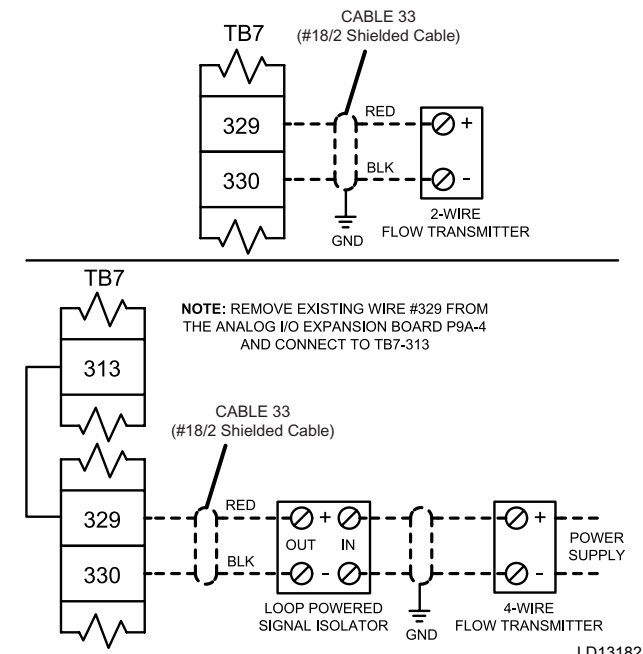
**CONDENSER LIQUID FLOW TRANSMITTER** - If desired, a flow transmitter may be connected to the chiller control panel to display the rate of cooling water flowing through the condenser.

The flow transmitter (supplied by others) may be a 2-wire or 4-wire device. If a 4-wire device is used, a loop powered signal isolator must be supplied by others and wired as shown.

Depending on the type of flow metering element and transmitter used, the 4-20mA input signal may be a non linear (square root) signal. This input must be enabled and the calibrated full scale range and the signal type must be entered at the keypad using the Service Access Level. Refer to Configuration Screen 2 in the Operation Manual 160.67-01.



**Do NOT apply voltage on field instruments wiring terminal block TB7. Instrument loop power is supplied from terminals 313 or 327.**



**FIG. 21 – STEAM FLOW TRANSMITTER**

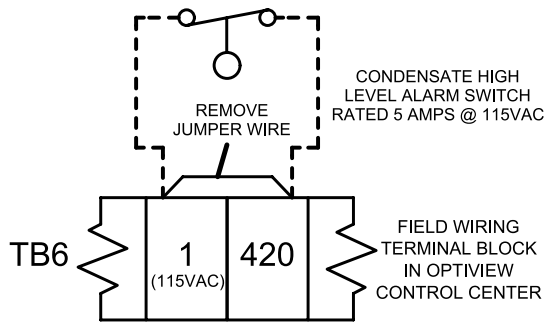
**STEAM FLOW TRANSMITTER** - If desired, a flow transmitter may be connected to the chiller control panel to display the rate of steam flowing through the turbine.

The flow transmitter (supplied by others) may be a 2-wire or 4-wire device. If a 4-wire device is used, a loop powered signal isolator must be supplied by others and wired as shown.

Depending on the type of flow measuring element and transmitter used, the 4-20mA input signal may be non linear (square root) signal. This input must be enabled and the calibrated full scale range and the signal type must be entered at the keypad using the Service Access Level. Refer to Configuration Screen 2 in the Operation Manual 160.67-01.



**Do NOT apply voltage on field instruments wiring terminal block TB7. Instrument loop power is supplied from terminals 313 or 329.**



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**FIG. 22 – TURBINE CONDENSATE DRAIN TANK HIGH LEVEL SWITCH**

**TURBINE CONDENSATE DRAIN TANK HIGH LEVEL SWITCH** - In some applications, a condensate drain tank is used to automatically collect and drain any water that accumulates in the turbine casing. If the tank is provided with a high level float switch, it may be connected to the chiller control panel to provide a warning in the event that the tank draining controls malfunction. The contact opens on high level to activate the warning.

## NOTES

1. This drawing shows recommended field control wiring modifications (by others) to the standard OptiView™ Control Center Wiring Diagram 160.67-PW6.
2. If more than one of these modifications is to be utilized with a particular unit, additional consideration must be given to the application to insure proper functioning of the control system. Consult your YORK representative.
3. The additional controls and wiring for these modifications are to be furnished and installed in the field (by others). See WARNING on page 2.
4. The controls specified are recommended for use, but other controls of equal specifications are acceptable.
5. All wiring shall be in accordance with the National Electrical Code, and applicable State and Local Codes.
6. Each 115VAC field connected inductive load, i.e. relay coil, motor starter coil, etc., shall have a transient suppressor wired (by others) in parallel with it's coil, physically located at the coil. Spare transient suppressors are furnished in a bag in the OptiView™ Control Center.
7. Maximum allowable current draw between circuits 45 , 151 , and 2 for each installed device is 2 amp holding and 10 amps inrush - see OptiView™ Control Center Wiring Diagram in Note 1.
8. For required field wiring connections of the chilled and condenser liquid pump contacts (terminals 45 and 151 on OptiView™ Control Center field wiring terminal block TB2) and chilled and condenser water flow switches ( terminals 1 , 11 , and 12 on the OptiView™ Control Center field wiring terminal board TB2), see Field Wiring diagram 160.67-PW4 and 160.67-PW5.  
The chilled and condenser liquid flow switches are safety controls. They must be connected to prevent operation of the chiller whenever liquid flow is stopped. The use of the liquid flow switches for purposes other than protection of the chiller may be accomplished by installing 2 flow switches, installing a flowswitch and a relay, or installing a flow switch with double pole, double throw contacts.
9. Do NOT apply voltage on field wiring terminal blocks TB4, TB6, and TB7 in YORK OptiView™ Control Center. All control and instrument power sources are received from the Control Center.

