Bell & Gossett
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INSTRUCTION MANUAL
S14334C

VARIABLE SPEED PUMPING SYSTEMS
INSTRUCTION MANUAL

BUILT IN THE USA
ENGINEERED, ASSEMBLED & TESTED

Technologic™ 5500 Series Variable Primary Pump and Valve Controller

WARNING LABEL PART #S11550 INSTALLED IN THIS LOCATION. IF MISSING IT MUST BE REPLACED.

INSTALLER: PLEASE LEAVE THIS MANUAL FOR THE OWNER'S USE.

DESCRIPTION

Microprocessor based dedicated pump controller for variable volume pumping systems. The control panel consists of the following components: microprocessor, operator interface with 4 line display and membrane key pad, and 24 VDC power supply. Multi-pinned connecting cables for connection to bypass panels are available as options.

OPERATIONAL LIMITS

See the control panel nameplate for operating voltage, current draw, as well as information on the equipment to be connected to the control panel.

SAFETY INSTRUCTIONS

This safety alert symbol will be used in this manual and on the Technologic 5500 Safety Instruction decal to draw attention to safety related instructions. When used, the safety alert symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THE INSTRUCTION MAY RESULT IN A SAFETY HAZARD!**

Preface

The following manual describes the new microprocessor based Technologic 5500 Variable Primary Pump Controller. This unit is in the tradition of the other members of the Technologic Control Panels as it incorporates many original, novel, and proprietary features that may only be found on B&G controllers. Some of these features require special emphasis here.

The controller is best described as a specific purpose programmable pump and valve controller. This means that the hardware and software have been created for the control and diagnostics of pumps and valves with consideration for their inherent characteristics. This results in an optimum pump controller without the cost of general purpose control hardware. Software is dedicated and established for the unit only after extensive testing. Changes to this software are not taken lightly and must pass rigid version control.

The controller has the unique analog input protection of other members of the control family. In the event of a short circuit condition the current limit circuitry prevents failure of the analog input components.

This new controller has standard manual motor bypass switches when a Bell & Gossett automatic bypass is supplied. The manual motor bypass switches allow the user to de-energize the programmable logic controller and take manual control of the pumping system. This is helpful during system startup to confirm pump rotation and to purge air from the system prior to switching to automatic control.

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INDEX (continued)

NOTE: The information contained in this manual is intended to assist operating personnel by providing information on the characteristics of the purchased equipment.

It does not relieve the user of the responsibility to adhere to local codes and ordinances and the use of accepted practices in the installation, operation and maintenance of this equipment.

Further information pertaining to the installation, operation, and maintenance of your Technologic 5500 series pump controller can be found in the I.O.M.s for the associated equipment provided see Section 5, Maintenance, for a list of relevant manuals.

Glossary of Terms

AFD

Adjustable Frequency Drive; converts a constant power input into a variable power output for the motor; a device for controlling motor speed

Alternation

Process of determining which pump will serve as lead pump and which pump will serve as lag pump

Bypass

Controller bypasses the AFD, pumps stop running in variable speed mode and run at constant speed (50 Hz / 60 Hz)

Bypass Valve

Modulating valve that controls the minimum flow required by chillers

Destage

To turn off a lag pump

EOC

End of Curve; point at which a pump is staged or destaged

I.O.M.

Installation Operation Manual

Isolation Valve

Two way control valve that isolates flow from standby chillers

Lag pump

Standby pump that activates only when lead pump alone cannot efficiently provide sufficient pressure or flow rate

Lead pump

Duty pump which runs continuously until a standby pump is required

LED

Light emitting diode, located on OIP and controller

OIP

Operator Interface Panel

O.L.

Overload: device to protect a motor from overheating

PID

Proportional Integral Derivative; 3 variables required for error control

Process Variable

Signal generated by a sensor that is set up to control the system

Proof timer

Minimum time period before controller acknowledges an input; time period for which a signal must be stable before it is accepted by the controller as a sustained and valid signal

RTC

Real time clock

RTD

Resistive temperature device used to supply temperature signals to the PLC

Stage

To start a lag pump

Section 1 - General

1.1 **Purpose of Manual**

This manual is furnished to acquaint you with some of the practical ways to install, operate, and maintain this unit. Read it carefully before doing any work on your unit and keep it handy for future reference.

Equipment cannot operate well without proper care. To keep this unit at top efficiency, follow the recommended installation and servicing procedures outlined in this manual.

1.2 **Safety**

1.2.1 **Safety Alert Symbol**

SAFETY INSTRUCTION

This safely alert symbol will be used in this manual and on the unit safety instruction to draw attention to safety related instructions. When used the safety alert symbol means **ATTENTION BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THIS INSTRUCTION MAY RESULT IN A SAFETY HAZARD.**

1.2.2 **Safety Instruction Decal**

Your Technologic 5500 Series Variable Primary Pump and Valve Controller should have a safety instruction decal (part # S11550). If the decal is missing or illegible contact your local B&G representative for a replacement.

1.2.3 **Motor Safety**

Each motor must have a properly sized starter with properly sized overload block to provide overload and undervoltage protection. Ground fault protection should be sized properly. Refer to local electrical codes for sizing and selection. Refer to the motor manufacturer's I.O.M. (Installation Operation Manual) for specific installation information. Even when the motor is stopped, it should be considered "alive" as long as its controller is energized.

WARNING: Motor can start automatically. Keep hands away from output shaft until motor is completely stopped and input power is removed from the motor control panel. Lockout main power switch while working near the motor shaft. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

The use of motor disconnect switches is acceptable. Consult the factory for proper interlocking with adjustable frequency drives, AFD's. See section 1.9.

1.2.4 **Motor Control Equipment Safety**

Motor control equipment and electronic controls are connected to hazardous line voltages. When servicing electronic controls, there will be exposed components at or above line potential. Extreme care should be taken to protect against shock. Stand on an insulating pad and make it a habit to use only one hand when checking components. Always use accurate test meters when checking electrical components. Always work with another person in case of an emergency. Disconnect power when performing maintenance. Be sure equipment is properly grounded. Wear safety glasses whenever working on electronic control or rotating equipment.

DANGER: Troubleshooting live control panels exposes personnel to hazardous voltages. Only a qualified electrician may do electrical troubleshooting. **FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

1.3 **Storage**

For long periods of storage, the unit should be covered to prevent corrosion and contamination from dirt. It should be STORED in a clean, dry location between -20 and +60°C. The relative humidity should not exceed 85%. The unit should be checked periodically to ensure that no condensation has formed. After storage, again check that it is dry before applying power.

NOTE: EXTENDED STORAGE OF AFDs MAY REQUIRE SPECIAL ATTENTION PRIOR TO START-UP. SEE MANUFACTURER'S I.O.M. FOR DETAILS.

1.4 **Handling**

Care should be taken to prevent damage due to dropping or jolting when moving the Technologic Variable Primary Pump and Valve Controller. Transportation damage should be brought to the carrier's attention immediately upon receipt.

1.5 **Temperature and Ventilation**

All electrical equipment is susceptible to failure if operated in ambient temperatures outside of its rating. The operating temperature range for this unit is 0 to 40°C. The relative humidity should not exceed 95% non-condensing. The unit should not be operated outside these extremes.

1.6 **Input Voltage**

The Technologic Variable Primary Pump and Valve Controller was factory set to operate on the voltage shown on the nameplate. Check the AFD nameplate for the proper input and output voltages before wiring the AFD.

WARNING: Prevent electrical shocks. Disconnect the power supply before beginning installation. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

The voltage tolerance is +10/-5% and phase to phase voltage must not have an imbalance greater than 5 VAC.

1.7 Ground Connections

A grounding terminal is provided for a dedicated ground wire connection. All provisions of the National Electrical Code and local codes must be followed.

WARNING: Conduit grounds are not adequate. A separate ground wire must be attached to the ground lug provided in the enclosure to avoid potential safety hazards. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

1.8 Power Wiring

Power wire types and sizes must be selected based upon conformance with the National Electrical Code and all local codes and restrictions. In addition, only copper (Cu) wire rated for 75°C (minimum) may be used for the power connections. Refer to the input current as listed on the nameplate on the enclosure door when sizing wire.

1.9 Output/Motor Disconnect

It is necessary that any device that can disconnect the motor from the output of the AFD be interlocked to the emergency shutdown circuits of the AFD. This will provide an orderly shutdown if the disconnecting device is open circuited while the AFD is in operation. Failure to provide this interlock may result in damaged components due to improper installation.

CAUTION: Metal filings can create electrical short circuits. Do not drill, saw, file or perform any operation on the AFD conduit entry plate while attached to the AFD. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE AND/OR MODERATE PERSONAL INJURY.**

1.10 Analog Signal Wiring

Shielded cable (#22 AWG, Belden type 8762, Alpha #2411, or equal) should be installed for all D.C. control wiring. The shield must be terminated in the Technologic Variable Primary Pump and Valve Controller panel. **Do not connect the shield at the other end of the cable! Insulate the shield so that no electrical connection is made at the other end of the cable.** A twisted pair of #22 AWG conductors (Belden 8442 or equal) can be used in place of shielded cable. The cable length must be limited to 5,000 feet for #22 AWG wire.

1.11 Field Connection Diagrams

Refer to the pump I.O.M. for specific details unique to the pump.

Refer to the flow sensor/transmitter I.O.M. for specific details unique to the flow sensor/transmitter.

The Wiring Diagram(s), Dimensional Drawings and Field Connection Diagram should be reviewed prior to unit installation and operation.

1.12 Sensor and Control Wiring

WARNING: Prevent electrical shocks. Disconnect the power supply before beginning installation. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

The following sections are based on the installation of standard Technologic 5500 product. Because customized software and hardware is available, the installing contractor should base all wiring connections on the wiring diagrams that accompany each controller. These sections are meant to complement, not replace, those wiring diagrams.

1.12.1 DP Switches

Differential pressure switches sense the increase in pressure between the pump suction and discharge gauge taps. DP switches are used to determine whether a pump is running. Each switch should be wired from the normally closed contact.

1.12.2 AFDs

To monitor if an adjustable frequency drive is running, it is necessary to wire from each AFD's normally open "run" or "on" contact.

For the Technologic Variable Primary Pump and Valve Controller to start and stop each AFD, it is necessary to wire to the remote start terminals in each AFD.

Additional wiring to each of the adjustable frequency drives may be required with certain types of controller programs. Refer to the wiring diagram for all connection points.

With certain bypass and control methods, it is necessary to disable an adjustable frequency drive from running. This is accomplished by wiring from the Technologic 5500 terminals to each AFD's interlock terminals. Should this wiring be required, any jumpers which may be found on the AFD's interlock terminals should be removed.

1.12.3 Analog Inputs

The Technologic 5500 control family has the capability to accept many analog inputs. Typically, all analog inputs must be 4-20mA and powered by the 24VDC power supply in the Technologic 5500. All shields must be grounded, only in the Technologic 5500, to prevent ground loops and improper signals.

To monitor system zones, it is not necessary for all analog inputs to be used. It is necessary, however, that all zone transmitters be connected consecutively starting with zone 1. Optional transmitters (i.e., other than zones) may be supplied.

1.12.4 **Analog Inputs with External Power**

The following steps describe the general procedure for rewiring an analog input sensor when the sensor's power source is not the Technologic 5500 controller.

WARNING: Prevent electrical shocks. Disconnect the power supply before beginning installation. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

1) Turn off all power to the Technologic 5500 controller.
2) Refer to the appropriate controller wiring diagram that was shipped with unit. Locate the analog input sensors on the wiring diagram that will be rewired. They are labeled AI X.
3) Remove the 24 VDC positive (+) wire from TB 40 for the respective analog input sensor connection. This wire needs to be removed completely or terminated if used as a jumper. This will prevent any accidental contact with a negative (-) voltage source (i.e. control panel) and avoid becoming a short circuit. Care should be taken to ensure that 24 VDC positive (+) voltage is still provided to any remaining sensors that will be powered by the Technologic 5500 controller.
4) Remove the 24 VDC negative (-) wire from TB 41 for the respective analog input sensor connection. This wire needs to be removed completely or terminated if used as a jumper. This will prevent any accidental contact with a positive (+) voltage source and avoid becoming a short circuit. Care should be taken to ensure that 24 VDC (-) negative voltage is still provided to any remaining sensors that will still be powered by the Technologic 5500 controller.
5) Terminate the negative (-) wire of the sensor to TB 41 of the respective analog input sensor connection. Terminate the positive (+) wire of the sensor to the terminal block which is connected to the positive (+) terminal shown on the Analog input card.

NOTE: Be certain that the power supplied to other terminal blocks has not been interrupted! The wires that were removed in the preceding steps may have been used as jumpers.

1.12.5 **Drive Speed Signals**

Drive speed (follower) signals must be wired from the Technologic 5500 Controller to each of the adjustable frequency drives. The AFDs must be configured to accept a 0-10 VDC speed signal with the minimum speed set for 30% (0 VDC) and maximum speed set for 100% (10 VDC). All shields must be grounded, only in the Technologic 5500, to prevent ground loops and improper signals.

1.12.6 **Valve**

The Valve must be configured to accept a 4 - 20mA signal with the closed position set for 4 mA and the open position set for 20 mA. All shields must be grounded, only in the Technologic 5500, to prevent ground loops and improper signals.

1.12.7 **Hardwire Communications**

Hardwire communications refers to the capability of the Technologic 5500 Controller to communicate with an energy management system. Standard communication features such as remote start/stop and remote alarm indications are listed below.

1.12.7.1 **Remote Start/Stop**

Install a switch as indicated on the wiring diagram. With the LOCAL-REMOTE-OFF switch in the REMOTE position, this contact closure will provide the start signal.

1.12.7.2 **Remote Alarm Indication**

A digital output rated 8 amps at 115V is supplied. This output closes to indicate an alarm condition exists.

1.12.8 **User Configurable I/O**

The Technologic 5500 Controller comes equipped with the capability to define the operation of any unused input or output signal. Refer to Section 4.3.9 for detailed information on the I/O Setup Menu.

Section 2 - Installation and Startup

2.1 **Location**

Install the pumping unit appropriately for ease of inspection, maintenance and service. Observe local electrical codes concerning control panel spacing.

DANGER: Heavy load, may drop if not lifted properly. Do not lift the entire unit by the motor eyebolts. Lift the unit with slings placed under the unit base rails. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

2.2 **Installation of Skid Mounted Systems with Factory Supplied Pumps**

This unit is built to give you years of service if it is installed properly with a suitable foundation.

2.2.1 **Foundation**

A base of concrete weighing 2-1/2 times the weight of the unit is recommended. Check the shipping ticket for unit weight. Tie the concrete pad in with the finished floor. Use foundation bolts and larger pipe sleeves to give room for final bolt location. Place the unit on its concrete foundation, supporting it with steel wedges or shims totaling 1" in thickness. These wedges or shims should be put on both sides of each anchor-bolt to provide a means of leveling the base.

2.2.2 Grout

After the frame has been leveled and securely bolted to the pad, a good grade of grout should be installed beneath the base. A suggested mixture for grout is: one part Portland Cement and two or three parts plain, sharp sand mixed with water until it will pour easily. Commercial grout mixtures with suspended iron particles are available. Wet the concrete base before pouring grout. To hold wedges or shims in place, allow the grout to flow around them and beneath the entire length of the base flange.

2.2.3 Closed System Safety Measures

Important: Do not install and operate the Bell & Gossett Technologic 5500 Variable Primary pump and valve controller in a closed system unless the system is constructed with properly sized safety and control devices. Such devices include the use of properly sized and located pressure relief valves, compression tanks, pressure controls, temperature controls and flow controls as appropriate. If the system does not include these devices, consult the responsible engineer or architect before making pumps operational.

DANGER: The heating of water and other fluids causes volumetric expansion. The associated forces may cause failure of system components and releases of high temperature fluids. This will be prevented by installing properly sized and located pressure relief valves and compression tanks. **FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN SERIOUS PROPERTY DAMAGE AND SERIOUS PERSONAL INJURY OR DEATH.**

2.2.4 Eccentric Increasers

Eccentric increasers can be used in the suction lines when increasing the pipe size, with straight sides of the increaser on top to eliminate air pockets.

2.2.5 Pipe Support

Be sure to eliminate any pipe strain on the unit. Support the suction and discharge pipes independently by use of pipe hangers near the unit. Line up the vertical and horizontal piping so that the bolt holes of the flanges match. DO NOT ATTEMPT TO SPRING THE SUCTION OR DISCHARGE LINES INTO POSITION. As a rule, ordinary wire or band hangers are not adequate to maintain alignment. It is very important to provide a strong, rigid support for the suction line. A saddle hanger is recommended.

2.2.6 Expansion and Vibration Absorbtion

For critical installations, equipment for absorbing expansion and vibration should be installed in the inlet and outlet connections of the unit.

2.2.7 Lubrication

Before starting, all pumps and motors should be checked for proper lubrication.

2.3 Putting the Unit into Service

2.3.1 Pump Rotation, 3 Phase Motors Only

CAUTION: Seal Damage may occur. Do not run pumps dry. Fill and vent the pump volute prior to operation. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE AND/OR MODERATE PERSONAL INJURY.**

WARNING: Rotating shafts can catch loose clothing. Do not operate the pump without all guards in place. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

It will be necessary to check for proper rotation for all pumps in both variable speed and bypass. Run each pump in AUTO and then in BYPASS, if so equipped, and note the rotation in each.

DANGER: High voltage 3 phase power can kill. Disconnect and lockout power prior to servicing unit. **FAILURE TO FOLLOW THESE INSTRUCTIONS WILL RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

If both rotations (AFD and bypass) are wrong, exchange the wiring on two motor phases. If the rotation is incorrect in the AFD mode, but it is correct in the bypass mode, exchange the wiring on two of the AFD output phases.

If the rotation is correct in the AFD mode, but it is incorrect in the bypass mode, exchange the wiring on two of the bypass input phases.

NOTE: Changing phase at AFD input does not change output phasing.

2.3.2 Joint Check

While the unit may be hydro tested at the factory to internal quality standards, there may be some joints that are not pressure tested. Some joints may have been loosened, to allow for draining of the system, and not retightened. Thus, some joints may be loose due to system drainage or shocks during the shipping process. All flanged joints are to be checked for tightness and proper torque of the flange bolts prior to filling the system with fluid.

WARNING: Failure to check all joints for tightness and all flange bolts for proper torque could result in leaks and/or flooding. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

Section 3 - Operator Interface

3.1 **Power-up**

WARNING: Electrical shock hazard. Inspect all electrical connections prior to powering the unit. Wiring connections must be made by a qualified electrician in accordance with all applicable codes, ordinances, and good practices. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

Put LOCAL-REMOTE-OFF (LRO) switch in the LOCAL position. Put the optional AUTO-OFF-HAND switch in the AUTO position.

WARNING: Electrical shock hazard. Multiple power sources. The off position of the LOCAL-REMOTE-OFF switch does not disconnect all of the power sources in the technologic panel. All power sources must be disconnected prior to entering the control panel. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

Turn main disconnect on.

3.2 **Technologic Pump Controller Screen**

Upon powering up the controller, the display will light and show the Technologic Variable Primary Pump and Valve Controller default screen shown below:

Technologic Pump
Controller
MM/DD/YY HH:MM:SS A/P
Normal Manual

The current date and time will be displayed on the third line.

3.3 **Key Functionality**

The names of the keys on the Operator Interface Panel (OIP) are shown as CAPITAL LETTERS in this manual. Table 1 shows the functionality of the keys on the OIP.

3.4 **LEDs**

The START-STOP LED will be flashing. If the START-STOP LED is not illuminated as described above, press the START-STOP button once to light the LED.

The Auto-Manual LED should be green for auto operation. The display should also indicate MANUAL in the lower right hand corner. If not, press the AUTO-HAND key to enter the operation mode menu, press the SET POINT/2 key, then the ENTER key to select manual operation.

The PREV. SCREEN and NEXT SCREEN LEDs flash when the keys can be used to navigate to neighboring screens.

The HELP LED flashes when HELP can be pressed to obtain information.

Key Name	Functionality
Start/Stop	Starts and Stops System
Reset	Resets System
Auto/Manual	Brings up the Operation Mode screen shown in section 5.5
Pump 1-6 On/Off	Turns the corresponding Pump on or off
PREV. SCREEN	navigates to neighboring screens if its green led is flashing
NEXT SCREEN	navigates to neighboring screens if its green led is flashing
HELP	gives details on alarm conditions (see section 5.11) / if used in conjunction with a function key it will give a detailed explanation of the function key application
PROCESS VARIABLE/1	Brings up the Process Variable screen, shown in section 5.9, or used as a numeric key
SET POINT/2	Brings up the Set Point screen, shown in section 5.8, or used as a numeric key
SETUP/3	Brings up the Setup screen, shown in section 4, or used as a numeric key
ALTERNATION/4	Brings up the Alternation screen, shown in section 5.10, or used as a numeric key
F1/LOG/5	Brings up the Log Menu, shown in section 6.13, or used as a numeric key
F2/6	Used as a numeric key or an up arrow for manual control of pumps or bypass valve
YES/7	Used as a numeric key or YES
F3/INFO/8	Shows controller information screen, shown in section 6.12, or used as a numeric key
F4/9	Used as a numeric key or a down arrow for manual control of pumps or bypass valve
NO/0	Used as a numeric key or NO
ENTER	Used to confirm entries and to advance to the next item if there are multiple entries
CLEAR	Used to clear entries and to exit some screens

Table 1: Key Functionality

Section 4 - Setup Selection Menu

From the Technologic Pump Controller screen, shown in section 3.2, press the SETUP/3 key to get to the Setup Selection Menu shown below.

```
Setup Selection:  0
1 = Sensors    4 = Test
2 = Pumps      5 = Default
3 = System     0 = Exit
```

Press the NEXT SCREEN key to view the neighboring page, which is shown below. Press PREV. SCREEN to return to the screen shown above.

```
Setup Selection:  0
6 = Chillers
7 =  Bypass Valve
0 = Exit
```

Press the numeric key that corresponds to the desired Setup Menu and then press ENTER.

4.1 **Sensors**

From the Setup Selection Menu, shown in section 4, press PROCESS VARIABLE/1 and ENTER, to get to the Sensors screens.

4.1.1 **Sensor Number**

The first of the Sensors screens is the Sensor Number screen. The display will show:

```
Sensor No: #
```

Press the numeric key(s) for the sensor you wish to setup. The sensor number is limited to the maximum number of sensors allowed, typically 16. Press the ENTER key to proceed.

4.1.2 **Edit/Copy**

After entering the sensor number, the display will show:

```
        Sensor No:  #
1 - Edit   2 - Copy  :  #
        0 - Exit
```

Press PROCESS VARIABLE/1 and then the ENTER key to edit the sensor setup. See section 4.1.3.

Press SET POINT/2 and then the ENTER key to copy from an existing sensor. See section 4.1.13.

4.1.3 **Sensor Edit**

If 1-Edit was selected in section 4.1.2, the display will show:

```
Sensor No ##          (Type)
Span = 0              Zero = 0
*PV:Y/N               *Set Point No: #
*Override:Y/N         Ok ? (Y/N)
```

*PV, Set Point No, and Override will only appear if the sensor was previously set up to be a process variable.

Press YES/7 and then ENTER to accept these values, and proceed to section 4.1.4. Press NO/0 and ENTER to modify these values, and skip to section 4.1.5.

4.1.4 **Do Another**

If YES/7 was selected in the Sensor Edit Menu, shown in section 4.1.3, the display will show:

```
DO ANOTHER  ?  (Y/N)
```

Press YES/7 and then ENTER to set up another sensor, or press NO/0 and ENTER to return to the Setup Selection Menu shown in section 4.

4.1.5 **Sensor Type**

If NO/0 was selected in the Sensor Edit Menu, shown in section 4.1.3, the following is displayed:

```
No: ##       Sensor Type: #
1 = DP, 2 = PR, 3 = Flow
4=KW, 5 = Temp, 6 = DT
7 = SyDp, 8 = SyKW, 0 = None
```

To view the neighboring screen, Press the NEXT SCREEN key. The following will be displayed:

```
No: ##       Sensor Type: #
9 = Chi Flow, 10 = Chi DP
11=S Temp, 12 = R Temp
13 = Bep V Fb, 0 = None
```

Table 2, shown on next page, gives a description and the units of each sensor type.

Enter the numeric key followed by ENTER for the type of sensor you are setting up. The abbreviation for the sensor type will appear in the upper right corner of the display in the following screens.

*If the sensor type is Chi Flow or Chi DP, then see section 4.1.14.

4.1.6 **Sensor Span**

The display will now show the selected sensor type and prompt the user for the sensor span as shown below.

```
Sensor No  ##   (Type)
Span = #####
```

Obtain the span of the sensor from the nameplate on the sensor. Enter the span by pressing the appropriate numeric keys followed by the ENTER key.

4.1.7 **Sensor Zero**

The display will now prompt the user for the zero of the sensor as follows:

```
Sensor No  ##   (Type)
Span = #####   Zero = #####
```

Selection	Description	Units
1=DP	Differential Pressure	PSID
2=PR	Pressure	PSI
3=Flow	Flow Rate	GPM
4=KW	Power, from each AFD, totalized in controller.	KW
5=Temp	Temperature	°F
6=Delta T	Differential Temperature	°F
7=SysDP	System Differential Pressure	PSID
8=SysKW	System Power, from KW transmitter at single point power connection	KW
*9=Chi Flow	Chiller Flow	GPM
*10=Chi DP	Chiller Differential Pressure	PSID
11=S Temp	System Temperature	°F
12=R Temp	Return Temperature	°F
13=BYP V FB	Bypass Valve Feedback	%
0=None	Non-standard transmitter	N/A

Table 2: Sensor Types

Typically the variable value is zero at 4mA for many sensors. An exception would be for a temperature sensor. Enter the desired zero value by pressing the appropriate numeric keys followed by the ENTER key.

4.1.8 **Sensor PV**

The display will now show the following:

Sensor No ## (Type)
Span = ##### Zero = #####
PV: ? (Y/N)

Press the YES/7 key if the selected sensor will control the system by supplying a process variable feedback signal. Typical process variable signals are supplied by one of the following: Pressure, Differential Pressure, Temperature, or Differential Temperature sensors. Continue to section 4.1.9

Press the NO/0 key for all sensors that supply optional signals. Typical optional signals are supplied by any of the following: System Differential Pressure, System Differential Temperature, Flow, and KW Sensors. If NO/0 was selected, skip to section 4.1.12.

4.1.9 **Sensor Set Point**

If YES was selected in section 4.1.8, the display will now prompt the user for a Set Point NO as shown below.

Sensor No ## (Type)
Span = ##### Zero = #####
PV: Y Set Point No: ##

Enter a setpoint number by using the numeric keypad. See section 5.8 for more information on how to modify setpoints.

4.1.10 **Sensor Override**

The display will now show:

Sensor No ## (Type)
Span = # Zero = #
PV: Y/N Set Point No: ##
Override: Y/N

The controller is capable of accepting sensor input either through a 4-20mA analog input or through the RS-485 communication port. The communication port must be set up properly and connected to an external building automation system.

Press the YES/7 key to receive the sensor signals via the RS-485 port. Press the ENTER key.

Press the NO/0 key to receive the sensor signals via the analog input card. Press the ENTER key

4.1.11 **Sensor Setup Exit**

The display will now show:

Sensor No ## (Type)
Span = # Zero = #
PV: Y/N Set Point No: ##
Override: Y/N Ok? (Y/N)

If correct, record your sensor setup information on the wiring diagram that was included with the unit. Press YES/7 and then ENTER to accept all of the values shown and return to section 4.1.4.

Press NO/0 and ENTER to return to section 4.1.5 and modify the sensor.

4.1.12 **Sensor Setup Exit (not PV)**

If NO/0 was selected in section 4.1.8 (the sensor does not provide a PV), the display will show:

```
Sensor No  ##      (Type)
Span=     #   Zero=     #

                      Ok? (Y/N)
```

If correct, record your sensor setup information on the wiring diagram that was included with the unit. Press YES/7 and then ENTER to accept all of the values shown and return to section 4.1.4.

Press NO/0 and ENTER to return to section 4.1.5 and modify the sensor.

4.1.13 **Copy Sensor**

If 2-Copy was selected in section 4.1.2, the display will show:

```
Copy to Sensor No: #
From Sensor No:    #
                      Copy? (Y/N)
                      Exit? (Y/N)
```

The **Copy to Sensor No** refers to the sensor number for which the setup is being performed. The **From Sensor No** refers to the sensor from which the information will be copied.

Select NO/0 and ENTER, in the **Exit** field, to modify the variables. In the **From Sensor No** field, enter the numeric value of the sensor from which you want to copy. In the **Copy** field, press YES/7 and ENTER to confirm copying. In the Exit field, press YES/7 and ENTER to exit. Proceed with section 4.1.11 if the sensor will provide a PV, and proceed to section 4.1.12 if the sensor will not provide a PV.

4.1.14 **Chiller Sensor Span**

If 9 = Chi Flow or 10 = Chi DP was selected for the sensor type in section 4.1.5, then the display will show:

```
Sensor No ##   (Type)
Span = #####
```

The span is the sensor value that corresponds to a 20mA signal. Obtain the span of the sensor from the nameplate on the sensor. Enter the span by pressing the appropriate numeric keys followed by the ENTER key.

4.1.15 **Chiller Sensor Zero**

The display will show:

```
Sensor No ##   (Type)
Span = #####   Zero = #####
```

The zero is the sensor value that corresponds to a 4mA signal. Typically the variable value is zero at 4mA for many sensors. An exception would be for a temperature sensor. Enter the desired zero value by pressing the appropriate numeric keys followed by the ENTER key.

4.1.16 **Chiller Number**

The display will show:

```
Enter the Chiller
No  ##

          OK  ?  (Y/N)
```

Press NO/0 and ENTER to edit the chiller number. Press the numeric key and ENTER for the chiller you wish to set up. The chiller number is limited to the maximum number of chillers allowed, typically 9. Press YES/7 and ENTER keys to proceed with the set up.

4.1.17 **Chiller Sensor Exit**

The display will now show:

```
Sensor No  ##     (Type)
Span = #####    Zero = #####
Chill No. #
          Ok  ? (Y/N)
```

If correct, record your chiller setup information on the wiring diagram that was included with the unit. Press YES/7 and ENTER to accept the values and return to section 4.1.4.

Press NO/0 and ENTER to return to section 4.1.5 to modify the sensor.

4.2 **Pump Setup Menu**

From the Setup Selection Menu, shown in section 4, Press SETPOINT/2 and ENTER to get to the Pump Setup Menu shown below. Record your pump setup information on the wiring diagram that was included with the unit.

```
Selection: #          0 = Exit
1 = Enable/Disable
2 = Pump Off Delay
3 = Lag Pump Run Timer
```

To view the neighboring screen, press the NEXT SCREEN key. The following will be displayed:

```
Selection: #          0 = Exit
4 = Hi Load Transfer
5 = Lo Load Transfer
```

Push the desired numeric key and ENTER to proceed.

4.2.1 **Enable/Disable**

From the Pump Setup Menu, shown in section 4.2, Press PROCESS VARIABLE/1 and ENTER to get to the Enable/Disable screen shown below.

```
          # PUMPS = #
P1: *      P2: *        P3: *
P4: *      P5: *        P6: *
                        OK ? (Y/N)
```

*The pump status will be displayed for each defined pump. Table 3, on the next page, shows the possible pump states.

State	Description
N/A	pump not available as defined by setup
Rdy	pump available, not running
On	pump is running
Off	pump disabled, will not be allowed to start

Table 3: Pump States

DANGER: High voltage 3 phase power can kill. Pumps can start automatically. Disconnect and lock-out power prior to servicing pumps. **FAILURE TO FOLLOW THESE INSTRUCTIONS WILL RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

Press YES/7 and ENTER to accept pump configuration and return to setup selection screen.

Press NO/0 and ENTER to setup any pumps.

4.2.2 **Number of Pumps**

If NO was selected in section 4.2.1, the following displayed:

Total # Pumps = #

Press the numeric key for the total number of pump (1 to 6 pumps). Press ENTER to continue.

4.2.3 **Edit Pump**

The display will now show the following:

Edit Pump ? (Y/N)

Press YES/7 and ENTER to set up any pumps. Press the NO/0 and ENTER keys to return to the Pump Setup Menu shown in section 4.2.

4.2.4 **Edit Pump Number**

The display will now show the following:

Edit Pump # #

Press the numeric key(s) for the pump you wish to setup. The pump number is limited to the maximum numbers of pumps. Press the ENTER key to proceed with the setup.

4.2.5 **Enable/Disable Pump**

The display will now show the following:

Pump # #
Enable/Disable: #

1 = Enable 0 = Disable

Press PROCESS VARIABLE/1 and ENTER to enable the pump. Press NO/0 to disable a pump.

4.2.6 **Do Another**

The screen will now display:

Do Another ? (Y/N)

Press YES/7 and ENTER to setup another pump. Return to section 4.2.4 and repeat for all remaining pumps.

Press NO/0 and ENTER to return to the Pump Setup Menu, shown in section 4.2.

4.2.7 **Pump Off Delay**

From the Pump Setup Menu, shown in section 4.2, press SET POINT/2 and ENTER to edit the pump off time delay. The display will show:

Pump Off Time Delay
 # Min.

Exit ? (Y/N)

Press NO/0 and ENTER to edit the value. Press YES/7 and ENTER to return to the Pump Setup Menu shown in section 4.2. See Table 4 for a description of the Pump Off Time Delay. Note: This time delay only applies to dedicated pump to chiller systems.

4.2.8 **Lag Pump Run Timer**

From section 4.2, press SETUP/3 and ENTER to edit the lag pump run timer. The display will show:

Lag Pump Full Speed
Minimum run time
 # Sec.
Exit ? (Y/N)

Press NO/0 and ENTER to edit the value. Press YES/7 and ENTER to return to section 4.2. See Table 5 for a description of the variable. Note: This variable only applies to dedicated pump to chiller systems.

Variable	Unit	Description	Default Value	Range	Field Value
Pump off time delay	min	The delay prior to turning a pump off after losing the chiller start signal.	1	0-99	

Table 4: Pump Off Delay Variables

Variable	Unit	Description	Default Value	Range	Field Value
Lag pump full speed min run time	s	The amount of time a pump will run at full speed when an additional chiller is turned on. 0 disables this function.	0	0-999	

Table 5: Lag Pump Run Timer Variable

4.2.9 **Low Load Transfer**

From section 4.2, press 4 and ENTER to get to the Low Load Transfer screen shown below.

```
Low Load Transfer
Point ### % Speed
Enable?
        Exit (Y/N)
```

See Table 6 for a description of the Low Load Transfer variables.

4.2.10 **High Load Transfer**

From section 4.2, press 5 and ENTER to get to the High Load Transfer screen shown below.

```
High Load Transfer
Point ### % Speed
Enable?
        Exit (Y/N)
```

See Table 7 for a description of the HIgh Load Transfer variables.

4.3 **System Setup Menu**

From the Setup Selection Menu, shown in section 4, press the SETUP/3 key and ENTER to get to the System Setup Menu shown below.

```
Selection: #        0 = Exit
1 = Stage/De-stage
2 = PID
3 - Alarms
```

Press NEXT SCREEN key or PREV. SCREEN to view the neighboring pages in the System Setup Menu. There are five screens in this menu. The remaining screens are shown below.

```
Selection: #        0 = Exit
4 = Alternation
5 = Bypass
6 = AFD
```

```
Selection: #        0 = Exit
7 = Date/Time
8 = Password
9 = I/O Setup
```

```
Selection: #        0 = Exit
10 = Communication
11 = Special Functions
12 = Set Bright/Constr
```

```
Selection: #        0 = Exit
13 = Save to Flash
14 = Load from Flash
```

Use the appropriate numeric key to select the setup menu desired, and press the ENTER key.

4.3.1 **Stage/Destage Menu**

From the System Setup Menu, shown in section 4.3, press PROCESS VARIABLE/1 and ENTER to get to the Stage/Destage Menu shown below.

```
Selection: #
1 = PV Stg      2 = PV Destg
3 = EOC Stg     4 = EOC Dest
                0 =  Exit
```

Press the appropriate numeric key and ENTER to complete the setup, or press NO/0 to exit back to the System Setup Menu, shown in section 4.3.

Note: No pump staging will occur on dedicated pump to chiller systems.

4.3.1.1 **PV Stage**

From the Stage/Destage Menu, shown in section 4.3.1, press PROCESS VARIABLE/1 and ENTER to get to the PV Stage screen shown below.

```
Stg Spd: ##%
Stg Proof Timer: ##s
Stab Timer: ##s
        Ok ? (Y/N)
```

Variable	Unit	Description	Default Value	Range	Field Value
Low Load Tranfer Point	%	Percentage of pump speed at which load will be transferred	0	0-100	
Enable		Select Y to enable or N to disable	N	Y/N	

Table 6: Low Load Transfer Variables

Variable	Unit	Description	Default Value	Range	Field Value
High Load Tranfer Point	%	Percentage of pump speed at which load will be transferred	0	0-100	
Enable		Select Y to enable or N to disable	N	Y/N	

Table 7: High Load Transfer Variables

Press NO/0 and ENTER to edit the fields. To return to the Stage/Destage Menu, shown in section 4.3.1, press YES/7 and ENTER. See Table 8 below for a description of the PV Stage variables.

4.3.1.2 **PV Destage**

From the Stage/Destage Menu, shown in section 4.3.1, press SET POINT/2 and ENTER to get to the PV Destage screen shown below.

```
Destage:  ##%
Destg Pr Timer: ##s
HD Spd: ##%
HD Pr Tm: ##s    Ok ? (Y/N)
```

To edit the fields, press NO/0 and ENTER. To return to the Stage/Destage Menu, shown in section 4.3.1, press YES/7 and ENTER. See Table 9 below for a description of the PV Destage variables.

4.3.1.3 **EOC Stage**

From the Stage/Destage Menu, shown in section 4.3.1, press SETUP/3 and ENTER to get to the EOC Stage screen shown below.

```
Pump Max Flow:  #
Stage Proof Tm: ##s
Flow Offset: #
                    Ok ? (Y/N)
```

To edit the fields, press NO/0 and ENTER. To return to the Stage/Destage Menu, shown in section 4.3.1, press YES/7 and ENTER. See Table 10 below for a description of the EOC Stage variables.

Variable	Unit	Description	Default Value	Range	Field Value
Stg Spd	%	Maximum speed at which the lead pump will operate prior to starting a lag pump	95	0-100	
Stg Proof Timer	s	Proof timer prior to starting lag pump	30	0-999	
Stab	s	Staging stabilization time, delay prior to calculating	60	0-999	
Timer		destage value			

Table 8: PV Stage Variables

Variable	Unit	Description	Default Value	Range	Field Value
Destage	%	Percentage of the stabilized speed at which the lag pump will stop	85	0-100	
Destg Pr Timer	s	Proof timer prior to stopping lag pump	30	0-999	
HD Spd	%	Lowest speed at which parallel pumps will operate prior to destaging the lag pump	50	0-100	
HD Pr Tm	s	Proof timer prior to destaging the lag pump when operating below the HD speed	30	0-999	

Table 9: PV Destage Variables

Variable	Unit	Description	Default Value	Range	Field Value
Pump Max Flow	GPM	Maximum flow allowable prior to starting a lag pump	0	0-9999	
Stg Proof Tm	s	Proof timer prior to end of curve staging	30	0-999	
Flow offset	GPM	Flow rate of constant speed pump supplying variable speed pump; input only required on series pumping applications. The flow rate of the constant speed pump is deducted from the total system flow rate in order to provide end of curve protection for the variable speed pump	0	0-999	

Table 10: PV EOC Stage Variables

4.3.1.4 EOC Destage

From the Stage/Destage Menu, shown in section 4.3.1, press ALTERNATION/4 and ENTER to get to the EOC Destage screen shown below.

```
Destage Flow:          ##%
Destage Pr Tm:         ##s
Tm Forced Destg:       #m
                Ok ? (Y/N)
```

To edit the fields, press NO/0 and ENTER. To return to the Stage/Destage Menu, shown in section 4.3.1, press YES/7 and ENTER. See Table 11 below for a description of the EOC Destage variables.

4.3.2 PID

From the System Setup Menu, shown in section 4.3, press SETPOINT/2 and ENTER to get to the PID screen shown below.

```
PID-P ###    PID-I    #
PID-D  #
Ramp Timer  ###s
            Ok ? (Y/N)
```

To edit the fields, press NO/0 and ENTER. To return to the System Setup Menu, shown in section 4.3, press YES/7 and ENTER. See Table 12 below for a description of the PID variables.

4.3.3 Alarms Setup

From the System Setup Menu, shown in section 4.3, press SETUP/3 and ENTER to get to the Alarms Setup screen shown below.

```
AFD Fail Pr Tm: ##s
Pump Fail Pr Tm:  ##s
O.L. Fail Pr Tm:  ##s
Reset Tm: 10s Ok ? YN
```

To return to the System Setup Menu, shown in section 4.3, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. See Table 13 for a description of the Alarms Setup variables.

4.3.4 Alternation Setup

From the System Setup Menu, shown in section 4.3, press ALTERNATION/4 and ENTER to get to the Alternation Setup screen shown below.

```
Time Between:  # Hr.
Duration: ##s
          Ok ? YN
```

To return to the System Setup Menu, shown in section 4.3, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. See Table 14 on next page for a description of the Alternation Setup variables.

Note: Alternation can also be accomplished manually. See section 5.10.

Variable	Unit	Description	Default Value	Range	Field Value
Destage Flow	%	Percentage of max flow at which the lag pump is destaged	45	0-100	
Destage Pr Tm	s	Proof timer prior to destaging lag pump	30	0-999	
Tm Forced Destg	m	Time elapsed before a forced destage	0	0-100	

Table 11: EOC Destage Variables

Variable	Unit	Description	Default Value	Range	Field Value
PID-P	N/A	Proportional value	200	0-999	
PID-I	N/A	Integral value	5	0-999	
PID-D	N/A	Derivative value	2	0-999	
Ramp Timer	s	The amount of time it takes to get a pump up to full speed immediately after starting a chiller. This variable only applies to dedicated pump to chiller systems.	100	25-100	

Table 12: PID Variables

Variable	Unit	Description	Default Value	Range	Field Value
AFD Fail Pr Tm	s	Proof timer prior to setting the AFD fail alarm	20	0-999	
Pump Fail Pr Tm	s	Proof timer prior to setting the pump fail alarm	30	0-999	
O.L. Fail Pr Tm	s	Proof timer prior to setting the O.L. fail alarm	3	0-999	
Reset Tm	s	Time delay between pressing the RESET key and restarting the pumps in variable speed mode, allows for pump deceleration	10	0-999	

Table 13: Alarm Variables

4.3.5 Bypass Setup

From the System Setup Menu, shown in section 4.3, press F1/LOG/5 and ENTER to get to the Bypass Setup screen shown below.

```
No of AFDs Fail to
go to bypass: #
No of Pumps go to
bypass: #          Ok ? (Y/N)
```

To return to the System Setup Menu, shown in section 4.3, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. See Table 15 for a description of the Bypass Setup variables.

4.3.6 AFD Setup

From the System Setup Menu, shown in section 4.3, press F2/6 and ENTER to get to the AFD Setup screen shown below.

```
AFD Min/Max = ## / ###
Reset Tm/No = ### / ##
All PV Fail Spd = ###
# of Pumps = #     Ok ? (Y/N)
```

To return to the System Setup Menu, shown in section 4.3, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. See Table 16 for a description of the AFD Setup variables.

4.3.7 Date/Time Setup

From the System Setup Menu, shown in section 4.3, press YES/7 and ENTER to get to the Date/Time Setup screen shown below.

```
MM/DD/YYYY      HH:MM
Display 24 Hr Fmt: ? (Y/N)
Daylite Saving Tm: ? (Y/N)
                Ok  ? (Y/N)
```

To return to the System Setup Menu, shown in section 4.3, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. See Table 17 on next page for a description of the Date/Time Setup variables.

Variable	Unit	Description	Default Value	Range	Field Value
Time Between	hr	Enter the time between automatic alternation cycles. s disables automatic alternation.	0	0-999	
Duration	s	The amount of time allowed to decelerate the running pump(s) and start the new lead pumps	20	0-999	

Table 14: Alternation Variables

Variable	Description	Default Value	Range	Field Value
No of AFDs Fail to go to bypass	Number of AFDs that are required to fail prior to running the pump(s) across the line. Generally the number of drives controlled by the system.	0	0-6	
No of Pumps go to bypass	After the number of AFDs fail as per above, this item determines the maximum number of pumps allowed to start in bypass. Before setting for all available pumps confirm that the system can handle the flow.	0	0-6	

Table 15: Bypass Variables

Variable	Unit	Description	Default Value	Range	Field Value
AFD Min	%	Percent speed at which the AFD will operate with the speed follower signal minimized (0V)	30	0-99	
AFD Max	%	Percent speed at which the AFD will operate with the speed follower signal maximized (10V)	100	0-999	
Reset Tm	s	Time it takes the AFD to reset after detecting a self protecting fault. Refer to the AFD manufacturer's setup manual for proper setup.	0	0-999	
Reset No		Number of resets the AFD will attempt after detecting a self protecting fault prior to determining that the AFD is in the fault condition. Refer to the AFD manufacturer's setup manual for proper setup	0	0-10	
All PV Fail Spd	%	Percent speed for the drive(s) to operate at in the event that all zones fail	100	0-100	
# of Pumps		Number of pumps that should operate at the above speed in the event that all zones fail	1	0-6	

Table 16: AFD Variables

4.3.8 Password Setup

From the System Setup Menu, shown in section 4.3, press F3/INFO/8 and ENTER to get to the Password Setup screen shown below.

```
Enable Password To:
Setup Menu  ? (Y/N)
Set Point  ? (Y/N)
                    Ok  ? (Y/N)
```

To return to the System Setup Menu, shown in section 4.3, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. See Table 18 for a description of the Password Setup variables.

If either of the above are set to YES the screen, shown below, prompts the user to define the password.

```
ENTER NEW PASSWORD
>_____________<
```

Enter a password from 0-999999. Record it here or somewhere else!

After entering a password the Verify Password screen requires the user to confirm the password. If the confirmed number does not agree with the first number, the Enter New Password screen is repeated to allow the user to get both input screens to agree.

```
VERIFY THE PASSWORD
>_____________<
```

4.3.9 I/O Setup

From the System Setup Menu, shown in section 4.3, press F4/9 and ENTER to get to the I/O Setup Menu shown below.

```
I/O Setup          Select: #
1 = DI             4 = AO
2 = DO
3 = AI             0 = EXIT
```

Note: The total available number of I/O to be configured is dependent on the system setup. Complete all previous setup screens, specifically sensors, prior to completing the following.

4.3.9.1 DI

From the I/O Setup Menu, shown in section 4.3.9, press PROCESS VARIABLE/1 and ENTER to get to the DI screen shown below.

```
Opt. DI  #         Avail: #
Code:  #           Delay: #s

                   Exit: ? (Y/N)
```

To return to the I/O Setup Menu, shown in section 4.3.9, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. See Table 19 on next page for a description of the DI variables.

Variable	Description	Default Value	Range	Field Value
MM	Current month (two digits), example: Jan. should be created as 01			
DD	Current date (two digits), example: the 6th should be entered as 06			
YYYY	Current year using all 4 digits			
HH	Hours (24 hour format), example: 9:00 p.m. should be entered as 21			
MM	Minutes (two digits)			
Display 24 Hr Fmt	Enter YES to display the time in the 24 hour format. Enter NO to display the time in AM/PM format	N	Y or N	
Daylite Saving TM	Enter YES for automatic setback during daylight saving time. Enter NO to disable the automatic setback during daylight saving time.	N	Y or N	

Table 17: Date/Time Variables

Variable	Description	Default Value	Range	Field Value
Setup Menu	Enter YES for password protection of the entire setup menu	N	Y or N	
Set Point	Enter YES for password protection of the entire set point menu	N	Y or N	

Table 18: Password Variables

4.3.9.2 **DO**

From the I/O Setup Menu, shown in section 4.3.9, press SET POINT/2 and ENTER to get to the DO screen shown below.

```
Total Avail. DO: #
Opt. DO#   #        Code:  #


                Exit:  ? (Y/N)
```

To return to the I/O Setup Menu, shown in section 4.3.9, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. See Table 20 for a description of the DO variables.

4.3.9.3 **AI**

No AI's can be configured here. Use the Sensor Setup.

4.3.9.4 **AO**

From the I/O Setup Menu, shown in section 4.3.9, press ALTERNATION/4 and ENTER to get to the AO screen shown below.

```
Total Avail. AO: #
Opt. AO#   #        Code:  #


                Exit:  ? (Y/N)
```

To return to the I/O Setup Menu, shown in section 4.3.9, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. See Table 21 for a description of the AO variables.

NOTE: If a programming error is made, ERROR is shown on the display. An error is due to reprogramming an input that is currently used by the system or inputting an undefined code number.

Variable	Unit	Description	Default Value	Range	Field Value
Opt. DI		Enter the input to be configured as it appears on the digital input module. The first digit is the rack number. The second digit is the slot number. The third and fourth digits are the input numbers. For example, a digital input configured on rack 0, slot 0, input 1 would be encoded as 0001.	N/A	0-9999	
Avail		This variable is not modifiable. It is here to advise the user of how many digital inputs can be customized.	N/A	0-99	
Code		Defines the desired functionality of the input, valid codes are defined in Appendix C of this manual	0	0-255	
Delay	s	Proof timer prior to acting on the optional DI	0	0-999	

Table 19: DI Variables

Variable	Description	Default Value	Range	Field Value
Total Avail. DO	This variable can not be modified. It is here to advise the user of how many digital outputs can be customized	N/A	0-99	
Opt. DO	Enter the output to be configured as it appears on the digital output module. The first digit is the rack number. The second digit is the slot number. The third and fourth digits are the input numbers. For example, a digital output configured on rack 2, slot 1, input 1 would be encoded as 2101.	N/A	0-9999	
Code	Enter the code to defines the desired functionality of the output. Valid codes are defined in Appendix C of this manual	0	0-255	

Table 20: DO Variables

Variable	Description	Default Value	Range	Field Value
Total Available AOs	This variable can not be modified. It is here to advise the user of how many analog outputs can be customized	N/A	0-99	
Opt. AO	Enter the output to be configured as it appears on the wiring diagram. The analog output card can be configured for 0-10VDC or 4-20mA signals. Remove the card from the rack. There are two switches below the pin connector on the back of the card. The bottom switch #1 configures the first analog output. The top switch #2 configures the second analog output. Select position U for 0-10VDC and position I for 4-20mA output signals.	N/A	0-99	
Code	Defines the desired functionality of the output. Valid codes are defined in Appendix C of this manual	0	0-255	

Table 21: AO Variables

4.3.10 Communication Setup Menu

From the System Setup Menu, shown in section 4.3, press 10 and ENTER to get to the Communication Setup Menu shown below.

```
Comm. Setting
1 = BACnet      2 = JC N2
3 = MODBUS      4 = BACnet/IP
0 = Exit        Select: #
```

Press the numeric key and ENTER.

4.3.10.1 BACnet MS/TP

From the Communication Setup Menu, shown in section 4.3.10, press PROCESS VARIABLE/1 and ENTER to get to the BACnet screen shown below.

```
BACnet MS/TP
Baud, 8, 1, 1, N Slave
MAC address:   #
SP Ovrd: ? Y/N     Exit ? Y/N
```

The first line confirms setup for the BACnet protocol. The second line defines the 9600 bps baud rate, 8 bit data packets, 1 stop bit, 1 start bit and no parity. To return to the Communication Setup Menu, shown in section 4.3.10, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. Table 22 gives a description of the BACnet Variables.

Note: The Technologic 5500 Series Variable Primary Pump and Valve Controller is a MS/TP slave only. It will not respond to a Who-Is command or initiate any communications.

4.3.10.2 Metasys N2

From the Communication Setup Menu, shown in section 4.3.10, press SET POINT/2 and ENTER to get to the Metasys N2 screen shown below.

```
Matesys N2
9600, 8, 1, 1, N.   VND
Node:   #   SP Ovrd: ? Y/N
            Exit ? Y/N
```

The first line confirms setup for the Johnson Controls N2 protocol. The second line defines the 9600 bps baud rate, 8 bit data packets, 1 stop bit, 1 start bit and no parity. To return to the Communications Setup Menu, shown in section 4.3.10, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. Table 23 gives a description of the Metasys N2 Variables.

4.3.10.3 Modbus RTU

From the Communication Setup Menu, shown in section 4.3.10, press SETUP/3 and ENTER to get to the Modbus screen shown below.

```
Modbus
9600, 8, 1, 1, N.   RTU
Node:   #   SP Ovrd: ? Y/N
            Exit ? Y/N
```

The first line confirms setup for Modbus protocol. The second line defines the 9600 bps baud rate, 1 stop bit, 1 start bit, and no parity. To return to the Communications Setup Menu, shown in section 4.3.10, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. Table 24 gives a description of the Modbus Variables.

Variable	Description	Default Value	Range	Field Value
Baud	The baud rate is user adjustable	9600	9600, 19200, 38400	
MAC Address	Obtain the node number from the manufacturer that supplied the device that will communicate with the Technologic Controller. A change requires a power cycle.	0	0-255	
Inst #	If multiple devices are present on the network, a unique instance number is required.	100	0-9999	
SP Ovrd	Select “Y” for SP Ovrd to allow the external device to override the local setpoint data.	N	Y/N	

Table 22: BACnet MS/TP Variables

Variable	Description	Default Value	Range	Field Value
Node	Obtain the node number from the manufacturer that supplied the device that will communicate with the Technologic Controller	0	0-255	
SP Ovrd	Select “Y” for SP Ovrd to allow the external device to override the local setpoint data.	N	Y/N	

Table 23: Metasys N2 Variables

Variable	Description	Default Value	Range	Field Value
Node	Obtain the node number from the manufacturer that supplied the device that will communicate with the Technologic Controller	0	0-255	
SP Ovrd	Select “Y” for SP Ovrd to allow the external device to override the local setpoint data.	N	Y/N	

Table 24: Modbus RTU Variables

4.3.10.4 **BACnet/IP**

From the Communication Setup Menu, shown in section 4.3.10, press ALTERNATION/4 and ENTER to get to the BACnet/IP screen shown below.

```
IP Address:
###. ###. ###. ###
Subnet:
###. ###. ###. ###
```

BACnet device IP address and Subnet is provided by building management system. Press NEXT SCREEN and the display will show:

```
Inst. # ####  Delay  ##
Setpoint Ovrd ?(Y/N)
Save IPAdd.   ?(Y/N)
        Exit  ? (Y/N)
```

To return to the Communications Setup Menu, shown in section 4.3.10, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. Table 25 gives a description of the BACnet/IP Variables.

For additional information concerning the above protocols, consult the Bell & Gossett Technologic 5500 Serial Communications instruction manual (part number S13654).

Contact your Bell & Gossett representative concerning additional protocols and setups.

4.3.11 **Special Functions**

From the System Setup Menu, shown in section 4.3, press 11 and ENTER to get to the Special Functions Menu shown below.

```
Selection: #          0 = Exit
1 = Pump Duty/Standby
```

Press PROCESS VARIABLE/1 and ENTER to get to the Pump Duty/Standby screen shown below, or press NO/0 to exit back to the System Setup Menu shown in section 4.3.

```
# of Duty Pump      #
# of Standby Pump   #

        Exit: ? (Y/N)
```

Table 26, shown below, gives a description of the Pump Duty/Standby variables.

4.3.12 **Brightness/Contrast**

From the System Setup Menu, shown in section 4.3, press 12 and ENTER to get to the Brightness/Contrast screen shown below.

```
Contrast is: ###
Change is: ###
     Ok ? (Y/N)
```

To return to the System Setup Menu, shown in section 4.3, press YES/7 and ENTER. To edit the field, press NO/0 and ENTER. Table 27 gives a description of the Brightness/Contrast variables.

4.3.13 **Save to Flash**

From the System Setup Menu, shown in section 4.3, press 13 and ENTER to get to the Save to Flash screen shown below.

```
**WARNING**
CPU WILL BE HALTED
DATA WILL BE SAVED
PROCEED:  ? (Y/N)
```

To return to the System Setup Menu, shown in section 4.3, press NO/0 and ENTER. To save all of the user setup data to the ROM within the controller, press YES/7 and ENTER.

Variable	Unit	Description	Default Value	Range	Field Value
Inst. #	N/A	If multiple devices are present on the network, a unique instance number is required.	100	0-9999	
Start Delay	Seconds	Time delay to start the BACnet interface	10	0-999	
Set Point Ovrd		Select YES for the external device to override the local setpoint data	N	Y/N	
Save IP Add		Select YES to save IP address. Saving the I.P. address will cause the controller to power cycle.	N	Y/N	

Table 25: BACnet/IP Variables

Variable	Description	Default Value	Range	Field Value
# of Duty Pump	Number of duty pump equals the number of pumps configured in the pump setup menu minus the number of standby pumps	0	0-6	
# of Standby Pump	Standby pumps are those pumps that will not run unless one of the duty pumps fail.	0	0-6	

Table 26: Pump Duty/Standby Variables

Variable	Description	Default Value	Range	Field Value
Contrast is:	Current contrast setting is not modifiable (0 = Light Characters, 100 = Darkest Characters)	500	200-1000	
Change to:	Desired Contrast Setting (Setting of 1000 will reduce the life of the screen)	500	200-1000	

Table 27: Brightness/Contrast Variables

4.3.14 Load from Flash

From the System Setup Menu, shown in section 4.3, press 13 and ENTER to get to the Save to Flash screen shown below.

```
**WARNING**
PRIOR SETTINGS WILL
BE LOADED FROM FPROM
PROCEED: ?  (Y/N)
```

To return to the System Setup Menu, shown in section 4.3, press NO/0 and ENTER. To load the user setup data, which was previously saved, to the ROM within the controller, press YES/7 and ENTER.

4.4 Test Selection Menu

From the Setup Selection menu, shown in section 4, press ALTERNATION/4 and ENTER to get to the Test Selection Menu shown below.

```
Test Selection: #
1 = DI      4 = AO      7 = Disp
2 = DO      5 = LED     8 = Comm
3 = AI      6 = Key     0 = EXIT
```

4.4.1 DI Test

From the Test Selection Menu, shown in section 4.4, press PROCESS VARIABLE/1 and ENTER to get to the DI Test Screen shown below.

```
          Digital Inputs
SLOT  0   1       SLOT 1.4  1
1234567890        1234567890
0000000000        0000000000
```

The zero below each corresponding input will change to a one upon receiving a digital input. Press the PREV/NEXT SCREEN keys to view more digital inputs. Press CLEAR to exit the test.

4.4.2 DO Test

From the Test Selection Menu, shown in section 4.4, press SET POINT/2 and ENTER to get to the DO Test Screen shown below.

```
DO Slot 2.X
12345678
00000000
Enter DO #  0    (0 = Exit)
```

Press any numeric key, numbered 1-8, corresponding to the digital output for which the state is to be changed. Press the ENTER key to change the state of the digital output. Pressing ENTER multiple times will toggle between 0 and 1. Press the PREV/NEXT SCREEN keys to view more digital outputs. To exit, press "0" followed by the ENTER key.

4.4.3 AI Test

From the Test Selection Menu, shown in section 4.4, press SETUP/3 and ENTER to get to the AI Test Screen shown below.

```
Analog Inputs:
1: ###%     4: ###%     7: ###%
2: ###%     5: ###%     8: ###%
3: ###%     6: ###%     9: ###%
```

The current percentage of the signal span will be indicated next to each input (0% = 4mA, and 100% = 20mA). Press the PREV/NEXT SCREEN keys to view more analog inputs. Press CLEAR to exit the test.

4.4.4 AO Test

From the Test Selection Menu, shown in section 4.4, press ALTERNATION/4 and ENTER to get to the AO Test Screen shown below.

```
AO1 ###%        AO5 ###%
AO2  ###%       AO6 ###%
AO3 ###%        AO7 ###%
AO4 ###%        OK  ?  (Y/N)
```

Press YES/7 to exit or press NO/0 to edit the fields. Input the desired numeric values, and press ENTER to modify the values (0% = 0mA or 0V, 100% = 20mA or 10V). The switch on the analog output card must be set to "I" for mA output or "U" for voltage output. Press the NEXT/PREV SCREEN keys to view more analog outputs.

4.4.5 LED Test

From the Test Selection Menu, shown in section 4.4, press F1/LOG/5 and ENTER to get to the LED Test Screen shown below.

```
LED TEST
**** LED ON ****
**** LED OFF ****
**** LED BLINK ****
```

All of the LED's on the left key set turn on, then turn off, then flash. The entire test takes 5 seconds to complete prior to returning to the Test Selection menu shown in section 4.4. Press the CLEAR key at any time to terminate the test and return to the Test Selection menu.

4.4.6 Key Test

From the Test Selection Menu, shown in section 4.4, press F2/6 and ENTER to get to the Key Test Screen shown below.

```
Key Test

Press a Key for Test
```

Press any key except for the CLEAR key and the display will confirm that the key is working by displaying the key name. Press the CLEAR key to return to the Test Selection menu shown in section 4.4.

4.4.7 Disp Test

From the Test Selection Menu, shown in section 4.4, press YES/7 and ENTER to get to the Disp Test Screen shown below.

```
Press Clear to Exit
>>> 0 1 2 3 4 5 6 7 8 9...>>>
>>> 0 1 2 3 4 5 6 7 8 9...>>>
>>> 0 1 2 3 4 5 6 7 8 9...>>>
```

The display will scroll ASCII characters from right to left. All four lines will be tested at the same time. To exit the test, press the CLEAR key and return to the Test Selection menu shown in section 4.4.

4.4.8 Comm Test

From the Test Selection Menu, shown in section 4.4, press F3/INFO/8 and ENTER to get to the Comm Test Screen shown below. The display will show:

```
Test Communication
B & G Read      #
B & G Write     #
```

If the controller is communicating properly with the building automation system, the numbers will continue increasing in value. For Modbus protocol, the read and write numbers will be equal. For BACnet and Johnson N2 protocols, the numbers will not be equal. If the numbers are not increasing in value, the controller is not communicating properly. If it is not communicating, check the wiring at the terminal blocks and the RS communication card mounted on the controller. Press CLEAR to exit this test.

4.5 Default Setup

From the Setup Selection Menu, shown in section 4, press F1/LOG/5 and ENTER to get to the Default screen shown below.

```
*** WARNING ***
All Setup Data Will
Be Overwritten.
Proceed:  ?  (Y/N)
```

Prior to reverting to the default values, it is strongly recommended that all factory/field variables be recorded for future reference. Use the 'Field Value' location in the tables to record your current data. Also record your sensor, pump, and chiller setup information on the wiring diagram that was included with the unit.

Press NO/0 to return to the Setup Selection Menu, shown in section 4, without loading the default values. Press YES/7 to load all of the pre-defined default variables including: sensor, pump, and chiller information. The default values are defined in the tables. Once the default values are loaded, the controller will return to the Setup Selection Menu shown in section 4.

4.6 Chiller Setup

From the Setup Selection Menu, shown in section 4, press F2/6 and ENTER to get to the Chiller Setup Menu shown below.

```
Selection: #        Exit = 0
1 = Enbl/Disbl Chiller
2 = Chiller's Run Tmr
3 = Isolation Valve
```

Press the appropriate numeric key and ENTER.

4.6.1 Enbl/Disbl Chiller

From the Chiller Setup Menu, shown in section 4.6, press PROCESS VARIABLE/1 and ENTER to get to the Enbl/Disbl Chiller screen shown below.

```
# Chiller = #
C1:*    C2:*    C3:*
C4:*    C5:*    C6:*
      OK ? (Y/N)
```

*The chiller status will be displayed for each defined chiller. The possible states are shown in Table 28.

State	Description
N/A	Chiller not available as defined by setup
Rdy	Chiller available, not running
On	Chiller is running
Off	Chiller disabled, will not start

Table 28: Chiller Status

Press YES/7 and ENTER to accept chiller configuration and return to the Chiller Setup Menu shown in section 4.6. Press NO/0 and ENTER to set up a chiller. If NO/0 was selected, then the screen will show:

```
Edit Chiller  ?  (Y/N)
```

Press YES/7 to Edit a Chiller. Press NO/0 to return to the previous screen. If YES was selected, the screen will show:

```
Total Number
Chillers =  #
```

Press the numeric key for the total number of chillers. Press ENTER to continue. The display will show:

```
Edit Chiller #   #
```

Press the numeric key for the chiller you wish to setup. The chiller number is limited to the maximum number of chillers. Press ENTER to proceed with the setup. The display will show:

```
Chiller # #
Enable/Disable: #

1 = Enable    0 = Disable
```

Press PROCESS VARIABLE/1 and ENTER if the chiller will be enabled. If the Chiller is enabled, then the controller will go to the Chiller Setup screen shown immediately below.

Press NO/0 and ENTER if the chiller will be disabled. If the chiller is disabled, then the controller will skip the following Chiller Setup screen.

```
Chiller # #
DP Max ##  Min  # Or
Flow Max   # Min  #
           Ok  ? (Y/N)
```

To accept the values shown and proceed, press YES/7 and ENTER. To edit the fields, press NO/0 and ENTER. Table 29 gives a description of the Chiller Setup variables.

Now the display will show:

```
Do Another ? (Y/N)
```

Press YES/7 and ENTER to set up another chiller. Press NO/0 and ENTER to return to the Enbl/Disbl Chiller screen shown at the beginning of this section.

4.6.2 Chiller's Run Tmr

From the Chiller Setup Menu, shown in section 4.6, press SET POINT/2 and ENTER to get to the Chiller Run Timer screen shown below.

```
Chiller Minimum
Run Timer  ### min
        Ok ?  (Y/N)
```

To return to the Chiller Setup Menu, shown in section 4.6, press YES/7 and ENTER. To edit the chiller minimum run timer, press NO/7 and ENTER. See Table 30 for a description of the Run Timer.

4.6.3 Isolation Valve

From the Chiller Setup Menu, shown in section 4.6, press SETUP/3 and ENTER to get to the Chiller Isolation Valve screen shown below.

```
Monitor Valve ? (Y/N)
Control Valve ? (Y/N)
Vlv Close Delay ? (Y/N) s
          OK ? (Y/N)
```

To return to the Chiller Setup Menu, shown in section 4.6, press YES/7 and ENTER. To edit the chiller isolation valve, press NO/7 and ENTER. See Table 31 on next page for a description of the Isolation Valve variables.

Variable	Unit	Description	Default Value	Range	Field Value
DP Max	PSID	Maximum Differential Pressure prior to requesting to stage another chiller.	18	0-999	
DP Min	PSID	Minimum Differential Pressure to be maintained for the selected chiller.	5	0-999	
Flow Max	GPM	Maximum Flow prior to requesting to stage another chiller	0	0-9999	
Flow Min	GPM	Minimum Flow to be maintained for the selected enable chiller	0	0-9999	

Table 29: Chiller Setup Variables

Variable	Unit	Description	Default Value	Range	Field Value
Run Timer	min	Request to destage chiller will not occur until chiller's minimum run timer has expired	10	0-999	

Table 30: Chiller Run TMr Variable

Variable	Description	Default Value	Range	Field Value
Monitor Valve	A DI signal is supplied from the limit switch on the valve. When the switch is closed, the valve is open. If Y is selected, the pumps will not be allowed to start if all of the isolation valves are closed.	N	Y or N	
Control Valve	A DO signal is supplied to control the actuator on the isolation valve. When the output is closed, the valve is to open. Note: the isolation valve must be monitored if it is controlled.	N	Y or N	
Vlv Close Delay	Timer to delay closing the isolation valve after stopping the chiller. This variable is only used for dedicated pump to chiller systems.	5	0-999	

Table 31: Isolation Valve Variables

4.7 Bypass Valve Setup

From the Setup Selection Menu, shown in section 4, press YES/7 and ENTER to get to the Bypass Valve Setup Menu shown below.

```
Selection: #        Exit =0
1 = Byps Valve Setting
2 = Byps Operat. Mode
3 = Timers
```

Press the appropriate numeric key and ENTER.

4.7.1 Bypass Valve Setting

From the Bypass Valve Setup Menu, shown in section 4.7, press PROCESS VARIABLE/1 to get to the Bypass Valve Setting screen shown below.

```
Min Opening = ##%
Max Opening = ##%
Step = ##%    Volts: ?
Rev ?(Y/N)   Ok  ? (Y/N)
```

To return to the Bypass Valve Setup Menu, shown in section 4.7, press YES/7 and ENTER. To edit the values shown, press NO/7 and ENTER. See Table 32 for a description of the Bypass Valve Opening variables.

4.7.2 Bypass Valve Operation Mode

From the Bypass Valve Setup Menu, shown in section 4.7, press SET POINT/2 to get to the Bypass Valve Operation Mode screen shown below.

```
Bypass Valve
Operation Mode   #
1 = Auto                2 = Manual
                        Ok  ? (Y/N)
```

To return to the Bypass Valve Setup Menu, shown in section 4.7, press YES/7 and ENTER. To edit the value shown, press NO/7 and ENTER. See Table 33 for a description of the Operation Modes.

4.7.3 Timers

From the Bypass Valve Setup Menu, shown in section 4.7, press SETUP/3 to get to the Timers screen shown below.

```
Bypass Valve Timers
Opening Timer   ##s
Closing Timer  ## s
                        Ok ?
```

To return to the Bypass Valve Setup Menu, shown in section 4.7, press YES/7 and ENTER. To edit the values shown, press NO/7 and ENTER. See Table 34 for a description of the Timer variables.

Variable	Unit	Description	Default Value	Range	Field Value
Min Opening	%	Minimum Valve Position	0	0-100	
Max Opening	%	Maximum Valve Position	100	0-100	
Step	%	The increment by which the valve will modulate	3	0-100	
Volts	N/A	Select "Y" if the signal to the bypass valve is 0-10V. Select "N" if the signal is 4-20mA.	N	Y/N	
Rev	N/A	Select "N" if the signal to the bypass valve is not reversed (4mA or 0V = closed, 20mA or 10V = open), Select "Y" if the signal to the bypass valve is reversed (20mA or 10V = closed, 4mA or 0V = open).	N	Y/N	

Table 32: Bypass Valve Opening Variables

Variable	Description	Default Value	Range	Field Value
Bypass Valve Operation Mode	Select "1" for automatic operation. In automatic operation the Logic controls the valve opening to protect the chiller minimum flow. Select "2" for manual operation. In manual operation use the Bypass Valve Position screen, shown in section 5.1.10, to control valve position.	1	1,2	

Table 33: Bypass Valve Operation Modes

Variable	Unit	Description	Default Value	Range	Field Value
Opening Timer	s	Time delay between opening the bypass valve by the Step.	3	0-30	
Closing Timer	s	Time delay between closing the bypass valve by the Step.	5	0-30	

Table 34: Timers Variables

Section 5 - Operation

5.1 Status Screens

5.1.1 Technologic Pump Controller Screen

The Technologic Pump Controller screen displays the date, time, status, and mode of operation. STATUS indicates the current alarm status. If NORMAL is displayed, there are no alarms. If *ALARM* is displayed, there are alarms that may prevent normal operation. See section 5.11 for more information on alarms.

MODE, in the lower right corner, will display the system operation mode. The operation mode will be Auto, Manual or Manual Bypass. See sections 5.5-5.7.

Technologic Pump Controller	
MM/DD/YY	HH:MM:SS
STATUS	MODE

During normal operation, PREV. SCREEN and NEXT SCREEN can be pressed to scroll through the status screens shown below.

5.1.2 Pump Status Screen

Pressing NEXT SCREEN, the controller will display the Pump Status screen shown below.

Pump Status		
P1:*	P2:*	P3:*
P4:*	P5:*	P6:*
STATUS		MODE

*The pump status will be displayed for each defined pump. The valid options are as follows:

N/A = Pump not available as defined by setup.
Rdy = Pump available, not running.
On = Pump is running.
Off = Pump disabled, will not be allowed to start.

5.1.3 Pump Speed Screen

Pressing NEXT SCREEN, the controller will display the Pump Speed screen shown below.

Pump Speed %		
P1: 0	P2: 0	P3: 0
P4: 0	P5: 0	P6: 0
STATUS		MODE

The actual pump speed is shown. Allowable values are 0-100%.

5.1.4 Chiller Status Screen

Pressing NEXT SCREEN, the controller will display the Chiller Status screen shown below.

Chiller Status		
C1:*	C2:*	C3:*
C4:*	C5:*	C6:*
STATUS		MODE

*The chiller status will be displayed for each defined chiller. The possible states are as shown below.

N/A = Chiller not available as defined by setup.
Rdy = Chiller available, not running.
On = Chiller is running. (Received Chiller “Start” DI.)
Off = Chiller disabled, will not be allowed to start.

5.1.5 Chiller Data Screen

Pressing NEXT SCREEN, the controller will display the Chiller Data screen shown below.

Chiller Data (UNITS)	
C1: 0	C4: 0
C2: 0	C5: 0
C3: 0	C6: 0

If the chiller flow is monitored by a flow meter the units are GPM.

If the chiller flow is monitored by a Differential Pressure meter the units are PSI.

5.1.6 Active Values Data Screen

Pressing NEXT SCREEN, the controller will display the Active Values Data screen shown below.

Active Values	
Zone: ###	Flow: ###
KW: N/A	SysDp: N/A
STATUS	MODE

The actual values for each signal are displayed.

5.1.7 Bypass Valve Signal Screen

Pressing NEXT SCREEN, the controller will display the Bypass Valve Signal screen shown below.

Bypass Valve
Signal To Valve ###%
Signal Frm Valve n/a
Valve Control Man

The analog signal (4 - 20mA or 0-10V) to and from the valve is displayed, in percentage.

5.1.8 Manual Speed Screen

Pressing NEXT SCREEN, the controller will display the Manual Speed screen, shown below. This screen will only be present if the operation mode is Manual.

Manual Speed ###%	
STATUS	MODE

Press F2/6, the up arrow, to increase the pump speed. Press F4/9, the down arrow, to decrease pump speed.

5.1.9 **Active Values Seq Screen**

Pressing NEXT SCREEN, the controller will display the Active Values Seq screen shown below.

```
Active Values
Seq:          # - # - #
System Eff:  n/a%
STATUS                    MODE
```

The # symbol indicates the current pump sequence. The lead pump is shown on the left, and the next pumps in the staging sequence follow to the right. This screen is only displayed if Sys DP, Flow, or Sys KW meters are installed.

5.1.10 **Bypass Valve Position Screen**

Pressing NEXT SCREEN, the controller will display the Bypass Valve Position screen shown below. This screen will only be present when the Bypass operation mode is in Manual. See section 4.7 for more information.

```
Bypass Valve
Position:  0%
(0% = Close 100% =Open)
Valve     Control     Man
```

Press F2/6, the up arrow, to increase the Bypass Valve Position. Press F4/9, the down arrow, to decrease the Bypass Valve Position.

5.1.11 **Sys. Temp Screen**

Pressing NEXT SCREEN, the controller will display the Sys. Temp screen shown below.

```
Sys. Supply Temp    #F
Sys. Return Temp    #F

STATUS        MODE
```

Sys. Supply Temp and Sys. Return Temp display values from RTDs installed in the piping. If no RTDs are installed, this screen will be skipped.

5.1.12 **Isolation Valve Status Screen**

Pressing NEXT SCREEN, the controller will display the Isolation Valve Status Screen shown below.

```
Isolat. Valve Status
V1: Opn      V2: Cls      V3: Cls
V4: n/a      V5: n/a      V6: n/a
STATUS       MODE
```

The staus of the limit switch installed on the isolation valve will be displayed if either "Monitor Valve" or "Control Valve" is set to "Y" in section 4.6.3. This screen will be skipped if they are both "N".

5.2 **Bypass Valve Operation**

The Bypass Valve position can be controlled manually or automatically. See the following sections for instructions on both types of operation.

5.2.1 **Manual Bypass Valve Operation**

To manually control the Bypass Valve with the controller, the Bypass Valve operation mode must be set to Manual. See section 4.7.2.

Once the Bypass Valve operation mode is set to manual, the Bypass Valve can be controlled from the Bypass Valve Position screen shown in section 5.1.10. The Bypass Valve Position screen will only be accessible once the Bypass Operation Mode is set to Manual. The Bypass Valve Position screen can be accessed by pressing NEXT SCREEN or PREV. SCREEN the appropriate number of times from the Technologic Pump Controller screen shown in section 3.2.

The analog signals to and from, if the feedback is present, the bypass valve can be viewed from the Bypass Valve Signal screen shown in section 5.1.7. This is a status screen that can be accessed by pressing NEXT SCREEN or PREV. SCREEN the appropriate number of times from the Technologic Pump Controller screen shown in section 3.2.

5.2.2 **Auto Bypass Valve Operation**

To automatically control the Bypass Valve with the controller, the Bypass Valve operation mode must be set to Auto. See section 4.7.2.

Once the Bypass Valve operation mode is set to Auto, the Bypass Valve will be controlled automatically by the controller.

The analog signals to and from, if the feedback is present, the bypass valve can be viewed from the Bypass Valve Signal screen shown in section 5.1.7. This is a status screen that can be accessed by pressing NEXT SCREEN or PREV. SCREEN the appropriate number of times from the Technologic Pump Controller screen shown in section 3.2.

5.3 **Manual Bypass Operation From The Controller**

The following programs support constant speed operation of pumps: A1 and D4. Refer to the following steps to override the automatic operation of the unit to allow manual control of the constant speed pumps.

Press the START/STOP key to stop the system. The solid green LED will flash, and any running pumps will stop. Press the AUTO/MANUAL key and the screen will display Operation Mode screen shown below.

```
Enter Operation Mode
#
1 = AUTO,  2 = MANUAL
3 = MANUAL BYPASS
```

Press the SETUP/3 key followed by ENTER to proceed to manual bypass operation. The display will now show the following:

Technologic Pump Controller	
DATE	**TIME**
NORMAL	**MAN. BPS**

Press the START/STOP key to run the enabled pump(s) in bypass. The flashing green LED(s) will turn solid green after the pump(s) starts.

Press the START/STOP key to stop the system. The running pump(s) will stop.

5.4 **Manual Operation**

Press the START/STOP key to stop the system. Press the AUTO/MANUAL key and the screen will display the Operation Mode screen shown below.

Enter Operation Mode # 1 = AUTO, 2 = MANUAL 3 = MANUAL BYPASS

Press the Set Point/2 key followed by ENTER to proceed to the Manual Speed screen shown below. This display will now show the following:

MANUAL SPEED: 0%	
NORMAL	**MANUAL**

Press the START/STOP key to run the enabled pump(s) in manual. After a brief time delay, the pump(s) start, and the flashing green LED(s) will turn solid green.

Press the F2/6 key, the up arrow, to increase pump speed to a maximum of 100% of rated speed. Press the F4/9 key, the down arrow, to decrease the speed to 0% where the pump will run at the minimum speed configured in the AFD, typically 18 HZ.

Press the START/STOP key to stop the system. The running pump(s) will stop.

5.5 **Hand Bypass Operation**

The following programs include a Bell & Gossett bypass panel: A1 and D4. The bypass panel allows for switch control of the starters during system start-up or failure.

Place the AUTO-OFF-HAND switch in HAND. While this switch is in HAND or OFF, the controller will be prevented from starting the pumps. Place the pump's DRIVE - BYPASS switch in the desired position.

To return to Automatic control place the AUTO-OFF-HAND switch in the AUTO position.

5.6 **Setpoint Modification**

To modify any of the setpoints for the transmitter configured in the setup, press the SETPOINT/2 key and press ENTER.

The following will be displayed:

SP1 = #	**SP4 = #**
SP2 = #	**SP5 = #**
SP3 = #	**SP6 = #**
	Ok ? (Y/N)

Press the PREV/NEXT SCREEN keys to view more setpoints.

To accept the current setpoint settings, press the YES/7 key followed by ENTER to return to the previous screen. To modify any of the setpoints, press NO/0 and ENTER.

Note: The setpoints are compared to a sensor in which PV is set to "Y" and the "Setpoint No" corresponds to the number on this screen. Example: SP1 could correspond to AI (Sensor) #3 which has PV="Y" and "Setpoint No"=1.

5.7 **Process Variable Monitoring**

To view the actual process variable signals that are being sent to the controller press the PROCESS VARIABLE/1 key. The following will be displayed:

PV1 = #	**SP1 = #**
PV2 = #	**SP2 = #**
PV3 = #	**SP3 = #**
PV4 = #	**SP4 = #**

The source of the PV signal is defined in the sensor setup menu. PV#1 corresponds to a sensor with PV="Y" and "Setpoint No"=1.

If the setpoint is defined by the Technologic, the number remains static. If the setpoint is supplied by an external device the number will fluctuate as the SP signal fluctuates from the controlling device. See section 4.3.10 to remotely override the setpoints.

5.8 **Request to Stage/Destage Chillers**

The controller will close relays and activate a horn and light, if equipped, to request to stage/destage chillers. A request to stage will be based on the maximum flow or dp set in Section 4.6.1. A request to destage will be based on the supply and return temperature sensors or the bypass valve position if no temperature sensors are used.

5.9 Alternation

From the Technologic Pump Controller screen, shown in section 3.2, press Alternation/4 to get to the Alternation screen shown below.

Alternate ? (Y/N)

Press YES/7 and ENTER to alternate the sequence of pump staging. The pump sequence is shown in the Active Values Seq screen shown in section 5.1.9. Press NO/0 and ENTER to return to the Technologic Pump Controller screen without alternating.

Note: Alternation can also be accomplished automatically. See section 4.3.4.

5.10 Alarms

When the controller detects an alarm condition, the display will flash *ALARM* in the lower left corner of the main screen.

The green LED on the HELP key will also flash during an alarm condition. Press the HELP key for additional information on the alarm(s). If there are more than one alarm the alarms will be listed in order of occurrence.

To view possible causes for alarms press the HELP key again after the alarm is displayed.

Refer to table Table 35 below for an overview of the possible alarms and their respective causes.

Press the CLEAR key to return to the main screen. Pressing RESET may be required to re-start the system.

The controller logs alarms as they occur to aid in troubleshooting unobserved alarms. Refer to Section 5.13 for alarm logging information.

HELP SCREEN ALARM	HELP/HELP SCREEN DISPLAY	DETAILED DESCRIPTION
AFD failure	Check H-O-A switch, wiring, and AFDs LED	The controller is not receiving a closed run signal from AFD number X after it has been given a start command
Battery Empty	Check battery's voltage and its continuity	Check for less then a 3V charge on the battery, check battery connection
High Level	Check setting of level switch	Check for open or closed contacts, refer to wire diagram for proper connection
Low Level	Check setting of level switch	Check for open or closed contacts, refer to wire diagram for proper connection
Overload Fail	Check amp draw, Use manual reset if it's OK	On Systems with Bell & Gossett bypasses the controller is not receiving a digital input from the pump number X starter confirming that it has closed
Pump Fail	Check DP switch, impeller, coupler, motor	The controller is receiving a closed signal from the differential pressure switch for pump number X after it has been given a start command
Sensor Fail	Check wiring, piping, polarity, continuity	The controller is not receiving the proper 4-20mA signal from zone number X transmitter
Iso Vlv Fail	Check wiring, continuity	This alarm is only available if “Monitor Valve” or “Control Valve” is set to “Y” in section 4.6.3. The controller will not start the corresponding pump if its isolation valve is closed. In ganged pump systems, only one isolation valve needs to be open to run the pumps.

Table 35: Alarm Messages

Section 6 - Maintenance

The following is a description of the hardware, diagnostics, and corrective action to maintain a process being controlled by the Technologic 5500 Variable Primary Pump Controller.

NOTE: The following should not be interpreted as the maximum configuration of this controller, rather this describes its application as a technologic 5500 variable primary pump controller only.

6.1 Technical Overview

The Technologic 5500 Variable Primary Pump Controller is a micro-processor based dedicated pump controller unique to and exclusively manufactured by Bell & Gossett. All aspects of this unit are strictly proprietary to Bell & Gossett.

6.2 Digital Inputs

The controller has provision for digital inputs with an operating voltage of 24 VDC. This signal voltage must be obtained from the 24 VDC power supply mounted to the subpanel. It is not recommended that other power sources be used without factory approval. Customer connections are made directly to the terminals mounted on the digital input module.

6.3 Digital Outputs

The controller has provision for relay outputs to control 120 V 50/60 HZ devices. The relays are not removable. If defective the digital output module must be returned to the factory for repair. All relays operate as single pole single throw. Components are provided to reduce contact arc and extend electrical life. Customer connections are made directly to the terminal blocks that are tied to the digital output module.

6.4 Analog Inputs

Analog inputs are provided for process variables and optional transmitters. All analog inputs operate at 4-20mA. They must be powered from the 24 VDC power supply included with the controller.

6.5 Memory

The logic is stored in a non-removable EEPROM chip which can be updated from the RS-232 program port on the CPU or from a memory card. The user setup data is stored in non-volatile memory or fixed RAM. The fixed RAM requires power to hold the information. While the controller is powered up the CPU controller provides the power to save the user values. When the controller is powered down a 3V Lithium battery provides the power to store the user values. When the battery voltage drops below 2.5 VDC the controller will display *ALARM*. After pressing the HELP key the display will indicate # of # Low Battery. You will have approximately 25 weeks to replace the battery before losing memory due to an under voltage condition during a power loss.

6.6 CPU

The CPU does not require any maintenance, and it cannot be replaced as a field repair.

6.7 Power Supply

The power supply provides 24 VDC for all digital and analog signals as well as the CPU. It is specifically rated only for the controller and other loads should not be applied without factory approval.

6.8 Protection

Analog inputs - the analog inputs provided on the Technologic 5500 Variable Primary Pump Controller must be wired according to the wiring diagram that shipped with the unit.

Protection - all analog inputs are protected from high voltage, crossed wiring, etc. A sustained fault will be limited to 20mA by the current limiting circuit.

Digital Inputs - as long as input power is derived from the integral 24VDC power supply they are protected.

Digital Outputs - each output shall not exceed the ratings on the digital output module.

The digital outputs are fuse protected. For the DO721 module, replace with a T 5A H / 250V fuse only. For the DO 722 module, Replace with a T 3.15A H / 250V fuse only.

6.9 Instruments and their Use

With the diagnostics described herein, extensive instruments are not required. However, the instruments used should be quality units to meet the following at a minimum.

Under no circumstances shall any instrument be used to test any on board components. Especially risky is an ohmmeter with battery voltage higher than TTL logic or applied with incorrect polarity.

6.9.1 AC/DC Voltmeter

Input impedance	Not less than 10 MEGOHM.
Accuracy	- AC ± 2% of Full Scale - DC ± 3% of Full Scale
Rated circuit to ground voltage	1000V.

6.9.2 Ohmmeter

Accuracy	± 2.5%
Max open circuit voltage	0.5 V

6.9.3 Milliamp Meter

Accuracy	± 2% of Full Scale

6.9.4 Signal Generator (analyzer) - recommended

The following signal generators are recommended: Beta calibrator Model 434 20mA signal analyzer, Altek calibrator Model 334 4-20mA loop analyzer or Druck UPS III loop calibrator. Either instrument may be purchased from a Local Process Control Distributor.

NOTE: If some other instrument is used it must float above ground, preferably battery powered.

6.10 Field Repair

General - typical field repair should include: replacing fuses, replacing input/output modules and assuring connections are correct and secure.

DANGER: Troubleshooting live control panels exposes personnel to hazardous voltages. Electrical troubleshooting must only be done by a qualified electrician. **FAILURE TO FOLLOW THESE INSTRUCTIONS WILL RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

6.11 Program Updating

Contact your Bell & Gossett representative for the preferred method of upgrading your software.

6.12 Controller Information Screen

To check the program type, scheme, or version numbers, press the F3/8 key while in the Technologic Pump Controller screen shown in section 3.2. The screen will now display the Controller Information Screen shown below.

```
SYS INFO   CPU V: #.##
AS V: #.#.##   OS V: #.##
 Prog Type: ####   ###
Scheme Set    #
```

Press the CLEAR key to exit this screen. If the factory is called for information or service on this unit, this information may be requested.

6.13 Logging

Press the F1/5 key, while in the Technologic Variable Primary Pump Controller screen, to get to the Logging Menu shown below.

```
Selection: #       Exit = 0
1 = Alarm Log
2 = Pump Log
3 = Data Log
```

Select the log to view, and press ENTER. Press PREV. SCREEN or NEXT SCREEN to view more options on the neighboring screen shown below.

```
Selection: #       Exit = 0
4 = Operation Log
5 = Power Log
6 = Service Log
```

6.13.1 Alarm Log

From the Logging Menu, shown in section 6.13, press PROCESS VARIABLE/1 and ENTER to get to the Alarm Log screen shown below.

DATE	TIME	ALARM
MMDD	HHMM	"
"	"	"
"	"	"

The four digit date is displayed in the MMDD format. The four digit time is displayed in the 24 hour HHMM format. Press the CLEAR key to exit this screen.

6.13.2 Pump Log

From the Logging Menu, shown in section 6.13, press SET POINT/2 and ENTER to get to the Pump Log Menu shown below.

```
View Selection #
1 = Pump Run Time.
2 = Pump On/Off Time
0 = Exit
```

Select the pump log to view.

6.13.2.1 Pump Run Time Log

From the Pump Log Menu, shown in section 6.13.2, press PROCESS VARIABLE/1 and ENTER to get to the Pump Run Time Log screen shown below.

```
Pump Run Time
P1:      # P2:      #
P3:      # P4:      #
P5:      # P6:      #
```

The pump run time is displayed in total accumulated elapsed time in hours. Press the CLEAR key to exit this screen.

6.13.2.2 Pump On/Off Log

From the Pump Log Menu, shown in section 6.13.2, press SET POINT/2 and ENTER to get to the Pump On/Off Log screen shown below.

```
Pump On/Off
P1:      # P2:      #
P3:      # P4:      #
P5:      # P6:      #
```

The pump on/off times are displayed in total accumulated times the pumps are switched on and off. Press the CLEAR key to exit this screen.

6.13.3 Data Log Menu

From the Logging Menu, shown in section 6.13, press SETUP/3 and ENTER to get to the Data Log Menu shown below.

```
Selection :  #    0 = Exit
1 = PV
2 = KWH
3 = Flow
```

Select the Data Log to view, and press ENTER.

6.13.3.1 PV Log

From the Data Log Menu, shown in section 6.13.3, press PROCESS VARIABLE/1 and ENTER to get to the PV Log screen shown below.

```
PV:  #            Max:    #
MM/DD/YY        HH:MM:SS
Now:   #        Min:    #
MM/DD/YY        HH:MM:SS
```

The process variable number is displayed along with its current, maximum and minimum values. The times and dates that the max. and min. values occurred are also displayed. To view other process variables press the Next Screen button. Press the CLEAR key to exit this screen.

6.13.3.2 KWH Log

From the Data Log Menu, shown in section 6.13.3, press SET POINT/2 and ENTER to get to the KWH Log screen shown below.

```
          KiloWatt Hours
S1:     #.#     S2:     #.#
S3:     #.#     S4:     #.#
S5:     #.#     S6:     #.#
```

The pump kilowatt consumption is displayed in total accumulated hours. Press the CLEAR key to exit this screen.

6.13.3.3 Flow Log

From the Data Log Menu, shown in section 6.13.3, press SETUP/3 and ENTER to get to the Flow Log screen shown below.

```
MAX:    #       NOW:    #
MM/DD/YY        00:00:00
MIN:    #
MM/DD/YY        00:00:00
```

The current, maximum and minimum flows are shown along with the date and time for the maximum and minimum flow. Press the CLEAR key to exit this screen.

6.13.4 Operation Log Menu

From the Logging Menu, shown in section 6.13, press ALTERNATION/4 and ENTER to get to the Operation Log Menu shown below.

```
Selection :  #    Exit = 0
1 = System On/Off
2 = Op Mode Changes
3 = Alternations
```

Press NEXT SCREEN or PREV. SCREEN to display the neighboring screen shown below.

```
Selection :  #    Exit = 0
4 = System Reset
5 = Control Logger
```

Press the appropriate numeric key and ENTER.

6.13.4.1 System On/Off Log

From the Operation Log Menu, shown in section 6.13.4, press PROCESS VARIABLE/1 and ENTER to get to the System On/Off Log screen shown below.

```
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
```

The first column shows the date. The second column shows the time. The third column shows the system start or stop action that occurred at the given time. Press the CLEAR key to exit this screen.

6.13.4.2 Op Mode Changes Log

From the Operation Log Menu, shown in section 6.13.4, press SET POINT/2 and ENTER to get to the Op Mode Changes Log screen shown below.

```
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
```

The first column shows the date. The second column shows the time. The third column shows the operation mode, auto or manual, that the system was changed to at the given time. Press the CLEAR key to exit this screen.

6.13.4.3 Alternations Log

From the Operation Log Menu, shown in section 6.13.4, press SETUP/3 and ENTER to get to the Alternations Log screen shown below.

```
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
```

The first column shows the date. The second column shows the time. The third column shows the type of command for pump alternation that occurred at the given time. Press the CLEAR key to exit this screen.

6.13.4.4 **System Reset Log**

From the Operation Log Menu, shown in section 6.13.4, press ALTERNATION/4 and ENTER to get to the System Reset Log screen shown below.

```
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
```

The first column shows the date. The second column shows the time. The third column shows the type of command for system reset that occurred at the given time. Press the CLEAR key to exit this screen.

6.13.4.5 **Control Logger**

From the Operation Log Menu, shown in section 6.13.4, press F1/LOG/5 and ENTER to get to the Control Logger screen shown below.

```
MMDD  HHMMSS  $$$$$
MMDD  HHMMSS  $$$$$
MMDD  HHMMSS  $$$$$
MMDD  HHMMSS  $$$$$
```

The first column shows the date. The second column shows the time. The third column shows the control event that occurred at the given time. Press the CLEAR key to exit this screen.

6.13.5 **Power Log**

From the Logging Menu, shown in section 6.13, press F1/LOG/5 and ENTER to get to the Power Log screen shown below.

```
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
```

The first column shows the date. The second column shows the time. The third column shows the type of command, Pwr Up or Pwr Dn, that occurred at the given time. Press the CLEAR key to exit this screen.

6.13.6 **Service Log Menu**

From the Logging Menu, shown in section 6.13, press F2/6 and ENTER to get to the Service Log Menu shown below.

```
Selection: #    Exit = 0
1 = Error Log
2 = Operating Hours
```

6.13.6.1 **Error Log**

From the Service Log Menu, shown in section 6.13.6, press PROCESS VARIABLE/1 and ENTER to get to the Error Log screen shown below.

```
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
MMDDYY  HHMMSS  $$$$$
```

The first column shows the date. The second column shows the time. The third column shows system error code for the error that occurred at the given time. Press the CLEAR key to exit this screen.

6.13.6.2 **Operating Hours Log**

From the Service Log Menu, shown in section 6.13.6, press SET POINT/2 and ENTER to get to the Operating Hours Log screen shown below.

```
Operating Since
MM/DD/YY    HH:MM:SS
Total Hours    ####
```

The Operating Hours screen shows the date and time when the controller was configured. Total Hours shows how long the controller has had power applied. Press the CLEAR key to exit this screen.

6.14 **Maintenance (Physical)**

6.14.1 **Electrical**

No maintenance is required for the electrical panel except to keep the modules free of dirt and dust that might hold moisture. Cabinet door should be kept closed, and the components kept dry.

6.14.2 **Mechanical**

If a B&G pump was supplied it was lubricated at the factory. Future lubrication should be according to the instructions that came with the pump.

If there is a danger of freezing, drain the pump. Inspect pump and system piping regularly.

For leaky seals or gaskets and loose or damaged components, replace or repair as required.

For more instruction on B&G parts see Table 36 for a list of manuals.

Manual #	Description
A91310I	Suction Diffuser Instruction Sheet
PO6451A	Series 60 Pump Installation & Operation
PO6452	Series 60 Pump Service
P70620A	Series 3510 Centrifugal Pumps
P70621B	Series 3531 Centrifugal Pump
P81547A	Series 90 In-Line Mounted Pumps
P81555B	Series 1510 Pump Kit Instructions
P81567D	Series 1531 Pump Instruction Manual
P81568B	Series 1535 Pump Instruction Sheet
P81569A	Series 1522 Pump Instruction Sheet
P81629C	Series 80 Pump Instruction Manual
P81630C	VSC & VSCS Instruction Manual
P81673E	Series 1510/Universal Pump Instruction Sheet
P81875A	Series HSC Centrifugal Pump
P95200B	Series 1550 Pump Instruction Sheet
V50960B	Triple Duty Valve with Soft Seat
None	Flow Transmitter
None	Temp/Pressure Transmitter
None	Misc. Transmitter

Table 36: List of Manuals

Appendix A

SYSTEM PIPING AND UNIT INSTALLATION – FINAL CHECK LIST

____ 1. Is the unit base properly level, grouted and secured?

____ 2. Are all lubrication points properly lubricated?

____ 3. Are the shut-off valves to the transmitters open?

____ 4. Is the shut-off valve to the pump suction open?

____ 5. Is the shut-off valve on the discharge line open?

____ 6. Is the piping properly supported so as to prevent strains on unit?

____ 7. Is the system, including the pumps and valving, purged of debris and air?

CAUTION: Seal damage may occur. Do not run pumps dry. Fill and vent the pump volute prior to operation. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE AND/OR MODERATE PERSONAL INJURY.**

____ 8. Are the pump and motor shafts properly aligned?

____ 9. Is the pump rotatation correct?

Appendix B

ELECTRICAL WIRING AND CONTROL SETTINGS – FINAL CHECK LIST

____ 1. Does the feeder line voltage correspond to the unit voltage? Check the unit nameplate or motor terminal connection.

WARNING: Electrical shock hazard. Inspect all electrical connections prior to powering the unit. Wiring connections must be made by a qualified electrician in accordance with all applicable codes, ordinances, and good practices. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

____ 2. Are the feeder wires correctly sized for the load?

____ 3. Are the fuses correctly sized? They must not exceed 1.75 times the full load current of the motor. Usual sizing is 1.15 to 1.5 times the full load current.

WARNING: Conduit grounds are not adequate. A separate ground wire must be attached to the ground lug provided in the enclosure to avoid potential safety hazards. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

____ 4. Is the unit properly grounded??

____ 5. Have all the power terminals in the control panel been checked for tightness? This is imperative since stranded wires tend to “flow” and become loose after initial installation.

DANGER: High voltage AC power can kill. Disconnect and lockout power prior to servicing unit. **FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

____ 6. Are all I/O connected per the wiring diagram including: DP sensors, RTDs, start signals to AFDs and confirmation signals from AFDs, analog speed signals to AFDs, digital isolation valve signals, analog bypass valve signals, digital on/off status signal?

Appendix C - Valid I/O Codes

Code	Function Description	I/O Type	Range	Equate to the Signal
101	Pump 1 Status (On/Off)	DO	1/0	On/Off
102	Pump 2 Status (On/Off)	DO	1/0	On/Off
103	Pump 3 Status (On/Off)	DO	1/0	On/Off
104	Pump 4 Status (On/Off)	DO	1/0	On/Off
105	Pump 5 Status (On/Off)	DO	1/0	On/Off
106	Pump 6 Status (On/Off)	DO	1/0	On/Off
111	Pump 1 Failure	DO	1/0	On/Off
112	Pump 2 Failure	DO	1/0	On/Off
113	Pump 3 Failure	DO	1/0	On/Off
114	Pump 4 Failure	DO	1/0	On/Off
115	Pump 5 Failure	DO	1/0	On/Off
116	Pump 6 Failure	DO	1/0	On/Off
121	AFD 1 Failure	DO	1/0	On/Off
122	AFD 2 Failure	DO	1/0	On/Off
123	AFD 3 Failure	DO	1/0	On/Off
124	AFD 4 Failure	DO	1/0	On/Off
125	AFD 5 Failure	DO	1/0	On/Off
126	AFD 6 Failure	DO	1/0	On/Off
131	Pump 1 Overload Failure	DO	1/0	On/Off
132	Pump 2 Overload Failure	DO	1/0	On/Off
133	Pump 3 Overload Failure	DO	1/0	On/Off
134	Pump 4 Overload Failure	DO	1/0	On/Off
135	Pump 5 Overload Failure	DO	1/0	On/Off
136	Pump 6 Overload Failure	DO	1/0	On/Off
140	A-V Alarm Output	DO	1/0	On/Off
171	Low Suction Detected, W/ Proof Time	DI	1/0	On/Off
172	High Suction Detected, W/ Proof Time	DI	1/0	On/Off
173	High Level Alarm Detected, W/ Proof Time	DI	1/0	On/Off
174	Low Level Alarm Detected, W/ Proof Time	DI	1/0	On/Off
175	Push to Silence Switch Input	DI	1/0	On/Off
201	Speed Signal	AO	0-100	4 - 20 ma
202	Active PV	AO	0-Span	4 - 20 ma
203	System Flow Rate	AO	0-Span	4 - 20 ma
204	System KW	AO	0-Span	4 - 20 ma
205	System DP	AO	0-Span	4 - 20 ma
206	System Efficiency	AO	0-100	4 - 20 ma
211	Analog Input 1	AO	0-Span	4 - 20 ma
212	Analog Input 2	AO	0-Span	4 - 20 ma
213	Analog Input 3	AO	0-Span	4 - 20 ma
214	Analog Input 4	AO	0-Span	4 - 20 ma
215	Analog Input 5	AO	0-Span	4 - 20 ma
216	Analog Input 6	AO	0-Span	4 - 20 ma
217	Analog Input 7	AO	0-Span	4 - 20 ma
218	Analog Input 8	AO	0-Span	4 - 20 ma
219	Analog Input 9	AO	0-Span	4 - 20 ma
220	Analog Input 10	AO	0-Span	4 - 20 ma
221	Analog Input 11	AO	0-Span	4 - 20 ma
222	Analog Input 12	AO	0-Span	4 - 20 ma
223	Analog Input 13	AO	0-Span	4 - 20 ma
224	Analog Input 14	AO	0-Span	4 - 20 ma
225	Analog Input 15	AO	0-Span	4 - 20 ma
226	Analog Input 16	AO	0-Span	4 - 20 ma

Appendix D - BACnet MS/TP Protocol Implementation Conformance Statement

BACnet MS/TP Protocol Implementation Conformance Statement

Date: 9/13/06
Vendor Name: Bell & Gossett
Product Name: Technologic 5500 Pump Controller
Product Model Number: N/A
Applications Software Version: 1.71 or above **Firmware Revision:** N/A **BACnet Protocol Revision:** 2.0

Product Description: The Technologic 5500 Pump Controller is a variable speed pumping system for HVAC, industrial process and domestic water booster systems. It operates either as a stand-alone controller or as part of a building-wide integrated system. The BACnet communication interface will provide communication between the Technologic 5500 pump controller and the BACnet system residing on EIA-485 media.

BACnet Standardized Device Profile (Annex L): BACnet Application Specific Controller (B-ASC)

List all BACnet Interoperability Building Blocks Supported (Annex K): DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DM-TS-B

Segmentation Capability: None

Standard Application Services Supported:

Application Service	Initiate Requests	Executes Requests
Read Property	No	Yes
Read Property Multiple	No	Yes
Write Property	No	Yes
Write Property Multiple	No	Yes
Time Synchronization	No	Yes
Who-Has	No	Yes
I-Have	Yes	Yes
Who-Is	No	Yes
I-Am	Yes	Yes

Standard Object Types Supported:

Object Type	Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
Analog Input	No	No	None	
Analog Output	No	No	None	
Analog Value	No	No	None	Present Value
Binary Input	No	No	None	
Binary Output	No	No	None	
Binary Value	No	No	None	Present Value

Data Link Layer Options:
☐ BACnet IP, (Annex J)
☐ BACnet IP, (Annex J), Foreign Device
☐ ISO 8802-3, Ethernet (Clause 7)
☐ ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
☐ ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) _____
☐ MS/TP master (Clause 9), baud rate(s): _____
☒ MS/TP slave (Clause 9), baud rate(s): 9600, 19200, 38400
☐ Point-To-Point, EIA 232 (Clause 10), baud rate(s): _____
☐ Point-To-Point, modem, (Clause 10), baud rate(s): _____
☐ LonTalk, (Clause 11), medium: _____
☐ Other: _____

Device Address Binding:
Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.) ☐ Yes ☒ No

Networking Options:
☐ Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
☐ Annex H, BACnet Tunneling Router over IP
☐ BACnet/IP Broadcast Management Device (BBMD).
Does the BBMD support registrations by Foreign Devices? ☐ Yes ☐ No

Character Sets Supported:
Indicating support for multiple character sets does not imply that they can all be supported simultaneously.
☒ ANSI X3.4 ☐ IBM™/Microsoft™ DBCS ☐ ISO 8859-1
☐ ISO 10646 (UCS-2) ☐ ISO 10646 (UCS-4) ☐ JIS C 6226

Appendix E - BACnet IP Protocol Implementation Conformance Statement

BACnet IP Protocol Implementation Conformance Statement

Date: 9/13/06
Vendor Name: Bell & Gossett
Product Name: Technologic 5500 Pump Controller
Product Model Number: N/A
Applications Software Version: 1.71 or above **Firmware Revision:** N/A **BACnet Protocol Revision:** 2.0

Product Description: The Technologic 5500 Pump Controller is a variable speed pumping system for HVAC, industrial process and domestic water booster systems. It operates either as a stand-alone controller or as part of a building-wide integrated system. The BACnet communication interface will provide communication between the Technologic 5500 pump controller and the BACnet system residing on Ethernet media.

BACnet Standardized Device Profile (Annex L): BACnet Application Specific Controller (B-ASC)

List all BACnet Interoperability Building Blocks Supported (Annex K): DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DM-TS-B

Segmentation Capability: None

Standard Application Services Supported:

Application Service	Initiate Requests	Executes Requests
Read Property	No	Yes
Read Property Multiple	No	Yes
Write Property	No	Yes
Write Property Multiple	No	Yes
Time Synchronization	No	Yes
Who-Has	No	Yes
I-Have	Yes	Yes
Who-Is	No	Yes
I-Am	Yes	Yes

Standard Object Types Supported:

Object Type	Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
Analog Input	No	No	None	
Analog Output	No	No	None	
Analog Value	No	No	None	Present Value
Binary Input	No	No	None	
Binary Output	No	No	None	
Binary Value	No	No	None	Present Value

Data Link Layer Options:
☒ BACnet IP, (Annex J)
☐ BACnet IP, (Annex J), Foreign Device
☐ ISO 8802-3, Ethernet (Clause 7)
☐ ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
☐ ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) _____
☐ MS/TP master (Clause 9), baud rate(s): _____
☐ MS/TP slave (Clause 9), baud rate(s): _____
☐ Point-To-Point, EIA 232 (Clause 10), baud rate(s): _____
☐ Point-To-Point, modem, (Clause 10), baud rate(s): _____
☐ LonTalk, (Clause 11), medium: _____
☐ Other: _____

Device Address Binding:
Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.) ☐ Yes ☒ No

Networking Options:
☐ Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
☐ Annex H, BACnet Tunneling Router over IP
☐ BACnet/IP Broadcast Management Device (BBMD).
Does the BBMD support registrations by Foreign Devices? ☐ Yes ☐ No

Character Sets Supported:
Indicating support for multiple character sets does not imply that they can all be supported simultaneously.
☒ ANSI X3.4 ☐ IBM™/Microsoft™ DBCS ☐ ISO 8859-1
☐ ISO 10646 (UCS-2) ☐ ISO 10646 (UCS-4) ☐ JIS C 6226

Appendix F - BACnet Communications Objects

Object Identifier	Object Name	Object Type	Present Value/Range	
Binary Input, 1	P1 Overload Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 2	P1 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 3	P1 AFD Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 4	P1 Off	BINARY_INPUT	1 = Alarm	0 = O.K.
Binary Input, 5	P2 Overload Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 6	P2 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 7	P2 AFD Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 8	P2 Off	BINARY_INPUT	1 = Alarm	0 = O.K.
Binary Input, 9	P3 Overload Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 10	P3 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 11	P3 AFD Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 12	P3 Off	BINARY_INPUT	1 = Alarm	0 = O.K.
Binary Input, 13	P4 Overload Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 14	P4 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 15	P4 AFD Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 16	P4 Off	BINARY_INPUT	1 = Alarm	0 = O.K.
Binary Input, 17	P5 Overload Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 18	P5 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 19	P5 AFD Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 20	P5 Off	BINARY_INPUT	1 = Alarm	0 = O.K.
Binary Input, 21	P6 Overload Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 22	P6 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 23	P6 AFD Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 24	P6 Off	BINARY_INPUT	1 = Alarm	0 = O.K.
Binary Input, 25	System Reset Req	BINARY_INPUT	1 = Yes	0 = No
Binary Input, 26	P1 Enabled	BINARY_INPUT	1 = Enabled	0 = Disabled
Binary Input, 27	P1 in Variable Speed	BINARY_INPUT	1 = In VSM	0 = Not In VSM
Binary Input, 28	P1 In Bypass Mode	BINARY_INPUT	1 = In Bypass	0 = Not In Bypass
Binary Input, 29	P2 Enabled	BINARY_INPUT	1 = Enabled	0 = Disabled
Binary Input, 30	P2 in Variable Speed	BINARY_INPUT	1 = In VSM	0 = Not In VSM
Binary Input, 31	P2 In Bypass Mode	BINARY_INPUT	1 = In Bypass	0 = Not In Bypass
Binary Input, 32	P3 Enabled	BINARY_INPUT	1 = Enabled	0 = Disabled
Binary Input, 33	P3 in Variable Speed	BINARY_INPUT	1 = In VSM	0 = Not In VSM
Binary Input, 34	P3 In Bypass Mode	BINARY_INPUT	1 = In Bypass	0 = Not In Bypass
Binary Input, 35	P4 Enabled	BINARY_INPUT	1 = Enabled	0 = Disabled
Binary Input, 36	P4 in Variable Speed	BINARY_INPUT	1 = In VSM	0 = Not In VSM
Binary Input, 37	P4 In Bypass Mode	BINARY_INPUT	1 = In Bypass	0 = Not In Bypass
Binary Input, 38	P5 Enabled	BINARY_INPUT	1 = Enabled	0 = Disabled
Binary Input, 39	P5 in Variable Speed	BINARY_INPUT	1 = In VSM	0 = Not In VSM
Binary Input, 40	P5 In Bypass Mode	BINARY_INPUT	1 = In Bypass	0 = Not In Bypass
Binary Input, 41	P6 Enabled	BINARY_INPUT	1 = Enabled	0 = Disabled
Binary Input, 42	P6 in Variable Speed	BINARY_INPUT	1 = In VSM	0 = Not In VSM
Binary Input, 43	P6 In Bypass Mode	BINARY_INPUT	1 = In Bypass	0 = Not In Bypass
Binary Input, 44	Pump #1 On/Off	BINARY_INPUT	1 = On	0 = Off
Binary Input, 45	Pump #2 On/Off	BINARY_INPUT	1 = On	0 = Off
Binary Input, 46	Pump #3 On/Off	BINARY_INPUT	1 = On	0 = Off
Binary Input, 47	Pump #4 On/Off	BINARY_INPUT	1 = On	0 = Off
Binary Input, 48	Pump #5 On/Off	BINARY_INPUT	1 = On	0 = Off
Binary Input, 49	Pump #6 On/Off	BINARY_INPUT	1 = On	0 = Off
Binary Input, 50	System Start/Stop	BINARY_INPUT	1 = Start	0 = Stop
Binary Input, 51	AI #1 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 52	AI #2 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 53	AI #3 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 54	AI #4 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 55	AI #5 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 56	AI #6 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 57	AI #7 Failure	BINARY_INPUT	1 = Failure	0 = O.K.
Binary Input, 58	AI #8 Failure	BINARY_INPUT	1 = Failure	0 = O.K.

Appendix F (cont'd.)

Object Identifier	Object Name	Object Type	Present Value/Range
Binary Input, 59	AI #9 Failure	BINARY_INPUT	1 = Failure 0 = O.K.
Binary Input, 60	AI #10 Failure	BINARY_INPUT	1 = Failure 0 = O.K.
Binary Input, 61	AI #11 Failure	BINARY_INPUT	1 = Failure 0 = O.K.
Binary Input, 62	AI #12 Failure	BINARY_INPUT	1 = Failure 0 = O.K.
Binary Input, 63	AI #13 Failure	BINARY_INPUT	1 = Failure 0 = O.K.
Binary Input, 64	AI #14 Failure	BINARY_INPUT	1 = Failure 0 = O.K.
Binary Input, 65	AI #15 Failure	BINARY_INPUT	1 = Failure 0 = O.K.
Binary Input, 66	AI #16 Failure	BINARY_INPUT	1 = Failure 0 = O.K.
Binary Input, 67	Isolation Valve #1	BINARY_INPUT	1 = Open 0 = Closed
Binary Input, 68	Isolation Valve #2	BINARY_INPUT	1 = Open 0 = Closed
Binary Input, 69	Isolation Valve #3	BINARY_INPUT	1 = Open 0 = Closed
Binary Input, 70	Isolation Valve #4	BINARY_INPUT	1 = Open 0 = Closed
Binary Input, 71	Isolation Valve #5	BINARY_INPUT	1 = Open 0 = Closed
Binary Input, 72	Isolation Valve #6	BINARY_INPUT	1 = Open 0 = Closed
Binary Input, 73	Request to Stage Chiller	BINARY_INPUT	1 = Yes 0 = No
Binary Input, 74	Request to De-stage Chiller	BINARY_INPUT	1 = Yes 0 = No
Binary Input, 75	General Alarm	BINARY_INPUT	1 = Alarm 0 = O.K.
Binary Output, 1	Pump Sequence Alternation	BINARY_OUTPUT	1 = Yes 0 = No
Binary Output, 2	System Reset Request	BINARY_OUTPUT	1 = Yes 0 = No
Binary Output, 3	System Start / Stop	BINARY_OUTPUT	1 = Start 0 = Stop
Analog Value, 1	Process Variable #1	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 2	Process Variable #2	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 3	Process Variable #3	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 4	Process Variable #4	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 5	Process Variable #5	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 6	Process Variable #6	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 7	Process Variable #7	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 8	Process Variable #8	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 9	Process Variable #9	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 10	Process Variable #10	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 11	Process Variable #11	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 12	Process Variable #12	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 13	Process Variable #13	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 14	Process Variable #14	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 15	Process Variable #15	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 16	Process Variable #16	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 17	System Flow	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 18	Reserved	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 19	System KW	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 20	KW #1	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 21	KW #2	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 22	KW #3	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 23	KW #4	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 24	KW #5	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 25	KW #6	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 26	Sys Diff Pressure	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 27	Sys Supply Temp	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 28	Sys Return Temp	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 29	Setpoint #1	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 30	Setpoint #2	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 31	Setpoint #3	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 32	Setpoint #4	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 33	Setpoint #5	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)

Appendix F (cont'd.)

Object Identifier	Object Name	Object Type	Present Value/Range
Analog Value, 34	Setpoint #6	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 35	Setpoint #7	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 36	Setpoint #8	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 37	Setpoint #9	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 38	Setpoint #10	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 39	Setpoint #11	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 40	Setpoint #12	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 41	Setpoint #13	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 42	Setpoint #14	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 43	Setpoint #15	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 44	Setpoint #16	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 45	Pump # 1 Speed	ANALOG_VALUE	0 to 100
Analog Value, 46	Pump # 2 Speed	ANALOG_VALUE	0 to 100
Analog Value, 47	Pump # 3 Speed	ANALOG_VALUE	0 to 100
Analog Value, 48	Pump # 4 Speed	ANALOG_VALUE	0 to 100
Analog Value, 49	Pump # 5 Speed	ANALOG_VALUE	0 to 100
Analog Value, 50	Pump # 6 Speed	ANALOG_VALUE	0 to 100
Analog Value, 51	Lead Pump Number	ANALOG_VALUE	1 to Pump # (in Technologic User Setup Menu)
Analog Value, 52	Active Zone Number	ANALOG_VALUE	1 to Zone # (in Technologic User Setup Menu)
Analog Value, 53	Operation Mode	ANALOG_VALUE	0=Manual, 1=Auto, 2=Auto Bypass, 3=Manual Bypass
Analog Value, 54	Bypass Valve Position	ANALOG_VALUE	0 to 100. (0 = Closed 100 = Open)
Analog Value, 55	Chiller #1 Flow	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 56	Chiller #2 Flow	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 57	Chiller #3 Flow	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 58	Chiller #4 Flow	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 59	Chiller #5 Flow	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 60	Chiller #6 Flow	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 61	Chiller #1 DP	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 62	Chiller #2 DP	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 63	Chiller #3 DP	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 64	Chiller #4 DP	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 65	Chiller #5 DP	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)
Analog Value, 66	Chiller #6 DP	ANALOG_VALUE	0 to Span (in Technologic User Setup Menu)

Appendix G - LonWorks Communications Points

NV Index	Name	SNVT Type	SNVT Length (bytes)	POINT DESCRIPTION	RANGE/VALUE	Unit
0	nvoPmp1_OL_Fail	SNVT_switch(95)	2	Pump #1 Overload Failure	1 = Failure 0 = O.K.	
1	nvoPmp1__Fail	SNVT_switch(95)	2	Pump #1 Failure	1 = Failure 0 = O.K.	
2	nvoPmp1__AFD_Flr	SNVT_switch(95)	2	Pump #1 AFD Failure	1 = Failure 0 = O.K.	
3	nvoPmp1_Off_Alm	SNVT_switch(95)	2	Pump #1 Off Alarm	1 = Alarm 0 = O.K.	
4	nvoPmp2_OL_Fail	SNVT_switch(95)	2	Pump #2 Overload Failure	1 = Failure 0 = O.K.	
5	nvoPmp2__Fail	SNVT_switch(95)	2	Pump #2 Failure	1 = Failure 0 = O.K.	
6	nvoPmp2__AFD_Flr	SNVT_switch(95)	2	Pump #2 AFD Failure	1 = Failure 0 = O.K.	
7	nvoPmp2_Off_Alm	SNVT_switch(95)	2	Pump #2 Off Alarm	1 = Alarm 0 = O.K.	
8	nvoPmp3_OL_Fail	SNVT_switch(95)	2	Pump #3 Overload Failure	1 = Failure 0 = O.K.	
9	nvoPmp3__Fail	SNVT_switch(95)	2	Pump #3 Failure	1 = Failure 0 = O.K.	
10	nvoPmp3__AFD_Flr	SNVT_switch(95)	2	Pump #3 AFD Failure	1 = Failure 0 = O.K.	
11	nvoPmp3_Off_Alm	SNVT_switch(95)	2	Pump #3 Off Alarm	1 = Alarm 0 = O.K.	
12	nvoPmp4_OL_Fail	SNVT_switch(95)	2	Pump #4 Overload Failure	1 = Failure 0 = O.K.	
13	nvoPmp4__Fail	SNVT_switch(95)	2	Pump #4 Failure	1 = Failure 0 = O.K.	
14	nvoPmp4__AFD_Flr	SNVT_switch(95)	2	Pump #4 AFD Failure	1 = Failure 0 = O.K.	
15	nvoPmp4_Off_Alm	SNVT_switch(95)	2	Pump #4 Off Alarm	1 = Alarm 0 = O.K.	
16	nvoPmp5_OL_Fail	SNVT_switch(95)	2	Pump #5 Overload Failure	1 = Failure 0 = O.K.	
17	nvoPmp5__Fail	SNVT_switch(95)	2	Pump #5 Failure	1 = Failure 0 = O.K.	
18	nvoPmp5__AFD_Flr	SNVT_switch(95)	2	Pump #5 AFD Failure	1 = Failure 0 = O.K.	
19	nvoPmp5_Off_Alm	SNVT_switch(95)	2	Pump #5 Off Alarm	1 = Alarm 0 = O.K.	
20	nvoPmp6_OL_Fail	SNVT_switch(95)	2	Pump #6 Overload Failure	1 = Failure 0 = O.K.	
21	nvoPmp6__Fail	SNVT_switch(95)	2	Pump #6 Failure	1 = Failure 0 = O.K.	
22	nvoPmp6__AFD_Flr	SNVT_switch(95)	2	Pump #6 AFD Failure	1 = Failure 0 = O.K.	
23	nvoPmp6_Off_Alm	SNVT_switch(95)	2	Pump #6 Off Alarm	1 = Alarm 0 = O.K.	
24	nvoSys_Rst_Req	SNVT_switch(95)	2	System Reset Required	1 = Yes 0 = No	
25	nvoPmp1_En	SNVT_switch(95)	2	Pump #1 Enabled	1 = Enabled 0 = Disabled	
26	nvoPmp1_Run_VSM	SNVT_switch(95)	2	Pump #1 Running In Variable Speed Mode	1 = In VSM 0 = Not In VSM	
27	nvoPmp1_Run_BM	SNVT_switch(95)	2	Pump #1 Running In Bypass Mode	1 = In Bypass 0 = Not In Bypass	
28	nvoPmp2_En	SNVT_switch(95)	2	Pump #2 Enabled	1 = Enabled 0 = Disabled	
29	nvoPmp2_Run_VSM	SNVT_switch(95)	2	Pump #2 Running In Variable Speed Mode	1 = In VSM 0 = Not In VSM	
30	nvoPmp2_Run_BM	SNVT_switch(95)	2	Pump #2 Running In Bypass Mode	1 = In Bypass 0 = Not In Bypass	
31	nvoPmp3_En	SNVT_switch(95)	2	Pump #3 Enabled	1 = Enabled 0 = Disabled	
32	nvoPmp3_Run_VSM	SNVT_switch(95)	2	Pump #3 Running In Variable Speed Mode	1 = In VSM 0 = Not In VSM	
33	nvoPmp3_Run_BM	SNVT_switch(95)	2	Pump #3 Running In Bypass Mode	1 = In Bypass 0 = Not In Bypass	
34	nvoPmp4_En	SNVT_switch(95)	2	Pump #4 Enabled	1 = Enabled 0 = Disabled	
35	nvoPmp4_Run_VSM	SNVT_switch(95)	2	Pump #4 Running In Variable Speed Mode	1 = In VSM 0 = Not In VSM	
36	nvoPmp4_Run_BM	SNVT_switch(95)	2	Pump #4 Running In Bypass Mode	1 = In Bypass 0 = Not In Bypass	
37	nvoPmp5_En	SNVT_switch(95)	2	Pump #5 Enabled	1 = Enabled 0 = Disabled	
38	nvoPmp5_Run_VSM	SNVT_switch(95)	2	Pump #5 Running In Variable Speed Mode	1 = In VSM 0 = Not In VSM	
39	nvoPmp5_Run_BM	SNVT_switch(95)	2	Pump #5 Running In Bypass Mode	1 = In Bypass 0 = Not In Bypass	
40	nvoPmp6_En	SNVT_switch(95)	2	Pump #6 Enabled	1 = Enabled 0 = Disabled	
41	nvoPmp6_Run_VSM	SNVT_switch(95)	2	Pump #6 Running In Variable Speed Mode	1 = In VSM 0 = Not In VSM	
42	nvoPmp6_Run_BM	SNVT_switch(95)	2	Pump #6 Running In Bypass Mode	1 = In Bypass 0 = Not In Bypass	
43	nvoPmp1_On_Off	SNVT_switch(95)	2	Pump #1 On/Off	1 = On 0 = Off	
44	nvoPmp2_On_Off	SNVT_switch(95)	2	Pump #2 On/Off	1 = On 0 = Off	
45	nvoPmp3_On_Off	SNVT_switch(95)	2	Pump #3 On/Off	1 = On 0 = Off	
46	nvoPmp4_On_Off	SNVT_switch(95)	2	Pump #4 On/Off	1 = On 0 = Off	

Appendix G (cont'd.)

NV Index	Name	SNVT Type	SNVT Length (bytes)	POINT DESCRIPTION	RANGE/VALUE	Unit
47	nvoPmp5_On_Off	SNVT_switch(95)	2	Pump #5 On/Off	1 = On 0 = Off	
48	nvoPmp6_On_Off	SNVT_switch(95)	2	Pump #6 On/Off	1 = On 0 = Off	
49	nvoSys_Start_Sto	SNVT_switch(95)	2	System Start/Stop	1 = Start 0 = Stop	
50	nvoAnIn1_Fail	SNVT_switch(95)	2	Analog Input #1 Failure	1 = Failure 0 = O.K.	
51	nvoAnIn2_Fail	SNVT_switch(95)	2	Analog Input #2 Failure	1 = Failure 0 = O.K.	
52	nvoAnIn3_Fail	SNVT_switch(95)	2	Analog Input #3 Failure	1 = Failure 0 = O.K.	
53	nvoAnIn4_Fail	SNVT_switch(95)	2	Analog Input #4 Failure	1 = Failure 0 = O.K.	
54	nvoAnIn5_Fail	SNVT_switch(95)	2	Analog Input #5 Failure	1 = Failure 0 = O.K.	
55	nvoAnIn6_Fail	SNVT_switch(95)	2	Analog Input #6 Failure	1 = Failure 0 = O.K.	
56	nvoAnIn7_Fail	SNVT_switch(95)	2	Analog Input #7 Failure	1 = Failure 0 = O.K.	
57	nvoAnIn8_Fail	SNVT_switch(95)	2	Analog Input #8 Failure	1 = Failure 0 = O.K.	
58	nvoAnIn9_Fail	SNVT_switch(95)	2	Analog Input #9 Failure	1 = Failure 0 = O.K.	
59	nvoAnIn10_Fail	SNVT_switch(95)	2	Analog Input #10 Failure	1 = Failure 0 = O.K.	
60	nvoAnIn11_Fail	SNVT_switch(95)	2	Analog Input #11 Failure	1 = Failure 0 = O.K.	
61	nvoAnIn12_Fail	SNVT_switch(95)	2	Analog Input #12 Failure	1 = Failure 0 = O.K.	
62	nvoAnIn13_Fail	SNVT_switch(95)	2	Analog Input #13 Failure	1 = Failure 0 = O.K.	
63	nvoAnIn14_Fail	SNVT_switch(95)	2	Analog Input #14 Failure	1 = Failure 0 = O.K.	
64	nvoAnIn15_Fail	SNVT_switch(95)	2	Analog Input #15 Failure	1 = Failure 0 = O.K.	
65	nvoAnIn16_Fail	SNVT_switch(95)	2	Analog Input #16 Failure	1 = Failure 0 = O.K.	
66	nvoIso_Valve1	SNVT_switch(95)	2	Isolation Valve 1 Feedback	1 = Closed 0 = Open	
67	nvoIso_Valve2	SNVT_switch(95)	2	Isolation Valve 2 Feedback	1 = Closed 0 = Open	
68	nvoIso_Valve3	SNVT_switch(95)	2	Isolation Valve 3 Feedback	1 = Closed 0 = Open	
69	nvoIso_Valve4	SNVT_switch(95)	2	Isolation Valve 4 Feedback	1 = Closed 0 = Open	
70	nvoIso_Valve5	SNVT_switch(95)	2	Isolation Valve 5 Feedback	1 = Closed 0 = Open	
71	nvoIso_Valve6	SNVT_switch(95)	2	Isolation Valve 6 Feedback	1 = Closed 0 = Open	
72	nvoReq_Stg_Chil	SNVT_switch(95)	2	Request to stage chiller	1 = Active 0 = Inactive	
73	nvoReq_Dstg_Chil	SNVT_switch(95)	2	Request to destage chiller	1 = Active 0 = Inactive	
74	nvoGeneral_Alarm	SNVT_switch(95)	2	General Alarm	1 = Alarm 0 = O.K.	
75	nvoPV_1	SNVT_press_p (113)	2	Process Variable #1	0 to Span (in Technologic User Setup Menu)	
76	nvoPV_2	SNVT_press_p (113)	2	Process Variable #2	0 to Span (in Technologic User Setup Menu)	
77	nvoPV_3	SNVT_press_p (113)	2	Process Variable #3	0 to Span (in Technologic User Setup Menu)	
78	nvoPV_4	SNVT_press_p (113)	2	Process Variable #4	0 to Span (in Technologic User Setup Menu)	
79	nvoPV_5	SNVT_press_p (113)	2	Process Variable #5	0 to Span (in Technologic User Setup Menu)	
80	nvoPV_6	SNVT_press_p (113)	2	Process Variable #6	0 to Span (in Technologic User Setup Menu)	
81	nvoPV_7	SNVT_press_p (113)	2	Process Variable #7	0 to Span (in Technologic User Setup Menu)	
82	nvoPV_8	SNVT_press_p (113)	2	Process Variable #8	0 to Span (in Technologic User Setup Menu)	
83	nvoPV_9	SNVT_press_p (113)	2	Process Variable #9	0 to Span (in Technologic User Setup Menu)	
84	nvoPV_10	SNVT_press_p (113)	2	Process Variable #10	0 to Span (in Technologic User Setup Menu)	
85	nvoPV_11	SNVT_press_p (113)	2	Process Variable #11	0 to Span (in Technologic User Setup Menu)	
86	nvoPV_12	SNVT_press_p (113)	2	Process Variable #12	0 to Span (in Technologic User Setup Menu)	
87	nvoPV_13	SNVT_press_p (113)	2	Process Variable #13	0 to Span (in Technologic User Setup Menu)	
88	nvoPV_14	SNVT_press_p (113)	2	Process Variable #14	0 to Span (in Technologic User Setup Menu)	
89	nvoPV_15	SNVT_press_p (113)	2	Process Variable #15	0 to Span (in Technologic User Setup Menu)	
90	nvoPV_16	SNVT_press_p (113)	2	Process Variable #16	0 to Span (in Technologic User Setup Menu)	
91	nvo_System_Flow	SNVT_flow (15)	2	Totalized system flow	0 to Span (in Technologic User Setup Menu)	GPM
92	nvo_Reserved	SNVT_flow (15)	2	Not used		
93	nvo_SysKW	SNVT_power_kilo (15)	2	System KW	0 to Span (in Technologic User Setup Menu)	KW

Appendix G (cont'd.)

NV Index	Name	SNVT Type	SNVT Length (bytes)	POINT DESCRIPTION	RANGE/VALUE	Unit
94	nvo_KW1	SNVT_power_kilo (15)	2	KW #1	0 to Span (in Technologic User Setup Menu)	KW
95	nvo_KW2	SNVT_power_kilo (15)	2	KW #2	0 to Span (in Technologic User Setup Menu)	KW
96	nvo_KW3	SNVT_power_kilo (15)	2	KW #3	0 to Span (in Technologic User Setup Menu)	KW
97	nvo_KW4	SNVT_power_kilo (15)	2	KW #4	0 to Span (in Technologic User Setup Menu)	KW
98	nvo_KW5	SNVT_power_kilo (15)	2	KW #5	0 to Span (in Technologic User Setup Menu)	KW
99	nvo_KW6	SNVT_power_kilo (15)	2	KW #6	0 to Span (in Technologic User Setup Menu)	KW
100	nvoSys_DP	SNVT_press_p (113)	2	System Differential Pressure	0 to Span (in Technologic User Setup Menu)	PSI
101	nvoSupply_Temp	SNVT_temp (39)	2	System Supply Temperature	0 to Span (in Technologic User Setup Menu)	F°
102	nvoReturn_Temp	SNVT_temp (39)	2	System Return Temperature	0 to Span (in Technologic User Setup Menu)	F°
103	nvoSet_Pt1	SNVT_press_p (113)	2	Setpoint #1	0 to Span (in Technologic User Setup Menu)	
104	nvoSet_Pt2	SNVT_press_p (113)	2	Setpoint #2	0 to Span (in Technologic User Setup Menu)	
105	nvoSet_Pt3	SNVT_press_p (113)	2	Setpoint #3	0 to Span (in Technologic User Setup Menu)	
106	nvoSet_Pt4	SNVT_press_p (113)	2	Setpoint #4	0 to Span (in Technologic User Setup Menu)	
107	nvoSet_Pt5	SNVT_press_p (113)	2	Setpoint #5	0 to Span (in Technologic User Setup Menu)	
108	nvoSet_Pt6	SNVT_press_p (113)	2	Setpoint #6	0 to Span (in Technologic User Setup Menu)	
109	nvoSet_Pt7	SNVT_press_p (113)	2	Setpoint #7	0 to Span (in Technologic User Setup Menu)	
110	nvoSet_Pt8	SNVT_press_p (113)	2	Setpoint #8	0 to Span (in Technologic User Setup Menu)	
111	nvoSet_Pt9	SNVT_press_p (113)	2	Setpoint #9	0 to Span (in Technologic User Setup Menu)	
112	nvoSet_Pt10	SNVT_press_p (113)	2	Setpoint #10	0 to Span (in Technologic User Setup Menu)	
113	nvoSet_Pt11	SNVT_press_p (113)	2	Setpoint #11	0 to Span (in Technologic User Setup Menu)	
114	nvoSet_Pt12	SNVT_press_p (113)	2	Setpoint #12	0 to Span (in Technologic User Setup Menu)	
115	nvoSet_Pt13	SNVT_press_p (113)	2	Setpoint #13	0 to Span (in Technologic User Setup Menu)	
116	nvoSet_Pt14	SNVT_press_p (113)	2	Setpoint #14	0 to Span (in Technologic User Setup Menu)	
117	nvoSet_Pt15	SNVT_press_p (113)	2	Setpoint #15	0 to Span (in Technologic User Setup Menu)	
118	nvoSet_Pt16	SNVT_press_p (113)	2	Setpoint #16	0 to Span (in Technologic User Setup Menu)	
119	nvoPump1_Speed	SNVT_count (8)	2	Pump1 Speed %	0 to 100	%
120	nvoPump2_Speed	SNVT_count (8)	2	Pump2 Speed %	0 to 100	%
121	nvoPump3_Speed	SNVT_count (8)	2	Pump3 Speed %	0 to 100	%
122	nvoPump4_Speed	SNVT_count (8)	2	Pump4 Speed %	0 to 100	%
123	nvoPump5_Speed	SNVT_count (8)	2	Pump5 Speed %	0 to 100	%
124	nvoPump6_Speed	SNVT_count (8)	2	Pump6 Speed %	0 to 100	%
125	nvoLead_Pmp#	SNVT_count (8)	2	Lead Pump Number	1 to Pump # (in Technologic User Setup Menu)	
126	nvoActv_Zone#	SNVT_count (8)	2	Active Zone Number	1 to Zone # (in Technologic User Setup Menu)	
127	nvoSys_Op_Mode	SNVT_count (8)	2	System Operation Mode	0=Manual, 1=Auto, 2=Auto Bypass, 3=Manual Bypass	
128	nvoByp_Valve_Pos	SNVT_count (8)	2	Bypass Valve Position	0 - 100	%
129	nvoChiller1_Flow	SNVT_flow (15)	2	Chiller 1 Flow	0 to Span (in Technologic User Setup Menu)	
130	nvoChiller2_Flow	SNVT_flow (15)	2	Chiller 2 Flow	0 to Span (in Technologic User Setup Menu)	
131	nvoChiller3_Flow	SNVT_flow (15)	2	Chiller 3 Flow	0 to Span (in Technologic User Setup Menu)	
132	nvoChiller4_Flow	SNVT_flow (15)	2	Chiller 4 Flow	0 to Span (in Technologic User Setup Menu)	
133	nvoChiller5_Flow	SNVT_flow (15)	2	Chiller 5 Flow	0 to Span (in Technologic User Setup Menu)	
134	nvoChiller6_Flow	SNVT_flow (15)	2	Chiller 6 Flow	0 to Span (in Technologic User Setup Menu)	
135	nvoChiller1_DP	SNVT_press_p (113)	2	Chiller 1 Differential Pressure	0 to Span (in Technologic User Setup Menu)	
136	nvoChiller2_DP	SNVT_press_p (113)	2	Chiller 2 Differential Pressure	0 to Span (in Technologic User Setup Menu)	
137	nvoChiller3_DP	SNVT_press_p (113)	2	Chiller 3 Differential Pressure	0 to Span (in Technologic User Setup Menu)	
138	nvoChiller4_DP	SNVT_press_p (113)	2	Chiller 4 Differential Pressure	0 to Span (in Technologic User Setup Menu)	
139	nvoChiller5_DP	SNVT_press_p (113)	2	Chiller 5 Differential Pressure	0 to Span (in Technologic User Setup Menu)	
140	nvoChiller6_DP	SNVT_press_p (113)	2	Chiller 6 Differential Pressure	0 to Span (in Technologic User Setup Menu)	

Appendix G (cont'd.)

NV Index	Name	SNVT Type	SNVT Length (bytes)	POINT DESCRIPTION	RANGE/VALUE	Unit
141	nviSeq_Alt	SNVT_switch(95)	2	Pump Sequence Alternation	1 = Yes 0 = No	
142	nviRst_Req	SNVT_switch(95)	2	System Reset Request	1 = Yes 0 = No	
143	nviSys_Start_Sto	SNVT_switch(95)	2	System Start / Stop	1 = Start 0 = Stop	
144	nviOvrd_PV1	SNVT_press_p (113)	2	Override Process Variable #1	0 to Span (in Technologic User Setup Menu)	
145	nviOvrd_PV2	SNVT_press_p (113)	2	Override Process Variable #2	0 to Span (in Technologic User Setup Menu)	
146	nviOvrd_PV3	SNVT_press_p (113)	2	Override Process Variable #3	0 to Span (in Technologic User Setup Menu)	
147	nviOvrd_PV4	SNVT_press_p (113)	2	Override Process Variable #4	0 to Span (in Technologic User Setup Menu)	
148	nviOvrd_PV5	SNVT_press_p (113)	2	Override Process Variable #5	0 to Span (in Technologic User Setup Menu)	
149	nviOvrd_PV6	SNVT_press_p (113)	2	Override Process Variable #6	0 to Span (in Technologic User Setup Menu)	
150	nviOvrd_PV7	SNVT_press_p (113)	2	Override Process Variable #7	0 to Span (in Technologic User Setup Menu)	
151	nviOvrd_PV8	SNVT_press_p (113)	2	Override Process Variable #8	0 to Span (in Technologic User Setup Menu)	
152	nviOvrd_PV9	SNVT_press_p (113)	2	Override Process Variable #9	0 to Span (in Technologic User Setup Menu)	
153	nviOvrd_PV10	SNVT_press_p (113)	2	Override Process Variable #10	0 to Span (in Technologic User Setup Menu)	
154	nviOvrd_PV11	SNVT_press_p (113)	2	Override Process Variable #11	0 to Span (in Technologic User Setup Menu)	
155	nviOvrd_PV12	SNVT_press_p (113)	2	Override Process Variable #12	0 to Span (in Technologic User Setup Menu)	
156	nviOvrd_PV13	SNVT_press_p (113)	2	Override Process Variable #13	0 to Span (in Technologic User Setup Menu)	
157	nviOvrd_PV14	SNVT_press_p (113)	2	Override Process Variable #14	0 to Span (in Technologic User Setup Menu)	
158	nviOvrd_PV15	SNVT_press_p (113)	2	Override Process Variable #15	0 to Span (in Technologic User Setup Menu)	
159	nviOvrd_PV16	SNVT_press_p (113)	2	Override Process Variable #16	0 to Span (in Technologic User Setup Menu)	
160	nviOvrd_SP1	SNVT_press_p (113)	2	Override Setpoint #1	0 to Span (in Technologic User Setup Menu)	
161	nviOvrd_SP2	SNVT_press_p (113)	2	Override Setpoint #2	0 to Span (in Technologic User Setup Menu)	
162	nviOvrd_SP3	SNVT_press_p (113)	2	Override Setpoint #3	0 to Span (in Technologic User Setup Menu)	
163	nviOvrd_SP4	SNVT_press_p (113)	2	Override Setpoint #4	0 to Span (in Technologic User Setup Menu)	
164	nviOvrd_SP5	SNVT_press_p (113)	2	Override Setpoint #5	0 to Span (in Technologic User Setup Menu)	
165	nviOvrd_SP6	SNVT_press_p (113)	2	Override Setpoint #6	0 to Span (in Technologic User Setup Menu)	
166	nviOvrd_SP7	SNVT_press_p (113)	2	Override Setpoint #7	0 to Span (in Technologic User Setup Menu)	
167	nviOvrd_SP8	SNVT_press_p (113)	2	Override Setpoint #8	0 to Span (in Technologic User Setup Menu)	
168	nviOvrd_SP9	SNVT_press_p (113)	2	Override Setpoint #9	0 to Span (in Technologic User Setup Menu)	
169	nviOvrd_SP10	SNVT_press_p (113)	2	Override Setpoint #10	0 to Span (in Technologic User Setup Menu)	
170	nviOvrd_SP11	SNVT_press_p (113)	2	Override Setpoint #11	0 to Span (in Technologic User Setup Menu)	
171	nviOvrd_SP12	SNVT_press_p (113)	2	Override Setpoint #12	0 to Span (in Technologic User Setup Menu)	
172	nviOvrd_SP13	SNVT_press_p (113)	2	Override Setpoint #13	0 to Span (in Technologic User Setup Menu)	
173	nviOvrd_SP14	SNVT_press_p (113)	2	Override Setpoint #14	0 to Span (in Technologic User Setup Menu)	
174	nviOvrd_SP15	SNVT_press_p (113)	2	Override Setpoint #15	0 to Span (in Technologic User Setup Menu)	
175	nviOvrd_SP16	SNVT_press_p (113)	2	Override Setpoint #16	0 to Span (in Technologic User Setup Menu)	

Appendix H - Metasys N2 Communications Points

NPT	NPA	POINT DESCRIPTION	RANGE/VALUE		UNIT
BI	1	Pump #1 Overload Failure	1 = Failure	0 = O.K.	
BI	2	Pump #1 Failure	1 = Failure	0 = O.K.	
BI	3	Pump #1 AFD Failure	1 = Failure	0 = O.K.	
BI	4	Pump #1 Off Alarm	1 = Alarm	0 = O.K.	
BI	5	Pump #2 Overload Failure	1 = Failure	0 = O.K.	
BI	6	Pump #2 Failure	1 = Failure	0 = O.K.	
BI	7	Pump #2 AFD Failure	1 = Failure	0 = O.K.	
BI	8	Pump #2 Off Alarm	1 = Alarm	0 = O.K.	
BI	9	Pump #3 Overload Failure	1 = Failure	0 = O.K.	
BI	10	Pump #3 Failure	1 = Failure	0 = O.K.	
BI	11	Pump #3 AFD Failure	1 = Failure	0 = O.K.	
BI	12	Pump #3 Off Alarm	1 = Alarm	0 = O.K.	
BI	13	Pump #4 Overload Failure	1 = Failure	0 = O.K.	
BI	14	Pump #4 Failure	1 = Failure	0 = O.K.	
BI	15	Pump #4 AFD Failure	1 = Failure	0 = O.K.	
BI	16	Pump #4 Off Alarm	1 = Alarm	0 = O.K.	
BI	17	Pump #5 Overload Failure	1 = Failure	0 = O.K.	
BI	18	Pump #5 Failure	1 = Failure	0 = O.K.	
BI	19	Pump #5 AFD Failure	1 = Failure	0 = O.K.	
BI	20	Pump #5 Off Alarm	1 = Alarm	0 = O.K.	
BI	21	Pump #6 Overload Failure	1 = Failure	0 = O.K.	
BI	22	Pump #6 Failure	1 = Failure	0 = O.K.	
BI	23	Pump #6 AFD Failure	1 = Failure	0 = O.K.	
BI	24	Pump #6 Off Alarm	1 = Alarm	0 = O.K.	
BI	25	System Reset Required	1 = Yes	0 = No	
BI	26	Pump #1 Enabled	1 = Enabled	0 = Disabled	
BI	27	Pump #1 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	
BI	28	Pump #1 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	
BI	29	Pump #2 Enabled	1 = Enabled	0 = Disabled	
BI	30	Pump #2 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	
BI	31	Pump #2 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	
BI	32	Pump #3 Enabled	1 = Enabled	0 = Disabled	
BI	33	Pump #3 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	
BI	34	Pump #3 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	
BI	35	Pump #4 Enabled	1 = Enabled	0 = Disabled	
BI	36	Pump #4 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	
BI	37	Pump #4 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	
BI	38	Pump #5 Enabled	1 = Enabled	0 = Disabled	
BI	39	Pump #5 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	
BI	40	Pump #5 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	
BI	41	Pump #6 Enabled	1 = Enabled	0 = Disabled	
BI	42	Pump #6 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	
BI	43	Pump #6 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	
BI	44	Pump #1 On/Off	1 = On	0 = Off	
BI	45	Pump #2 On/Off	1 = On	0 = Off	
BI	46	Pump #3 On/Off	1 = On	0 = Off	
BI	47	Pump #4 On/Off	1 = On	0 = Off	
BI	48	Pump #5 On/Off	1 = On	0 = Off	
BI	49	Pump #6 On/Off	1 = On	0 = Off	

Appendix H (cont'd.)

NPT	NPA	POINT DESCRIPTION	RANGE/VALUE	UNIT
BI	50	System Start/Stop	1 = Start 0 = Stop	
BI	51	Analog Input #1 Failure	1 = Failure 0 = O.K.	
BI	52	Analog Input #2 Failure	1 = Failure 0 = O.K.	
BI	53	Analog Input #3 Failure	1 = Failure 0 = O.K.	
BI	54	Analog Input #4 Failure	1 = Failure 0 = O.K.	
BI	55	Analog Input #5 Failure	1 = Failure 0 = O.K.	
BI	56	Analog Input #6 Failure	1 = Failure 0 = O.K.	
BI	57	Analog Input #7 Failure	1 = Failure 0 = O.K.	
BI	58	Analog Input #8 Failure	1 = Failure 0 = O.K.	
BI	59	Analog Input #9 Failure	1 = Failure 0 = O.K.	
BI	60	Analog Input #10 Failure	1 = Failure 0 = O.K.	
BI	61	Analog Input #11 Failure	1 = Failure 0 = O.K.	
BI	62	Analog Input #12 Failure	1 = Failure 0 = O.K.	
BI	63	Analog Input #13 Failure	1 = Failure 0 = O.K.	
BI	64	Analog Input #14 Failure	1 = Failure 0 = O.K.	
BI	65	Analog Input #15 Failure	1 = Failure 0 = O.K.	
BI	66	Analog Input #16 Failure	1 = Failure 0 = O.K.	
BI	67	Isolaion Valve #1	1 = Open 0 = Closed	
BI	68	Isolaion Valve #2	1 = Open 0 = Closed	
BI	69	Isolaion Valve #3	1 = Open 0 = Closed	
BI	70	Isolaion Valve #4	1 = Open 0 = Closed	
BI	71	Isolaion Valve #5	1 = Open 0 = Closed	
BI	72	Isolaion Valve #6	1 = Open 0 = Closed	
BI	73	Request to Stage Chiller	1 = Yes 0 = No	
BI	74	Request to De-stage Chiller	1 = Yes 0 = No	
BI	75	General Alarm	1 = Alarm 0 = O.K.	
BO	1	Pump Sequence Alternation	1 = Yes 0 = No	
BO	2	System Reset Request	1 = Yes 0 = No	
BO	3	System Start / Stop	1 = Start 0 = Stop	
ADI	1	Process Variable #1	0 to Span (in Technologic User Setup Menu)	
ADI	2	Process Variable #2	0 to Span (in Technologic User Setup Menu)	
ADI	3	Process Variable #3	0 to Span (in Technologic User Setup Menu)	
ADI	4	Process Variable #4	0 to Span (in Technologic User Setup Menu)	
ADI	5	Process Variable #5	0 to Span (in Technologic User Setup Menu)	
ADI	6	Process Variable #6	0 to Span (in Technologic User Setup Menu)	
ADI	7	Process Variable #7	0 to Span (in Technologic User Setup Menu)	
ADI	8	Process Variable #8	0 to Span (in Technologic User Setup Menu)	
ADI	9	Process Variable #9	0 to Span (in Technologic User Setup Menu)	
ADI	10	Process Variable #10	0 to Span (in Technologic User Setup Menu)	
ADI	11	Process Variable #11	0 to Span (in Technologic User Setup Menu)	
ADI	12	Process Variable #12	0 to Span (in Technologic User Setup Menu)	
ADI	13	Process Variable #13	0 to Span (in Technologic User Setup Menu)	
ADI	14	Process Variable #14	0 to Span (in Technologic User Setup Menu)	
ADI	15	Process Variable #15	0 to Span (in Technologic User Setup Menu)	
ADI	16	Process Variable #16	0 to Span (in Technologic User Setup Menu)	
ADI	17	System Flow	0 to Span (in Technologic User Setup Menu)	GPM
ADI	18	Reserved	0 to Span (in Technologic User Setup Menu)	

Appendix H (cont'd.)

NPT	NPA	POINT DESCRIPTION	RANGE/VALUE	UNIT
ADI	19	System KW	0 to Span (in Technologic User Setup Menu)	KW
ADI	20	Pump #1 Power	0 to Span (in Technologic User Setup Menu)	KW
ADI	21	Pump #2 Power	0 to Span (in Technologic User Setup Menu)	KW
ADI	22	Pump #3 Power	0 to Span (in Technologic User Setup Menu)	KW
ADI	23	Pump #4 Power	0 to Span (in Technologic User Setup Menu)	KW
ADI	24	Pump #5 Power	0 to Span (in Technologic User Setup Menu)	KW
ADI	25	Pump #6 Power	0 to Span (in Technologic User Setup Menu)	KW
ADI	26	System Differential Pressure	0 to Span (in Technologic User Setup Menu)	PSI
ADI	27	Supply Temperature Sensor	0 to Span (in Technologic User Setup Menu)	F°
ADI	28	Return Temperature Sensor	0 to Span (in Technologic User Setup Menu)	F°
ADI	29	Setpoint #1	0 to Span (in Technologic User Setup Menu)	
ADI	30	Setpoint #2	0 to Span (in Technologic User Setup Menu)	
ADI	31	Setpoint #3	0 to Span (in Technologic User Setup Menu)	
ADI	32	Setpoint #4	0 to Span (in Technologic User Setup Menu)	
ADI	33	Setpoint #5	0 to Span (in Technologic User Setup Menu)	
ADI	34	Setpoint #6	0 to Span (in Technologic User Setup Menu)	
ADI	35	Setpoint #7	0 to Span (in Technologic User Setup Menu)	
ADI	36	Setpoint #8	0 to Span (in Technologic User Setup Menu)	
ADI	37	Setpoint #9	0 to Span (in Technologic User Setup Menu)	
ADI	38	Setpoint #10	0 to Span (in Technologic User Setup Menu)	
ADI	39	Setpoint #11	0 to Span (in Technologic User Setup Menu)	
ADI	40	Setpoint #12	0 to Span (in Technologic User Setup Menu)	
ADI	41	Setpoint #13	0 to Span (in Technologic User Setup Menu)	
ADI	42	Setpoint #14	0 to Span (in Technologic User Setup Menu)	
ADI	43	Setpoint #15	0 to Span (in Technologic User Setup Menu)	
ADI	44	Setpoint #16	0 to Span (in Technologic User Setup Menu)	
ADI	45	Pump #1 Speed	0 to 100	%
ADI	46	Pump #2 Speed	0 to 100	%
ADI	47	Pump #3 Speed	0 to 100	%
ADI	48	Pump #4 Speed	0 to 100	%
ADI	49	Pump #5 Speed	0 to 100	%
ADI	50	Pump #6 Speed	0 to 100	%
ADI	51	Lead Pump Number	1 to Pump # (in Technologic User Setup Menu)	
ADI	52	Active Zone Number	1 to Zone # (in Technologic User Setup Menu)	
ADI	53	System Operation Mode	0=Manual,1=Auto, 2=Auto Bypass, 3=Manual Bypass	
ADI	54	Bypass Valve Position	0 to 100, 0 = Closed 100 = Open	%
ADI	55	Chiller #1 Flow	0 to Span (in Technologic User Setup Menu)	
ADI	56	Chiller #2 Flow	0 to Span (in Technologic User Setup Menu)	
ADI	57	Chiller #3 Flow	0 to Span (in Technologic User Setup Menu)	
ADI	58	Chiller #4 Flow	0 to Span (in Technologic User Setup Menu)	
ADI	59	Chiller #5 Flow	0 to Span (in Technologic User Setup Menu)	
ADI	60	Chiller #6 Flow	0 to Span (in Technologic User Setup Menu)	
ADI	61	Chiller #1 DP	0 to Span (in Technologic User Setup Menu)	
ADI	62	Chiller #2 DP	0 to Span (in Technologic User Setup Menu)	
ADI	63	Chiller #3 DP	0 to Span (in Technologic User Setup Menu)	
ADI	64	Chiller #4 DP	0 to Span (in Technologic User Setup Menu)	
ADI	65	Chiller #5 DP	0 to Span (in Technologic User Setup Menu)	
ADI	66	Chiller #6 DP	0 to Span (in Technologic User Setup Menu)	

Appendix I - Modbus RTU Communications Points

Function Code	Point #	Point Description	Range/Value		Modbus Address	Unit
02	1	Pump #1 Overload Failure	1 = Failure	0 = O.K.	10001	
02	2	Pump #1 Failure	1 = Failure	0 = O.K.	10001	
02	3	Pump #1 AFD Failure	1 = Failure	0 = O.K.	10003	
02	4	Pump #1 Off Alarm	1 = Alarm	0 = O.K.	10004	
02	5	Pump #2 Overload Failure	1 = Failure	0 = O.K.	10005	
02	6	Pump #2 Failure	1 = Failure	0 = O.K.	10006	
02	7	Pump #2 AFD Failure	1 = Failure	0 = O.K.	10007	
02	8	Pump #2 Off Alarm	1 = Alarm	0 = O.K.	10008	
02	9	Pump #3 Overload Failure	1 = Failure	0 = O.K.	10009	
02	10	Pump #3 Failure	1 = Failure	0 = O.K.	10010	
02	11	Pump #3 AFD Failure	1 = Failure	0 = O.K.	10011	
02	12	Pump #3 Off Alarm	1 = Alarm	0 = O.K.	10012	
02	13	Pump #4 Overload Failure	1 = Failure	0 = O.K.	10013	
02	14	Pump #4 Failure	1 = Failure	0 = O.K.	10014	
02	15	Pump #4 AFD Failure	1 = Failure	0 = O.K.	10015	
02	16	Pump #4 Off Alarm	1 = Alarm	0 = O.K.	10016	
02	17	Pump #5 Overload Failure	1 = Failure	0 = O.K.	10017	
02	18	Pump #5 Failure	1 = Failure	0 = O.K.	10018	
02	19	Pump #5 AFD Failure	1 = Failure	0 = O.K.	10019	
02	20	Pump #5 Off Alarm	1 = Alarm	0 = O.K.	10020	
02	21	Pump #6 Overload Failure	1 = Failure	0 = O.K.	10021	
02	22	Pump #6 Failure	1 = Failure	0 = O.K.	10022	
02	23	Pump #6 AFD Failure	1 = Failure	0 = O.K.	10023	
02	24	Pump #6 Off Alarm	1 = Alarm	0 = O.K.	10024	
02	25	System Reset Required	1 = Yes	0 = No	10025	
02	26	Pump #1 Enabled	1 = Enabled	0 = Disabled	10026	
02	27	Pump #1 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	10027	
02	28	Pump #1 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	10028	
02	29	Pump #2 Enabled	1 = Enabled	0 = Disabled	10029	
02	30	Pump #2 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	10030	
02	31	Pump #2 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	10031	
02	32	Pump #3 Enabled	1 = Enabled	0 = Disabled	10032	
02	33	Pump #3 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	10033	
02	34	Pump #3 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	10034	
02	35	Pump #4 Enabled	1 = Enabled	0 = Disabled	10035	
02	36	Pump #4 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	10036	
02	37	Pump #4 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	10037	
02	38	Pump #5 Enabled	1 = Enabled	0 = Disabled	10038	
02	39	Pump #5 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	10039	
02	40	Pump #5 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	10040	
02	41	Pump #6 Enabled	1 = Enabled	0 = Disabled	10041	
02	42	Pump #6 Running In Variable Speed Mode	1 = In VSM	0 = Not In VSM	10042	
02	43	Pump #6 Running In Bypass Mode	1 = In Bypass	0 = Not In Bypass	10043	
02	44	Pump #1 On/Off	1 = On	0 = Off	10044	
02	45	Pump #2 On/Off	1 = On	0 = Off	10045	
02	46	Pump #3 On/Off	1 = On	0 = Off	10046	
02	47	Pump #4 On/Off	1 = On	0 = Off	10047	
02	48	Pump #5 On/Off	1 = On	0 = Off	10048	
02	49	Pump #6 On/Off	1 = On	0 = Off	10049	
02	50	System Start/Stop	1 = Start	0 = Stop	10050	

Appendix I (cont'd.)

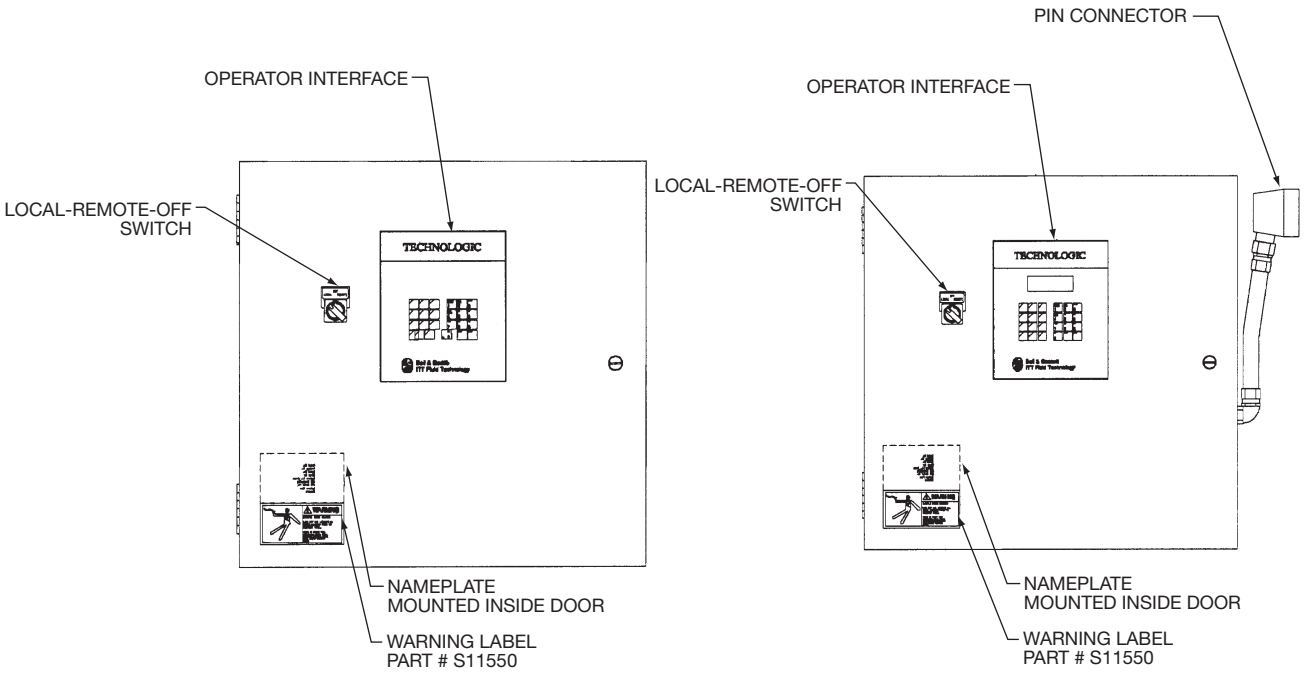
Function Code	Point #	Point Description	Range/Value	Modbus Address	Unit
02	51	Analog Input #1 Failure	1 = Failure 0 = O.K.	10051	
02	52	Analog Input #2 Failure	1 = Failure 0 = O.K.	10052	
02	53	Analog Input #3 Failure	1 = Failure 0 = O.K.	10053	
02	54	Analog Input #4 Failure	1 = Failure 0 = O.K.	10054	
02	55	Analog Input #5 Failure	1 = Failure 0 = O.K.	10055	
02	56	Analog Input #6 Failure	1 = Failure 0 = O.K.	10056	
02	57	Analog Input #7 Failure	1 = Failure 0 = O.K.	10057	
02	58	Analog Input #8 Failure	1 = Failure 0 = O.K.	10058	
02	59	Analog Input #9 Failure	1 = Failure 0 = O.K.	10059	
02	60	Analog Input #10 Failure	1 = Failure 0 = O.K.	10060	
02	61	Analog Input #11 Failure	1 = Failure 0 = O.K.	10061	
02	62	Analog Input #12 Failure	1 = Failure 0 = O.K.	10062	
02	63	Analog Input #13 Failure	1 = Failure 0 = O.K.	10063	
02	64	Analog Input #14 Failure	1 = Failure 0 = O.K.	10064	
02	65	Analog Input #15 Failure	1 = Failure 0 = O.K.	10065	
02	66	Analog Input #16 Failure	1 = Failure 0 = O.K.	10066	
02	67	Isolation Valve #1	1 = Open 0 = Closed	10067	
02	68	Isolation Valve #2	1 = Open 0 = Closed	10068	
02	69	Isolation Valve #3	1 = Open 0 = Closed	10069	
02	70	Isolation Valve #4	1 = Open 0 = Closed	10070	
02	71	Isolation Valve #5	1 = Open 0 = Closed	10071	
02	72	Isolation Valve #6	1 = Open 0 = Closed	10072	
02	73	Request to Stage Chiller	1 = Yes 0 = No	10073	
02	74	Request to De-stage Chiller	1 = Yes 0 = No	10074	
02	75	General Alarm	1 = Alarm 0 = O.K.	10075	
05	1	Pump Sequence Alternation	1 = Yes 0 = No	00001	
05	2	System Reset Request	1 = Yes 0 = No	00002	
05	3	System Start / Stop	1 = Start 0 = Stop	00003	
04, 06	1	Process Variable #1	0 to Span (in Technologic User Setup Menu)	30001, 40001	
04, 06	2	Process Variable #2	0 to Span (in Technologic User Setup Menu)	30002, 40002	
04, 06	3	Process Variable #3	0 to Span (in Technologic User Setup Menu)	30003, 40003	
04, 06	4	Process Variable #4	0 to Span (in Technologic User Setup Menu)	30004, 40004	
04, 06	5	Process Variable #5	0 to Span (in Technologic User Setup Menu)	30005, 40005	
04, 06	6	Process Variable #6	0 to Span (in Technologic User Setup Menu)	30006, 40006	
04, 06	7	Process Variable #7	0 to Span (in Technologic User Setup Menu)	30007, 40007	
04, 06	8	Process Variable #8	0 to Span (in Technologic User Setup Menu)	30008, 40008	
04, 06	9	Process Variable #9	0 to Span (in Technologic User Setup Menu)	30009, 40009	
04, 06	10	Process Variable #10	0 to Span (in Technologic User Setup Menu)	30010, 40010	
04, 06	11	Process Variable #11	0 to Span (in Technologic User Setup Menu)	30011, 40011	
04, 06	12	Process Variable #12	0 to Span (in Technologic User Setup Menu)	30012, 40012	
04, 06	13	Process Variable #13	0 to Span (in Technologic User Setup Menu)	30013, 40013	
04, 06	14	Process Variable #14	0 to Span (in Technologic User Setup Menu)	30014, 40014	
04, 06	15	Process Variable #15	0 to Span (in Technologic User Setup Menu)	30015, 40015	
04, 06	16	Process Variable #16	0 to Span (in Technologic User Setup Menu)	30016, 40016	
04	17	System Flow	0 to Span (in Technologic User Setup Menu)	30017	GPM
04	18	Reserved	0 to Span (in Technologic User Setup Menu)	30018	GPM

Appendix I (cont'd.)

Function Code	Point #	Point Description	Range/Value	Modbus Address	Unit
04	19	System KW	0 to Span (in Technologic User Setup Menu)	30019	KW
04	20	KW #1	0 to Span (in Technologic User Setup Menu)	30020	KW
04	21	KW #2	0 to Span (in Technologic User Setup Menu)	30021	KW
04	22	KW #3	0 to Span (in Technologic User Setup Menu)	30022	KW
04	23	KW #4	0 to Span (in Technologic User Setup Menu)	30023	KW
04	24	KW #5	0 to Span (in Technologic User Setup Menu)	30024	KW
04	25	KW #6	0 to Span (in Technologic User Setup Menu)	30025	KW
04	26	System Differential Pressure	0 to Span (in Technologic User Setup Menu)	30026	PSI
04	27	System Supply Temperature	0 to Span (in Technologic User Setup Menu)	30027	F°
04	28	System Return Temperature	0 to Span (in Technologic User Setup Menu)	30028	F°
04, 06	29	Setpoint #1	0 to Span (in Technologic User Setup Menu)	30029, 40029	
04, 06	30	Setpoint #2	0 to Span (in Technologic User Setup Menu)	30030, 40030	
04, 06	31	Setpoint #3	0 to Span (in Technologic User Setup Menu)	30031, 40031	
04, 06	32	Setpoint #4	0 to Span (in Technologic User Setup Menu)	30032, 40032	
04, 06	33	Setpoint #5	0 to Span (in Technologic User Setup Menu)	30033, 40033	
04, 06	34	Setpoint #6	0 to Span (in Technologic User Setup Menu)	30034, 40034	
04, 06	35	Setpoint #7	0 to Span (in Technologic User Setup Menu)	30035, 40035	
04, 06	36	Setpoint #8	0 to Span (in Technologic User Setup Menu)	30036, 40036	
04, 06	37	Setpoint #9	0 to Span (in Technologic User Setup Menu)	30037, 40037	
04, 06	38	Setpoint #10	0 to Span (in Technologic User Setup Menu)	30038, 40038	
04, 06	39	Setpoint #11	0 to Span (in Technologic User Setup Menu)	30039, 40039	
04, 06	40	Setpoint #12	0 to Span (in Technologic User Setup Menu)	30040, 40040	
04, 06	41	Setpoint #13	0 to Span (in Technologic User Setup Menu)	30041, 40041	
04, 06	42	Setpoint #14	0 to Span (in Technologic User Setup Menu)	30042, 40042	
04, 06	43	Setpoint #15	0 to Span (in Technologic User Setup Menu)	30043, 40043	
04, 06	44	Setpoint #16	0 to Span (in Technologic User Setup Menu)	30044, 40044	
04	45	Pump #1 Speed	0 to 100	30045	%
04	46	Pump #2 Speed	0 to 100	30046	%
04	47	Pump #3 Speed	0 to 100	30047	%
04	48	Pump #4 Speed	0 to 100	30048	%
04	49	Pump #5 Speed	0 to 100	30049	%
04	50	Pump #6 Speed	0 to 100	30050	%
04	51	Lead Pump Number	1 to Pump # (in Technologic User Setup Menu)	30051	
04	52	Active Zone Number	1 to Zone # (in Technologic User Setup Menu)	30052	
04	53	System Operation Mode	0=Manual, 1=Auto, 2=Auto Bypass, 3=Manual Bypass	30053	
04	54	Bypass Valve Position	0 to 100 (0 = Closed, 100 = Open)	30054	
04	55	Chiller #1 Flow	0 to Span (in Technologic User Setup Menu)	30055	
04	56	Chiller #2 Flow	0 to Span (in Technologic User Setup Menu)	30056	
04	57	Chiller #3 Flow	0 to Span (in Technologic User Setup Menu)	30057	
04	58	Chiller #4 Flow	0 to Span (in Technologic User Setup Menu)	30058	
04	59	Chiller #5 Flow	0 to Span (in Technologic User Setup Menu)	30059	
04	60	Chiller #6 Flow	0 to Span (in Technologic User Setup Menu)	30060	
04	61	Chiller #1 DP	0 to Span (in Technologic User Setup Menu)	30061	
04	62	Chiller #2 DP	0 to Span (in Technologic User Setup Menu)	30062	
04	63	Chiller #3 DP	0 to Span (in Technologic User Setup Menu)	30063	
04	64	Chiller #4 DP	0 to Span (in Technologic User Setup Menu)	30064	
04	65	Chiller #5 DP	0 to Span (in Technologic User Setup Menu)	30065	
04	66	Chiller #6 DP	0 to Span (in Technologic User Setup Menu)	30066	

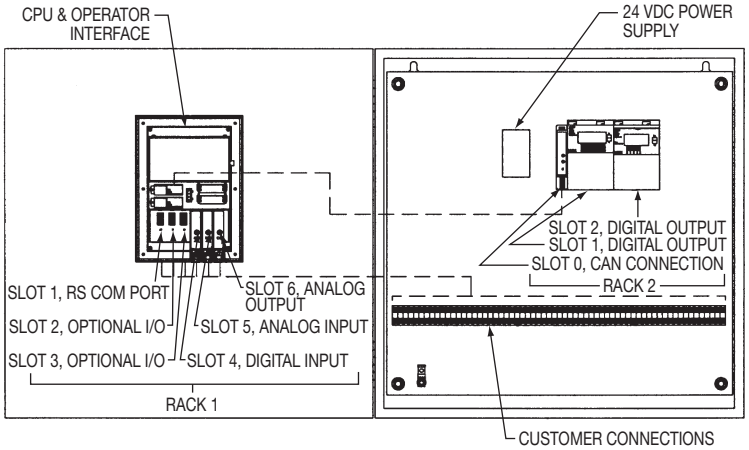
Appendix J – Drawings

Drawing #	Description
1	Technologic 5500 Variable Primary Pump Controller – Door
2	Technologic 5500 Variable Primary Pump Controller – Subpanel
3	Operator Interface and CPU

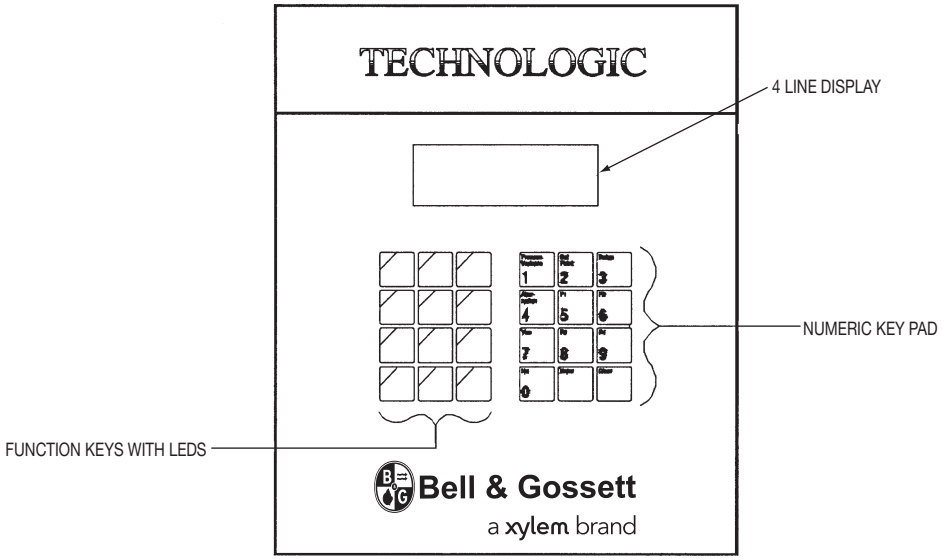


WITHOUT BYPASS WITH BYPASS

Technologic 5500 Variable Primary Pump Controller – Door
(Front View Door Closed)
DRAWING 1.0



Technologic 5500 Variable Primary Pump Controller – Subpanel
(FRONT View Door Open, Bypass & Non Bypass)
DRAWING 2.0



Technologic 5500 Operator Interface and CPU
DRAWING 3.0

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